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Pottery economics: A Kalinga ethnoarchaeological study

Stark, Miriam Thelma, Ph.D.

The University of Arizona, 1993

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POTTERY ECONOMICS:
A KALINGA ETHNOARCHAEOLOGICAL STUDY

by
Miriam Thelma Stark

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A Dissertation Submitted to the Faculty of the
DEPARTMENT OF ANTHROPOLOGY
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For the Degree of
DOCTOR OF PHILOSOPHY
In the Graduate College
THE UNIVERSITY OF ARIZONA

1993
As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Miriam Thelma Stark entitled _Pottery Economics: A Kalinga Ethnoarchaeological Study_ and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

Dr. William A. Longacre  
Date: 12/1/93

Dr. Carol Kramer  
Date: 12/2/93

Dr. Michael B. Schiffer  
Date: 1 Dec 93

Dr. John W. Olsen  
Date: 01 Dec 93

Dr. Barbara J. Mills  
Date: 1 Dec 93

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Dissertation Director  
Date: 12/1/93

Dr. William A. Longacre
STATEMENT BY AUTHOR

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SIGNED: Miriam T. Mark
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ABSTRACT

This ethnoarchaeological study explores the economics of pottery production and distribution in the Kalinga village of Dalupa in the northern Philippines. For individual Dalupa potters, pottery production is a part-time craft specialization that fits around an intensive cultivation schedule. For the regional economic system in which Dalupa participates, pottery production is a community-based specialization that provides numerous settlements with much-needed goods.

This model of community-based specialization, in which households and communities pursue multiple types of productive specialization, is common among traditional societies that anthropologists study. Yet surprisingly little is known about conditions under which village-based specialization develops. Still less is known about the factors that encourage a part-time production system to evolve into a full-time system, since ethnographic examples indicate that productive intensification characterizes a wide range of societies.

Historical and social contexts of Dalupa ceramic production are explored as they affect the nature of its production system. Resource access and production parameters that archaeologists employ (e.g., scale, intensity) are influenced by capitalist penetration into the area, social relations, and the level of tribal warfare. Household pottery production scale is affected by the availability of alternative income-generating activities, which fluctuate in response to externally-imposed pressures toward development in the Cordillera highlands.

Examination of Dalupa production scale (i.e., levels of inputs and outputs) over an annual cycle reveals that variability within the producer work force is related to differential economic pressures. Analyses of Dalupa production intensity (or the relative level of inputs per production
entity) concentrate on dimensional variability of cooking pots. Comparisons at the inter-community and intra-community level evaluate widely-held assumptions regarding the relationship between production intensity and product standardization.

This ethnoarchaeological case study provides detailed information on the relationship between production scale and distributional range in small-scale systems. Economic personalism operates in all aspects of the Dalupa pottery exchange network. Dalupa ceramics circulate within a multi-centric economy. These two processes affect the formal variation in the material record of pottery distribution. Investigating both production and distribution processes within a single economic system illuminates our understanding of prehistoric pottery economics.
CHAPTER ONE

INTRODUCTION TO THE STUDY

The ethnological record is not a tranquilizer, and, although it is humbling to us as archaeologists, it is also stimulating; it phrases questions that we have not asked, and suggests where hidden evidence may be sought (Shepard 1963:1).

This ethnoarchaeological study focuses on pottery economics in the Kalinga village of Dalupa, Pasil in northern Luzon, Philippines. Ethnoarchaeology, as a research strategy undertaken by archaeologists, generally seeks one of two goals: 1) a more comprehensive understanding of a particular society, using historic, ethnographic and archaeological information; or 2) a more comprehensive understanding of widespread behavioral processes, from use behaviors to economics, that is obtained through systematic examination of particular societies. This study seeks the latter goal in examining the behavioral system and the material correlates of Kalinga pottery production and distribution.

The purpose of my study is to document one example of community-based craft specialization that focuses on ceramic production. To do this I examine three economic components of pottery economics: production, distribution and consumption. Understanding how activities surrounding ceramic production and distribution articulate with other realms of community organization is important. Ethnoarchaeological data from traditional societies such as the Kalinga make substantive contributions to archaeological interpretation.

Rationale Behind Study

Research questions for this Kalinga study developed out of research interests in prehistoric ceramics. My interest lay in economics and political structure of populations during the Pueblo IV period (ca. A.D. 1300-1450). Ceramic distributions were held as key evidence in models of political complexity, as some degree of administrative control was
believed to characterize economic distribution systems during that time period. I had just completed documenting the distribution of Jeddito Yellow Ware (a 14th century ancestral Hopi ware) in northeastern Arizona in 1987 as part of my research with the Homol'ovi Research Project at the Arizona State Museum (Adams, Stark and Dosh 1993).

We sought alternative economic models to explain patterning in the distributional data to those proposed by previous researchers (e.g., Plog 1983; Upham 1982). The ceramic ethnoarchaeological literature on production and distribution provided intriguing alternatives to elite-controlled exchange systems (Kramer 1985). Ethnoarchaeology provided a research strategy for developing general models (rather than direct analogues) of ceramic distribution. Such models could then be applied to some prehistoric small-scale societies.

My involvement in the Kalinga Ethnoarchaeological Project (under the direction of Dr. William A. Longacre) began in the spring of 1987, when I analyzed previously collected data from Dangtalan on ceramic production and distribution. The resulting patterns were intriguing, and suggested a trend toward intensified production among Dangtalan (Kalinga) potters. This finding was corroborated by Michael Graves (1991) in a separate but similar analysis of ceramic data collected between 1975 and 1980. What had been a system of household production -- that is, production largely intended for the use of one's own household -- was becoming a system of household industry (Balfet 1965; Peacock 1982; van der Leeuw 1977).

These dual interests, in the distributional patterning of prehistoric Southwestern ceramics and in scalar changes observed in previously collected Dangtalan data, thematically converged. Kalinga society seemed an appropriate setting for researching my interests, and I began the 1987-1988 field season with a focus on understanding the economic organization of Kalinga ceramic exchange. During research and data analysis, my interest has expanded to
include the organization of ceramic production, distribution and consumption.

One might justifiably ask how appropriate Kalinga society is for an ethnoarchaeological study of ceramic production and specialization. The Kalinga are not peasants in either a political or economic sense. Politically, the Kalinga (and their Cordillera neighbors) have successfully resisted governmental intervention from the 16th century to modern times. The Kalinga continue to be part of a subsistence economy that is only weakly integrated into the national economic system. Chapter Three discusses some indicators of this weak integration. For example, traffic between the study region and areas outside is relatively constant, but rates of emigration from the study region are low. Social and economic stratification operates in Kalinga villages and is common cross-culturally among smallholders in an intensive cultivation system (Netting 1993).

The impetus for the Kalinga Ethnoarchaeological Project lay in an assumption that Kalinga society was roughly analogous, as a 'neolithic' society, to societies documented in the prehistoric Southwest, and this rationale has been discussed elsewhere in greater detail (Longacre 1974, 1981; Longacre and Stark 1992). Similarities in social and political form between the two societies are balanced by differences in climate and subsistence strategy. The common thread lies in the organization of a certain technology that both societies employ: hand-built ceramic production in a non-market economy.

Ethnoarchaeological research provokes mixed responses from archaeologists, the majority of whom study prehistoric societies. Some distrust the use of ethnographically-based models and dismiss ethnoarchaeological findings as being entirely incompatible with certain processes in prehistory (e.g., Kelly and Todd 1988). Others are middle-range theorists who uncritically embrace ethnoarchaeological data and build actualistic models incorporating
ethnoarchaeological data (e.g., Binford 1978, 1979 et passim).

As producers of "source" data upon which models are built, ethnoarchaeologists have a responsibility to their consumer public: archaeologists. Few ethnoarchaeologists have examined the epistemological paradigms that guide their research (cf. David 1992). Fewer still have addressed the problem of intellectual accountability, a point to which I return in Chapter Nine. The lack of consensus on what constitutes high-quality ethnoarchaeological research (Stark 1993); this lack of consensus contributes to archaeologists' skepticism regarding actualistic research. The following section addresses this ambivalence by discussing uses of ethnographic data by archaeologists and issues of archaeological relevance.

Archaeological Relevance and Ethnoarchaeology

Ethnographic data have been used in archaeological interpretation for the last century. Material from the ethnographic record can, in some cases, supply archaeologists with evidence for presumed continuity between prehistoric and historic cultural traditions. Ethnographic anecdotes provide cautionary tales and document the range of variability in a given behavioral phenomenon among living societies. The abundant corpus of ethnographic literature has enriched archaeological interpretations, particularly in the area of "middle-range" or "actualistic" research.

The concept of "middle-range" or "actualistic" research has been envisioned somewhat differently by different practitioners (see, for example, Binford 1983; Raab and Goodyear 1985; and Schiffer 1988b). However, some aspects of the general approach in various definitions are similar. Much of what is called middle-range research focuses on isolating organizational variables that are characteristic of past systems (Binford 1987:449).

Ethnoarchaeology is one of the most useful strategies employed for developing middle-range
theory, when theories are viewed as "observationally influenced claims about more global processes that are not directly linked to particular perceptions" (Kosso 1991:625).

The term "ethnoarchaeology" was first suggested by Jesse Walter Fewkes during his (1898) study of Tusayan migration myths in the American Southwest. A call to "action archaeology" by Kleindeinst and Watson (1956) provided a major catalyst for the burst of ethnoarchaeological research during the heyday of the New Archaeology. Myriad definitions of ethnoarchaeology exist and are discussed elsewhere in the annals of ethnoarchaeological literature (e.g., Binford 1983; Gould 1978, 1980; Kramer 1979; Longacre 1981; Oswalt 1974; Schiffer 1978; Staski and Sutro 1991). Understood in its broadest sense, ethnoarchaeology provides data from contemporary (and, often, nonindustrialized) systems that aid in developing models to relate variability in human behavior to variability in the archaeological record (see also Longacre 1981:49-50).

The archaeologist's task is to focus on organizational constraints on prehistoric human behavior, and ethnoarchaeological research provides foundations for developing explanatory models. Some ethnoarchaeological findings are immediately applicable to archaeological issues such as site formation processes (e.g., P. Arnold 1991; Deal 1983, 1985; Hayden and Cannon 1984). Other research, such as this Dalupa case study, carefully details aspects of particular organizational systems. With the accumulation of numerous studies of this genre, we can develop "integrated arguments as to what conditions both the similarities and the differences" (Binford 1987:507) among varieties of ceramic production.

One of the primary contributions of ethnoarchaeological research has been in the area of developing and refining behavioral inferences. The ceramic ethnoarchaeological literature is rife with cautionary tales that warn archaeologists away from widely-held suppositions. Some
Melanesian research, for example, sheds light on the complexity of materials procurement and preparation in pottery production (e.g., Rye 1976), thereby warning archaeologists against simplistic models of temper source utilization. Other Melanesian research indicates that traditional assumptions regarding the relationship between geographic scale and administrative complexity are misguided (e.g., Allen 1984).

Several assumptions and goals unite ethnoarchaeological research (see for example Gould 1980; Kramer 1979). The first is that humans interact with their material world in systematic relationships that can be studied in contemporary systems to aid in the interpretation of prehistoric human behavior. The second assumption is that these interrelationships can be described through a series of generalizations that provide analog models for archaeological cases, with a recognition that the deviations are as important as are the similarities (D. Arnold 1985:14; Gould 1980). Finally, all ethnoarchaeological research is conducted under the assumption that "past behaviors and conditions can confidently be inferred from the cultural resources available at present" (Staski and Sutro 1991:2). These three assumptions unite the dazzling array of ethnoarchaeological literature now available.

Three weaknesses underlie much of the extant ethnoarchaeological literature. The first is that ethnoarchaeological studies often lack a discussion regarding why a specific society (and/or particular research topic) was selected for study. Research often omits a description of the cultural and historical milieu in which the ceramic system operates. The absence of "contextual" information in most ethnoarchaeological studies is explicable through two factors: 1) short-term, fortuitous, and poorly conducted research (see Stark 1993); and 2) an overriding focus on developing cross-cultural generalizations. A third weakness lies in ethnoarchaeological research that does not address questions that have archaeological relevance
(see also P. Arnold 1991; Krause 1984:617).

Underlying ethnoarchaeological research is an assumption of cross-cultural relevance. Equally important is the uniformitarian assumption that some conditions hold constant in different societies. Just as no two societies cross-culturally are identical, neither are two communities within a single social system. The comparative method identifies salient similarities in such systems, and suggests material correlates for archaeologists to seek. Proper use of the comparative method also requires that researchers pay close attention to the historical and cultural contexts of a study area (Kosso 1991:626).

Analogy and Archaeological Interpretation

Archaeological inference -- including inference derived from ethnoarchaeological research -- is unavoidably analogical. And analogy, as a system of reasoning, is indispensable to archaeological research. Limitations persist in how findings from present-day societies (industrial or nonindustrial) can be used to understand past behavior. Various problems in the uses of analogy have been discussed at length in previous discussions and will not be repeated here (e.g., Ascher 1961; Gould and Watson 1982; Kramer 1979, 1982:3-5; Trigger 1990; Watson 1979; Wylie 1982, 1985; Yellen 1977). How information is generated that will be used in analogical reasoning is extremely important. Carefully-conducted ethnoarchaeology supplies archaeologists with explicitly analogical information.

Bridging the gap between behavior in living societies and patterns in the archaeological record is a difficult task. Not only have a variety of post-depositional processes affected the archaeological record, but substantial differences exist between prehistoric and present-day populations (e.g., Schrire 1984; Wobst 1978). Indeed, many prehistoric hunter-gatherer populations lack modern-day analogues (e.g., Binford 1987; Kelly and Todd 1988).
Ceramic specialists encounter similar problems, as some of the best ethnoarchaeological research focuses on ceramic production systems that operate within a peasant market economy (see Kramer 1985 and Rice 1987b for examples).

This ethnoarchaeological study of Dalupa pottery economics has two goals. The first is to present quantified data that can be utilized in comparative research on topics related to specialization as a general economic process and ceramic specialization in particular. Various researchers in the area of specialization emphasize the need for more ethnoarchaeological research on variability in relations of production (e.g., Clark and Parry 1990) and in the products that result from these systems (e.g., Rice 1991). The second goal is to delineate factors involved in relationships that obtain between technology, ecology and society. While many details about Dalupa are historically and culturally unique, each of the following chapters illustrates how Dalupa’s ceramic system also fits into a comparative perspective.

The Kalinga Ethnoarchaeological Project

The Kalinga Ethnoarchaeological Project was initiated by W. A. Longacre in 1973 (Longacre 1974). Research was conducted primarily in the village of Dangtalan on pottery manufacture (Longacre 1981), pottery use-life (Longacre 1985) and the inter-generational transmission of design styles (Graves 1981, 1985). Subsequent data collection produced limited information on pottery exchange that was analyzed and reported by Graves (1991). The 1987-1988 Kalinga Ethnoarchaeological Project field season has already begun to produce new studies on a variety of topics (see Longacre et al. 1991 for an overview).

The Kalinga Ethnoarchaeological project is unique in its longitudinal nature, and provides as much time-depth as any ethnoarchaeological project in the world. The project is now entering its 18th year of research. Few ceramic studies have attempted a long-term
research program in a single area with an interval studies approach (but see Papousek 1981, 1984; David and Hennig 1972). Its researchers have documented numerous changes in economic and social spheres throughout that period, these trends are made visible only through a long-term commitment to episodic research in the area. But the project's work in the area documents only the most recent history. In order to understand the dynamics observed during the 1987-1988 field season, it is necessary to describe aspects of the history and culture in the southern Kalinga area.

The village of Dalupa is located in the Pasil Municipality in the southern portion of the Kalinga-Apayao Province. The Pasil Municipality as a study region has been the focus of previous research by the Kalinga Ethnoarchaeological Project (Longacre 1974). However, previous research has concentrated on Dangtalan pottery production. This study makes an important contribution to the Kalinga Ethnoarchaeological Project by its focus on a second, and more intensive pottery making center.

Outline of Dissertation

This dissertation consists of eight chapters. The first two chapters lay the theoretical and methodological groundwork for the data analyzed in the remainder of the study. Archaeological perspectives on pottery economics are first discussed, as I summarize previous research on ceramic production, distribution, and consumption. The third chapter contextualizes the study by introducing the research setting. Aspects of the geography, history and culture are described. Research methods utilized in the study are then presented with some discussion of potential observer bias.

The fourth chapter focuses on the Dalupa ceramic production system. Aspects of the ceramic production system are first delineated, focusing briefly on climate and geology.
Attention then turns to the ceramic production system in historic context, and recent historical events are recounted that have altered the scale and nature of the Dalupa ceramic system. The ceramic system becomes the focus of discussion in Chapter Six: organizational issues and the scale of production. The Dalupa system of ceramic production is a community-based craft specialization that can be examined at the household and community levels. Chapter Seven addresses material correlates of specialized ceramic production by examining morphological standardization. In Chapter Eight, spatial and social aspects of the 1988 Dalupa pottery exchange network are outlined.

Summary

This study examines technological, economic and social aspects of Dalupa’s ceramic system. Extant models for the organization of ceramic production are explored and critiqued by tacking between archaeological and ethnographic approaches to the topic. This study provides a comprehensive, synchronic analysis of a single pottery system in its various components. The study is not designed to provide a single model to be directly applied to a particular archaeological society in the Philippines or elsewhere. Instead, this study aims to contribute to cross-cultural model-building that enriches our understanding of ceramic systems.
CHAPTER TWO

ARCHAEOLOGICAL PERSPECTIVES ON POTTERY ECONOMICS:
CERAMIC PRODUCTION AND DISTRIBUTION

The concept "economy" involves the social relations people establish to control the production, consumption, and circulation of goods. Therefore, an integrated study of pottery economics requires examination of patterns in each of these three spheres (Bey and Pool 1992; van der Leeuw 1983b:40). Intimate relationships exist between the organizational mode, production scale, distributional range, and consumption rate within a given ceramic system (Rice 1987b:68).

Until rather recently, archaeological and ethnographic ceramic studies have concentrated on distinct but complementary aspects of ceramic economy. Whereas archaeologists have focused on ceramic distribution, ethnoarchaeologists have focused on ceramic production (e.g., technology, manufacture) and consumption (e.g., household assemblage composition, pottery use-life). This division of labor largely results from the types of data that each research strategy yields. For archaeologists, distributional data and (to a lesser extent) ceramic consumption data are more accessible than is information on production (Rice 1987b:197).

This chapter focuses on the three facets of pottery economics by reviewing current theoretical frameworks and methods. The organization of ceramic production is first evaluated by examining the relative merits and weaknesses of extant models. Attention then turns to efforts to identify ceramic production in the archaeological record. Such studies have proposed correlates of production, and these are examined and critiqued. The chapter's final
section focuses on research on specialized production, and evaluates ethnoarchaeological approaches and archaeological applications in ceramic specialization studies.

Organisation of Production: Scales and Models

Several cross-cultural models have been proposed to explain the organization of ceramic production. The earliest systematic approaches use ethnographic examples in a typological model of the organization of ceramic production (e.g., Balfet 1965; Peacock 1982; van der Leeuw 1977, 1984b). The typological model is useful in providing labels for different organizational forms under which comparable ethnographic cases can be grouped, but the model has several major problems as well (e.g., J. Arnold 1992; Clark and Parry 1990; Costin 1991). The following section briefly summarizes and evaluates the typological model.

Typological approaches to the organization of production. Cross-cultural data provide a foundation in the typological model that has been used most successfully by van der Leeuw (1977) and Peacock (1982). The approach uses an evolutionary framework to characterize organizational production modes along a continuum from simple to complex. Three components of the economic system vis-a-vis ceramic production are emphasized: production scale, periodicity and market demand.

Table 2.1 combines elements of multiple typological models. At one end of the continuum is household pottery production, in which self-sufficient households engage in intermittent production that is geared primarily for household use. The scale of household production is low, and distribution is restricted to the household where the goods were produced and to gift-giving beyond the household. Pottery production lies in the hands of a few part-time artisans, vessels are produced primarily for household use. Production is a part-time activity to supplement household income, and local resources are utilized.
Table 2.1. The Typological Model.

Individual industry is a more intensified production mode, in which pottery production is in the hands of a few independent artisans. Pottery manufacture represents the primary source of subsistence for the producer, although other family members may pursue alternative economic strategies. Potters are active year-round (excepting winter or rainy seasons), production is geared toward a regional market, and local raw materials are utilized. Individual industry may be difficult to separate from the household industry form in the archaeological record, since the primary distinction between the two modes lies in the part-time vs. full-time distinction in production activities.

The next mode of pottery production includes workshop industries (van der Leeuw 1977:71) and individual workshops (Peacock 1982:9). One or a few artisans working together in a workshop manufacture pottery; they may be organized into guilds or cooperatives. Ceramic production represents their main source of subsistence, and production is for exchange at the town level. Workshop industries are organized into neighborhoods or barrios, and are located in nucleated settlements (i.e., either villages or towns).

The next level of production involves village industries (van der Leeuw 1977:71) or nucleated workshops (Peacock 1982:9). Pottery production, organized into a tightly clustered
industrial complex or workshop, is a full-time economic strategy. Village industries are commonly associated with community specialization, as is the case with my study village of Dalupa (Stark 1991). Table 2.2 presents documented ethnographic cases that provide comparative data for this Kalinga study. In each case the potters employ a hand-built technology (rather than wheel-built construction techniques) and are involved in a predominantly non-market distributional network.

<table>
<thead>
<tr>
<th>GEOGRAPHIC REGION</th>
<th>GROUP (COUNTRY)</th>
<th>REFERENCE</th>
</tr>
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<tbody>
<tr>
<td>Southeast Asia</td>
<td>Kalinga (Philippines)</td>
<td>Stark 1991b</td>
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<td>Southeast Asia</td>
<td>Bontoc (Philippines)</td>
<td>Jenks 1905</td>
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<td>Southeast Asia</td>
<td>Buhid (Philippines)</td>
<td>Conklin 1953</td>
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<tr>
<td>Oceania</td>
<td>Sio Gitua (Papua New Guinea)</td>
<td>Harding 1967; May and Tuckson 1982</td>
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<td>Oceania</td>
<td>Buka Island (Papua New Guinea)</td>
<td>Specht 1972</td>
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<td>Oceania</td>
<td>Albom (Papua New Guinea)</td>
<td>May and Tuckson 1982</td>
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<td>Tumleo (Papua New Guinea)</td>
<td>May and Tuckson 1982</td>
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<td>Mailu (Papua New Guinea)</td>
<td>Irwin 1977; May and Tuckson 1982</td>
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<td>Amphlett Islands (Papua New Guinea)</td>
<td>Lauer 1970, 1974; May and Tuckson 1982</td>
</tr>
<tr>
<td>Oceania</td>
<td>Motu (Papua New Guinea)</td>
<td>Allen 1984; Groves 1960; May and Tuckson 1982</td>
</tr>
<tr>
<td>Africa</td>
<td>Kabyle (Algeria)</td>
<td>Balfet 1965, 1981</td>
</tr>
<tr>
<td>Africa</td>
<td>Deir el Gharbi (Egypt)</td>
<td>Nicholson and Patterson 1985, 1992</td>
</tr>
<tr>
<td>North America</td>
<td>Tohono O'odham/ Papago (SW U.S.)</td>
<td>Fontana et al. 1962</td>
</tr>
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</table>

Table 2.2. Cross-cultural Examples of Village Industries (hand-built; no markets).

At the most complex end of the continuum is full-time, administratively controlled
pottery production in three subvarieties. These are the manufactory, estate production and military/official production (Peacock 1982). Modern-day factories and corporations could be considered as an end-point in this typological continuum as well.

**Critiques of the typological model.** The typological model is historically important because it synthesized previously disparate ceramic research and galvanized ceramicists into developing a more holistic perspective on ceramic economy. However, the model suffers from several weaknesses -- including a theoretical and typological bias, ignorance of intra-modal variability and the association of each production mode with a single distribution mode -- that make it inadequate. Recent critiques of these models (Costin 1991; Pool 1992; Rice 1991) identify additional problems with the models.

The typological approach of the organizational model (i.e., from simple to complex organizational modes) resembles evolutionary typologies for state development. The focus on stages, rather than on transitions, can identify particular organizational types but cannot not explain why types change through time in either direction (Mills 1990; van der Leeuw 1984b). The model also does not easily accommodate the operation of multiple production or distribution modes (or both) within a single economic system (e.g., van der Leeuw 1984a:340 for Negros, Philippines).

In some cases, distinctions made between some production modes (particularly between household production and household industry) are too fine-grained for application to archaeological evidence (P. Arnold 1991:92-93). In other cases, the model simplifies and overgeneralizes organizational modes. For example, "household production" systems vary substantially in small-scale societies in ways that generate divergent developmental trajectories.

**Sample size.** Another problem with the typological model lies in the small sample
size for particular organizational modes within the scheme. The effective use of a typological
approach depends on a wide breadth of ethnographic, historical and archaeological cases to
assure cross-cultural comparability (Costin 1991:8). Modifications on the typological model
have been proposed that focus on particular production modes or on different dimensions of
variability. These approaches overcome some weaknesses of the van der Leeuw/Peacock
model but remain resolutely typological in character.

Another comparative approach. One effort to rectify the sample size problem uses
cross-cultural data to study the relationship between craft specialization and cultural
complexity (Clark and Parry 1990). Using a sample of 53 societies drawn from the HRAF
files, associations were found between craft specialization and the level of political integration,
the degree of social stratification, and overall community size. Craft specialization and
intensive agriculture were also associated (op.cit, 315-316), a relationship noted previously by
other researchers (e.g., D. Arnold 1985; Dow 1985).

The critical parameters in the Clark-Parry typology (1990:299) are scale and relations
of production. The scale of production is measured along a continuum from ad hoc to full-
time production. Relations of production distinguish independent from attached specialization
(sensu Brumfiel and Earle [1987]). The model's loose definition of specialization, however,
embraces most craft production in most societies, and as such is not useful in identifying
organizational changes through time (see also Costin 1991:4). In addition, the Clark-Parry
concept of the scale of production (i.e., ad hoc, part-time, and full-time) is hard to
operationalize using archaeological materials (see also Rice 1987b). Despite its rigorous
approach to cross-cultural analysis, the Clark-Parry model provides little improvement over
previous approaches.
More useful than the Clark/Parry study is Costin’s (1991) model for the organization of production. Costin identifies four parameters of production: 1) context, 2) concentration, 3) scale, and 4) intensity (1991:8-9). These parameters are amenable to both archaeological and ethnoarchaeological research, although they are clearly more accessible through studies in ethnographic settings. The model’s first parameter, the context of production, focuses on the degree of administrative control over the production process. In this parameter, Costin’s analysis articulates with earlier formulations by Brumfiel and Earle (1987) that distinguish between independent vs. attached specialization.

The second parameter, the relative concentrations of production facilities, contrasts nucleated with dispersed production centers. Costin’s third parameter centers on the scale of the production units, and thereby articulates with earlier formulations of the typological model. Kin-based household production lies at one end of the continuum, while the ‘manufactory’ mode lies at the other. A fourth and final parameter focuses on the intensity of production, or the distinction between part-time and full-time specialization.

Costin’s model, while a vast improvement on previous efforts, still suffers from problems. The model lacks the anchor of cross-cultural ethnographic examples that previous approaches use. Second, the model’s typological focus obscures variability across production systems. Gauging the intensity of production is also problematic, since what is considered "part-time" versus "full-time" depends on the economic system in which ceramic production operates. Most contemporary ceramic systems today are involved in petty commodity production economies (sensu Cook and Binford 1990), where the relative importance of craft production as a community-based specialization is highly variable.

Having summarized the extant literature on the organization of ceramic production, we
move on to how production is identified in the archaeological record. Recent state formation research emphasizes the systematics of craft specialization and commodity exchange. This emphasis has prompted methodological advances in techniques for identifying production in the archaeological record and in ceramic compositional techniques. These developments in ceramic production studies are reviewed below.

Ceramic Production and the Archaeological Record:

Correlates and Critiques

Interest in production and consumption have inspired a wealth of efforts bent on identifying archaeological evidence of ceramic production (e.g., Adams 1970; Blinman and Wilson 1992; Deal 1988; B. Stark 1985; Sullivan 1988; Underhill 1991). Multiple data sources have been used to identify ceramic production, such as on-site production facilities (e.g., workshops, kilns, and open firing areas), caches of raw material and pottery-making tool assemblages.

Evidence for ceramic production has been suggested in archaeological sites from both state-level societies (e.g., P. Arnold 1991; Evans 1978; Feinman et al. 1992; Pool and Santley 1992; Santley et al. 1989; Sinopoli 1988; B. Stark 1985, 1992; Tosi 1984) and non-state societies (e.g., Fuller 1984; Haury 1976:194-197; Kisselburg 1987; Rafferty 1982; Seymour and Schiffer 1987). Archaeological emphasis on the identification of production areas has soared in recent years, but few production areas have been confidently identified relative to the volume of ceramics excavated. As B. Stark points out, "the sheer infrequency with which pottery production has been identified archaeologically suggests major problems with our approaches" (1985:172).

Ethnoarchaeological research has started to delineate new methods for identifying
ceramic production in the archaeological record (P. Arnold 1991; Deal 1988; B. Stark 1984). Certain types of residues (i.e., raw materials, production-related tools, and firing locations) may be associated with contemporary pottery production and their spatial location in a settlement (Deal 1988). Ethnoarchaeological data on firing area assemblages (P. Arnold 1991) provides proportions that can be evaluated against archaeological data. More ethnoarchaeological work is clearly needed to ascertain whether these approaches have broad applicability to archaeological assemblages.

Compositional studies are increasingly common in archaeological research on ceramic production. The relative advantages of various techniques have been discussed at great length elsewhere (e.g., D. Arnold et al. 1991; Beaudry 1991; Bishop et al. 1982; Bishop and Neff 1989; Neff 1992). Various compositional analyses have enabled archaeologists to characterize ceramic production and distribution systems at a regional scale and to document changes through time. Recent efforts within the archaeological subdiscipline have also integrated archaeological and ethnoarchaeological materials in their analyses (e.g., D. Arnold et al. 1991).

The most useful approach to identifying ceramic production in the archaeological record lies in a multi-pronged research strategy that combines archaeological, compositional, stylistic, and technological approaches to understanding a particular ceramic ware’s production history. One example of this approach is found in research on the prehistoric Hopi ware known as Jeddito Yellow Ware, whose geographic distribution throughout the American Southwest has been documented (Adams et al. 1993); its compositional and stylistic aspects are also currently under examination (e.g., Bishop et al. 1988). Compositional and stylistic analyses of Jeddito Yellow Ware have identified multiple production centers on the Hopi Mesas and suggests community-based specialization by multiple potting groups. Research of
this scope, encompassing a range of data sources and techniques, provides a comprehensive picture of a prehistoric ceramic production and distribution system.¹

The appearance of new compositional methods for characterizing prehistoric ceramics poses new methodological and explanatory challenges for researchers. Sourcing techniques should be run on well-dated and well-provenienced samples, and few published studies describe the nature of their ceramic sample. Close collaboration between archaeometrist and archaeologist and a shared information base are necessary for developing well-grounded interpretations of patterning in compositional data. A wide interpretive gulf currently separates the archaeologist from the archaeometrist (DeAtley and Bishop 1991). The availability of reliable characterization studies has not diminished the importance of building solid interpretive frameworks into which compositional data sets can be placed.

It is in this latter area where ethnoarchaeological research can make its largest contribution. The organization and material patterning of ceramic production in small-scale societies remains poorly understood. When archaeologists encounter evidence for ceramic production in the archaeological record (e.g., polishing stones, lumps of unfired clay), the tendency has been to assume that such evidence implies not only production but specialization.

The process of specialization is also poorly understood in small-scale societies. Craft specialization must be understood as one form of economic intensification. The first part of the next section briefly explains why economic intensification is the broader process into which craft specialization must be fit. We next move to pragmatic considerations involved

¹. Despite the productivity of recently-introduced chemical compositional techniques, several key problems surrounding characterization have not been solved, including the variation introduced by different depositional environment or by different types of use-residues (e.g., Loy 1991; Skibo 1992).
with the study of ceramic specialization. Compositional, stylistic, and morphological studies of ceramic specialization are described and critiqued.

Ceramic Specialization: Its Meaning and Measurement

Defining specialization. This study focuses on economic intensification as a component of organizational complexity. Economic intensification assumes myriad forms, and the archaeological literature contains ample discussion of two forms of intensification that often occur as a pair: agricultural intensification and craft specialization. Demographically-based models of economic intensification are useful to archaeologists, and these processes are discussed below in the section on ceramic distribution.

Economic intensification looms large in most models of state formation (Brumfiel and Earle 1987), and ceramic specialization is one common form of economic intensification. Growing demand on an ever-shrinking number of resources is accompanied by competition for status through trade and wealth accumulation (e.g., J. Arnold 1992; Brumfiel 1980; Childe 1950; Halstead and O'Shea 1989; Kipp and Schortmann 1989; Muller 1987; Wittfogel 1957; Wright 1986). Access to, and control over, the means of production is thus relevant to most studies of sociopolitical complexity, including those involving state formation.

This study focuses on specialization as it relates to processes of economic intensification. Intensification is here defined as increases in both productivity and in production that involve social or political, as well as economic, variables. Processes of intensification -- economic, political, and social -- can be inferred throughout the developmental continuum of human organization in prehistory and have been extensively discussed (e.g., Bender 1981, 1985; Braun and Plog 1982; Knapp 1990; Lourandos 1985; S. Plog 1980; Renfrew 1982).
The incentives behind, and the directionality of, intensification processes are important topics in studies of changing prehistoric social relations. Frameworks derived from myriad theoretical perspectives emphasize the role of economic specialization and the control of production in the development of state structures. The appropriation of the means of production by elites is a pivotal force in theories proposed in structural Marxist models (e.g., Tosi 1984), 'adaptationist' approaches (e.g., Wright and Johnson 1975), and 'political' models (e.g., Brumfiel 1987; D'Altroy and Earle 1985; Muller 1987). As one form of economic intensification, specialization entails a series of organizational changes in a society's social and technological systems. How specialization articulates within a social system is discussed in a later section on ceramic distribution.

**Variability in types of specialization.** Measurements and interpretations of ceramic specialization vary in the extant literature. Craft specialization as been defined in numerous ways (e.g., J. Arnold 1987; Brumfiel and Earle 1987; Costin 1991; Michaels 1989; Rice 1981, 1987, 1991; Santley et al. 1989; Tosi 1984). However, most concepts in these various definitions are subsumed within Costin's (1991) definition. For Costin, craft specialization

... is a differentiated, regularized, permanent, and perhaps institutionalized production system in which producers depend on extra-household exchange relationships at least in part for their livelihood, and consumers depend on them for acquisition of goods they do not produce themselves (1991:4).

The definition is useful for its broad focus, since it does not posit elite control over production. In this definition, both administered (or "attached") and autonomous (or "independent") forms of specialization, as used by Brumfiel and Earle (1987), are included.²

² Others (e.g., Arnold 1991; Santley et al. 1989) use the term "tethered" to refer to a similar situation that the term "attached" describes.
The concepts "regularized" and "permanent" also neatly avoid debate over full-time vs. part-time specialization, a distinction that is elusive in the archaeological record of production activities. Finally, the definition emphasizes the structural interdependence between producers and consumers within all specialized systems, irrespective of political organization. Craft specialization takes on a variety of forms, and multiple organizational forms can co-exist within a single economic system.

One common form is community-based craft specialization, which has been documented throughout the organizational continuum from small-scale societies to state-controlled expansionist systems. In such systems, individual artisans intermingle craft and agricultural production pursuits as part-time specialists. At the other end of the continuum are full-time urban specialists, such as potters described in different regions of India (e.g., Kramer and Douglas 1992; Kramer 1991; Miller 1981, 1985, 1986). For these specialist artisans, production involves workshops, multiple personnel, and distribution channels that can include intermediaries ("middlemen") and markets.

Most research examines evidence for specialization along an axis of variability. Differing degrees of specialization encourage differing degrees of standardization, and variability among products is viewed as an index for the degree of craft specialization. Tosi's (1984) study of the Turanian Basin notes that:

the degree of craft specialization is best determined as variability of output per capita for a given product within the population sampled (23).

Archaeologists assume that specialist production involves a restricted number of artisans, each of whom produce fairly standardized goods and who serve a broad market with diverse consumer needs (also see Costin 1991:33; Hagstrum 1985; Kramer 1985:88; Michaels
1989:142, 146; Rice 1981). Conversely, non-specialist production involves more artisans who work less frequently and produce a few ceramic types that are highly variable in quality, relative to those goods produced by specialists (see Rice 1991:273 for rationale).

Specialization is equated with production efficiency (Torrence 1986) and entails a reduction in variability in each type of good that is manufactured (e.g., Feinman et al. 1981; Mills 1990), and it may also entail an increase in the variety of functional classes or varieties within a modern or ancient pottery assemblage.

Ethnoarchaeological research is an extremely effective tool for exploring issues related to ceramic production, consumption and distribution. The preceding discussion of models for the organization of production suggests that more ethnoarchaeological research is needed to explore parameters outlined by Costin (1991). Methods for identifying ceramic production in the material record have been greatly enhanced by parallel ethnoarchaeological studies, and more work is needed in various regions of the world to understand variability in production residues. Ethnoarchaeological observations may also prove important for deciphering results of compositional studies (D. Arnold et al. 1991).

Ceramic Distribution Models: The Old and the New

In the previous sections, archaeological perspectives on ceramic production were discussed from the viewpoints of theory and method. This section focuses on ceramic distribution and consumption patterns. The goal of this section is to review general developments in studies of distribution and consumption, and to illustrate ways in which ethnographically-based research contributes to each of these domains.

To understand the dynamics behind models of distribution requires an historical review of archaeological research on distribution. It also requires forays into the literature of
ecological and economic anthropology. Ecological perspectives are discussed that address the issue of productive specialization in a more comprehensive approach than has been attempted in archaeological research. Examining ceramic specialization as a particular form of economic intensification places it in its broader economic context. This approach also facilitates the evaluation of dynamics that are involved in the development of specialized (or intensified) production.

The old: models of distribution and models of exchange. Throughout the nineteenth and mid-twentieth centuries, archaeologists concentrated on documenting artifact distributions and defining culture areas. A primary goal lay in defining small-scale geographical and temporal varieties of archaeological cultures, whose differences and similarities were explained through migration and diffusion processes (Trigger 1990:151). This practice mirrored the focus among North American cultural anthropologists in culture element distributions. Differences in culture 'traits' were attributed to diffusion and migration (Johnson 1978:66-70; Trigger 1990:275-276).³

Out of the interest in settlement pattern studies and concern with culture process in the 1950s came the New Archaeology, with interests in settlement pattern studies and the dynamics of regional interaction. Prehistoric exchange networks became the focus of extensive research in the late 1960s and have continued to the present time (Schortmann and Urban 1987:49). The goal of such research was "to establish which types of interaction were linked with which institutional forms and which shifts in interaction were related to other decisive

³ Anna Shepard, in her studies along the Rio Grande (Shepard 1965) and in the Valley of Oaxaca (Shepard 1963), was one of the few researchers to integrate studies on artifact production and distribution during this era. Regrettably, much of her work was ignored, and some work refuted, by leading archaeologists of the time such as A.V. Kidder.
changes in social scale and complexity" (Adams 1974:240).

Analytic models were constructed and methods suggested to operationalize modes of exchange through the identification of archaeological correlates for each exchange mode. Proponents of the "New Archaeology" identified characteristics of exchange networks to facilitate archaeological comparison. Ceramic studies began to focus on ceramic distributions to understand patterns of trade and exchange. Where diffusion and migration previously accounted for culture change, exchange -- through "interaction spheres" (Caldwell 1964) -- was next posited as the prime mover behind state formation (see review in Brumfiel and Earle 1987). Most recently, interest has shifted to an integrated focus on production, distribution, and consumption. In order to understand behaviors and patterning involved in ceramics circulation, some definitions of key terms -- distribution, exchange, and trade -- are required.

**Definitions: distribution, exchange, trade.** Ceramic distribution refers either to material patterning produced by the circulation of artifacts or through human and non-human means by which pottery is dispersed from its production source outward in space. The former definition of distribution identifies the behavior in an archaeological context, and produces distributional studies in the pre-New Archaeology tradition. Circulation, as a process, involves the exchange and distribution of output and the redistribution of stocks between members of a given population (Gregory and Altman 1989:198). The latter definition of distribution focuses on behavioral mechanisms that generate certain distributional patterns.

The archaeological distinction made between the terms exchange and trade has its roots in the New Archaeology, where these were viewed as discrete modes of circulation (e.g., Plog 1977). Exchange involves the relatively small-scale circulation of commodities, through institutionalized reciprocity, in traditional economies and exchange transactions are mutually
beneficial. Trade, which often occurs within institutions such as markets, involves a higher volume of goods and a higher frequency of activities than does exchange. Archaeologists have used this distinction to compare economic systems of prehistoric social formations with one another (e.g., Kipp and Schortmann 1989).

Economic anthropological research indicates that the archaeological distinction drawn between trade and exchange is simplistic on conceptual and developmental grounds. Both circulation modes operate in traditional societies that are characterized by "multi-centric economies" (Bohannan 1967). Found in both market and non-market settings, multi-centric economies involve the circulation of different classes of goods in a combination of trade and exchange transactions. These classes of goods are often distinguished in terms of relative value (e.g., prestige vs. subsistence), and they circulate in two or more basically exclusive spheres. Institutionalized means generally exist to convert goods from one sphere into the other sphere (Bohannan 1967:124-125).

The fact that no evolution need occur from exchange to trade-based economies cross-culturally further weakens the archaeological distinction between trade and exchange. The barter economy, when faced with the intrusion of a cash-based market system, may respond by extinction or incorporation (e.g., Humphrey 1985). The introduction of cash may act as a catalyst for the emergence of a multi-centric economy or it may add another dimension to a multi-centric economy. These insights from the ethnographic record have only begun to affect archaeological theory.

In its emphasis on systems theory and process, the New Archaeology effectively shifted the focus in distributional studies away from a "culture area" approach and toward understanding economic and social systems in prehistory. However, processual exchange
models encountered serious limitations in theory and implementation. Several problems continue to plague distribution-focused research:

1) Exchange behaviors produce an unrepresentative sample of materials that were exchanged. Identifying materials that participated in the prehistoric networks is not synonymous with identifying mechanisms of prehistoric exchange.

2) Archaeological distributions may reflect a host of discrete processes that create similar archaeological distributions (Rice 1987b:198; Schortmann and Urban 1987).

3) Studies of distributional patterns cannot obtain an entirely representative picture of the distribution network. Nodes or points in the networks may be affected by formation processes that obscure cultural patterning. Any distributional study, therefore, only reflects a portion of the prehistoric interaction network.

4) Exchange systems are dynamic entities whose structure changes through time, and extant approaches cannot model systemic change at the appropriate temporal scale.

5) Exchange systems commonly involve a wide range of goods, only some of which (as little as 10%, Crawford 1973; Lathrap 1973) will survive in the archaeological record for the reconstruction of a prehistoric economy.

The new: models of economic systems. The focus on exchange mechanisms rather than simply on resulting distributions represented an important development in studies of prehistoric economy. Advancements in analytic techniques have also stimulated the development of integrated models of economic systems that focus on production, distribution, and consumption. Such archaeological research is a genuine advance over previous approaches to prehistoric economy. However, most examples of successful (i.e., integrative) archaeological research derive from complex social formations, particularly in social formations identified as chiefdoms and states (e.g., J. Arnold 1992; Earle 1987).

Many studies of intensified production generally examine this topic with reference to a broader interest in the emergence of sociopolitical complexity (see J. Arnold 1987:38-48 for review). Extant specialization research in state-level societies is overly typological in content,
tending as it does to emphasize the type identification and material correlates rather than causes and processes of different forms of specialized production develop. However, this research contributes to our knowledge of how specialized production and distribution operate in more complex societies (e.g., J. Arnold 1992; Brumfiel 1987; Brumfiel and Earle 1987; Earle 1987; Rice 1981, 1987a).

Clearly, a more comprehensive theoretical framework is needed to understand the origin and mechanics of specialization in prehistoric small-scale economies. Archaeologists have now reached some consensus that small-scale societies are rarely autonomous entities. Appropriate approaches to prehistoric economy in small-scale societies recognize economic interdependence and regional integration (e.g., Braun and Plog 1982; Spielmann 1986). However, theoretical research that explores these phenomena with the archaeological record in mind is nascent indeed.

The availability of abundant data and theory, rather than a deference to cultural anthropology, should compel archaeologists to turn their gaze toward the economic and ecological anthropological literature. Caveats associated with ethnographic data were described in Chapter One, but these do not preclude study of economic and ecological approaches. Theory and examples in the following section provide guidance in constructing archaeological frameworks for understanding prehistoric small-scale economies.

Ecological Perspectives on Productive Intensification

Productive intensification systems have been the focus of extensive research in the economic anthropology literature. Economic anthropologists concentrate on productive intensification, both within and beyond the agricultural sector, because this process characterizes households and communities during periods of economic transformation.
Economic development-based research encouraged the emergence of demographically-driven theories of cultural change (e.g., Boserup 1965; MacLachlan 1987). Studies of intensified production in smallholder economic systems provide both comparative data and a theoretical perspective (e.g., Cook and Binford 1990; Netting 1993; Wiber 1985).

Ecological anthropologists are also interested in processes of intensification. Ecological studies often focus on small-scale societies to examine relations among population dynamics, social organization and culture, and the physical environments of human groups (Orlove 1980:235). Households and communities, as parts of regional ecosystems, are integrated in terms of both subsistence and sociopolitical structure. Studies of human ecosystems in the context of resource heterogeneity and regional integration suggest appropriate scales of analysis (e.g., Ellen 1982, 1990; Orlove 1980).

Approaches taken by economic and ecological anthropologists are not entirely foreign to archaeological theory. Similar issues are broached in the "ceramic ecology" approach that much ceramic ethnoarchaeological literature uses (e.g., Allen 1984; D. Arnold 1975, 1985; P. Arnold 1991; Mouat and D.Arnold 1988; Papousek 1981, 1984; Rice 1987b; van der Leeuw 1984b). The "ceramic ecology" approach, as formulated by Matson (1965), emphasizes the inter-connectedness of ceramic production with social, cultural, and environmental aspects of society. In its emphasis on ceramic production as a subsystem of a larger economic and social whole, ceramic ecology research has made substantive contributions.

Archaeologists have also applied ecological frameworks to human settlement and economic behavior, with mixed results. Applications range from optimal foraging theory frameworks used to study mobile societies (e.g., Belovsky 1988; Bettinger 1987; Winterhalder and Smith 1981) to ecological research on simple agricultural societies (e.g., Leonard 1989;
Spielmann 1986). Here, social organization in small-scale societies is seen as an adaptation by which populations can effectively exploit environments without outstripping their carrying capacities (Orlove 1980:240). Charges of ecological reductionism, misappropriation of theory and hyper-functionalism might justifiably be levelled at these overly simple archaeological applications. Certainly, more work is needed to bridge the gulf between ecology and archaeology, but an ecologically-based framework is worth pursuing in archeological interpretations.

Community-based specialization and interdependent systems. This section contrasts generalized community-based specialization with intensified community-based specialization. Both organizational forms operate within regional economic systems, and the former is common ethnographically. In the latter form, producers become specialists and communities become economically interdependent. The discussion then examines community-based specialization in the context of regional integration. Conditions under which community-based specialization develops, and why specialization may lead to systems of regional economic integration are discussed below.

Community-based specialization occurs when particular communities become recognized for the production or procurement of particular goods. These goods are then exchanged between communities within a regional economic system. Community-based specializations may involve agricultural/horticultural pursuits, wild resource procurement, or

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4. Abundant archaeological research using ecologically-derived ideas has been undertaken, including concepts from sociobiology and evolutionary ecology. This discussion focuses exclusively on ecologically-derived research as applied to sedentary farming societies, since the Kalinga are sedentary farmers.
craft production. Specialization may be low-intensity, as is the case among mobile populations (e.g., Cashdan 1985), in which the process involves "generalized community-based specialization." As used ethnographically, "community-based specialization" refers to the resource(s) that a community produces or procures but not to the intensity of involvement in resource production or procurement.6

The extent to which communities depend on goods from other communities varies, and has to do with alternative subsistence strategies. Communities often have non-intensive, low-labor pursuits that qualify as generalized specializations. Using Costin's (1991) parameters, independent producers organized into small, kin-based groups operate in dispersed industries on a part-time basis. These individuals supplement their agricultural pursuits with a specialization that, collectively, is a community specialization. For example, groups in Indonesia maintained their specialization -- supplying the Asian (and world) market with forest and ocean products (e.g., edible bird nests, sea cucumbers, and tortoise shell) -- for hundreds of years without sacrificing their generalized subsistence base (Ellen 1990:206).

Community-based specialization in small-scale societies involves economic integration at the regional level. Even in its least intensive form, generalized community-based specialization furnishes goods and produce that supplement a community's available resources. Systems of community-based specialization and regional integration are successful because they confer benefits to everyone involved by reducing the amount of risk in subsistence tasks.

5. Some economic approaches would also view human labor (in the form of slavery or wage labor) as a community-based specialization, but this discussion does not address such situations.

6. The gloss of "specialization" over a wide variety of organizational forms in the cross-cultural literature is problematic, resulting in problematic discussions of "specialization" by cultural anthropologists.
The geographic scale entailed in "the region" varies but is influenced by several factors, including distance, dietary complementarity and (where applicable) state intervention. Regarding distance, participants are generally able to reach any other community in the regional system through a day's journey (e.g., Ellen 1990:210-213; Specht 1974:234). Regarding dietary complementarity: the system must be large enough to provide the full range of needed subsistence goods to participants within the regional system (Spielmann 1986:283). Complementarity may be achieved by linking populations from distinct ecological zones (e.g., highland vs. lowland, coastal vs. interior) or populations practicing distinct subsistence strategies (e.g., sedentary agricultural populations and pastoralists or hunter-gatherers). Regarding state intervention, where economies are managed by a state organization, resources from diverse settings may be tapped for tribute and redistribution and the perimeters are defined by a state apparatus.

Community-based specialization and regional integration operate differently in small-scale economies than they do in state-administered economies. For one thing, resource heterogeneity, rather than governmental mandate, provides a major incentive for community-based specialization. Some communities, regions, or islands may have better access to certain resources than their neighbors. These localized imbalances encourage the specialization in communities into particular crops, industries, and trades. Resultant exchange systems even out patchy distributions of resources. Regional systems incorporate groups that occupy different ecological zones and/or pursue discrete subsistence strategies, such as agriculturalists and pastoralists or horticulturalists and hunter-gatherers.

Community-based productive specialization is encouraged by, but does not require, resource heterogeneity. Biotopic diversity does favor community-based specialization in many
areas, such as Melanesia (e.g., Allen 1984; Harding 1967; Ross 1978; Schwartz 1963; Specht 1974). However, even in such ecologically diverse areas, resource areas of groups with discrete specializations may be virtually identical. Localized social and ecological factors can produce imbalances that are mitigated through community specialization and exchange (Bodley 1979; Ellen 1990:204; Ross 1978; Specht 1974:234-235; Tax 1952:44-46).

Non-environmental factors, such as prestige accumulation and the need to suppress inter-group conflict, are also instrumental in the operation of regional economic systems in Melanesia (e.g., Harding 1967; Specht 1974:235). Groups occupying homogeneous environmental zones may partition up specializations by community or region to perpetuate social relations between communities, irrespective of ecology. In Amazonia, this division of labor may involve the types of crafts produced (Chernela 1992). In highland South America, potters specialize in subtypes of goods within a particular region, ensuring that each community actively engages in the exchange network (Chavez 1992).

The avenue created by the exchange of goods also provides a route for information exchange and the flow of marriage partners. Economic exchange networks can mitigate political tensions, particularly when physical settings (e.g., marketplaces) are recognized as neutral ground between otherwise antagonistic populations (e.g., Ross 1978). Regional integration, through community-based specialization, also reinforces social boundaries by linking defining groups in various sizes that interact in a broader network. Among the Yanomamo for example, villages in alliance with a pottery-making village denied all knowledge of how to make pottery themselves until after the alliance dissolved, at which point the villagers "remembered" how to make pots (Chagnon 1983:149-150).

The relations of production in the framework presented may also seem overly
functional, as these exchange networks are assumed to be adaptive strategies. Intersocietal resource acquisition clearly has the potential to confer benefits to participants. But if all systems were truly adaptive, then one would expect to see a much more common tendency toward long-lived systems (longevity is discussed later in this chapter). Ecological factors can encourage systems of economic integration, and such systems can even out patchy resource distributions. However, large-scale political and economic forces can upset regional systems, as can internal social tensions that continually threaten to disrupt their operation. How such intensification develops over the long-term and the conditions under which it persists are discussed from an evolutionary perspective in the following section.

Why community-based specializations transform into systems of intensified production. Systems of community-based specialization often transform through time into regionally integrated systems. When this transformation occurs, at least some of the participant communities intensify their production strategies and become dependent upon other communities to meet their subsistence needs. This transformation does not require that all communities intensify to the same degree. Factors such as availability of agricultural land, accessibility to other forms of income, and tradition or costumbre (Reina and Hill 1978) affect choices at the household and community level. For example, in communities where women are already involved in low-intensity artisan work (e.g., pottery production, mat weaving, or hat making), women may intensify production of these goods (e.g., increase the number of goods made, develop new forms to add to the extant repertoire) rather than engage in the production of goods whose technology is unfamiliar. In communities where some crops are grown for periodic exchange, groups intensify production with crops through such strategies as increased plantings, shorter fallow seasons.
To view the process of transformation from an evolutionary perspective, it is useful to employ an ecologically-derived distinction between generalized and specialized production systems (see summary in Leonard 1989). Generalized systems involve diversified economic strategies and are quite stable, since they use a wide array of available resources. Specialized strategies, in their reliance on a narrower range of resources, are more productive and less stable than generalized systems. When systems of community-based specialization evolve into systems of intensified production, the general strategy changes from one that is generalized to one that is specialized.

Systems of generalized community-based specialization change into systems of intensified production through a processes that contribute to localized resource deficiencies. Foremost among them are population growth, locational circumscription, deterioration of the habitat, technological change, and declining returns to labor (D. Arnold 1985: 168-201; Boserup 1965; Geertz 1960:32-33; Netting 1990:46). When productive intensification occurs, community-based specializations become major components of a community’s economy. Production may become more nucleated, and the scale of personnel involved may increase as production intensifies. One of the most common forms of productive intensification in small-scale societies is agricultural intensification.

Agricultural intensification can involve a number of different adjustments. Generally, the first production adjustment is intensification of crops that are already under production (Boserup 1965; Geertz 1960:35; Loucky 1979:705). Increases in labor inputs, the shift to double-cropping, or the adoption of new varieties are some alternatives. Where possible, groups intensify their production of agricultural goods as cash crops for a market network with which they were previously uninvolved.
If circumstances continue to decline after agricultural production has intensified, households may adopt alternatives that do not rely on the household's agricultural resources (e.g., craft production, trade and wage labor). Tenant farming and agricultural wage labor are desirable alternatives, but either provide low yields relative to labor input (tenant farming) or provide highly seasonal work (agricultural wage labor). Another alternative lies in expanding labor into non-agricultural subsistence pursuits. Among the more common alternatives are agricultural and non-agricultural wage labor and the development of craft specializations. Dow's (1985:149) study concludes that "... the relationship between agricultural intensity and the division of labor into nonagricultural craft specialties appears to be a rather dynamic process." When groups shift into intensified non-agricultural production, producers prefer utilitarian goods that require low capital investment, stable prices and a predictable market demand. Craft production is often considered provisional, if agricultural alternatives become available again, most producers will abandon their non-agricultural pursuits (e.g., Nash 1961; Netting 1990).

Ceramic Specialization as One Form of Productive Intensification

Because the Dalupa case involves ceramic production, the fact that community-based ceramic specialization as an economic alternative is extremely common throughout the world. Such economic systems often arise in the context of high population pressure and insufficient access to arable land. Table 2.3 illustrates that such systems emerge in a wide variety of ecological settings and in most geographic zones. In societies such as Melanesia, ceramic exchange followed parallel routes to those of prestige goods (Fortune 1932; Malinowski 1920). In some societies, ceramic production for exchange supplements scanty returns from farming, while in others, ceramic manufacture has entirely replaced an agricultural lifestyle. Where
arable land is scarce and raw materials for ceramic production are locally available, many households in such systems rely on a combination of agriculture and craft production as complementary forms of productive activity.

<table>
<thead>
<tr>
<th>GEOGRAPHIC REGION</th>
<th>GROUP (COUNTRY)</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southeast Asia</td>
<td>Negros (Philippines)</td>
<td>Saligan 1982; van der Leeuw 1983</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>Ilocos (Philippines)</td>
<td>Scheans 1969</td>
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<tr>
<td>Oceania</td>
<td>Sio Gitua (Papua New Guinea)</td>
<td>Harding 1967</td>
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<td>Allen 1984; Groves 1960; May and Tuckson 1982; Oram 1982</td>
</tr>
<tr>
<td>Oceania</td>
<td>Mailu (Papua New Guinea)</td>
<td>Irwin 1977; May and Tuckson 1982</td>
</tr>
<tr>
<td>Oceania</td>
<td>Moluccas (Indonesia)</td>
<td>Ellen 1990</td>
</tr>
<tr>
<td>West Asia</td>
<td>Chowra Island (India)</td>
<td>Mathur 1968; Reddy 1982</td>
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<td>Nicholson and Patterson 1985</td>
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<td>Foster 1967; Kemper 1976</td>
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<tr>
<td>Central America</td>
<td>Highland Chiapas (Mexico)</td>
<td>Howry 1976; Nash 1961</td>
</tr>
<tr>
<td>South America</td>
<td>Ayacucho (Peru)</td>
<td>Arnold 1975, 1985</td>
</tr>
</tbody>
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Table 2.3. Community-Based Ceramic Specialization in Comparative Perspective.

The link between craft specialization and resource-poor areas has been amply illustrated in the ethnographic and ethnohistoric literature. Systems of community-based specialization are associated with forms of regional integration throughout the world. Ecological factors play an important, but not primary, role in the development and structure of such systems. Upon occasion, groups inhabiting similar ecozones may opt for different community-based specializations so as to participate in a regional economy. In addition, the degree to which a community can specialize its production depends, to a large extent, on the available market for its products (also see Bates and Lees 1977:825). By 'market' is meant a
group of consumers, and these consumers must be linked to producers by webs of social and/or economic relationships. Where inter-tribal warfare is active, constraints are placed on the degree of regional integration that can be attained.

**Archaeological considerations.** Productive intensification is a common ethnographic pattern, even among societies that lack centralized political power. Two stimuli for intensification include population increase in the face of limited agricultural resources and/or the integration of communities into national economies. When this type of strategy is widespread, community-based specialization unites groups into systems of regional integration and forges links across ethnic boundaries. Resource heterogeneity, demographic factors, and population circumscription may aggravate the degree of specialization, particularly when the distribution mechanisms become sophisticated enough to require intermediaries and secondary distribution centers.

The framework presented describes how community-based specialization operates, and conditions under which systems of production intensify in contemporary small-scale societies. This approach has suggested causal factors that affect the intensification process, such as demographic pressure, land circumscription, and the intrusion of the national economy into certain areas. These may seem particular to modern small-scale societies, but perhaps this model of productive intensification also has evolutionary implications.

Similar systems of regional integration may have been prevalent in prehistoric small-scale societies with "tribal" social networks (e.g., Braun and Plog 1982). In fact, some of the same factors may have operated to stimulate intensification processes, particularly in regard to subsistence-based (rather than prestige goods-based) exchange networks. These include demographic pressure, increasingly limited land availability, and even the intrusion (through
The development of intensified subsistence production in small-scale societies.

Small-scale societies are commonly characterized by mixed economies (or generalized strategies, Leonard 1989:494) and non-intensive production systems. Agriculture (either extensive or intensive) or horticulture may be combined with such subsistence strategies as hunting, collecting and/or fishing. When land is available, several strategies can be used to mitigate population increase and its related stress on extant resources. In the short term, groups can rely on exchange as a buffering mechanism. Residential dispersal (Spielmann 1986:302), expansion into frontier areas for agriculture/horticulture, or increased reliance on non-agricultural/ horticultural food procurement (e.g., Cashdan 1985:469) are three longer-term alternatives. As land becomes circumscribed, populations lose the option of residential mobility that accompanies swidden agriculture, and they intensify production for exchange (op.cit.,457).

The relationship between intensification and wealth accumulation is of great concern to archaeologists (e.g., Halstead and O’Shea 1989; Knapp 1990; Renfrew 1982). However, wealth accumulation receives little ethnographic attention as a force behind the development of intensified production. And when agricultural intensification is specifically considered as a means to surplus accumulation, archaeologists and cultural anthropologists disagree.

Archaeologists traditionally view agricultural intensification as a means for wealth accumulation and ultimately, state formation. Cultural anthropologists, on the other hand, argue that agricultural intensification is often a response to diminishing resources and a stopgap measure, rather than a strategy for accumulating surplus. When wage labor and tenant farming systems are used extensively, economic stratification can result from intensified
production (Maclachlan 1987:11). But stratification need not always result from the shift to intensified production.

Data on the longevity of such systems might be helpful in understanding under what conditions productive intensification systems transform into more complex social formations. Estimates of duration range from as little as fifty years or so (in post-contact Melanesia, after the suppression of tribal warfare by colonial administrators) to four centuries or longer in the central Sudan (see Spielmann 1986:304). The lifespan of a regional economic network is important from an archaeological viewpoint, since short-lived exchange networks may not leave substantial material traces in the archaeological record.

Understanding the lifespan of a regional system may help illuminate aspects of a system's structure. Regional systems of intensified production may be transitional, as the social relations of production change en route to more complex political formations. Alternately, intensified production systems may represent endpoints in cycles of small-scale political development. In such cases, the system reaches an apex of population growth and intensified production and the system collapses, evidenced by disintegration or regional abandonment (e.g., Leonard 1989). It is also possible that intensified production systems could represent more enduring economic structures in what archaeologists have envisioned as relatively stable systems over extended time periods.

Summary

This chapter has presented the theoretical rationale for my research on ceramic production, distribution and consumption. I first discussed various models that deal with the organization of ceramic production, many of which employ cross-cultural ethnographic material. The discussion then turned to archaeological methods for measuring ceramic
production. Ceramic approaches to specialization were then addressed with respect to units of analysis. The relevance of ethnoarchaeological research on this issue was emphasized.

Studies of ceramic distribution were presented in historical context, moving from early models of culture areas to reviewing and critiquing New Archaeology models of exchange. Recent examples of integrated research on prehistoric economy were used to illustrate how current research addresses the roles of production, exchange, and consumption more fully than did earlier approaches.

Because the Dalupá ceramic system involves community-based specialization, ecological anthropological approaches illuminate aspects of the origins and transformations that occur in systems of specialized production. As a form of productive intensification, ceramic specialization is common worldwide, and comparative data were marshalled to demonstrate this point. This chapter provides a general framework for the topics which is covered in the succeeding chapters. The next chapter describes Kalinga as a research setting.
CHAPTER 3
KALINGA AS A RESEARCH SETTING

This chapter introduces the Kalinga area as a research setting by summarizing aspects of Kalinga political and cultural geography. Some histories and restricted historical accounts exist for both the general Cordillera region (e.g., Fry 1983; Keesing 1962; Scott 1977) and for the Kalinga subprovince of Kalinga-Apayao (e.g., Dozier 1966; Wilson 1956). Despite the numerous ethnographers who have roamed the area, little research has been done on certain topics that affect our interpretations of Kalinga society. Studies of ethnicity, contact, and capitalist penetration elsewhere in the Cordilleras (e.g., Eder 1982; Lewis 1992b; Voss 1987) illustrate group identity maintenance in the face of profound external pressures.

The primary objective of this chapter is to provide an historical and social framework in which my study of Dalupa pottery economics must be understood. I review the geography and history of the area and summarize aspects of Kalinga economy and political structure. My secondary goal is to present the Kalinga as a dynamic society that is neither isolated and primitive nor peasantized and enmeshed in the Philippine national economy. The Dalupa pottery production system and the regional exchange network described in this study cannot be understood without examining the structure of Kalinga society, including the history of contact and concepts of Kalinga ethnicity.

The Study Region

Geography. Kalinga-Apayao province is considered part of the Central Cordillera region, whose boundaries are largely defined by those of the Cordillera mountain range (Figure 3.1). The most massive montane system in the Philippines, the north-south trending
Figure 3.1. Northern Luzon, Philippines.
Cordilleras contain three adjacent but separate ranges whose steep mountain slopes have a maximum elevation of 3000 ft above sea level. The study area is nestled between the Malayan Range system (to the west and north) and the Central Range (Wernstedt and Spencer 1967:342). This region has an area of approximately 20,000 sq. km. and contains five provinces (Kalinga-Apayao, Abra, Mountain Province, Ifugao and Benguet) in which seven related, indigenous languages are spoken.

The Cordillera Central population is distinct from the surrounding lowlands in terms of its culture, its languages, and its history of colonial contact. Few (about 10%) of the Cordillera residents are Ilocano immigrants from the lowlands (De Raedt 1991:355). Ilocano has been the **lingua franca** throughout the Cordilleras since at least the turn of the century (Keesing and Keesing 1934:75-76). However, highlanders or "Igorots" have resisted political domination and full-scale economic penetration by outside forces for the last 300 years.

Bounded on the east by the Cagayan Valley, on the west by Abra Province, and on the south by Mountain Province, Kalinga-Apayao Province was established as a subprovince of the Mountain Province in 1908. Kalinga-Apayao has a total land area of 704,760 hectares, of which the Kalinga section comprises a little less than half (Almazan 1985:3; Cleto 1986:6). The Kalinga area encompasses the eastern flanks of the central Cordilleras, its rolling foothills, and low-lying plains adjacent to the Cagayan River Valley in northern Luzon. Kalinga-Apayao is the twelfth largest province in the Philippines, almost equal in size with the combined area of Benguet, Ifugao and Mountain Province.

Kalinga-Apayao province contains ethnic populations that include the southern and northern Kalingas (Figure 3.2). Most (99.7%) of the population is native born (Kalinga-Apayao Census 1970). The province is dominated by ethnic groups that are officially
Figure 3.2. Kalinga-Apayao Province.
recognized by the Philippine government as "cultural minorities" and are akin, in status, to Native American groups in the United States. The Kalingas are the predominant cultural minority group in Kalinga-Apayao, although Isnegs (or Tingguians) inhabit northern portions of the province as well as areas in Abra, to the west. Most of the Kalinga population resides in Kalinga-Apayao, excluding emigrants who have relocated to urban areas for wage labor opportunities.¹

The Mountain Province was officially established by the American colonial administration in 1907, and contained five subprovinces, one of which was Kalinga-Apayao. The Kalinga portion of the Kalinga-Apayao province, on the eastern side of the Cordillera Central, contains eight municipalities that roughly coincide with valleys that enclose major drainages and their tributaries. As of 1980, the Kalinga area had 15 municipalities and approximately 114,000 inhabitants (Cleto 1986:6). Minor linguistic differences have been noted between the Kalinga municipalities by their inhabitants, but the Kalinga area represents a spatially and linguistically bounded cultural unit that is separable from the other ethnic communities located within the central Cordillera mountains (see Cleto 1986:89, 91).

A system of steep river valleys, the Kalinga area is covered with monsoon forest, grassy swidden plots and rice terraces that cascade down the mountain slopes. Two major river systems, the Tanudan and the Chico, have largely determined the settlement pattern. Territorial boundaries divide each settlement (ili) from one another, and settlements are located along river banks, slope gradients and hill or mountain sides in close proximity to springs that can be used for irrigation agriculture. Each ili is composed of one or several communities and

¹ A small enclave of Kalingas also resides in Bontoc in the village of Mandukayan (Scott 1958, 1960).
is recognized by custom law as an autonomous unit (e.g., Magannon 1984).

**Previous ethnographic and ethnoarchaeological research.** The corpus of Kalinga ethnography has grown substantially over the last three decades (for additional references see Prill-Brett 1978 and Saitto 1974 for additional references). Kalinga social, political and economic structure has been described in detail elsewhere (Bacdayan 1967; Barton 1949; DeRaedt 1989, 1991; Dozier 1966, 1967; Lawless 1973, 1975, 1977, 1978; Scott 1969; Takaki 1977). Both Barton’s and Dozier’s research focused on southern Kalinga around the community of Lubuagan, the former provincial capital. Takaki’s study of Kalinga commodity exchange was conducted in the Uma district, a multi-settlement community (a three hour hike west of Dalupa) that is now part of the Lubuagan municipality. Cultural ecological research by Lawless (1977) focused on the Dangtalan community in the Pasil municipality, and a recent analysis of Kalinga sacrifice was written by De Raedt (1989). At least one researcher (Magannon 1972, 1984) documents aspects of Kalinga ideology and religion, based on information from the Tanudan municipality (south of Pasil).

The Kalinga Ethnoarchaeological Project (hereafter called KEP) is unique in its longitudinal nature, and provides as much time-depth as any ethnoarchaeological project in the world. Its researchers have documented numerous changes in economic and social spheres throughout that period, these trends are made visible only through a long-term commitment to episodic research in the area. But the project’s work in the area documents only the most recent history. In order to understand the dynamics observed during the 1987-1988 field season, it is necessary to describe aspects of the history and culture in the southern Kalinga area.
Kalinga in Historical Context

The people who now call themselves Kalingas have a long history of ethnicity and contact, despite their rugged mountain location and their opposition to outside forces. The term Kalinga, meaning enemy, may have been coined by fearful Ibanag speakers (Keesing 1962:221) although a Bontoc origin for the term has also been suggested (e.g., Scott 1969:63). If any consensus exists on the term Kalinga, it is that the Kalingas did not refer to themselves as such in the recent past. Even 60 years ago, the Kalingas used more localized group names that were defined by drainage systems (Dozier 1966:240; Keesing 1962:221-224).

The use of broad, linguistically-based ethnic groupings (e.g., Kalinga, Ifugao or Bontoc) began in the 18th and 19th centuries with the Spaniards. German ethnographers and geographers elaborated on the taxonomies in the late 19th century, and Dean Worcester (American administrator for the Bureau of Non-Christian Tribes) institutionalized the ethnic groups after the turn of the century (see Lewis 1991). This establishment of political provinces earlier in the century generated a new 'tribal' consciousness that was previously absent (Scott 1969:165), and recent incursions by the Philippine government have strengthened this sentiment (e.g., DeRaedt 1991:356; Lawless 1978:155-156).

The earliest contact between the Kalinga and the outside world ensued with a Spanish encomienda survey in 1591 of the Tanudan area.\(^2\) The Spaniards referred to the population they encountered in 1591 as Lobo (Keesing 1962:224). The modern population of Tanudan Kalinga contains a community called Lubo. In the 19th century, Spaniards referred to another population in the general area as Guinaanes (Scott 1977:4). Lieutenant Colonel Guillermo

\[\text{\footnotesize\(^2\) Encomiendas were crown grants of land to Spanish soldiers and civilians. These grants carried the right to levy tribute and labor service from the resident population (Wernstedt and Spencer 1967:123).}\]
Galvey’s journal of his 1830 expedition across the Cordilleras mentions communities that are now found in the Pasil and Lubuagan municipalities (Scott 1977:222).

In 1689, Spanish missionaries formally established their presence in the Kalinga area at the Tuga Catholic Church in what is now the Tabuk municipality (Almazan 1985:1). Mountain people were called Ygorrotes, and their area was renowned for its rich gold mines as one of the principal mining regions in the country (Tegengren 1964). Various attempts at ‘pacification’ (i.e., missionization and mining enterprises) continued through the 19th century (see Dozier 1966:28-36 for summary). Efforts at religious pacification seem largely directed toward obtaining access to gold mines in the area as well as the tobacco produced by its inhabitants (Scott 1977:4).

The Spanish met with intense resistance from the native populations in every endeavor. All Igorot (i.e., Kalinga, Isneg, Bontoc, Ifugao, Kankanay, and Ibaloy) groups were formidable opponents to the Spanish colonial administration (Scott 1970:707). It was not until the 1880s, after the introduction of the bolt action repeating rifle that the Spaniards established permanent garrisons in the area (Scott 1977:274). Lowland travellers in the Cordillera Mountains were thus not guaranteed protection until the very end of the Spanish colonial period (see also Scott 1982).

Indigenous resistance to all outsiders thus precluded deep acculturation of the area until the entry of the American administration in 1908. Resistance to the Spanish colonial forces has already been described. Mountain groups were also hostile toward Philippine lowlanders, who participated with the Spaniards in punitive expeditions in the highlands and engaged in shady business dealings with Igorots who ventured down to the lowlands during trading expeditions (Jenista 1987:186). Following the Philippine revolutionary war (at the turn
of the 20th century) came a renewed governmental interest in the Luzon highlands. The brief Philippine rule between 1896 and 1900 effected no better relations between highland and lowland Filipinos. Philippine soldiers who made their way through the mountains left a trail of pillage and plundering behind them (Joaquin 1986; Kane 1938).

Following the Philippine-American war in 1900, the United States began its colonial administration of the Philippines. In 1908, the American administration established the Mountain Province as a political unit (Fry 1983). At that time, the area was described as "the meanest country the devil ever created...high projections, rugged mountainous trails (not for horses), swollen streams and daily rains" (Fry 1983:29). American administrators viewed the Kalingas as intelligent but rather intractable (Worcester 1914). Efforts to incorporate the Igorot populations into American colonial administration relied upon traditional economic and social institutions and encouraged Kalingas to participate in the development (Magannon 1984:254; Wilson 1956).

American contact was, in some respects, benevolent: roads were constructed to open up highland-lowland trade and facilitate communication systems. Schools were established and medical facilities were built. Headhunting and tribal warfare waned under the careful supervision of local American administrators (DeRaedt 1991:363). Many Kalingas liked and respected some of the American administrators who were stationed in Lubuagan (Dozier 1966; Wilson 1956). The intrusion of World War II into Kalinga was signalled by Japanese military occupation of the area. Kalingas and other cultural minorities in the mountains were fiercely loyal to American forces. Headhunting, temporarily subdued by the American administration, resumed (particularly against Japanese soldiers) for the duration of the war (Dozier 1966:205). The last head taken in the Pasil municipality was taken during this period, and the victim was
a Japanese soldier (Rosaldo 1980 notes similar history among the Ilongots to the south). While headhunting as ritual warfare has essentially disappeared, revenge killings remain relatively common (Dozier 1966:197-215).

Internecine warfare briefly lessened after World War II, although tribal conflicts were documented in the 1960s by ethnographers (de Raedt 1991; Dozier 1966; van Fûrer-Haimendorf 1970) and have continued ever since. Consensus holds that the last head officially taken in the Kalinga subprovince was in the mid-1980s. In 1986, Tabuk residents of Tulgao origin avenged a child’s accidental death by killing the truck driver whose vehicle had hit the child (P. Awing, personal communication 1988). The cessation of head-taking has in no way entailed the cessation of tribal warfare: southern Kalinga is known as a warfare-ridden area in the general area (De Raedt 1991:363). Warfare accelerated during the late 1970s and early 1980s in response to the Philippine government’s entry into the area (see Drucker 1988; Rood 1991; Winnacker 1979), and it continues to plague the area today.

Two months before my entry into Dalupá in October 1987, Dalupá’s peace pact tie with Lubuagan was severed when two Lubuagan residents murdered a Dalupá man (a potter’s husband) while he tended his rice fields. Lubuagan was, at that time, also engaged in more active internecine warfare with communities from Cagaluan. This conflict involved motor vehicle ambushes and ambushes of entire settlements, and ended in multiple deaths. A lull occurred in warfare in the study area during the 1987-1988 field season, although activity resumed following our departure.

Kalinga society: political structure and economics. Disagreement persists over the nature of Kalinga political organization. Are Kalingas tribal, chiefly, classless, or peasants? They are not typical ‘peasants’ in Philippine society, lacking the strong linkages between their
own productive systems and those of the national economy. Kalinga organization more closely approximates a "tribal" structure, if the category "tribal" is opposed to the term "peasant" (see World Bank 1982:6-7). Kalingas function on the peripheries of the nation state, in part because of the lack of well-maintained roads. But Kalingas are also ethnically and linguistically distinct from their lowland neighbors. Because of physical isolation and a traditional economy, cash income contributes only a small percentage to the total economy and a barter economy predominates.

Researchers have viewed the Kalingas as either a "tribal" and "essentially classless society" (Dozier 1966:118; also see Takaki 1977), or they are characterized by "incipient class stratification" (Barton 1949:145-146) and are classified as a "chiefdom" (Service 1963). This disagreement regarding the nature of Kalinga political structure stems partly from historical factors. Barton's (1949) fieldwork occurred between 1916 and 1941, one of the most peaceful periods in recent Kalinga history. American colonial policies subdued tribal warfare, strongly encouraged the development of peace pacts, opened up new communication and trade routes and intensified wealth differences within communities as entrepreneurial Kalingas began lucrative trade enterprises with lowland areas. Barton's (1949) observation that Kalinga society represented an "inchoate state" inspired political theorists to grapple unsuccessfully with classifying Kalinga political organization, using taxonomic labels such as 'chiefdom' (Service 1963) and 'primitive state' (Service 1958) to 'ranked' or 'stratified' society (Fried 1967:167-168; 211-212 respectively).

Dozier's fieldwork took place in a radically different social milieu than had Barton's,
though they both spent time in Lubuagan. Post-World War II Kalinga society lacked the strong state intervention of the American colonial administration, and the Philippine government policy of benign neglect affected local politics and social life. Tribal warfare resurfaced, transportation routes deteriorated, and outside penetration in the Kalinga area consisted of sporadic, poorly planned capitalist ventures rather than government-sponsored programs. Today the Kalinga are classified as cultural minorities by the government, and as such are accorded substantial political autonomy. The Kalingas today are a small-scale society in that they lack solid economic, political and social linkages to the broader Philippine system.

One source of confusion regarding Kalinga political organization stems from successful Kalinga resistance to outside influences for most of their history. Kalingas today, like their other Cordillera neighbors, have resisted the political and economic penetration of the capitalist system into the area -- or controlled the degree and form of penetration -- with some success (see Lewis 1992, Sajise 1991:441-442, and Voss 1987 for parallel Cordillera examples). In open defiance of the World Bank and the Philippine government, the Kalingas and their Cordillera neighbors fought a long but successful battle over the Chico River dam projects from the mid-1970s to the mid-1980s (Cariño 1980; Cariño et al. 1979). Everyday forms of resistance are found in Kalingas' fierce pride in, and maintenance, of traditional customs and practices.

The concept of Kalinga as a "warrior society" (Scott 1979) has been proposed as an alternative to using terms like "stratified" vs. "classless" to conceptualize highland Cordillera

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4. Dozier's fieldwork took place during 1959 and 1960. He spent two months in Kalinga (one month each in Lubuagan and Alingag) and the remainder in Baguio City where he interviewed Kalinga college students from Lubuagan, Poswoy and Salegseg (1966:xii).
populations, but this concept is problematic. Ethnographers have traditionally assumed that Kalinga society lacks ascribed positions of leadership and that status is defined primarily through achievements in battle (e.g., Dozier 1966; Scott 1979). Some form of economic stratification has a long tradition in Kalinga, as indicated by Barton's early 20th century research. Substantial wealth differences among villagers affect the amount of prestige and power that any individual wields, a pattern that might have begun with Spanish tribute demands in the late 19th century (see Scott 1977:291). These economic differences continue to grow in the study area.

Wealthy or bacnang households possess both prestige and genuine power in the decision-making of the village. As off-farm income opportunities become more common (e.g., government work, wage labor), the personnel in the bacnang class has begun to change. Those traditionally wealthy families who have taken advantage of educational opportunities (particularly through sending children to college) have maintained their positions. Other former bacnang families have lost power as a nouveau riche (i.e., college-educated and government-employed) group emerges and taps into traditional institutions such as feasting to gain prestige and political influence. These trends may characterize most groups in the Cordillera Central. Eder's (1982:110-111) analysis of Ifugao society also describes a decline in power of the traditional elites, and the nouveaux riches phenomenon has also been observed in a Bontoc community (Voss 1987).

In the face of social change, the traditional institution of leadership (the pangat) remains strong today. Leaders (lalakay, the old men) or pangats are essential to the functioning of any Kalinga community, whose contributions to public disputes is invaluable. Those seeking to become pangats are considered effective leaders, whether such leadership
entails tribal warfare or simple everyday matters in the community.

Legal cases are set before a group of respected men (including but not restricted to pangats) and are settled according to custom law involving the maintenance of peace pacts (Bacdayan 1967; Barton 1949; Tadaoan 1954). A lowland overlay of political institutions has been applied to the Kalinga system in accordance with the national political and administrative structure. Kalinga communities today are united into municipalities with governmental appointments, a limited cadre of policemen have been appointed to secure law and order, and the entire set of Kalinga communities is united under the provincial designation. The intrusion of governmental institutions has had remarkably little impact on the adjudication of intra- and inter-community disputes and in the operation of traditional social and economic structures.

The well codified system of custom law that revolves around a peace pact or bodong system remains a pivotal aspect of Kalinga society (Bacdayan 1967). Peace pacts link villages and areas to one another through agreements that do the following: end tribal wars caused by blood feuding; establish peaceful areas for trade, travel, and commerce; ensure justice when a crime is committed by members of the peace pact holding units; and establish alliances that permit intermarriages. Peace pacts are maintained through generations and individual peace pact holders pass their responsibility down to next generation. The only threat to the system of kalinga custom law as it has been practiced has been the introduction of firearms into the Kalinga area, enabling antisocial individuals to skirt the traditional judicial system by sheer force of arms. Until recently, the combination of bodong adherents and the policing efforts of the New People’s Army helped to maintain the ideals of the peace pact institution within the Pasil municipality.

Despite the presence of at least three mission organizations in southern Kalinga,
traditional customs and beliefs are maintained. Catholic and Protestant missionaries have been in Kalinga communities for many years but have not eradicated elements of traditional Kalinga life. Gong (gangsa) dancing is performed at major events to ritualize agreements and arranged marriages still occur between wealthy families. Pig livers continue to be read as prognosticators during important decision-making.

Spirits (allan) continue to people the Kalinga trails and fields, boding ill for those who travel to these areas alone or at the wrong times in their lives. Spirits (allan) or non-human entities inhabit all parts of the Kalinga landscape, holding the potential to wreak havoc on individuals who walk in the wrong places or ignore customary practices for placating the spirits. Kalinga religion is expressed through rituals performed by traditional women mediums or healers called mandadawaks (Magannon 1972). In cases of illness, mandadawaks are consulted prior to contacting Western trained medical experts (located at least three hours away, by foot or by vehicle). Kalingas assume that malevolent spirits represent the primary source of illness.

KALINGA SUBSISTENCE

The Pasil Kalinga household today derives its subsistence from three supply sources, in descending order of importance: 1) the household’s agricultural landholdings; 2) barter between neighbors, relatives and friends; and 3) village stores or itinerant vendors (known as "walking stores"), through which non-locally produced items are acquired. Store goods include dried fish, cooking oil, sugar, salt, bitsin [monosodium glutamate], and matches. Foremost among these is, of course, the household farm. The Kalinga are intensive rice cultivators who rely on their irrigated rice terraces (payaw) as their primary means of subsistence. Whether wet-rice cultivation represents a recent strategy that replaced tuber
cultivation (i.e., sweet potatoes [katila, camote] and taro [gabi]) remains an unresolved issue (e.g., Dozier 1966; Keesing 1962; Scott 1977).

Kalinga rice cultivation involves a two-crop annual cycle. A traditional red rice called onoy is planted in early December and harvested in April and May. A second traditional variety ovak is planted in June and harvested in November. A third, glutinous or "sticky" rice called dikat (perhaps of Ilocano origin) is grown during both seasons, and introduced varieties such as wag-wag have started to penetrate the Kalinga agricultural system. Unlike the introduced rice varieties, the traditional varieties require no additional fertilizer and involve little capital outlay.

Wet-rice cultivation requires a complicated system of water management and coordinated work schedules among households within each village and occasionally between communities. Rice fields are differentially valued, based on proximity to springs. Access to irrigation water is critical, and must be mediated between community leaders. The intensive, two-crop cultivation system requires proper scheduling and labor power. With steady population increase in many parts of the Kalinga subprovince (Cleto 1986:59-63), the importance of access to water, as well as the location of new potential rice field areas, is becoming more important in the agricultural system.

A secondary subsistence activity, swidden cultivation, is on the decline. Pockets of land between rice fields and communal land tracts above each village are prime swidden areas. The frequency of fallow shifts seasonally until the soil loses its productivity, when the land is used for pasturage or for orchards. Although swidden plots occasionally include rice, plots are devoted to vegetable gardening; Kalinga swidden and garden crops are listed in Table 3.1.
<table>
<thead>
<tr>
<th>ENGLISH COMMON NAME</th>
<th>KALINGA NAME(S)</th>
<th>BOTANICAL NAME(^5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>pagoy</td>
<td><em>Oryza sativa</em> (Gram.) Linn.</td>
</tr>
<tr>
<td>Corn</td>
<td>gassilan</td>
<td><em>Zea mays</em> (Gram.) Linn.</td>
</tr>
<tr>
<td>Baguio bean, Common bean</td>
<td>ugwilas</td>
<td><em>Phaseolus vulgaris</em> (Leg.) Linn.</td>
</tr>
<tr>
<td>Winged bean</td>
<td>ullig</td>
<td><em>Psophocarpus tetragonolobus</em> (Leg.) Linn.</td>
</tr>
<tr>
<td>Mung beans</td>
<td>balatong</td>
<td><em>Phaseolus radiatus</em> (Leg.) Linn.</td>
</tr>
<tr>
<td>Pigeon peas</td>
<td>coldis</td>
<td><em>Cajanus cajan</em> (Leg.) Linn.</td>
</tr>
<tr>
<td>White squash</td>
<td>tabungao</td>
<td><em>Lagenaria siceraria</em> (Cucurb.) Molina</td>
</tr>
<tr>
<td>Yellow squash</td>
<td>calabasa</td>
<td><em>Cucurbita maxima</em> (Cucurb.) Duch.</td>
</tr>
<tr>
<td>String beans</td>
<td>ngulay</td>
<td><em>Vigna sesquipedalis</em> (Leg.) Fruw.</td>
</tr>
<tr>
<td>Bitter gourd/Ampalaya</td>
<td>papavit</td>
<td><em>Momordica charantia</em> (Cucurb.) Linn.</td>
</tr>
<tr>
<td>Taro, Taro leaves</td>
<td>gabi, lidoy</td>
<td><em>Colocasia esculenta</em> (Arac.) Linn.</td>
</tr>
<tr>
<td>Sayote</td>
<td>sayote</td>
<td><em>Sechichum edule</em> (Cucurb.) Sw. Jacq.</td>
</tr>
<tr>
<td>Camote, Camote tops</td>
<td>camote</td>
<td><em>Manihot esculenta</em> (Euphor.) Crantz</td>
</tr>
<tr>
<td>Yam, Ubi</td>
<td>katiila</td>
<td><em>Dioscorea alata</em> (Diosc.) Linn.</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>camote (??)</td>
<td><em>Ipomea batatas</em> (Convolv.) Lam.</td>
</tr>
<tr>
<td>Manioc (&quot;Cassava&quot;)</td>
<td>lobug</td>
<td><em>Manihot esculenta</em> (Euph.) Crantz</td>
</tr>
<tr>
<td>Eggplant</td>
<td>balas-si</td>
<td><em>Solanum melongena</em> (Sol.) Linn.</td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td>pichay</td>
<td><em>Bassica chinensis</em> (Crucif.) Linn.</td>
</tr>
<tr>
<td>Pineapple</td>
<td>pingivan</td>
<td><em>Ananas comosus</em> (Bromel.) Linn.</td>
</tr>
<tr>
<td>Betel nut</td>
<td>bowa</td>
<td><em>Piper betle</em> (Piper.) Linn.</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>unas</td>
<td><em>Saccharum officinarum</em> (Gram.) Linn.</td>
</tr>
<tr>
<td>Tobacco</td>
<td>tavaco</td>
<td><em>Nicotiana tabacum</em> (Sol.) Linn.</td>
</tr>
</tbody>
</table>

Table 3.1. Common Crops in Pasil Kalinga Swidden and Garden Plots.

\(^5\) Genus, species listed; family in parentheses. Scientific name followed by author who proposed species name.
Most swidden crops are consumed by the household. Exceptions include sugar cane, which is processed into traditional Kalinga wine (bayas or the Ilocano bassi) for occasional distribution, and a limited array of garden crops that households and communities cultivate as economic specialties (Table 3.2). In Dalupa, one household also grows ginger (lava) and garlic (bawang) expressly for exchange.

<table>
<thead>
<tr>
<th>ENGLISH COMMON NAME</th>
<th>KALINGA NAME(S)</th>
<th>BOTANICAL NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watercress</td>
<td>tongsoy</td>
<td>Ipomena aquatica (Convolv.) Forsk.</td>
</tr>
<tr>
<td>Chili</td>
<td>sili</td>
<td>Capsicum frutescens (Sol.) Linn.</td>
</tr>
<tr>
<td>Rattan shoots</td>
<td>pa-it</td>
<td>Calamus maximus (Palm.) Blanco</td>
</tr>
<tr>
<td>White onions/</td>
<td>sibuyas</td>
<td>Allium ascalonicum (Lil.) Linn.</td>
</tr>
<tr>
<td>Shallots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garlic</td>
<td>bawang</td>
<td>Allium sativum (Lil.) Linn.</td>
</tr>
<tr>
<td>Ginger</td>
<td>lava</td>
<td>Zingiber officinale (Zing.) Roscoe</td>
</tr>
</tbody>
</table>

Table 3.2. Swidden/Garden Crops Grown as Economic Specialties in Selected Pasil Barrios.

Arboriculture is increasingly vital to Kalinga subsistence, and tree crops include a variety of perennials for home and market consumption (Table 3.3). Fruit and coffee trees require low labor investment, yield relatively high returns, and therefore economize on land use (Eder 1981:91). Fruit trees (e.g., banana, coconut, papaya, star apple, mango, and orange) are planted near houses, between rice fields and in more formalized orchard areas. Most tree crops are grown exclusively for home consumption.

Some Pasil households also cultivate orange and coffee trees for a limited market, although the latter is of greater economic importance (as coffee is sold in the provincial
capital) than the former. Communities within the regional economic network specialize in these crops, and some potential exists for commercialized production of these crops.

According to some Dangtalan residents, unsuccessful attempts were made in the 1970s to establish a coffee cooperative that incorporated most Pasil communities. No efforts are currently underway to re-establish such an organization.

<table>
<thead>
<tr>
<th>ENGLISH COMMON NAME</th>
<th>KALINGA NAME(S)</th>
<th>BOTANICAL NAME(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackfruit</td>
<td>lamka</td>
<td>Artocarpus heterophyllus (Morac.) Lmk.</td>
</tr>
<tr>
<td>Papaya</td>
<td>appaya</td>
<td>Carica papaya (Caric.) Linn.</td>
</tr>
<tr>
<td>Banana</td>
<td>balat</td>
<td>Musa paradisiaca (Musac.) Linn.; Musa sapientum (Musac.) Linn.</td>
</tr>
<tr>
<td>Santol</td>
<td>santol</td>
<td>Sandoricum Koetjape (Melia.) Merr.</td>
</tr>
<tr>
<td>Mango</td>
<td>manga</td>
<td>Mangifera indica (Anac.) Linn.</td>
</tr>
<tr>
<td>Coconut</td>
<td>iyug</td>
<td>Cocos nucifera (Palm.) Linn.</td>
</tr>
<tr>
<td>Bamboo, Bamboo shoots</td>
<td>buyu, alibong</td>
<td>Bambusa blumeana (Gram.) Linn.</td>
</tr>
<tr>
<td>Guayabano (Soursop)</td>
<td>malnaba</td>
<td>Anona muricata Linn.</td>
</tr>
<tr>
<td>Cacao</td>
<td>cacao</td>
<td>Theobroma cacao (Stercul.) Linn.</td>
</tr>
<tr>
<td>Guava</td>
<td>gayba</td>
<td>Psidium guajava (Myrt.) Linn.</td>
</tr>
<tr>
<td>Coffee</td>
<td>kapi</td>
<td>Coffea arabica (Rub.) Linn., Coffea robusta (Rub.) Linn., Coffea excelsa (Rub.) Linn.</td>
</tr>
<tr>
<td>Star apple</td>
<td>caynito</td>
<td>Chrysophyllum cainito (Sap.) Linn.</td>
</tr>
<tr>
<td>Orange</td>
<td>alagan</td>
<td>Citrus sinensis (Rut.) Linn.</td>
</tr>
</tbody>
</table>

Table 3.3. Common Tree Crops in Pasil Villages.

Coffee growing complements rice cultivation because coffee trees will thrive in areas where rice fields will not: in relatively unfertile soil, along river banks, or in shaded places.

Trees require periodic weeding (ca. 3-4 times a year), and begin to yield after 4-5 years; trees
may be productive for as long as fifteen years (Sajise 1991:436). Two types of coffee
dominate Kalinga production: the high-yielding, more lucrative robusta (harvested between
December and March) and the lower yielding arabica (harvested in October and November).
The excelsa variety is also grown (and harvested in March and April). This latter variety is
less common in Pasil and is considered a third-class coffee, worth about one-fifth the value of
robusta.

Efforts to make coffee cultivation into a cash crop were begun by the Spaniards in the
17th century (e.g., Scott 1977:7). The American administration also encouraged coffee
production, distributing seedlings and advice through agricultural extension agents throughout
the Cordillera highlands (Keesing and Keesing 1934; Scott 1969:64; Wilson 1956). Close to
60,000 coffee trees were planted in the Lubuagan and Pasil areas during Walter Hale’s
administration alone (see Wilson 1956:35). By the 1930s, coffee was widely cultivated for
local consumption in the Cordillera highlands (Keesing and Keesing 1934:212).

Coffee is becoming an increasingly important cash crop in the Kalinga area. About
one-half of Dalupa households had fruit-bearing coffee trees during 1988, and Dalupa’s
reliance on coffee cash cropping is heavier than that found in other communities studied
during the Kalinga Ethnoarchaeological Project (KEP). By the early 1970s, Ableg and other
villages along the Kalinga-Abra road sold coffee (Lawless 1977:91), and several Pasil
communities now cultivate coffee for limited distribution: Guina-ang, Galdang, Bagtayan,
Balincagao, and Magsilay. Coffee beans are harvested and pounded in Pasil villages, and
then are sold along the Batong Buhay road or transported by truck to the provincial capital of
Bulanao/Dagupan, Tabuk. There beans are sold by the kilogram, and prices fluctuate
The development of coffee as a cash crop in the Pasil municipality has lagged behind that in the Lubuagan Municipality (see Takaki 1977:164). Only wealthier families, who have sufficient non-rice farming land and economic surplus, can allow extensive tracts of land to remain non-productive for the four or five years required before coffee trees yield fruit. Soil erosion, blight, and pests all exact damage on coffee orchards and are added risks to reliance on coffee cash-cropping. There is little reason to believe that coffee cultivation will eclipse rice production anywhere in southern Kalinga. Coffee prices are among the most unstable of major agricultural commodities and coffee is commonly grown as part of a mixed farming system (e.g., Godoy and Bennett 1989).

Meat, in several different forms, is a highly valued component of the Kalinga diet and economy. Meat consumption is generally restricted to special occasions that warrant displays of hospitality, which range from hosting out-of-town visitors to hosting wedding, funeral, and palanos celebrations that draw hundreds of people. At the larger, and most valuable end of the livestock continuum are water buffalos or carabaos. In more affluent Pasil households that own carabaos, young boys are responsible for their family’s carabao and herd them from one tract of pasture land (located above the villages) to the next. Nearly every household raises pigs and several chickens. Most households also have one or more dogs, which are guard dogs and also food sources for special occasions. Irrigated rice fields also provide minor protein sources, including a range of large and small snails and tiny fish.

Political and economic changes in the area described elsewhere (e.g., Aranal-Sereno and Libarios 1983; Lawless 1977, 1978; Stark 1991b) have substantially affected Kalinga economics and subsistence. Hunting and fishing were formerly important components in the subsistence regime. Wild game -- such as jungle fowl, pigs, deer, squirrel, monkey, and
python -- has become a minor part of the contemporary Pasil Kalinga diet as the available forest cover has diminished (see Lawless 1973:107; 1975:30). Environmental degradation resulting from mining activities has destroyed traditional riverine resources for the Kalinga, such as mudfish, crabs, freshwater shrimp, eel, and a variety of bottom feeding fish (e.g., ikan, kolidaw, mochi and tilapia). Dumping of mine tailings by the Batong Buhay mining company into the Pasil River has effectively destroyed food sources on which riverine organisms depend for food (also see Lawless 1973:102).

The various external factors that have affected Kalinga life have not overturned a traditional barter economy. Much of the cash generated through sporadic wage-labor opportunities (largely outside of Pasil) is used within Pasil communities to pursue traditional goals such as prestige accumulation. Goods purchased with cash earnings (lanterns, radios, tape players, and even synthetic tapestries purchased with Saudi Arabian wages) -- few as they are in any village -- are displayed as prominently as are the more traditional wealth items (e.g., Chinese porcelain and gongs). Earnings from wage labor opportunities in Kalinga are also funneled into prestige feasting (see Voss 1987 for a Bontoc parallel).

Kalinga resistance to external influences is partly attributable to the area's physical inaccessibility and partly to the traditional social system, which revolves around reciprocity and redistribution (e.g., Takaki 1977; Voss 1987). Barter equivalents are still essential to daily activities, and goods from village stores and "walking stores" (i.e., itinerant female vendors) are obtained through barter. Houses and rice fields are commonly acquired through the exchange of water buffalo or heirloom gold earrings (lubay). Day-to-day transactions for foodstuffs between individuals -- and even in the context of "stores" in the villages -- often exchange rice for other products. Exchange is fundamental to the Kalinga economic system,
and has cultural ramifications at every level of each encounter.

In economic transactions that involve large amounts of capital, the water buffalo (carabao) exchange standard is used. In daily subsistence transactions, pounded rice is the medium of exchange (Takaki 1977:375). Pottery transactions recorded during 1988 suggest that although rice still provides the primary medium of exchange, the range of traditional barter items has greatly expanded as contact increased between Kalinga and the outside world. Groceries, clothing (e.g., t-shirts, shorts, pants, skirts, and undergarments), rubber shoes, soap, medicine, enamel plates and even metal cooking pots (known in the Philippines as calderos) were exchanged for Dalupa pots of differing sizes during the 1988 exchange cycle.

Political Traditions and Interregional Interaction

Southern Kalinga. For a variety of reasons, ethnographic research in Kalinga has concentrated in the southern portion of the Kalinga-Apayao province. Kalingas to the west live primarily in Abra Province and are more acculturated to the Ilocano lowland traditions than are the southern Kalinga. Northern Kalingas reside in the Pinokpok and Balbalan municipalities of Kalinga and in parts of the Apayao subprovince. Northern Kalingas are also more acculturated than southern Kalingas and rely on swidden rice agriculture rather than on terraced rice farming. Ecological and social differences between the western, northern, and southern Kalinga have been viewed as causal in explaining organizational differences between the areas (Dozier 1966).

The boundaries of southern Kalinga have been documented in previous studies (e.g., Dozier 1966:9, 53; Lawless 1973:85). Southern Kalingas live in areas flanking the middle Chico River valley, from approximately 18 km south of the Pinukpuk municipal boundary to the Bontoc Province boundary in the south. Settlements along the Chico’s tributaries are also
part of southern Kalinga, including the Pasil, Tanudan, and Mananig rivers. Residents living
in four municipalities in Kalinga-Apayao (i.e., Lubuagan, Pasil, Tinglayan, and western
Tanudan), as well as in the Natonin Municipal District of Bontoc Province, are therefore
considered to be southern Kalingas.\(^6\)

**The Pasil municipality.** The Pasil municipality lies in the northern portion of
southern Kalinga as Dozier (1966) defined the area (Figure 3.2). The Pasil municipality was
established as an autonomous political unit in 1968 by Republic Act No. 4741, when Pasil was
separated from the Lubuagan and Balbalan municipalities (Almazan 1985:6). As of 1980, the
Pasil municipality consisted of fifteen communities with a population of almost 7000 residents
(op.cit.). The municipality is ethnically homogeneous, as 97 percent of the residents are
Kalingas, with small Ilocano and Tagalog populations. In Table 3.4, approximate numbers of
houses in each Pasil community are given.\(^7\)

Kalinga settlement is bounded by a series of geographical units, from the province and
municipality to the region or \textit{ili}. The region is a sovereignty, and consists of individual
settlements or settlement clusters that collectively negotiate and maintain peace pacts with
other like units (Dozier 1966; Takaki 1977:27-30). Regional population size varies, ranging
from a few hundred to over one thousand individuals. Kalingas commonly use the term \textit{barrio}
to refer to regions, following Spanish colonial custom. Regions that include settlement clusters
have one large settlement. The surrounding smaller settlements are called \textit{sitios}.

\(^6\) Scott (1958,1960) describes various customs of Natonin Kalingas whom, he claims, are migrants from
the Tanudan valley.

\(^7\) Estimates for several communities (including Balincigao, Colayo and Balatoc) are supplied by R.
Awing, who canvassed these villages during his 1988 political campaign. Estimates for the settlements in
Cagaluan are supplied by B. Bulawit, who was born in one of the Cagaluan barrios.
<table>
<thead>
<tr>
<th>COMMUNITY (MAY INVOLVE MULTIPLE SETTLEMENTS)</th>
<th>NUMBER OF HOUSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cagaluan (includes Dangla, Putao, Co-op, Bokyao, Da-o and Cagaluan Gate)</td>
<td>165</td>
</tr>
<tr>
<td>Magsilay (includes Bulen, Banat &amp; Litlitong sitios)</td>
<td>92</td>
</tr>
<tr>
<td>Balinciagao Sur (includes Bassang, Salagpat, Bantoklao and Limo-od barrios)</td>
<td>69</td>
</tr>
<tr>
<td>Balinciagao Norte (includes Bantiyao, Pogong, Dalimgao, Patakan and Simangan barrios)</td>
<td>120</td>
</tr>
<tr>
<td>Ableg</td>
<td>86</td>
</tr>
<tr>
<td>Pogong (includes Yugyug sitio)</td>
<td>75</td>
</tr>
<tr>
<td>Malucsd</td>
<td>70</td>
</tr>
<tr>
<td>Dalupa</td>
<td>79</td>
</tr>
<tr>
<td>Dangtalan (includes Puapo and Lonong sitios)(^8)</td>
<td>70</td>
</tr>
<tr>
<td>Guina-ang</td>
<td>109</td>
</tr>
<tr>
<td>Galdang (includes O-olosan sitio)</td>
<td>55</td>
</tr>
<tr>
<td>Bagtayan (includes Lisong sitio)</td>
<td>55</td>
</tr>
<tr>
<td>Balatoc</td>
<td>217</td>
</tr>
<tr>
<td>Batong Buhay(^9)</td>
<td>51</td>
</tr>
<tr>
<td>Colayo</td>
<td>120</td>
</tr>
</tbody>
</table>

Table 3.4. Estimated Household Counts for Pasil Communities: 1988.

Two of these fifteen Pasil communities, Balatoc and Colayo, are physically and socially peripheral to the rest of the Pasil villages in the core of the Pasil municipality (Figure 8).

\(^8\) Other estimates for Dangtalan exclude the sitio of Puapo from analysis. Although no Dangtalan residents now live in Lonong, it is technically a sitio of the village and occasionally includes inhabitants.

\(^9\) Batong Buhay is an industrial/residential barrio for individuals employed at the mines. Workers live in temporary bunkhouses, and few people claim legal residence in Batong Buhay, which is not considered a political unit in Pasil. The few Batong Buhay residents are subsumed as part of Balatoc.
3.3. Colayo is an enclave of emigrants from the Tulgao community in the Tinglayan municipality (to the south). This village lies 23 km west of Balatoc and is outside of the Pasil exchange network. Balatoc's close relationship to the Batong Buhay mining economy has made it largely autonomous from the rest of Pasil. Balatoc residents are wealthier and enjoy more modern (westernized) amenities than do other Pasil residents; one of these is a primary reliance on metal (rather than earthenware) cooking pots. Residents in Pasil's core communities emphasize the fact that Balatoc and Colayo are politically but not socially integral to the Pasil River Valley. For these reasons, the study region focuses on the thirteen core Pasil communities and in most cases excludes Colayo and Balatoc from analysis.

Pasil Kalingas divide the core communities into two distinct sociopolitical segments on the basis of drainages and elevation (Figure 3.4). These segments, Lower and Upper Pasil, are divided by the Tabia and the Catalbawan streams (Lawless 1977:17). "Upper Pasil" consists of the greater Guina-ang community (Bagtayan, Galdang, Pogong, and Malucsad), Dangtalan and the western communities of Batong Buhay and Colayo. "Lower Pasil" includes Dalupableg, Magsilay, Balinciagao, and the settlements within Cagaluan.10 This Upper-Lower Pasil distinction has social, political, and economic implications that have been described elsewhere (Aronson et al. in press; Lawless 1977:105-106; Longacre and Stark 1992).

Recent History and the Modern World System

Kalinga populations have not been isolated from the outside world during the last three centuries, although the greatest degree of contact has occurred after the installment of the American colonial administration. Kalinga history in the last 50 years is characterized by the

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10. Lawless (1977) uses different names but similar boundaries to divide the municipality into "Upper Stream" and "Lower Stream" and into west, central and eastern Pasil.
Figure 3.3.  The Pasil Municipality.
Figure 3.4. Upper Vs. Lower Pasil.
ever-increasing incursion of outside interests, specifically in the domains of commercial mining, logging, and hydro-electrification. An additional force of change comes from the immigration of lowland Ilocanos seeking farmland into areas previously controlled by highland populations (DeRaedt 1991:358). East of the study region, in the lowland plains surrounding the provincial capital of Tabuk, Ilocanos comprise a substantial local population.

Mining and logging companies that have operated sporadically since the 1930s provide an intermittent source of wage labor, have maintained and enlarged the road systems, and in some areas, have introduced electrification. In 1982, for example, 50 percent of the total land area in Kalinga-Apayao was allotted for lumber companies by the government (Cleto 1986:45). The mining and logging industries have forced modernization in Kalinga municipalities and stimulated the influx of non-Kalinga goods into the region over the last several decades, with mixed results (see also Magannon 1984:258). Widespread deforestation has resulted from commercial logging north of the Pasil municipality, thereby reducing the total forested area available for swidden agriculture. A ban on access to remaining forest areas was begun by the nearby Cellophil pulp and logging corporation in 1977, and trespassers who harvest forest resources are stiffly fined (Dorral 1980).

A massive, four-dam hydroelectric development project undertaken by the Philippine government sought to construct the Chico River Dams in the Kalinga area to provide electrification to (non-Kalinga) urban areas.11 First conceptualized in 1965, dam construction appeared feasible in the 1970s with the rising price of oil and the threat of an energy crisis.

11. In a discussion of the true beneficiaries of the hydroelectrification projects, Magannon (1984:259) notes with irony that people living barely a kilometer from the Ambuklao and Binga dams (in Benguet Province) lack electricity in their own homes.
(Cariño 1980:2). Government efforts in the study region concentrated on the Chico IV dam, to be located at the GaoGao/Tommiangan site (Tabuk municipality) just east of the study region. Construction of the Chico IV dam would have directly submerged the Pasil barrios of Ableg and Cagaluan, which lie immediately east of Dalupa.

Kalinga opposition to these efforts, which would have entailed the relocation of 10,000 Kalingas, as well as Bontocs, provoked the incursion of Philippine military and federal employees into the area (Cariño et al. 1979). The Philippine military involvement provoked the entry of the New People’s Army or NPA (the military arm of the Philippine Communist Party) to strengthen the anti-government battle (cf. Rocamora 1979; Winnacker 1979). One result of the Chico River development project was the introduction of non-Kalinga values and commodities, of particular interest to this study. A second result of the Chico River dam project is that the New People’s Army has now become entrenched throughout the Kalinga municipalities, and so, consequently, have skirmishes between the NPA and the military that often endanger the safety of Kalinga residents.

The Village of Dalupa

The community of Dalupa (Figure 3.5) is one of three Pasil settlements that underwent intensive study during the KEP. The settlement of 79 households is perched on a gentle slope. A cemented set of steps, constructed in the early 1980s, links the terrace-like levels upon which houses are perched from the top to the bottom of Dalupa.

The placement of Dalupa’s five divisions or wards holds some indication of the process of village development. The three central divisions split the main community elevationally and contain the majority of Dalupa households: lap-at ("upper"), gawa-an ("middle" or "center"), and dola ("lower" or "below"). Two additional divisions, Sacwilig (to
Figure 3.5. The Village of Dalupa.
the southeast) and Molayong (to the west), contain fewer households and appear to be relatively recent additions to the community structure.

Oral tradition has it that Dalupa was settled by residents from Guina-ang and Ableg sometime prior to the turn of the century (Barton 1949:35; Dozier 1966:57). Just when Dalupa was founded is unknown, although it must have occurred some time prior to the turn of the century, since a 1901 peace pact between Dalupa-Ableg and Lubuagan was recorded by Dozier (1966:270). Table 3.5 lists visits by outsiders to communities in what is now the Pasil Municipality and provides some time-depth for the age of these villages, including Dalupa. Barton describes the rupturing of a peace pact between Dalupa-Ableg and Lubuagan and Dalupa-Ableg in 1938 "on account of the wounding of one of its citizens" (Barton 1949:170, Table 3; 204).

Dalupa is famous today throughout the Pasil municipality for several reasons. Dalupa residents engage in a variety of economic activities that are discussed in this chapter and in Chapter Six. Most notable, however, is Dalupa's intensified scale of pottery production for exchange. About 48% (38/79) of Dalupa's households contained active potters in 1988, which is why a Cagaluan resident called Dalupa the "banga [pot] factory of Pasil."

Dalupa is also known for its continued association with the hated Chico River Dam government project through its residents' employment with the National Power Corporation (NPC). Although the dam project was permanently canceled in 1986 by Corazon Aquino's government, this affiliation has tarnished the community's reputation. The NPC smear was evident in the 1988 political sphere, when Dalupa's involvement with the Chico Dam became a major issue in the Pasil mayoral campaign and election (a Guina-ang candidate beat the Dalupa candidate). Dalupa also has a reputation as a den of vice because of gambling, a
practice currently prohibited from several (more Christianized) Pasil barrios. Gambling persists among Dalupa men (and visitors), as do losses of farmland and homes, despite outcries from Christianized Dalupa women.

1837
Spanish in Pasil area: reports ordered the punishment of the Guinaanes of Kalinga, along with other places in 1837 (Scott 1977:224).

1885
Trip through Pasil area by Dr. Hans Meyer; travelled to Guina-ang and Balatoc part of round-the-world trip (Scott 1977:277).

1887
Schadenberg (1881) reports a Spanish military post at "Balitokan" in the region of Guinaang on the Pacil (sic) River (Dozier 1966:32).

1900
(March-May) Spanish Army under Aguinaldo (fleeing from Americans) reaches Lubuagan, where they set up camp for at least four weeks (Carrasco 1900, in Joaquin 1986:58-63).

(March 22) Spanish Army digs in line of defense that runs between Lubuagan and Guina-ang (Carrasco 1900, in Joaquin 1986:60).

(April 12) Spanish Army passes through Guina-ang, Magsilay and Cagaluan, heading toward Tabuk (Carrasco 1900, in Joaquin 1986:63-66).


1902
David P. Barrows (First Chief of Bureau of Non-Christian Tribes, est. in October 1901) makes trip that includes Ableg from (7/25-8/17) to establish a quarantine system against cholera.

1906/7
Dean Worcester and company (from Chicago Field Museum) travel through the Pasil area.

1907
First American administrator (Walter Hale, or "Sapao") arrives in LUBUAGAN (Wilson 1956). American administration continues into Samuel E. Kane's tenure (begins 1915)

Table 3.5. External Contact with the Pasil Municipality.
1925
Belgian Fathers of the Congregation of the Immaculate Heart of Mary establish a mission in Lubuagan, under direction of Father Francisco Billiet (Dozier 1966:45).

1926
American Pastor Noll introduces Protestantism into Lubuagan (Awing 1988). American missionaries from United Evangelical Church visit Pasil barrios of Dangtalan and Dalupa in subsequent years (1930s)

1927

1929
Non-Kalinga operated mines functioning at Balatoc in 1929 (Fry 1983:174).

1930s
Mining companies actively prospect the Balatoc area to develop Batong Buhay mining operations (Fry 1983:186).

1945
(April) Japanese interred in Batong Buhay (near Balatoc) and in Lubuagan.
Americans bomb Lubuagan and the Japanese leave Kalinga dispersed, moving toward the Cagayan valley (Awing 1988).

1964-1967
Anthropologist Michiko Takaki takes up residence in Uma settlements to conduct field research.

1969
Two Japanese tourists stumble into Pasil area; witness the accidental death of Catalino Kinao’s son (Guasi) in December by a Lubuagan man (Awing 1988).

1973
Anthropologist William Longacre makes initial visit to Pasil area.

1974

Table 3.5. External Contact with the Pasil Municipality (cont.).
1975
PANAMIN (Presidential Assistant on National Minorities), begun in 1968, comes to Kalinga via helicopter (Drucker 1988).

Government moves installation of 700 Philippine Constabulary to site of Chico IV (GaoGao/Tommiangan) to back up the 150 man provincial force (Drucker 1988).

The Kalinga Ethnoarchaeological Project begins in Dangtalan; William Longacre remains in Pasil Municipality until mid-1976.

1976
Contact begins between NPA and the Kalinga (Drucker 1988).
Batong Buhay mines reopened by "Echo Asia" (Awing 1988).

1978
PANAMIN leaves, but Constabulary remains in large force (Drucker 1988).
NPA enters in full force to offer support against the government (Drucker 1988).
Philippine military come to live in Dalupa as part of the Chico River Development Project (Awing 1988).

1980-1988
NPA remain in area, as do Philippine military who live in GaoGao/Tommiangan. Clashes between NPA and Philippine military periodically occur.

1986
President Corazon Aquino officially cancels the Chico River Dam Project.

1987
(September) Lubuagan men kill a Dalupa resident in his field, and rupture the Dalupa/Ableg-Lubuagan peace pact.

1987-1988
Kalinga Ethnoarchaeological Project returns for year-long field season; project members reside in three separate Pasil villages and conduct fieldwork in three other communities.

1993
Tribal warfare erupts between Lubuagan and Pasil communities (specifically Balatoc); area is again plunged into tribal warfare.

Table 3.5. External Contact with the Pasil Municipality (cont.).
Dalupa's reputation within the Pasil River Valley has everything to do with economics. Intensified ceramic production and NPC work are off-farm employment alternatives for a community with inadequate farmland resources, a relationship that is explored in Chapter Six. Gambling has exacerbated some households' need for income as rice fields and houses have been lost. In terms of 1988 population size, Dalupa (with 79 households) stands half-way between Dangtalan (with approximately 64 households) and Guina-ang (with approximately 109 households). But in terms of per capita assets, Dalupa is the least wealthy and is located in the area having the least natural resources (primarily forests and farmland) of the three communities studied (Kobayashi 1989). In many respects, Dalupa is also the most traditional village under study by the KEP. It has the lowest rate of emigration and the highest rate of endogamy of all three communities (Ibid.). Dangtalan residents, at least, view Dalupa people as more superstitious (and more traditional) than themselves.

**Dalupa demographics.** In the 79 households recorded in the village of Dalupa in 1988, 399 individuals maintained residence within the community. An additional 65 Dalupa-born residents lived outside of the village; 54 of these individuals lived outside the Pasil Municipality entirely, while the remaining 11 lived in other Pasil barrios. Among those Dalupa people who lived outside of Pasil, a majority (n=37) lived in or around the provincial capital of Tabuk. This includes two entire households who moved to Tabuk for employment in the clerical and agricultural sectors.

No information was available regarding the occupation of 14 people within the group. The remainder were engaged in either wage labor (n=28, including 9 dependents) or educational training in the regional capital of Tabuk or elsewhere (n=12). Most Pasil male household heads send remittances home to their families when they work in areas distant from
However, no information was collected on the size or frequency of remittances that Dalupa residents received from distant relatives.

Over two-thirds of the Dalupa students who lived outside of Pasil did so to attend high school. Dalupa lacks a high school, and parents with means to do so send their children to Tabuk to obtain a better quality high school education than that offered in the Pasil high schools (one--Tukol--in Ableg, and one--DEMS--in the municipal seat of Amdalao). One Dalupa youngster also attended trade school in Tuguegarao, while five were enrolled in college in Tabuk, Tuguegarao, and Isabela.

Table 3.6 presents demographic data derived from population census data collected during the 1987-1988 field season. Only those individuals residing in Dalupa were used to derive demographic information, since it was not clear whether those 65 had permanently or temporarily emigrated. The categories "males" and "females" contrast dependents (here defined as individuals younger than 18 years of age) and adults (all those over 18 years of age). The average Dalupa household contains approximately five persons, equally distributed between the two sexes and between adults and dependents.

<table>
<thead>
<tr>
<th>PERSONS/HOUSEHOLD</th>
<th>MALES/HOUSEHOLD</th>
<th>FEMALES/HOUSEHOLD</th>
<th>ADULTS/HOUSEHOLD</th>
<th>DEPENDENTS/HOUSEHOLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.13</td>
<td>2.70</td>
<td>2.58</td>
<td>2.66</td>
</tr>
<tr>
<td>Median</td>
<td>5.00</td>
<td>3.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Min.</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max.</td>
<td>12</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

TABLE 3.6. Dalupa Household Size/Composition Data: 1988 (n=77).
Population increase has characterized the Cordilleras (and perhaps in the study region) since at least 1913 and may be the primary incentive for the development of irrigation agriculture in rice terraces (Keesing and Keesing 1934:185). Gradual population growth through time is evident in Dalupa household counts and total population estimates at different points in time, as presented in Table 3.7 (for similar trend in Dangtalan see Graves [1991] and Lawless [1977]). Only figures reported in the literature for Dalupa alone (i.e., not for the Dalupa-Ableg or Dalupa-Ableg-Magsilay groups) are listed in Table 3.7.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NUMBER OF HOUSEHOLDS</th>
<th>NUMBER OF PEOPLE</th>
<th>INFORMATION SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1933</td>
<td>50</td>
<td>N/A</td>
<td>Lawless (1977:63)</td>
</tr>
<tr>
<td>1955</td>
<td>31</td>
<td>120</td>
<td>Kobayashi 1989^12</td>
</tr>
<tr>
<td>1965</td>
<td>45</td>
<td>200</td>
<td>Kobayashi 1989^13</td>
</tr>
<tr>
<td>1974</td>
<td>71</td>
<td>340</td>
<td>Lawless (1977:18)</td>
</tr>
<tr>
<td>1988</td>
<td>79</td>
<td>400</td>
<td>this study</td>
</tr>
</tbody>
</table>

Table 3.7. Reported Figures for Dalupa Household Counts and Total Population Since 1933.

A second indicator of population growth lies in increased household size through time. Data from the 1988 Dalupa population census are reconstructed for different points along the last three decades (Figure 3.6). Dalupa household size has steadily increased since the mid-

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^12. Estimates were derived through reconstructing households from the 1987-1988 population census data. Variations in estimates may reflect this calibration approach.

^13. See note 12.
Figure 3.6. Reconstruction of Dalupa Household Size from 1958-1987 (Adapted From Kobayashi 1989).
1950s, a pattern also noted in Dangtalan (Kobayashi 1989). The steadily increasing Pasil population has outstripped its available subsistence resources, as evidenced in the increased rates of work-related emigration and the intensification of non-agricultural specializations.

Both Dalupa and Dangtalan, the two villages intensively studied by the KEP, responded to this strain on resources by implementing two strategies: subsistence diversification and work-related emigration. Subsistence diversification involves both cash-cropping (in Pasil, coffee cultivation) and intensified pottery production; ceramic production is discussed extensively in Chapters Five and Six. Work-related emigration is explored in the next section as a source of income and as an agent of cultural change.

**Off-farm employment and work-related emigration.** Internal demographic pressures have compelled Pasil Kalinga to seek sources of off-farm employment. Very limited off-farm employment opportunities are available within the Pasil municipality’s boundaries. Two common alternatives are tenant farming (tobao) and daily agricultural labor during periods of peak labor demands; these are described in detail in Chapter Six.

The Chico River dam era (i.e., from the mid-1970s to the early 1980s) was the only period in which myriad non-agricultural employment opportunities were available within Pasil’s boundaries. During that time, the Batong Buhay mine near Balatoc was in full operation, and the government sponsored a series of dam-associated construction projects. Mining employment opportunities for men in some villages -- like Dangtalan -- burgeoned during the 1970s and 1980s, and work was lucrative but brief in duration. Similarly, work opportunities through the Chico River Dam were both temporary in duration and politically charged.

Most of those jobs disappeared after the early 1980s, and very few Pasil men are
employed full-time in mining or construction activities today. Occasional work is available, such as working on road construction crews and implementing construction projects for each barrio (mandated by the Kalinga Special Development Region office in Tabuk); these are short-term and sporadic sources of cash. Poverty-stricken Dalupa households may borrow money from wealthy households at as much as 20 per cent/month. The Kalinga rate is high relative to other Cordillera lending rates: Voss (1987:135) found a 4-10 per cent monthly rate in the Sagada (Bontoc) area. A handful of governmental positions, as officials or in the local schools, provide annual employment for some Pasil residents.

Pasil Kalingas are also taking advantage of an increasing variety of employment opportunities beyond the municipality's boundaries. More common alternatives for Dalupa residents include work as agricultural laborers in the Tabuk municipality or work as tenant farmers on lowland rice farms (Eder [1982:103] notes a parallel situation in Ifugao). Two families had relocated to the Tabuk and Pinokpok area to work as tenant farmers for the entire duration of the 1987-1988 field season; typically, a few household members emigrate for agricultural work.

Other Tabuk area job opportunities lie in government work (for those who are college-educated) and in domestic employment. The few Kalingas who venture outside of the province often work in mines in northern Luzon, sometimes resettle in southern and central Luzon (particularly in Manila), and even less occasionally go to the Middle East to fulfill multi-year job contracts with multi-national corporations.

Education and related impact on child-rearing. Elementary and (some) secondary schools have existed in Kalinga communities since the early years of the American administration, and Kalingas have always placed a high value on education (also see Dozier
Schooling provides training for professional employment, especially in the public sector as teachers or other types of government employees. The public school is both an educational medium and an agent of acculturation: college educated Kalingas often emigrate from their natal communities to larger population centers where employment opportunities are available.

More children attend schools in both communities now than ever before, and young women attend school in higher proportions than do young men. Educated women marry later, have a greater tendency toward exogamous marriage (with partners they have met outside of Dalupa), and have a smaller number of children. To what extent education will intensify culture change in Dalupa depends on a number of factors: the proportion of children that complete high school and go on to college, the rate of emigration for college-educated Dalupa residents, and the availability of unskilled labor jobs within Pasil all will affect Dalupa's future.

Summary

This chapter has placed the study region and its potters into cultural and historical context. Dalupa potters ply their trade in an economic and political arena in which social and ethnic boundaries are all important. Throughout this chapter, I have emphasized factors involving physical and political geography that have shaped the study region through time. Particular aspects of Kalinga culture have fascinated earlier ethnographers and have, in so doing, crystallized the Kalinga into a timeless entity. However, all aspects of Kalinga culture - including custom law and tribal warfare -- are part of a larger dynamic historical process, within which Kalinga studies must be placed.

Surely, no cultural group is a static subject of study, and Kalingas are no exception.
The last fifty years have ushered in substantial changes in the political and economic systems. The impact of the modern world-system has been less profound on the Kalinga technological system, largely because the study region is located in a socially marginal area that receives little governmental funding for developing the infrastructure, such as roads and commerce. I have tried, in this chapter, to demonstrate that Kalingas are actively involved in culture change, and that they exert some control over the degree, and perhaps the forms, of acculturation that they embrace.

Having described the Kalinga research setting, I move in Chapter Four to an explication of research methods and data collection procedures. Clearly, data are never theory-free, nor are data ever free from various biases. In the next chapter, I discuss some sources of bias that must be considered to evaluate the data sets whose patterning is interpreted in Chapters Six through Eight.
CHAPTER 4

METHODOLOGY AND RESEARCH TECHNIQUES

No matter how sophisticated our methodological analyses or how elegant our theory construction, if our primary data-gathering techniques are faulty, then our theories and methodologies will be but elegant exercises in futility (Salamone 1979:57).

Few extant ethnoarchaeological studies discuss the methodology and research techniques underlying their field research. This is a problem when one wishes to synthesize comparative data from multiple research settings. Some aspects of the ethnoarchaeological approach require the development of entirely new research tools (Schiffer 1978:234). However, other aspects of ethnoarchaeological research require improvement that is found by tapping into the vast literature in cultural anthropology on ethnographic fieldwork. The selection of a field site, the establishment of units of observation, and various field research techniques are important to both ethnographers and ethnoarchaeologists who work in non-industrial settings. Advances in such research enhance the reliability and accuracy of ethnoarchaeological research.¹

My evolving research design and research techniques employed in this study are described in this chapter. By methodology, I refer to sets of procedural rules that I used to conduct field research. By research techniques, I refer to the practical steps involved in primary data collection. The chapter’s first section discusses my evolving research design. In the next section, the rationale for my field strategies and field research techniques are presented. The final section of this chapter addresses potential biases in the field research.

¹. "Accuracy" as used here refers to the degree to which scientific observations actually measure or record what they purport to measure. "Reliability" refers to the replicability of scientific observations by other researchers (see Pelto and Pelto 1978:33).
Most of the research discussed in this study was conducted in Dalupa, though my field research included work in three communities (i.e., Dalupa, Dangtalan, and Cagaluan). In Dalupa, three local residents assisted me: Josephine Bommogas, Narcisa Waggawag and Amy Awing. Three field assistants from Dangtalan also helped me to collect parallel Dangtalan data on ceramic production and exchange: Rosalina Busog, Cristina Tima and Brenda Dumayag. My selection of a specific community within Cagaluan for the household pottery inventories was based on the availability of Bini Bulawit, a Cagaluan man who had married into Dangtalan. Bini accompanied me to his natal community in Cagaluan on each research trip and served as my interpreter and assistant.

Research Methods

The evolving research design. I arrived in Dalupa in early October 1987 and completed my fieldwork in late June 1988. Pottery exchange was my primary research concern coming into the field. Part of the proposed 1987-1988 Kalinga Ethnoarchaeological Project (KEP) involved a subproject in another municipality south of Pasil, along the Tanudan River (Longacre 1991). The village of Lubo, one of several pottery-making communities in the Tanudan municipality, was scheduled to be a project field site and I wanted to work there. However, Lubo was inaccessible by truck, overrun by the openly anti-American NPA (New People’s Army), and tribal warfare raged between Tanudan and Tinglayan communities. Our Pasil assistants persuaded us that Lubo was politically unstable and prohibitively distant (a long day’s hike) from the project’s base. Pasil communities proved accessible and amenable for my research questions.

In my revised (i.e., Pasil Municipality) research design, I wished to compare pottery exchange in Dangtalan and Dalupa. Dangtalan was to be included in the study, since earlier
work on pottery exchange had focused on that village (Graves 1991, 1993). However, the
KEP (involving three to seven or more non-Kalinga Philippine college students, many of
whom were expressly interested in pottery) and the project-generated demand for ceramic
vessels inflated the scale of Dangtalan pottery production and exchange. Literally hundreds of
Dangtalan pots were made for a use-alteration study in Guina-ang (Skibo 1992) and for
museum collections (see Longacre 1992). It was clear that the project's presence in Dangtalan
inflated the scale of pottery production (particularly for the KEP and, to a much lesser extent,
pottery exchange.

That left Dalupa, where the scale of pottery making had escalated since Longacre's
1975-1976 research and where few project members resided during the 1987-1988 field
season. Field research accordingly focused on collecting quantitative data on demography,
economics, and the ceramic system in Dalupa. I collected parallel data in Dalupa and
Dangtalan (travelling to the latter village at least once a week) but focused on Dalupa to
collect more detailed economic, demographic, and ceramic-related information. The first three
months were spent gathering baseline data on the community and on Dalupa potters through
interview-based forms. Using these Dalupa data enabled me to expand my research focus by
January 1988 to examine ceramic production, distribution, and consumption as an integrated
set of concerns.

Research was guided by two objectives: (1) to systematically explore the relationship
between agricultural intensification, land shortages, and community-based ceramic
specialization in Dalupa; and (2) to collect quantitative data sets on aspects of specialized
ceramic production and the resulting distribution system. Earlier studies had called for such
research (e.g., Rice 1987b; van der Leeuw 1984a) to complement the few extant studies of
metric morphological standardization available at that time.

The baseline Dalupa data also helped me to identify relevant variables with respect to ceramic production, distribution, and consumption. Measures I developed for these variables involved both rank and numerical levels of measurement (Johnson 1978:52-53). These measures were standardized into a series of forms; the forms underwent evaluation and refinement with various Kalinga assistants. Having reached consensus on each form’s design, we mimeographed forms at the Pasil Poblacion, the municipal seat (identified on Figure 3.4), with the permission of local officials.

My field research in Dalupa captured the production center viewpoint. My original plan, to visit the full array of consumer communities where Dalupa products were found, was foiled because of tribal warfare (including Dalupa and Cagaluan, among others) and highway banditry. The sample of consumer communities was thus restricted to Pasil localities (Cagaluan, Guina-ang, Malucsad). Data on the remaining thirty or more receiving centers were collected through potters’ reports of exchange transactions in these communities (in the Pottery Exchange Log).

Intensive research in Dalupa provided data on ceramic production, consumption and distribution. Along with recording information on ceramic technology, locations of potter workshops and firing areas were identified, and the scale and seasonality of ceramic production were recorded. Pottery household inventories were collected from three pottery consuming villages in Pasil along an east-west axis to supplement inventories from households in the two pottery-making villages of Dalupa and Dangtalan. Information from these five Pasil villages (Dalupa, Dangtalan, Guina-ang, Malucsad, and Cagaluan) provide data on ceramic consumption and distribution (e.g., Longacre and Stark 1992). These data have
already been used in an analysis of household pottery assemblages to identify household-based material correlates for production centers versus receiving centers (Longacre and Stark 1992). Household assemblage variability is further explored in Chapter Eight.

**Units of analysis.** In research on consumption, the central unit of analysis was the household; in research on production, the central units of analysis were the producer and the household (which might contain several potters). These data are aggregated to form the third unit of analysis in research on Dalupa ceramic production and consumption: the community.

Households are a common unit of production and consumption in agrarian societies (e.g., Netting 1990:60), and form the primary economic and social unit in Kalinga (Takaki 1977). Difficulties in using the household as a unit of analysis were encountered in two areas during the Dalupa study. The first problem lay in defining the boundaries of individual households, which transcend the nuclear family structure (see Kramer 1982:21 for parallel concern).

Three Dalupa houses contained two households under a single roof, "each with their own possessions and carefully separated consumption budgets" (White 1980:11). These were treated as separate households under a single roof. The extended household or "faction" (a Kalinga term) is also an important economic unit in Kalinga (Dozier 1966:61-64), but I followed convention established in previous studies (e.g., Dozier 1966; Takaki 1977) and focused on the household. At least fifteen "factions" or extended family groupings exist in Dalupa, and potters are found in all of them. However, a disproportionate number of the active potters (n=15) are from a single faction, while another faction contains five more of the most active Dalupa potters.

Differences in domestic developmental cycles under-represented wealth in certain high-
status households (White 1980:21) and accounted for a second, and more minor, problem encountered during my field research. Fortunately, the presence of key material possessions -- such as carabao, porcelain, and (in some cases) electronics -- distinguish the wealthy (bacnang) from the less affluent (kapus) households. Differences in the degree of wealth among the bacnang would require a detailed analysis of inheritance patterns for each household, a task that is not included in this study.

**Sampling concerns.** Alternative methods for obtaining a representative sample were considered regarding the regional exchange system and the Dalupa potter community. A sample of the total population involved in the Dalupa pottery exchange network (both within and beyond the Pasil municipality) was impossible for scalar reasons. The 50 or more Dalupa potters each have sets of regular customers in multiple communities (Stark 1992). There are also customers who are involved in single transactions with the potter, and whose names are quickly forgotten. These sets partially overlap, but include hundreds of individuals over an annual cycle.

In the Dalupa pottery exchange network, the theoretical population includes 11 Pasil communities and at least an additional 29 non-Pasil communities. Original research plans aside, I ended up sampling the exchange network through four Pasil nodes beyond Dalupa, and in three of these nodes -- Dangtalan, Guina-ang, and Malucsad -- all of the households were inventoried. Judgmental sampling (Mueller [ed.] 1975) in Cagaluan led to approximately an 80 percent sample of Cagaluan households, or all households whose members were both available for, and willing to participate in, interviews. Field research involved approximately half of the Pasil communities that were intimately involved in Dalupa pottery distribution and consumption.
With regard to the Dalupa pottery community, sampling was straightforward and thorough: the sample and the empirical population were the same. My prolonged stay in Dalupa allowed me to collect data from all locally recognized potters who were resident in each community. This sample includes inactive and retired potters, who stopped pottery production because of age, infirmity or conflicting responsibilities such as child care. In sum, 56 Dalupa potters were included in my analysis, of whom 47 made pots between 1987 and 1988. About 39 of those women were active producers during 1988, making vessels for trade as well as for their own use. The scale of production varies among active potters, who were divided by Dalupa assistants (with aid from neighbors) into "expert," "active," and "beginner" potters. These distinctions are used in Chapter Six in an examination of ceramic specialization.

Research Techniques

Cultural anthropology can provide ethnoarchaeologists with useful examples of research techniques. The types of research questions that ethnoarchaeologists and ethnographers pursue in their field research differ, but many research techniques are similar. Furthermore, validity and reliability are the same criteria by which field research in each domain should be judged.

Myriad problems with informant-derived data have been explored in a burgeoning literature, where topics range from observer bias on informant responses (e.g., Hodder 1986; Mulder and Caro 1985:329; Pelto and Pelto 1978:74) and the selection or self-selection of

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2. Several women whose names were listed in household pottery inventories as having made pots were excluded from analysis. They made no pottery during the 1987-1988 field season, nor were they recognized as potters by Dalupa residents. Also, three or four recognized potters were neither resident nor active in Dalupa during the study. These women were also excluded from the sample.
informants (e.g., Freeman et al. 1987; Johnson 1978:58) to difficulties related to informant accuracy (e.g., Bernard et al. 1984). Non-obtrusive measures and observational data are less biased than informant-derived data (Nachman 1984; Pelto and Pelto 1978; Schiffer 1978). Non-obtrusive measures provide easily quantifiable data. Such quantitative measurement ensures reliability and comparability in cross-cultural research and permits statistical rigor (Johnson 1978:43-45; Mulder and Caro 1985:124). However, non-obtrusive measures are also time-consuming and expensive in field research.

For reasons of practicality, tradition, and scope, however, sound anthropological field research relies on a combination of informant-derived and observational data (see Marshall and Rossman 1989:102-104 for evaluation of techniques discussed in this section). Methodological research continues to improve the quality of informant-derived data collection strategies (e.g., Bernard et al. 1984; D’Andrade 1974; Freeman et al. 1987). The following sections describe both informant-derived and observational data.

**Primary data collection procedures.** I attempted to determine the most practical, effective and feasible techniques for collecting data as my field research progressed. Primary data collection procedures therefore utilized a combination of informant-derived strategies and a series of observational records. The former strategy followed the time-hallowed tradition of ethnographic fieldwork, using a combination of behavioral observation, open-ended and structured-domain interviewing. The latter strategy took the form of observational records of ceramic production and exchange.

The following forms were developed during the field season and provide baseline information for this study (these are found in Appendix 2):

1) Household Pottery Inventory
2) Population Census
3) Economic Questionnaire
4) Additional Material Inventory
5) Production Potter Survey, I and II
6) Sources of Materials for Potters inventory
7) Potter Productivity Log
8) Pottery Firing Log
9) Pottery Exchange Log
10) Origin of Non-Traditional Forms
11) Non-Pasil Municipality Trade Survey

A copy of each form is included in Appendix 1.

Field data collection. Data used in this study were collected through work done with and by Kalinga assistants employed through the KEP. Some of the assistants also became key informants (see Pelto and Pelto 1978:71-75). Assistants who also served as key informants had completed high school, and many had college degrees. Many women assistants were employed as teachers in local schools, in the civil service, or in other governmental positions. Male assistants had spent time outside of the Pasil municipality (and some, outside of the Kalinga-Apayao Province) engaged in wage-earning occupations. The cosmopolitan character of these assistants proved useful in travel throughout the municipality and in day-to-day interactions.

The use of Kalinga assistants was essential for my research for linguistic reasons. Most Kalingas are multi-lingual, and most educated Kalingas over the age of 40 speak English as a second or third language, having been educated during the American colonial administration. However, most potters in Dalupa lacked advanced education. Subsequently, few were fluent in English and conversed instead in the Kalinga dialect. Takaki (1977:vi-vii) estimated it took her one and a half years before she could speak Kalinga. By the end of the season, my host family primarily spoke Kalinga in the house and I understood sufficient
Kalinga to follow household conversations and to understand responses to interview questions.

The filter that resulted from my reliance on Dalupa assistants could, potentially, bias the results of my research. However, the use of Dalupa project assistants appears to have exacted minimal damage on the data sets used in this study. Two of the three women came from a wealthy, extended family that maintained good relations throughout most of the community, and the third assistant came from one of the poorer families in the village. The types of data that we collected were not deemed personal, so that responses (discussed post-interview with my key assistant) were largely accurate. Some Dalupa residents found the questionnaires amusing, and many potters were delighted to find an appreciative audience.

Kalinga assistants participated in field research in many ways beyond acting as interpreters, including their work in data collection. My training and supervision of the Dalupa assistants facilitated the data collection process. Within four months, each of the three assistants was responsible for data collection for one or more logs and inventories used in this analysis. Accompaniment on data collection excursions allowed me to continuously monitor the quality of data recovery on different subprojects.

Informant-Derived Data

Informant-derived data included interviewing (open-ended and structured interviews with key informants and potters) and a series of surveys and questionnaires. Kalinga custom dictates that strangers be housed and monitored with members of the village elite (Lawless 1978:145-146). Accordingly, I lived in the home of one of the wealthier Dalupa families where we all shared meals and a variety of day-to-day social encounters. In such a situation, participant observation and "on-the-spot interviewing" (Bernard et al. 1986:384) is a daily part of life in the field.
Open-ended interviews helped to establish the protocol for structured-domain investigation (see Bernard et al. 1986:385). Through these interviews, key and elite informants provided large amounts of contextual data on long-term patterns in the socioeconomic structure of the community and the history of the Pasil River valley (also see Freeman et al. 1987:319). Open-ended interviews with groups of Dalupa potters delineated parameters of the exchange networks and trends in Dalupa pottery production. Interviewing groups of potters enhanced the reliability of data, as recall and consensus increased substantially over interviews with individuals (also see Bernard et al. 1984:510).

Open-ended interviews provided background for the construction, administration, and interpretation of structured interviews. Structured domain interviews systematically ask the same questions of every individual in a sample of informants (Bernard et al. 1986:385-386). The structured domain interview format was used to collect standardized data on demographics, economics, and consumption patterns. Each form contained a combination of open-ended, "pick"-type, multiple-choice and "order" type questions. The structured interview format proved quite successful in my research because of an almost non-existent refusal rate.3

The surveys, questionnaires, and logs used in this study involved multiple and lengthy visits to each Dalupa household. No monetary compensation was offered for time spent in these interviews. Such a gesture would be highly inappropriate in the Kalinga culture, where hospitality is highly valued. However, members of virtually all Dalupa households were indirectly compensated through the medical services, monetary loans, employment and gifts (of

3. One wealthy family, who was in continual social competition and conflict with my host family, refused interviews with one of my assistants (a daughter in my host family). However, they were willing to talk with me and I administered all forms and questionnaires to them.
clothing and food) that we provided during the field season. The following forms used the structured domain interview format (forms are contained in Appendix 1):

1) Household Pottery Inventory
2) Population Census
3) Economic Questionnaire
4) Additional Material Inventory
5) Production Potter Survey I and II
6) Sources of Materials for Potters Questionnaire
10) Origin of Non-traditional forms
11) Non-Pasil Municipality Trade Survey.

**Population Census.** A population census was administered to all 79 Dalupa households in January and February 1988. The population census recorded information on age, sex, birthplace, wage employment history, and educational background for every family member. Population censuses were completed for all Dalupa households under my supervision. I trained two Dalupa assistants, Narcisa Waggawag and Amy Awing, to conduct most of the census project on their own with daily monitoring of the forms and periodic supervision of the interview process.

**Economic Questionnaire and Additional Material Inventory.** I administered nearly all of the economic questionnaires to household heads between January and March 1988. The economic survey consisted of two parts: the economic questionnaire and the additional household material inventory. These surveys collected information on material possessions and on agricultural productivity. Rice fields, houses, and livestock are among the most valuable possessions recorded in Dalupa homes.

The relative amount of a household’s social prestige may not be reflected in terms of material wealth, depending on the stage in a particular household’s domestic cycle. Kalinga inheritance procedures transfer resources from parents to children prior to the parents’ death,
rendering them relatively poor for the rest of their elderly lives. Family-sponsored posipos celebrations honor family elders while sapping the family’s pooled resources; such events garner enormous amounts of social prestige for the family as well (see Voss 1987:131 for a Bontoc example). The Dalupa economic data, which assess wealth better than social prestige, are explored in Chapter Six.

**Household Pottery Inventory.** The household pottery inventory is the foundation of longitudinal Kalinga research begun in 1975 and reported in various articles. Household pottery inventories were administered to the majority of Dalupa households in 1975-1976 and 1979-1980. To continue this longitudinal research project, the household inventory data base was updated and expanded to include both new households and those overlooked in earlier seasons.

The household pottery inventory was administered to every Dalupa household. This same inventory was used in four other villages (Dangtalan, Guina-ang, Malucsad, and Cagaluan) during the 1987-1988 field season to obtain data regarding distributional patterning by village and other issues of interest to project members. The 1987-1988 form represents an updated variant of the original forms used by William Longacre in 1975-1976 to launch his pottery use-life study (see Longacre 1985).

In many ways, the household pottery inventory form is the most important data source for the KEP, since comparably collected information exists for all communities whose vessels were studied during the field season. The Dalupa household pottery inventory was also among the most (if not the most) time-consuming form to complete, requiring an extended block of time by the female household head. Interviews varied in length between 45 minutes and three hours, depending on the size of the household assemblage and the personality of the informant.
Farming and pottery-making activities made finding such time blocks (without inconveniencing residents) a challenge. Household inventory data collection began in November 1987 and was completed in April 1988. Many Dalupa potters are active year-round, so household inventories are not particularly susceptible to seasonal fluctuations. Pottery stockpiling, in anticipation of exchange trips, occurs periodically in a few households, but was only observed in one household during the inventory process.

**Production Potter Surveys (I and II).** Dalupa potters were the subject of numerous structured-domain interviews, all designed to acquire comparable information on potter age, ability, and productivity. The Production Potter Survey (Part I) was administered between October and early December 1987 to all active and retired Dalupa potters. This survey included questions on birth date and age potting began, a list of the potter's relatives and gross estimates of seasonal productivity, range of items produced, and the geographic range of individual's exchange network. Analysis of the Production Potter Survey aided in the development of quantitative measures: the potter firing log, daily productivity log, and pottery exchange log all represent outgrowths of the initial Production Potter Survey.

A follow-up survey, the Production Potter Survey II, was administered between April and May 1988. This second survey collected additional personal information from each potter on her level of education, motivations for intensified pottery production (where applicable), and the household's economic alternatives to farming their own land. Supplemental information on pottery making was also collected. Questions in the second Production Potter Survey probed time allocation issues vis-a-vis farming and non-agricultural economic activities. Future research will include time allocation studies.

**Sources of Materials for Potters Questionnaire.** The Sources of Materials for
Potters Survey inventoried all Dalupa potters regarding source areas for all raw materials and equipment used in the production process. Information on preferred clay, ocher and resin sources was collected with an eye toward chemical characterization research. The gradual change in use from indigenous (wooden) bowls to imported (enamelled metal) plates for use as turntables prompted questions concerning the sources of traditional wooden turntables.

The final subject addressed in the Sources of Materials for Potters survey actually concerned the division of labor rather than sources of raw materials. Field observations suggest that Dalupa potters engage in multiple authorship (sensu Kramer 1985) in most stages of the production process. That is, few vessels are made exclusively by a single individual. Potters were asked to list individuals (and their relationships to the potter) who participated at various stages of the production, firing, and exchange process. This was done by breaking down ceramic production into a sequence of steps.

**Origin of Non-Traditional Forms and Non-Pasil Municipality Trade Surveys.** By March 1988, various data sources made it clear that the trend toward ceramic specialization in Dalupa was characterized by innovations in the range of goods produced, and by an expansion in the geographic boundaries of the exchange network. Interviews (both open-ended and structured-domain) suggested that these changes occurred sometime after Longacre’s 1975-1976 field season. I designed two forms that systematically probed these changes: the Origin of Non-traditional Forms Survey and the Non-Pasil Municipality Trade Survey.

The Origin of Non-traditional Forms Survey was designed to explore the development of particular categories of non-traditional forms (ay-ayam). The surveys included open-ended questions and structured response categories. The survey was administered to each potter for each type of non-traditional form (e.g., ashtrays, flower vases, money banks, decorative...
plaques) that she produced during the field season. Potters specializing in non-traditional forms completed more than 20 surveys (with one survey for each form the potter made). The survey's format of standardized responses was tedious for both interviewer and informant. However, information from the survey effectively monitors rates of innovation and adoption at the assemblage level and at the level of particular forms (Stark 1991a; Stark and Longacre 1993).

The Non-Pasil Municipality Trade Survey was developed to chronicle the expansion of the Dalupa pottery exchange network. Information obtained through this survey produced a more systematic history of the development of the non-Pasil Dalupa exchange network than was available through open-ended and structured-domain interviews. Lists of barter locales (within and beyond the Pasil Municipality) had been obtained through the Production Potter Survey for each potter. Data from the pottery exchange log in subsequent months supplemented each potter's list. Multiple survey forms were administered to each potter, one for each non-Pasil barter locality she visited. Information was collected on the motivations for the potter's first visit to the locality, her travel companions, and her estimated frequency of visits in the last year.

Observational Data

Observationally-based data collection. Three logs were developed to monitor the scale of Dalupa pottery production, firing, and exchange throughout 1988. These logs involved a combination of observational and interview techniques that provided a regular record of potter activities in each household. Observationally-based research techniques are considered excellent because the resulting data are relatively free from informant bias, easily quantifiable, and amenable to statistical analysis. These logs employ direct, reactive.
observation (Bernard 1988:271-298) rather than non-obtrusive measures that are relatively free from observer effects (Bernard et al. 1986:388; Schiffer 1978).

In my field research, various advantages of non-reactive data collection techniques—particularly the lack of observer effect on the behavior of subjects under observation—were outweighed by practical considerations of cost and scale with respect to my research design. Through a modified system of monitoring (see Bernard 1988:272-278), I maintained records on all active Dalupa potters for a 12-month field season (i.e., from January 1988 to December 1988). The use of daily (rather than weekly or monthly) logs was designed to mitigate problems associated with informant memory decay, particularly in relation to exchange events (e.g., Bernard et al. 1984:509; Brumbach and Jarvenpa 1990:40-41; Freeman et al. 1987). The logs, as initiated in December 1987, chronicled potter productivity and exchange transactions on a twice weekly basis. By January 1988, logs were administered to Dalupa potters on a daily basis. This daily recording system was continued through late June 1988 (my departure from Kalinga) and records were kept at a similar rate by my assistant thereafter until March 1989.4

Maintaining regular contact with the Dalupa potters for the logs maximized reliability in data collection and established rapport with the potters. They were initially puzzled and flattered by my interest in pottery production and use when the observational logs were begun. As the months passed, however, potters often shouted their daily production and exchange activities to us as we went on our daily interviews, and even occasionally asked us for information regarding other potters' productivity.

4. Between July 1988 and March 1989, my assistant sent monthly updates on all three logs to me in Tucson.
This log-maintenance technique certainly has disadvantages compared with continuous monitoring, time allotment or non-obtrusive techniques. The continuous monitoring of potters in a handful of Dalupa households might have produced a more comprehensive record of ceramic production vis-a-vis other economic activities within a few households. Other techniques may also have generated slightly more accurate estimates of daily pottery production and exchange (but not pottery firing).

However, the observational techniques met my research needs better. I obtained a systematic record of pottery activities that monitored informant-derived estimates and increased the accuracy of my data in regard to production scale, geographic extent of the Dalupa exchange network, and the relative importance of various receiving centers in the exchange system. These logs documented daily pottery activities over a longer period of time than has ever been reported in ceramic ethnoarchaeological research.

Non-obtrusive measures certainly produce less biased data than do informant-derived research techniques and for studying short-term phenomena (see also Hayden and Cannon 1983:124-125). But they cannot on their own provide the full range of demographic and economic data required for a study of Dalupa pottery economics. The structured-domain questionnaire format facilitated large-scale data collection. Informants may provide untruthful information for a number of reasons, including the desire for economic profit (e.g., Hodder 1986) or personal amusement (lies as jokes) to strategies used to smooth over socially charged situations (e.g., Nachman 1984). However, Kalinga informants had little incentive to dissemble or lie about topics such as artifact use-life, demographics or pottery exchange transactions. Most of our research questions seemed so trivial or unimportant to them that many were puzzled or amused by questions that we posed to them.
Economic data were potentially the most sensitive class of information collected. However, I encountered no resistance in Dalupa after I made it clear that this information was not to be shared with the Philippine government. Information on household wealth proved surprisingly accurate during cross-checks by my assistant of farmholdings and livestock. Kalinga custom dictates that wealth be prominently displayed, on the hoof or on the wall (see also Dozier 1966). Informants openly and honestly shared information on their household's possessions.

**Potter Productivity Log, Potter Firing Log, and Pottery Exchange Log.** The productivity log was begun first and monitored pottery production on a daily level. The firing log was developed later (January 1988) to more systematically record the scale and variability of production for individual potters. The pottery exchange log, begun for some potters in November 1987, is a systematic record of all pottery exchange transactions in which each potter participated. Data from the three observational logs gauge the degree of exchange-oriented production by potter and evaluate informant-derived assessments of potter productivity and exchange networks.

Data for the Potter Productivity Log were collected daily from each potter. Initially, each potter was asked how many vessels she formed that day. Later in the project, my assistant recorded the number of vessels drying that she observed in each potter's workshop. The pottery firing log required that an assistant observe the end of each Dalupa firing episode; types and sizes of pots that each potter fired were recorded as she removed her vessels from the fire. The pottery exchange log is more intrusive than the firing log, as all 39 active potters in Dalupa were interviewed each day to record all pots they exchanged within or beyond
These daily interviews relied on short-term memories of informants, thereby avoiding the problems associated with memory decay in informant-derived data.

The Pottery Firing Log monitors the level of firing activity (and hence, of production activity) for each Dalupa potter. This log circumvents problems involved with informant-based information and assesses the scale of ceramic production for each producer. For each potter, the firing log records the date, vessel types and sizes fired, and firing partners. Firing episodes often involved groups of two to six individuals, depending on how many pots each potter needed to fire. During periods of high potting activities, some potters were involved in multiple firing episodes during the same day. Data from the potter firing log are used to develop objective measures of productivity that can be compared to emic perceptions of "expert" potters that were derived from field interviews.

The Pottery Exchange Log monitors the level of exchange activity for each Dalupa potter. Data on each transaction also defined the geographic scale of the Dalupa exchange network and provides a proxy measure of the contribution that ceramic exchange makes to each potter's household. Multiple pieces of information were recorded for each exchange transaction by potter: (1) the seller--who was not always the potter, since some women now act as intermediaries (2) number and kind (i.e., type, size) of pots exchanged (3) location of the exchange transaction (4) name of customer and her/his relationship to the potter and (5) barter equivalents (or in some cases, cash prices).

The volume of pottery exchange during 1988 and social turbulence precluded my accompanying potters on their barter trips. Non-obtrusive approaches to recording exchange transactions would have entailed a very restricted sampling program.
Researcher Bias and Data Collection

**Impact on research communities.** The data presented in this study are by no means unbiased. Bias is inherent in anthropological fieldwork, as each researcher takes a particular theoretical framework into the field that affects all levels of research. This framework permeates every aspect of data collection: in the selection of observational units, the determination of variables to measure, and even in the names of variables assigned to data after the fieldwork has been completed (also see Bernard et al. 1986:383). However, delineating major sources of bias mitigates their impact on the research program (Salamone 1979).

The most profound, and unavoidable source of bias came from our project's presence in the study region. Although our research focused on three communities (with limited research in two additional communities), our project deeply affected the entire Pasil Municipality. Visits by project members to other communities, and basic medical care that we provided (e.g., antibiotics, aspirin, anti-parasite medicine) in our three home villages, ensured that our project was known far and wide.  

The impact of our presence in different Pasil villages varied by community in direct relation to the number of resident project members and the length of their stay. Dangtalan was the project center, and that community was most affected by the KEP. The project's focus on pottery production gave Dangtalan pottery making a certain prestige that encouraged inactive potters to resume activities for the duration of our stay. The KEP also commissioned over 300 Dangtalan pots: 251 for the Guina-ang use alteration study (of which 189 were utilized, Skibo

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6. We ensured approval of our project in the eyes of the local New People's Army detachments by providing basic medical services, a prerequisite for working in the study area.
An additional 61 Dangtalan vessels were for museum collections (48 pots from new potters; 13 vessels from veterans).

My Dalupa assistant continued to collect Dangtalan pottery productivity and firing data after the KEP's departure from the field (for the entire 1988 year). These records demonstrated how profoundly the KEP disrupted the scale and seasonality of Dangtalan ceramic production: retired potters who had resumed potting and those who began potting during our stay in Dangtalan abruptly stopped their pottery making activities as soon as our project left Dangtalan. Consequently, Dangtalan data are not included in this study.

Dalupa fared better, since I was the lone project member to reside in the community for the entire project (other project members visited for short periods of time). About 400 Dalupa pots were collected for the KEP, or 12.5 percent of the total pots exchanged during the 1988 year. All project-obtained pots are excluded from analyses conducted on Dalupa exchange data (see Stark 1991a, 1991b, 1992, 1994), so that -- if anything -- the scale of Dalupa exchange is under-represented with 1988 data. Dalupa pottery production is sensitive to seasonal changes in rice availability, so that annual productivity varies. Comparisons of the productivity and exchange logs for January-February 1988 and January-February 1989 provide some indication as to whether some variability in the 1988 Dalupa data is attributable to the project's presence.

Assessing bias: production and exchange data. We can measure the extent of researcher impact on production, which would produce an inflated production scale, by examining ceramic production data from the productivity log. Using the Dangtalan case for comparison, we would expect that higher production rates in 1988 (during my tenure in Dalupa) than in 1989 reflect the impact of the KEP on Dalupa pottery production and
distribution. Production data were aggregated to the household level (which sometimes
entailed the output of two potters in the same household) since the household is the basic
analytic unit in this study.

Dalupa ceramic production and distribution data are available for the months of
January and February in both 1988 and 1989. January 1988 marked the beginning of the
productivity and exchange logs in Dalupa, while February 1989 marked the end of Dalupa data
collection. These months also fall into one of two peak periods in the two crop annual rice
cultivation cycle (the other is June and July). During these peak farming periods, pottery
production is subordinated to farming demands in most households.

Nearly half (53.9 percent) of all Dalupa households contained active potters during the
1988 field season. Most potters (excepting the "production potters") varied seasonally in their
scale of production. Two periods in the agricultural cycle (January-February, June-July) are
normally periods of low potting and high agricultural activity. Plowing and transplanting of
the onoy rice crop takes place then (Dozier 1966:137). Indeed, most Dalupa potter households
(68 percent) were inactive in January or February of the 1988 year, although they
manufactured pots during subsequent months. A year later, nearly the same proportion (65.8
percent) of potter households were inactive during the months of January and February.

The attention that project members paid to Dangtalan pottery making during our field
season encouraged otherwise inactive potters to resume their craft; some intrepid women even
started making pots for the first time. The impact of hosting multiple KEP members, and the
value they placed on pottery making in Dangtalan, seriously affected Dangtalan ceramic
production rates. However, the project did not impact Dalupa production in a similar way.
Table 4.1 indicates that more potter households were active in January and February 1989
after my departure than in January and February 1988, at the peak of the KEP field season.

<table>
<thead>
<tr>
<th>MONTH</th>
<th>YEAR</th>
<th>N. POTS MADE</th>
<th>N. NON-TRADIT. FORMS MADE</th>
<th>TOTAL POTS MADE</th>
<th>NUMBER OF ACTIVE HOUSEHOLDS</th>
<th>MEAN POTS/HOUSEHOLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>1988</td>
<td>68</td>
<td>12</td>
<td>70</td>
<td>7</td>
<td>10.0</td>
</tr>
<tr>
<td>Feb.</td>
<td>1988</td>
<td>18</td>
<td>34</td>
<td>52</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Jan.</td>
<td>1989</td>
<td>68</td>
<td>26</td>
<td>94</td>
<td>5</td>
<td>18.8</td>
</tr>
<tr>
<td>Feb.</td>
<td>1989</td>
<td>361</td>
<td>65</td>
<td>426</td>
<td>13</td>
<td>32.8</td>
</tr>
</tbody>
</table>

Table 4.1. Productivity Rates in Active Potting Households for Sampled Months.

Why did the number of active households actually double from 1988 to 1989 during these months? The increase in ceramic production was attributed to inflated rice values during January-March 1989, when the price of rice in the provincial capital rose nearly 40 percent. The price for a *cavan* (180 chupas, ca. 55 kilograms)\(^7\) of rice in Tabuk went from P290 in January to 350/cavan in February and finally to approximately P390/cavan by March 1988 (Josephine Bommogas, personal communication, 1988). Economic factors exerted a stronger influence on the scale of Dalupa pottery production in 1989 than had my presence in the village during the previous year.

One might reasonably assume that both production and distribution rates could escalate during the KEP's tenure in Pasil. That this was the case in Dangtalan was described previously. The collections acquisition process for the National Museum of the Philippines and for the Arizona State Museum involved hundreds of vessels from the two villages

\(^7\) Weight conversion employed volumetric data on pounded, husked *oyak* rice contained in Appendix 1 (Takaki 1977:694-695).
(October-November 1987 for use-alteration study; March-June 1988 for the museums collections). Approximately 431 ceramic items (pots and non-traditional forms) were purchased in Dalupa between March 10, 1988 and May 10, 1988. An additional, unspecified number of Dangtalan and Dalupa pots (and non-traditional forms) were given as gifts to KEP members during the 1987-1988 field season.

Data on Dalupa pottery exchange during January and February in 1988 and 1989 are presented in Table 4.2. Changes from 1988 to 1989 in the exchange data resemble those previously observed in the production data. In each data set, the month of February in 1989 sees a quadrupling of output in the year following the KEP’s tenure in Pasil rather than a decrease in exchange levels.

<table>
<thead>
<tr>
<th>MONTH</th>
<th>YEAR</th>
<th>N. POTS TRADED</th>
<th>N. NON-TRADIT. FORMS TRADED</th>
<th>TOTAL POTS TRADED</th>
<th>N. ACTIVE HOUSEHOLDS</th>
<th>MEAN CERAMICS EXCHANGED/HOUSEHOLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>1988</td>
<td>28</td>
<td>4</td>
<td>32</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Feb.</td>
<td>1988</td>
<td>9</td>
<td>8</td>
<td>17</td>
<td>3</td>
<td>5.7</td>
</tr>
<tr>
<td>Jan.</td>
<td>1989</td>
<td>70</td>
<td>27</td>
<td>97</td>
<td>7</td>
<td>13.8</td>
</tr>
<tr>
<td>Feb.</td>
<td>1989</td>
<td>207</td>
<td>60</td>
<td>267</td>
<td>12</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Table 4.2. Pottery Exchange Rates in Active Potting Households for Sampled Months.

Three patterns are clear when results are compared from Tables 4.1 and 4.2: (1) a subset of active potting households in three of the four months engaged in trading pottery that household members had made; (2) households did not immediately trade all products they had

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8. Dalupa pottery exchange data presented in the literature exclude all vessels commissioned by the Kalinga Ethnoarchaeological Project for museum collections.
manufactured; and 3) Dalupa potters increased their production levels after my departure from their village. Many Dalupa households (potter and non-potter alike) maintain a cache of previously manufactured but unused vessels that can be exchanged for food or that can be given as gifts. As rice prices rose in the early months of 1989, some households began to barter stockpiled pots (see January 1989 data set, in which only five households produced pots but seven households traded pots).

The foregoing tables are not intended to show that my presence in Dalupa had no effect on pottery production and distribution. Indeed, our project's impact was felt in Dalupa long after our departure, as Dalupa elementary school teachers incorporated "pottery making" choreography into dance routines for Dalupa school children to practice for competition. In April 1989 (10 months after my departure), the Dalupa "little ambassadors" were invited to perform a "pot making" dance in the provincial capital of Tabuk for a large conference. In a school gymnasium there, Potter #206 demonstrated the paddle-and-anvil technique in the center of a circle of dancing children. The pot dance, replete with attempts to fire a ceramic vessel, was so successful that the "little ambassadors" were invited to perform a few weeks later in Baguio City (a ten hour bus ride away) for a multi-province "Cordillera Day."

Fluctuations in the Dalupa and Pasil economy exert more impact on Dalupa ceramic production and exchange than did this ethnoarchaeologist during the 1987-1988 field season. Ceramic specialization is one of multiple alternatives that Dalupa residents pursue during periodic food shortages, like the one in the early 1980s that drove an entire cohort of women into pottery-making. How intensified pottery production relates to alternative sources of income is discussed in detail in Chapter Six.
Summary

This chapter has summarized the methodology and research techniques used in my study of Dalupa pottery economics. The effect of various types of biases is a predominant concern in this chapter: how representative are the 1988 Dalupa data? I have taken steps in the data collection techniques and in data analysis to reduce the range of biases in the data sets. Efforts to mitigate informant bias included the collection of observational and non-interview based data. Efforts to reduce bias in the exchange log involve eliminating all vessels exchanged in conjunction with the acquisition of museum collections. Biases remain, however, and must be considered in the examination of Kalinga data sets.

Some biases are unavoidable in ethnographically-based field research in non-industrial societies. When an anthropologist enters a small community, s/he disrupts the normal course of activities in the residents’ lives for the duration of the stay. The extended duration of my tenure in Dalupa, and the fact that I was the only long-term researcher in that village (compared to other villages in the KEP, especially Dangtalan), are probably the two most important factors in controlling bias in my own field data. Dalupa residents grew accustomed to my presence in the village, to the point where children no longer tagged along after me on my daily interviews, I was no longer treated as a guest in my host family, and Dangtalan residents identified me as dinalupa (a Dalupa resident) rather than dinangtalan (a Dangtalan resident).

The foregoing points are not intended to imply that I "went native" or became fully integrated into the community. Instead, these points illustrate how I ceased to be a local celebrity by the end of my stay in Dalupa. As my celebrity quotient fell, I believe my presence had a decreasing effect on the behavior of those around me. For example, as the
months passed, people stopped speaking any English around me (to my detriment and benefit, as my comprehension of Kalinga increased out of necessity).

The previous chapters have laid out my research strategy (ethnoarchaeology), my theoretical justification (an integrated approach to pottery economics), the field setting and my methodology and research techniques. The next four chapters address topics germane to Dalupa pottery economics. I turn first, in Chapter Five, to the ceramic production environment in which Dalupa potters operate, and to the technologies that they utilize in making their ceramics.
CHAPTER 5
DALUPA POTTERY PRODUCTION

To anthropologists, a humble cooking pot is as much a cultural product as is a Beethoven sonata (Kluckhohn and Kelly 1945:78).

Understanding the Dalupa ceramic production system requires a working knowledge of the entire ceramic environment, from the natural resources that are available to potters to the techniques employed in ceramic manufacture. Dalupa pottery production is part of a dynamic economic system whose configuration shifts in response to internal and external factors. This chapter focuses first on factors that shape, and in some respects, constrain Dalupa pottery production, including aspects of the natural environment (i.e., temperature, climate, and geology), limitations inherent in hand-built technology, and the availability of particular resources (e.g., resin, ocher).

This chapter's second section discusses factors that encourage particular forms of intensified production, and on the recent history of the Pasil area. Changes that have occurred within the Dalupa system since the KEP’s inception are best seen at a regional level. Rising and falling fortunes of Dalupa and Dangtalan, with respect to employment opportunities outside the immediate community, account for their different trajectories as pottery production centers for a valley-wide exchange network.

Finally, the technology of Dalupa ceramic manufacture is described. Potters produce two different categories of ceramic goods for barter and sale: traditional goods (i.e., cooking pots and water storage pots) and non-traditional goods. The latter category consists of decorative items such as ashtrays, flower vases and decorative plaques, and is a recent introduction to the Dalupa ceramic assemblage. These categories require different
manufacturing technologies that are discussed in detail.

The Ceramic Production Environment

In linking economics and technology to ecology, Matson's (1965) introduction of the concept "ceramic ecology" into the literature had an enormous impact on anthropological studies of ceramics (Kolb 1989). The mark of "ceramic ecology" is found in much North Americanist ceramic research in the last two decades, and most research questions pursued in ceramic studies today were outlined in Matson's closing comments in the same volume, Ceramics and Man, that contained his article on "ceramic ecology." Dean Arnold's cross-cultural research is a classic example of the "ceramic ecology" approach: the environment may not determine the occurrence of ceramic production, but it does provide choices that favor or limit the development and intensity of ceramic production (D. Arnold 1975:201).

Ceramic ecological research has focused on the relationship between pottery-making communities (or regions) and aspects of their environment, such as access to resources, climate and seasonality, and scheduling conflicts (e.g., D. Arnold 1985). The conflict between pottery making and agricultural tasks, for example, helps determine the organization of ceramic production and sets a ceiling on the degree of ceramic craft specialization obtainable in a particular production system. Certain levels of pottery production are compatible with particular types of subsistence and with certain points in household developmental cycles.

A "ceramic ecology" approach has proven especially popular among ethnoarchaeologists and among ceramicists involved in compositional studies. One reason why this is the case is that ecological variables vis-a-vis production behavior can be documented in ethnographic settings. Another is that access to raw materials (e.g., clay, water, fuel, paints and glazes) affects the scale and nature of pottery production. Ethnoarchaeological studies that
focus on the impact of producers' choices in raw materials selection (Aronson et al. 1991) and on the variability inherent in raw materials sources (e.g., D. Arnold et al. 1991; Rye 1976) contribute to our knowledge of resource use by prehistoric potters.

Although the concept of "ceramic ecology" is attractive, few scholars have attempted to develop comprehensive explanatory frameworks within the "ceramic ecology" movement (cf. Kolb 1989). Theories that focus on the linkage between patchy resource distribution and the development of pottery making assume that intensified ceramic production occurs only where potters occupy land with high-quality clay resources (e.g., D. Arnold 1985:20). This is only one of multiple relationships that require study in order to illuminate the full range of factors that encourage the development and subsequent intensification of ceramic production.

The "ceramic ecology" approach, as Matson originally proposed it, promised to serve as a foundation for more sophisticated studies. However, more scholars have devoted their efforts to expanding the range of mechanical and analytic techniques for ceramic analysis than have devoted efforts to developing integrated approaches to understanding ceramic production and distribution systems (cf. Bey and Pool 1992; Howard and Morris 1981). The remarkable toolkit of analytic techniques that we now possess must be complemented by sound theoretical frameworks that link organizational scales of production with those of distribution in a dynamic framework.

This study of Dalupa pottery production is intended to provide a case study of pottery economics rather than to develop "ceramic ecology" theoretical frameworks. Because ecology does influence behavior, the following section examines a variety of environmental factors that are relevant to pottery production. By moving between environmental description and producer behavior, it becomes clear that ecology constrains but does not determine production
Seasonal constraints on ceramic production: temperature and climate.

Temperature and climate affect the composition of available clays and constrain the seasonality of ceramic production (D. Arnold 1975:203, 1985:61). The average annual temperature in the study area is approximately 80 degrees Fahrenheit, or five degrees cooler than the Philippine lowlands. May is the warmest month with a mean temperature of 85 degrees Fahrenheit. The greatest temperature variability is evident in seasonal differences in diurnal temperatures. These are associated with the wet and dry seasons, so that December and January are the "coldest" months and the "hottest" months include March through June. Northern Luzon is also affected by short "cold waves" during December or January as cold air currents from the Asian mainland sweep south (Wernstedt and Spencer 1967:40-42).

The Cordillera Central is classified as medium-elevation tropical highlands, and falls into the "per-humid" climatic pattern of the Thornthwaite classification. Overabundance of precipitation can be a problem in the Cordilleras, as precipitation figures range from approximately 200 cm to 510 cm (80 to 100 inches) per year (see Wernstedt and Spencer 1967:54, Figure 9). August is the wettest month, with an average of 50 cm rainfall. Typhoons occur most frequently in August and September, and more than 40% of typhoons are restricted to the northern Philippines (Chief of Naval Operations 1944).

Rainfall patterns vary annually in the study region, and particular years are remembered for their devastating droughts. While rainfall patterns vary annually in the study area, the annual climatic cycle is more predictable. The wet season (agilid) lasts from July to February, and the dry season (dagon) lasts from March to June (Magannon 1972:43). Takaki's (1977:46-48) research on temperature and precipitation in Uma (5-6 km west of the study area)
during the 1966 season provides monthly estimates (Table 5.1). The wet season has two
distinct periods: 1) sossoqod 'warm wet season' between June and mid-August; and 2) gaginid
'cold wet season' between mid-November and February (Takaki 1977:47). The summer
months (March, April and May) are dry relative to the rest of the year. This dagon period is
also a slow time in agricultural cycle, or the "month of leisure" (Magannon 1972:37).

The number of rainy days each month, as well as the type and amount of rainfall
involved affect the rhythm of Dalupa pottery production. During the hot, dry dagon season, an
overly short drying time may cause cracking because of uneven drying or excessive shrinkage
(Shepard 1971:72). When pots are inadequately dried during the wet agilid season, steam
expands during firing and ruins pots. Water trapped in the soil on which bonfires are built
also deforms the vessels (Shepard 1971:91). Large-scale pottery drying and firing requires
relatively dry weather, and Dalupa potters use fuel racks that are suspended above kitchen
hearths in their homes to dry pots during the rainy season.

During the sossoqod (warm wet season), many Dalupa potters fire their pottery on wet
ground (risking firing accidents) in the early mornings, thereby avoiding the torrential daily
afternoon rains. The gaginid (cold wet season) period presents greater problems, because this
season involves a continuous drizzle. The ground is continuously wet, precluding firing
episodes on many days each week. Fewer pots are made because it takes so long to dry them
and because firing accidents occur if rain falls when firing takes place.

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1. Estimates for May reflect an exceptionally wet month in 1966 (69 cm), relative to May in the
following year (6.8 cm).
<table>
<thead>
<tr>
<th>MONTH</th>
<th>MEAN TEMPERATURE (FAHRENHEIT)</th>
<th>MEAN RAINFALL (CM)</th>
<th>YEARS MEASURED</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>67.7</td>
<td>20.8</td>
<td>1966, 1967</td>
</tr>
<tr>
<td>February</td>
<td>68.2</td>
<td>10.8</td>
<td>1966, 1967</td>
</tr>
<tr>
<td>March</td>
<td>71.5</td>
<td>6.2</td>
<td>1966, 1967</td>
</tr>
<tr>
<td>April</td>
<td>73.8</td>
<td>5.3</td>
<td>1966, 1967</td>
</tr>
<tr>
<td>May</td>
<td>74.4</td>
<td>37.9</td>
<td>1966, 1967</td>
</tr>
<tr>
<td>June</td>
<td>75.1</td>
<td>36.7</td>
<td>1965, 1966, 1967</td>
</tr>
<tr>
<td>July</td>
<td>72.9</td>
<td>32.0</td>
<td>1965, 1966, 1967</td>
</tr>
<tr>
<td>August</td>
<td>74.4</td>
<td>20.1</td>
<td>1965, 1966</td>
</tr>
<tr>
<td>September</td>
<td>73.3</td>
<td>17.8</td>
<td>1965, 1966</td>
</tr>
<tr>
<td>October</td>
<td>71.7</td>
<td>17.5</td>
<td>1965, 1966</td>
</tr>
<tr>
<td>November</td>
<td>72.4</td>
<td>45.4</td>
<td>1965, 1966</td>
</tr>
<tr>
<td>December</td>
<td>70.0</td>
<td>31.3</td>
<td>1965, 1966</td>
</tr>
</tbody>
</table>


Temperature and climate affect the pace and scale of Dalupa pottery making, a pattern found throughout the world (D. Arnold 1985). Dangtalan lies approximately two kilometers west of Dalupa and experiences nearly identical weather patterns. There, fewer potters are active. Dangtalan pottery production and exchange -- even at its peak in the late 1970s -- is far more seasonal (Figure 5.1) than is Dalupa's cycle observed in 1988. The fact that Dalupa potters overcome environmental obstacles to manufacture and trade their vessels suggests that economic and social factors, rather than simply local environment, affects choices that Dalupa potters make to continue pottery production (at varying levels of intensity) throughout the year.
Figure 5.1. Seasonality in Dalupa and Dan integer Exchange: Comparative Data.
Distance to Production Resources

At the broadest level, distance to production resources places limits on which individuals and communities can engage in ceramic production. Ceramicists are particularly interested in ethnographic estimates of distances to raw materials for several reasons. One is that these distance estimates, taken as an aggregate, establish threshold distances that can be plotted against prehistoric site distributions to facilitate clay and temper sampling. Another reason is that some archaeologists feel that distances to resources can encourage or discourage the intensification of pottery production into a full-time specialization (e.g., D. Arnold 1975).

Dalupa data are presented to supplement the extant data base on distances to production sources. Following D. Arnold (1985), most estimates given here are geodesic (i.e., straight-line) rather than pheric distances (i.e., with some topographic correction, calculated in time spent to reach resources). Factors such as topography, means of transport, and the presence of formal roads all affect the travel time entailed. Dalupa potters procure all raw materials for pottery production from areas that lack paved road networks (Pasil, Lubuagan, Balbalan and Tinglayan municipalities). Travel often involves foot paths that follow the local topography. Straight-line distances presented in the following sections are rough approximations of distances to resource areas. Because the Dalupa pottery exchange network (discussed in Chapter Six) includes both upland and lowland plains areas, transportation time varies widely within the network depending on destination.

Clay resources: geology, accessibility, and potter preference. The island of Luzon is a composite of north-south trending ridges (the Cordillera mountains), which alternate with basins and troughs that follow the trend of bordering trenches (Bureau of Mines and Geosciences 1982:1). The study area is located within the Central Physiographic Province, which
is defined by the Cordillera mountain range. This area, known as either the Cordillera Central/Kalinga Foothills (Durkee and Pederson 1961) or the Luzon Central Cordillera (Bureau of Mines and Geo-Sciences 1982), contains considerable seismic and volcanic activity. These two processes have created a region of sharp topography with the highest peaks on the island of Luzon (Wernstedt and Spencer 1967:11).

Geologically, the Cordillera Central consists of intermediate to mafic plutonic basement-complex masses with intercalated volcanics and metasediments along the marginal area. Silicic intrusives and extrusives are found at the headwaters of the Pasil River (Bureau of Mines and Geo-Sciences 1982:39). Formation II, a combination of andesite lava and andesitic pyroclastic rocks with intercalated limestone lenses, is distributed throughout much of the Kalinga subprovince (op.cit., 91).

Four main rivers (Agno, Magat, Abra, Chico) drain the Cordillera Central, depositing sediments into basins to the northeast (into the lower Cagayan valley) and to the west (into the Ilocos lowlands) of the mountain range. Consequently, soils are thin, skeletal in development and patchy in occurrence. Severe soil erosion throughout the physiographic province has brought the surface down to weathered parent material (Kowal 1966:417). Highland Kalinga areas (e.g., Pasil, Lubuagan, Tinglayan, Tanudan) are characterized by steep slopes along rivers and streams, and the absence of broad, filled valleys in the Kalinga highlands encourages terrace farming strategies. Rock slides are frequent during the rainy season, and level surfaces are scarce.

Adequate descriptions of local geology in the Philippines largely correlate with areas that have been the focus petrochemical, geothermal or hydrological development. Because Kalingas resisted hydroelectric development during the Chico River Dam area, little work has
been done in the study area. Without detailed geological and soils maps, no thorough study of clay sources can be done. However, geological features of the study area that have been described in the literature provide clues to the availability and nature of clays.

Three inactive small volcanoes are located south of Batong Buhay (near Balatoc): Ambalatungan, Bumaga, and Podakan (Alvir 1956). This area is also known for the tuff beds that lie below grassland on Awidon Mesa, a Pleistocene formation in the Uma region of the Lubuagan municipality that are suggestive of volcanic activity (Durkee and Pederson 1961:159).2 Awidon Mesa is the type area for the Awidon Mesa formation, which is found throughout the Central Cordillera region and in the Cagayan Valley (Bureau of Mines and Geo-Sciences 1982: 227-228).

Limited geological reconnaissance in the study region provide information on formations that are likely clay sources for Pasil potters. A sequence of Asiga Formation and Balbalan sandstone (the latter was 27 m thick) was mapped at Ableg (Durkee and Pederson 1961:153, Figure 8). This location lies less than a mile north of Dalupa. Both the Asiga and Balbalan formations contain interbedded lenses of graywackes, claystones and shales (op.cit., 152-153). The clay that Dalupa potters utilize might derive from this formation.

Steps in the Dalupa pottery manufacture process are described later in this chapter. Dalupa potters mine clay from deposits that lie within one kilometer (a fifteen to twenty minute walk) of the village. This distance conforms to Dean Arnold's "Threshold A" for distance to clay resources, into which one-third of his cross-cultural sample falls (1985:50-57). Regarding resource selection, clay (soka) preparation is quite simple. The sandy clays, which

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suffer from an excess of non-plastic additives, require 'cleaning' to remove all visible pebbles during the pounding process (also see Longacre 1981). Unlike other potters in the Philippines (e.g., Paradijon potters, London 1991), Kalinga potters do not mix clays, nor do they add temper (also see Longacre 1981).

The Sources of Materials for Potters Survey (Appendix 1) was administered to a total of 54 potters (active and inactive). In-field observations suggested that potters used no more than two clay sources during the field season. Most potters listed between three and four sources (mean=3.9) in order of preference and frequency of usage. The four most common Dalupa sources are listed in Table 5.2 in order of preference. All sources are found in one area of rice fields called Lopok (a ten minute walk west of Dalupa), and the two preferred sources (Marcelo and Awaga) are located within 75 meters of one another. Each clay source is a hole approximately 2-3 m in diameter; depth of sources vary according to mining intensity, but may be as much as 3 m deep.

Of the variety of clay sources that Dalupa potters use, each yields clay with particular properties that the potters recognize. Two types of inclusions cause problems for Dalupa potters: 1) large yellowish particles (no Kalinga name given) that cannot be eliminated through pounding the clay and that protrude on the burnished surface of pots; and 2) white inclusions (lanipga or boga) that shrink in size (but do not disappear) with pounding. Although potters believe that some clay sources are better than others, potters consider a wide latitude of clays that contain boga/lanipga inclusions to be useable. This finding was corroborated by a series of laboratory-based tests involving workability, strength and compositional variability (Aronson et al. 1991, 1994).
Table 5.2. Most Common Clay Sources Utilized by Dalupa Potters from Sources of Materials for Potters Survey (n=54).

For Dalupa potters, social relations between potter and field owner matter as much as resource quality in selecting clay resources. Clay sources occur in the fields of individual land owners, and these fields may be used for irrigated rice cultivation or for swidden. Potters can and do exhaust clay sources in particular areas, so that they must find new sources to exploit. Clay mining in rice terraces can also cause the terraces to collapse, while clay mining in swidden fields is less destructive. Land owners, who receive no compensation from potters for the mined clays, occasionally close fields to clay mining if they fear damage to their fields from mining activities.

Data contained in the Sources of Materials for Potters Survey lists the closing of 13 clay sources since 1962, or 65% all clay sources utilized. One closing occurred during my fieldwork in October of 1987, when a disgruntled land owner from Ableg (Marcelo) denied potters access to the clay source on his land. He threatened to fine offenders one water buffalo (ca. P5000), or the cost of a small house. Explanations why access to this most
popular clay source was cut off varied. Some Dalupa potters believed that an older (less active) potter persuaded the owner to close the field out of jealousy toward more active potters. Others believed that some wealthy Dalupa households, deprived of an agricultural labor pool as field hands opted for pottery production instead of field labor, pressured the man to close the source to hinder pottery production in Dalupa. These reasons may have some validity, but excessive mining also causes ground slumping and tunnels of 10 feet or more are dangerous.

Exploratory compositional research was done previously to answer questions related to clay properties and firing technology (Aronson et al. 1991). Part of the study involved qualitative petrographic analysis of thin sections from three Dalupa clay sources. All three Dalupa sources examined derive from the same parent rock. Thin sections were prepared from small patties (ca. 1" diameter) from each clay source that had been fired at ca. 700-800 degrees Fahrenheit. Initial assessments were made by Meredith Aronson and David Killick using a petrographic microscope, and results are presented in Table 5.3.

Limited geological work in the study area provides few clues regarding clay source composition. However, previous mining reconnaissance suggests three possible sources for the quartz sands observed in thin sections of the Kalinga clay sources. One is the sequence of Asiga Formation and Balbalan sandstone, located in Ableg (Durkee and Pederson 1961:153, Figure 8), less than a mile north of Dalupa. Both the Asiga and Balbalan formations contain interbedded lenses of graywackes, claystones and shales (op.cit., 152-153). Another is the Tineg sandstone formation, which is "is well bedded, pale green to greenish clay, coarse grained, calcareous and tuffaceous. The mudstone is dark green and calcareous" (Bureau of Mines and Geo-Sciences 1982:91).
A third possibility lies in the Awiden Mesa formation, located on Awiden Mesa (just west of the study area). This formation is composed of dacitic welded tuff and tuffaceous sediments, is characterized by bipyramidal quartz and euhedral hornblende and sodic feldspar, and appears in outcrops about 300 m thick (Bureau of Mines and Geo-Sciences 1982:227). Clearly, more geological work needs to be done.

A small number of minerals was targeted using X-ray diffraction and electron microprobe techniques to identify gross compositional differences between clay sources (see Rice 1987b:382-386 for one evaluation of the technique). Samples of four Dalupa clay sources were included in the analysis. Use of the electron microprobe identified gross differences in the relative amounts of several fluxes were detected: potassium oxide (K₂O), calcium oxide (CaO), magnesium oxide (MgO) and iron oxide (assumed to be Fe₂O₃ [hematite], although Fe₃O₄ [limonite] could also be present). Data from the microprobe analysis are presented in Table 5.4.

The meaning of chemical differences between Dalupa clay sources is not altogether clear, since extensive variability exists within clay deposits from one sample to the next (D. 

<table>
<thead>
<tr>
<th>ANALYZED DALUPA CLAY SOURCE</th>
<th>MINERALS (QUALITATIVE DESCRIPTION)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopok (Marcelo)</td>
<td>hornblende, plagioclase, some opaque minerals, some quartz</td>
</tr>
<tr>
<td>Lopok (Awaga)</td>
<td>hornblende, plagioclase, quartz, odd mineral (melilite? bluish brown, anomalous interference colors, concentric twins), cubic magnetite or limonite</td>
</tr>
<tr>
<td>Lopok (Bullayao)</td>
<td>hornblende, plagioclase, quartz, odd mineral (melilite?) [similar to Awaga in this sense]</td>
</tr>
</tbody>
</table>

Table 5.3. Visual Estimation of Three Dalupa Clays Using a Petrographic Microscope (by M. Aronson).
Arnold et al. 1991; Neff et al. 1988). Clay deposits, formed by physical and chemical weathering of parent rock material, may exhibit extreme compositional variability. Each depositional event results from a different set of actions, and mobile elements may enter or leave the ceramic fabric through groundwater action in the depositional environment (Neff 1992:3). The result is that clays from different strata within a single river valley may exhibit rather different compositional fingerprints.

<table>
<thead>
<tr>
<th>CLAY SOURCE</th>
<th>SiO₂</th>
<th>Al₂O₃</th>
<th>Fe₂O₃</th>
<th>MgO</th>
<th>CaO</th>
<th>K₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopok: Marcelo</td>
<td>53.4</td>
<td>20.3</td>
<td>2.3</td>
<td>0.1</td>
<td>0.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Lopok: Awaga</td>
<td>51.0</td>
<td>21.0</td>
<td>4.5</td>
<td>1.2</td>
<td>0.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Lopok: Awing</td>
<td>50.9</td>
<td>19.7</td>
<td>5.3</td>
<td>1.0</td>
<td>1.4</td>
<td>0.7</td>
</tr>
<tr>
<td>Lopok: Bullayao</td>
<td>49.6</td>
<td>23.4</td>
<td>3.6</td>
<td>0.1</td>
<td>1.7</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Table 5.4. Compositional Variability in Four Dalupa Clay Sources: Electron Microprobe Analysis (Expressed as % of Total Matrix).

Many factors affect the working properties of clays, from mineral composition and degree of plasticity to particle size and the presence of non-plastic additives. Artisans generally have a science-like understanding of the working properties of their raw materials, a point made repeatedly in the prehistoric and ethnographic ceramic literature (e.g., Rands 1988; Rye 1976; Schiffer and Skibo 1987). The use of particular types of tempering material may be added, for example, to prevent cracking during drying, to enhance resistance to thermal shock, and to increase the tensile strength of the clay fabric (e.g., Rye 1981:31-36; West 1993). Some better known examples come from eastern North America, where prehistoric potters experimented with varieties of shell temper in the manufacture of multiple functional categories of pots (e.g., Steponaitas 1983; Stimmell et al. 1982).
The Kalinga clay study examined workability in clays by exploring the range of plasticity in the four most commonly utilized Dalupa sources. Plasticity is "that property of a water-clay moisture that allows it to be pressed into a shape without returning to its original form when pressure is released" (Shepard 1971:14). Plasticity is one of many properties that affects the workability of the clay. Some concepts of workability are technique-specific, so that a "good" (i.e., workable) Kalinga clay for hand-built pottery may in fact be a very "poor" clay for making wheel-thrown pottery in another industry (Rice 1987b:61).

Potters judge plasticity of a clay by "feel" (Rye 1981:21) through working with a material. Plasticity can be loosely quantified in laboratory tests by examining the amount of water involved in the range between a sample's yield point and the upper boundary of its extensibility. The yield point is the point at which the wet clay is just stiff enough to hold its form, and extensibility refers to the point at which this clay loses its structural integrity. As Shepard notes, "a workable clay should have a high enough yield point to prevent accidental deformation before drying and a large enough extensibility to allow for forming without cracking" (1971:15; also see Rice 1987b:61).

Plasticity in Dalupa clays was assessed using the percentage water of plasticity (% WP). This is the percentage (by weight) of water required to develop optimum plasticity in a dry clay (Rice 1987b:62). Techniques used in the workability tests are described in detail elsewhere (Aronson et al. 1991; 1994). Table 5.5 presents results from the range of plasticity in four Dalupa clay sources. Marcelo's clay source, which Dalupa most potters prefer to use, is also the most workable in terms of plasticity. Interestingly, Dangtalan potters' most preferred clay source exhibited an identical range in plasticity. It should be noted, however, that these two clays also have the highest potential for shrinkage problems. Despite their stated
preference for Marcelo’s clay source, Dalupa potters will use any of the three sources that are available.

<table>
<thead>
<tr>
<th>CLAY SOURCE</th>
<th>YIELD POINT (weight % H₂O)</th>
<th>EXTENSIBILITY (weight % H₂O)</th>
<th>RANGE (weight % H₂O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lopok:</td>
<td>17.9</td>
<td>24.7</td>
<td>6.8</td>
</tr>
<tr>
<td>Marcelo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lopok:</td>
<td>19.6</td>
<td>26.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Awaga</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lopok:</td>
<td>19.4</td>
<td>25.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Bullayao</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lopok:</td>
<td>20.2</td>
<td>25.8</td>
<td>5.6</td>
</tr>
<tr>
<td>Awing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.5. Range of Plasticity in Four Dalupa Clay Sources.

Because Dalupa potters are both pottery producers and pottery users, they recognize that different clays affect the performance of vessels, particularly in resistance to thermal shock (Aronson et al. 1993). Dalupa potters prefer to use clay scrapings from previous pottery-making episodes, which have a finer consistency, than to use raw clay to make water storage jars. Potters say that water jars made from these scrapings are less porous than those made using standard, cleaned clay.

The non-traditional ay-ayam industry, described later in the chapter, requires different production technologies than does the traditional pottery industry. Dean Arnold (1985:31) points out that potters utilize lower-quality clays (such as montmorillonites) for producing smaller tourist forms of pottery in Ticul (Mexico). Dalupa potters now use the same clay sources to produce both pottery and non-traditional forms, but this pattern may change as the technology for making non-traditional forms develops.

Detailed studies of the Pasil River Valley geology should be undertaken in the future
to clarify several issues. Foremost among these is examining the relevance of particular geological configurations to pottery specialization in Pasil communities. Cross-cultural research by Dean Arnold (1985 et passim) suggests an intimate relationship between pottery-making communities and optimal clay sources. Kalingas state that useable clays are available throughout the Pasil River Valley, and interviews in several villages made it clear that pottery was made in the eastern community of Cagaluan and in the western community of Balatoc until at least the mid-1960s (also see Takaki 1977:167).

Dalupa potters rely on clay resources that are close to their home villages and thresholds exist beyond which potters will not travel to continue their trade. This situation differs greatly for non-clay resources for potters, a point discussed in the following section.

Were optimal clay deposits to cluster in three parts of the River Valley (i.e., Dalupa/Dangtalan, Cagaluan, and Balatoc), the patterning might corroborate Arnold’s findings. If, however, such clay deposits are distributed evenly throughout the area, then why did only some Pasil communities specialize in pottery production through time? Detailed geological work in the study area would also enable us to link particular clay sources to geological formations.

**Ocher: mechanisms of acquisition and distance to resources.** Pasil Kalinga potters use red ocher (or pula) as a pigment in one of two decorative steps taken during vessel manufacture (see Longacre 1981). Red ocher is an earthy mixture of hematite and clay and it is an anhydrous ferric oxide mineral (Shepard 1971:37). Kalinga potters apply red ocher to their vessels prior to firing. Red ocher sources occur in outcrops near Pasil communities in the western end of the study area.

Most Dalupa potters (90.6% surveyed) purchase and use their own ocher for decorating pots. Beginning potters may use a female relative’s ocher and resin, but this
practice is rare (9.4% for ocher, 1.9% for resin) and ceases soon after the young potter starts her occupation. Table 5.6 lists the primary sources of ocher, which most Dalupa potters obtain in barter from traders who come to Dalupa. Guina-ang and Batong Buhay (the industrial sitio of Balatoc) are the primary sources of ocher. Distances presented are geodesic (or straight-line) that do not correct for topography.

Although potters prefer ocher from Batong Buhay (18-20 km distant), access is dependent upon two factors. The first is whether motor vehicles are operating that traverse the Batong Buhay road. One of the few operative dirt roads in the study region, the Batong Buhay road flanks the Pasil River up to the Batong Buhay mining settlement. When trucks are running, this road provides easy access to the Batong Buhay ocher area and to Dalupa: traders drop off at Lonong (one of Dangtalan’s farming sitios) and Dalupa is less than two km away. A second factor is whether Dalupa men are employed at Batong Buhay. When Dalupa men work at the mines, they occasionally bring home ocher to trade with the potters on their days off. Thus, access to this ocher source is profoundly dependent two very unpredictable factors.

<table>
<thead>
<tr>
<th>OCHER SOURCE</th>
<th>GEODESIC DISTANCE (KM.)</th>
<th>% POTTERS USING SOURCE</th>
<th>POTTERS’ CHARACTERIZATIONS OF OCHER SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batong Buhay</td>
<td>18.0-20.0</td>
<td>66.0%</td>
<td>Violet in color, &quot;smooth and bright,&quot; &quot;shiny like a paint bought in the store,&quot; &quot;bright and beautiful&quot;</td>
</tr>
<tr>
<td>Guina-ang</td>
<td>4.0</td>
<td>62.3%</td>
<td></td>
</tr>
<tr>
<td>Bagtayan</td>
<td>7.0</td>
<td>18.9%</td>
<td></td>
</tr>
<tr>
<td>Uma (Dola-as, Pangtitan, Ag-agama)</td>
<td>8.0</td>
<td>9.4%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.6. Preferred Ocher Sources (and Distances) Utilized by Dalupa Potters from Sources of Materials for Potters Survey (n=48).
The remaining three red ocher sources are much closer to Dalupa, and conform to figures given for other communities worldwide that rely exclusively on red ocher as a slip resource. Table 5.7 compares Dalupa ocher data with cross-cultural data on distance to slip resources (D. Arnold 1985:47-49, Table 2.3). Problems involved in relying on geodesic (rather than pheric) distances have been discussed by Dean Arnold (1985:37), so data in the table are only grossly comparable. Examination of cross-cultural data in this table (and in Arnold [1985, Table 2.3]) suggests that far greater distances to ocher resources are found in more intensified pottery systems and in those systems that rely on water transport.

<table>
<thead>
<tr>
<th>COMMUNITY</th>
<th>COUNTRY</th>
<th>DISTANCE IN KM</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalupa (Batong Buhay)</td>
<td>Philippines</td>
<td>18.0-20.0</td>
<td>this study</td>
</tr>
<tr>
<td>Dalupa (Guina-ang)</td>
<td>Philippines</td>
<td>4.0</td>
<td>this study</td>
</tr>
<tr>
<td>Dalupa (Bagtayan)</td>
<td>Philippines</td>
<td>7.0</td>
<td>this study</td>
</tr>
<tr>
<td>Dalupa (Uma localities)</td>
<td>Philippines</td>
<td>8.0</td>
<td>this study</td>
</tr>
<tr>
<td>La Chamba</td>
<td>Colombia</td>
<td>12.0</td>
<td>Litto 1976:152</td>
</tr>
<tr>
<td>Kharmathu</td>
<td>Pakistan</td>
<td>5.0</td>
<td>Rye and Evans (1976:39-40)</td>
</tr>
<tr>
<td>Bibil</td>
<td>New Guinea</td>
<td>5.0</td>
<td>Kakubayashi (1978:139)</td>
</tr>
<tr>
<td>Acatlan</td>
<td>Mexico</td>
<td>5.0</td>
<td>Lackey (1982:18)</td>
</tr>
</tbody>
</table>

Table 5.7. Cross-Cultural Distances to Slip Sources.

Potters appeared less concerned with performance characteristics of ocher than they did for other raw materials. Qualities used to describe ocher did not distinguish one source over
another as was the case for clay sources, although many potters expressed a general preference for a violet hue (rather than a reddish-orange hue) in ocher. Only half (n=27) of those polled even expressed preferences for a particular ocher source. Two-thirds of those potters with preferences reported that the Batong Buhay source was of superior quality.

Although geological differences have not yet been examined in ocher sources, potters' assessments suggest that compositional factors are not important in their slip source preferences. First, ocher outcrops may be homogeneous across the ocher source area in the western portion of the Pasil Municipality. Second, all ocher traders may visit the same general zone to procure their resources. Third, ocher availability may be so restricted that potters will use whatever material traders bring to the community. The re-opening of the Batong Buhay mines in the late 1970s briefly changed procurement patterns, as many traders went into mining and some Dangtalan and Dalupa residents began to bring ocher back to their communities (especially to Dalupa) to barter. Mining activity was extremely low during the 1987-1988 field season, and potters relied on traders visiting Dalupa to get their ocher.

No inquiries were made regarding whether Dalupa potters ever applied ocher around cooking pots' shoulders like their Dangtalan counterparts, and no Dalupa pots were collected during the 1975-76 season that could be examined for comparison. However, a major study was made of the timing and causes behind the development of the immosso decorations and has been described elsewhere (Stark 1991). Dalupa potters began decorating their water jars during the Chico River Dam era of the 1970s and 1980s. The Philippine government sought to curry favor with Kalingas through establishing an artisan cooperative in Lubuagan (see Figure 3.3). Weaving was to be developed into an income-generating cottage industry for a tourist market in Baguio and Manila, as it is now among such other Cordillera groups as the
Bontoc and Ifugao.

These ephemeral cooperatives drew Kalinga artisans from surrounding tributary valleys into Lubuagan, where Dalupa potters occasionally travelled to trade their pots. Weavers suggested to a few Dalupa potters that they decorate their water jars with ocher designs (derived from woven blankets and skirts) to make a more marketable product. Increased stress on forest resources may also have influenced the development of these styles (Stark 1991; Stark and Longacre 1993), a point discussed later in this chapter.

Dalupa potters, like 36 percent of pottery making centers sampled cross-culturally by Arnold, obtain their slips and paints less than 10 kilometers from their home. Most Dalupa potters (62.3%) obtain their ocher from itinerant traders. Almost 17.0% (n=9) of the potters had traveled to an ocher source community to obtain their most recent supplies. The Dalupa data thus do not fit neatly into Arnold's (1985) model of 'exploitable thresholds' for slips and paints. Ocher traders travel to any point in the Pasil Municipality to ply their goods, irrespective of distance. Presumably traders also traveled to all four barrios in years past when pottery was made more widely. Because small quantities of ocher are necessary for Dalupa pottery production, archaeological models derived from this data set would do best to focus on clay and resin sources, the latter of which is discussed below.

**Resin: mechanisms of acquisition and distance to resources.** Dalupa potters use resin (*lebu*) to seal their cooking pots and to coat their non-traditional forms. Resin is derived from the Almaciga tree (*Agathis philippinensis*, Pinac.), described previously for Dangtalan potters (Longacre 1981:60). Resin is a common organic coating in Asian earthenware technology (see Gianno 1990:9 for references) for technical reasons, since organic coating reduces permeability in vessels (D. Arnold 1985:140; Matson 1965:205; Schiffer 1988a).
Potters in neighboring Cordillera provinces (i.e., Abra, Mountain Province, Ifugao) also apply resin to their newly-fired vessels (Cooper-Cole 1922:428; Solheim and Shuler 1959:4-7). Similar resin treatments for newly-fired pottery have been noted among potters elsewhere in the Philippines, including Masbate, Legaspi, and Sulu (Foster 1956; Solheim 1952b:51; Szanton 1963:63).

The Almaciga tree's product is known commercially in the Philippines as "Manila Copal" resin and is used to produce high-grade varnish, patent leather, and sealing wax (Salita and Rosell 1980:100). Resin is sticky and highly viscous at first but hardens within a few days through the evaporation of its volatile fractions and/or the process of polymerization (Gianno 1990:7). Adhering to, or lying under source trees, naturally occurring resin may be harvested from natural seeps or from 'cultivated' trees. 'Cultivation' is done by cutting a gash in the trunk, or by chopping off a large limb and retrieving the resin some time later (a few days to a few weeks).

Traditionally, resin was bartered in solid unprocessed resin chunks rather than in the wands that are currently available. Dalupa potters say that resin chunks are very clean, and are a better alternative than the wand, which is cooked and formed into roughly standardized sizes (2-4 cm diameter and 12-20+ cm long). Resin-bearing trees are located in forests that flank the Pasil's western and northern boundaries. Resin is traditionally obtained from itinerant resin traders, from communities that neighbor resin areas, such as Balatoc, Uma and Bagtayan (to the west) and Balbalan and Salegseg in Balbalan municipality (to the north). Resin traders traditionally visit Dalupa to barter their resin for pots, and most Dalupa potters wait for traders (rather than procuring resin from one of these communities) as resin availability varies. Potter #212 in Dalupa has begun a very successful business as a resin
intermediary. She barters Dalupa pots in Balbalan for resin and then barters the Balbalan resin back in Dalupa for pots.

Table 5.8 lists the most common resin sources used by Dalupa potters; most (94.2%) listed at least two different sources that they used. The impact of Potter #212 on resin procurement by Dalupa potters is clear by the fact that all 52 potters who purchase resin (one uses her mother’s) use Balbalan resin. The Uma community is a more traditional source of resin, as resin-bearing trees are located in mountains near the settlement of Ag-agama and traders from there and from Dola-as (another Uma settlement) barter their resin in Dalupa.

<table>
<thead>
<tr>
<th>RESIN SOURCE</th>
<th>GEODESIC DISTANCE (KM)</th>
<th>% OF POTTERS USING SOURCE</th>
<th>% OF POTTERS USING THIS SOURCE WHO PREFER THIS RESIN SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balbalan</td>
<td>16.5</td>
<td>100.0%</td>
<td>31.3% (n=52)</td>
</tr>
<tr>
<td>Uma (Ag-agama, Dola-as)</td>
<td>8.0</td>
<td>63.5%</td>
<td>38.7% (n=31)</td>
</tr>
<tr>
<td>Guina-ang</td>
<td>4.0</td>
<td>32.7%</td>
<td>0.0% (n=17)</td>
</tr>
<tr>
<td>Bagtayan</td>
<td>7.0</td>
<td>30.8%</td>
<td>18.8% (n=16)</td>
</tr>
<tr>
<td>Balatoc</td>
<td>10.9</td>
<td>7.7%</td>
<td>100.0% (n=4)</td>
</tr>
</tbody>
</table>

Table 5.8. Most Common Resin Sources (and Distances) Utilized by Dalupa Potters from Sources of Materials for Potters Survey (n=52).

When asked why they preferred particular resin sources, Dalupa potters focused on compositional and performance characteristics of the resin: (1) its composition (i.e., freedom from impurities); (2) its spreadability and absorption rate; and (3) the quality of its appearance on a finished vessel or non-traditional form. Of 61 per cent (n=32) of the Dalupa potters who expressed strong preferences, Uma and Balbalan resins were considered superior over others.
because these sources were the purest ("clean").

Data presented in Table 5.8 illustrate how availability and preference are intertwined in Dalupa potters' resin usage: potters use the most accessible resin, regardless of preference. Although all potters use Balbalan resin, for example, only one-third of the potters prefer it. And none of the 17 potters who have used Guina-ang resin listed it as the best resin. Balbalan resin availability is affected by the level of highway banditry. In early 1988 there was a bit of a shortage because the Balbalan highway was infested with 'hold-uppers' and traders (including #212) restricted their activities between Dalupa and Balbalan.

**Firing materials.** Firing materials consist exclusively of locally available resources. Potters utilize a combination of split bamboo, cogon grass, and dried rice stalks. Bamboo is procured within the village boundaries or within a 10 minutes' walk and cogon grass is obtained from fallow rice fields. Dried rice stalks are readily available by-products of rice processing, a daily event (see D. Arnold 1985:36 for other examples). These rice stalks derive from the unthreshed rice bundles (lakom) that are a traditional unit of measurement in Kalinga (Takaki 1977:687-704). These lakom are assembled during the harvest and stored in granaries adjacent to fields until needed; rice bundles are processed through pounding and winnowing. Potters save the spent bundles after rice processing and use them as a primary fuel for open pottery firings. Potters occasionally share firing materials when they fire pots as a team.

The Dalupa firing process is very short and firing temperatures rarely exceed 700 degrees Fahrenheit. The first pots (which are generally smaller and require a shorter firing period) may be removed after only twenty minutes' firing, and all vessels are removed within thirty to forty-five minutes. This truncated firing time is directly associated with the fast-burning firing materials that potters use: the fire requires refueling several times during the
firing process. When women made pottery in Balatoc some years ago, it is said that their firing technology differed from that practiced today in Dalupa and Dangtalan.

Balatoc potters in the past used hardwood rather than bamboo and rice stalks, and they built a pit kiln that was covered with earth and burned overnight. Such hardwood resources are unavailable to potters in Middle Pasil today. Because resin must be applied to vessels hot from the fire, the brevity of Dalupa pottery firings requires extra labor recruitment (generally family members) to apply resin when potters fire large batches of vessels.

The foregoing section has summarized the types of resources and tools that are necessary for Dalupa pottery production for two reasons. The first is to provide sorely needed quantitative data for comparative research on distance to certain types of resources. The second is to outline the range of goods whose relative accessibility may influence the intensity and scale of pottery production. This latter point is particularly important in Dalupa’s history of pottery production, which has responded to fluctuations in the availability of certain types of resources in the last several decades.

Increasing Stress on Available Resources

Three types of commercial developments by outside business interests in the study region -- mining, dam construction, and logging -- have effected changes in resource availability and market demand for Dalupa products. These developments have also exacerbated household-based wealth differences in Dalupa, an issue that is addressed in Chapter Six. Recent changes in the Dalupa ceramic production system are thus largely local responses to external pressures on the study area.

Mining operations and Dalupa ceramics. Two key economic development projects are considered here: (1) the re-activation of the Batong Buhay gold mines in the late 1970s;
and (2) the Chico River Dam project in the late 1970s and early 1980s. Gold deposits throughout the Cordillera highlands have attracted lowlanders for hundreds of years (see Tegengren 1964). Both colonial administrations attempted to establish commercial mining ventures in various montane locations, with varying degrees of success.

The western community of Balatoc has been the locus of concerted commercial mining activity since at least 1929 (Fry 1983:174). Mines are located at the industrial locality of Batong Buhay, which is a sitio (enclave) of Balatoc. Mining operation may have halted during the Japanese occupation at Batong Buhay (Lawless 1977:23), but the mines were operative again by the early 1950s. Wilson’s (1956b:190) study reports that mineral production in 1952 for the Balatoc mines was 96,801 ounces of gold and 75,163 ounces of silver. This gold figure was only surpassed that year by Benguet mines near Baguio City; Lepanto mines produced more silver (177,112 oz).

Mining continued into the 1960s (Bacdayan 1967:175), ceased for almost a decade, and were re-activated in the late 1970s. Mining employment for unskilled Pasil worked depended largely on kin ties to the mine management. Close social ties between Dangtalan residents and mine workers enabled many Dangtalan men to take jobs, and their wives to quit making pottery. The job pipeline at Batong Buhay was more open to men from Dangtalan than from Dalupa, whose involvement consisted of short-term, low-paying contracts.

This differential access to Batong Buhay mining jobs had ramifications for the pottery production system. An ever-growing population (documented by both Lawless [1977] and Graves [1991]) strained households’ capacity to survive on farming yields. Dangtalan households moved into mining, as entire households (including potter wives) relocated for years at a time to the Batong Buhay mines. Dalupa households turned to other forms of
income-generation, including pottery production for exchange.

**Dam construction and Dalupa ceramics.** The re-activation of Batong Buhay mines coincided with the peak period of governmental effort associated with the Chico River Basin Development Project. Plans for hydroelectric dams along the Chico River had been under consideration since 1965. However, the threat of a supply cut-off during the energy crisis of the 1970s finally made dam-related construction costs palatable to the Philippine Government, with the assistance of the World Bank (see Carino 1980:1-3). The proposed four-dam hydroelectric project was designed to provide electrification to urban areas outside the Kalinga-Apayao province (e.g., the Cagayan Valley). Project officials estimated that the multi-purpose project would generate 845 million kilowatts of electricity and irrigated 49,000 ha of farmland each year (Itchon 1979:27).

Two of the dams were to be located in the Bontoc area of the Mountain Province (in Sabangan and Sadanga), and two in the Kalinga subprovince. Chico III was to be located in Bassao, Tinglayan Municipality, and Chico IV was to be constructed at the confluence of the Chico and Pasil rivers in Tommiangan. The Tommiangan dam site is located a few km east of the Cagaluan community in Pasil. Dam construction at this site anticipated the total inundation of both Cagaluan and Ableg in the Pasil Municipality. Farmland belonging to Dangtalan and Guina-ang residents would also have been under water. Dam construction would have required the resettlement of as many as 10,000 Kalingas, with minimal financial compensation (Carino et al. 1979:67).

The Philippine government met with strong resistance from both the Kalingas and the Bontocs as early as 1974 (for full histories of the project, see Carino 1979, 1980; Drucker 1988; Rocamora 1979; Winnacker 1979). As many as 150 Kalingas and Bontocs of all ages
were arrested as 'oppositionists' in the months following the October 1976 referendum supporting dam construction. Many of these people were held in the Philippine Constabulary stockade in Bulanao (Tabuk). An additional 50 Kalinga and Bontoc leaders (pangats) were detained in Pampanga Province for up to eight months (Cariffo 1980:8-9).

Governmental programs were launched to minimize indigenous opposition to the dam, the Philippine military moved into the area, and the New People's Army (NPA) entered the area to strengthen opposition to the government. The years between 1975 and 1985 were turbulent in the study region. Only with Corazon Aquino's ascendancy to the presidency in 1986 was the Chico River Basin Development Project permanently abandoned.

The multi-purpose Chico Dam project, despite its ultimate failure, effected profound changes in the Kalinga area. Lowland commodities and lowland cultural values, foreign to Kalingas, were introduced. Municipal facilities were constructed, road networks were improved and motor transport systems were encouraged as efforts to placate angry local residents. The construction of formal roads into the Pasil area and a concomitant increase in regular truck transport has linked Pasil residents to an ever-widening outside world. The Chico dam project, as well as other economic developments in the study area, changed the nature of Dalupa pottery production and distribution.

**Logging operations and Dalupa ceramics.** Kalingas and their highland Cordillera neighbors (e.g., Ifugao, Bontoc) continue to strive for nationally recognized, regional autonomy (Rood 1991). The concept of autonomy involves gaining political sovereignty, an ongoing process across the Cordilleras, and autonomy means gaining control over physical resources. The Philippine government considers most land in the Cordilleras as forest reserve that available for commercial investment, rather than the property of tribal groups who have lived
in these areas for generations. Despite the long tradition of indigenous law and land tenure systems, inhabitants are technically squatters with no tenurial rights (Lynch 1982; Rood 1991:536).

In theory, Marcos' Ancestral Land Decree of 1974 should have granted some modicum of political autonomy to cultural minorities by considering their land as alienable and disposable (Aral-Sereno and Libarios 1983:444-447). In reality, the decree classified most area within the Kalinga subprovince into a series of 20 different forest reserves that are accessible to commercial interests through leases and concessions granted by the government (Ibid.). By 1982, 275,026 ha of Kalinga-Apayao land was included in nine separate timber licenses to logging firms, which comprises half of all the timber-licensed area throughout the Cordillera provinces (see Cleto 1986:44-45, Table 24).

Economic developments in the area, especially mining and forestry, have exacted a heavy toll on the environment. Mining tailings and industrial effluent have polluted the Pasil River so profoundly that riverine sources have died out, a situation paralleled in the Baguio Mining district (Briones 1987). Although pulp processing for the Cellophil logging industry is done in Abra (Dorral 1979), full-scale operations also deplete the study region of valuable wooded resources. Logging operations concentrate on the oldest stands of trees, which are also the richest sources of resin (see Malaysian case study by Gianno [1990:94]). Meanwhile, ever-growing Kalinga populations work as much swidden land as they can and inadvertently transform formerly wooded mountain slopes into cogon grass wastelands.

These economic developments in the area have had severe ramifications for Dalupa pottery production. The total forested area in Kalinga-Apayao that contains resin-bearing trees continues to shrink: timber licenses in the province covered 39.0% (275,026 ha) of all
provincial land by 1982 (Cleto 1986:43-45). The largest commercial interest in the study region is the Cellophil Resource Corporation, and its sister company, the Cellulose Processing Corporation. Cellophil has restricted Kalingas from access to remaining forest areas since 1977; trespassers who harvest forest resources are stiffly fined (see Dorral 1979). Logging company restrictions, and the availability of wage labor elsewhere has encouraged some former resin traders in the Balatoc/Batong Buhay mining area to abandon their occupation. The Dalupa ceramic system of 1988 reflects all of these social and economic processes.

The foregoing sections have explored variability in raw materials that Dalupa potters use, while underscoring the importance of understanding economic and political contexts in which resources are obtained. Social relations and political situations affects Dalupa potters' access to, particular resources as much as do considerations of distance. This is not to imply that Dalupa potters lack an understanding of technical merits of the materials that they use, but instead to point out that technical considerations are always counterbalanced by those of feasibility. Having laid the economic and political foundations for understanding this technological system, the next section examines the types of ceramics that Dalupa potters produced in 1988. Many aspects of technology, scale, and variability in the Dalupa ceramic production also reflect the political environment in which Dalupa people live.

Technology of Dalupa Ceramic Manufacture

Varieties of Dalupa pottery forms. Dalupa potters manufacture the same functional categories as do Danagtalan potters (see Longacre 1981), as well as a range of non-traditional forms (ay-ayam) that are discussed below. Two types that are commonly made and used are the meat/vegetable cooking pot (oppaya) and the water jar (immosso), and these are illustrated in Figures 5.2 and 5.3.
Figure 5.2. Illustration of Oppaya (Meat/Vegetable Cooking Pot).
Figure 5.3. Illustration of *Immosso* (Water Storage Jar).
Some functional categories within the Dalupa ceramic assemblage are more commonly made than are others. Three forms documented in the 1970s by William Longacre (Longacre 1981) -- the ceramic pot lid, the sugarcane wine jar, and the ceramic pig trough -- have been replaced with non-locally manufactured products. The daily-use sized ittoyom, while still produced, has been largely replaced by metal cooking pots (calderos) while the meat/vegetable cooking pot is used routinely for preparing daily meals. Most households also continue to rely on the earthenware water storage jar (immosso), illustrated in Figure 5.3. Despite changes in morphology and decoration within the last twenty years, its rate of use has remained constant.

Multiple size classes are produced in the traditional pottery forms, and these size classes are presented in Table 5.9. Not surprisingly, cooking pots display more size variability than do water storage jars. The Kalinga pattern supports a close fit between vessel volume and household size, a correlation found in previous ethnoarchaeological studies (e.g., Nelson 1981). Most households have standard-sized water jars, irrespective of household size, but the size of their cooking pots is directly related to the number of mouths to feed in the household.

Vessel size classes are based volume, and volume is measured in terms of a chupa system of measurement. The chupa-based measurement system is employed throughout the Philippines for the measurement of grains and legumes, among other goods. In the study region, Kalingas re-use "Alaska" brand evaporated milk cans for their chupa measurement, whose capacity is approximately 350 cc of dry rice. The rice cooking pot (ittoyom) provides the standard for measurement, and size is based on the number of chupas of dry rice needed, when cooked, to fill an rice cooking vessel. Kalinga potters traditionally manufacture pairs of cooking pots (one for rice and the other for meat and vegetables), and size classes for meat/vegetable cooking pots assigned relative to their companion rice cooking pots.
Of the numerous non-traditional forms (ay-ayam) under production in 1988, several general categories require technologies different from those utilized to manufacture traditional ceramic vessels. The Kalinga term ay-ayam or (aiyaiyam) translates as "property in animals" or "pets" (Barton 1949:91) or "toys" (1988 Pasil translation). Kalinga potters traditionally produced ay-ayam forms (primarily miniature water jars, im-immosso) exclusively for their children. During the 1987-1988 field season, however, at least 50 different types of "souvenirs" were recorded (Table 5.10), and these forms are widely exchanged throughout the distributional network. As is discussed in Chapter Eight, these non-traditional forms have become an important commercial success for Dalupa potters.
<table>
<thead>
<tr>
<th>TYPE OF NON-TRADITIONAL FORM</th>
<th>RELATIVE FREQUENCY OF PRODUCTION</th>
<th>VARIETIES PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower vase</td>
<td>high</td>
<td>hanging shell, combination ashtray + flower vase</td>
</tr>
<tr>
<td>Money bank</td>
<td>high</td>
<td>pig, dog, cat, duck, chicken, fish, cow, carabao, elephant, lion, rat, turtle, frog, owl, deer, monkey, bird, person, chinese jar (gusi), pot-shaped bank, squash</td>
</tr>
<tr>
<td>Gusi (Chinese jar replica)</td>
<td>high</td>
<td>all sizes (small, medium, large)</td>
</tr>
<tr>
<td>Decorative plaques</td>
<td>high</td>
<td>&quot;God bless our home&quot;; &quot;souvenir&quot; or photo plaques</td>
</tr>
<tr>
<td>Ashtray</td>
<td>high</td>
<td>combination ashtray + flower vase</td>
</tr>
<tr>
<td>Flower pot</td>
<td>moderate</td>
<td>small and medium</td>
</tr>
<tr>
<td>Coffee cups and Tray</td>
<td>moderate</td>
<td>sets of 6</td>
</tr>
<tr>
<td>Candleholder</td>
<td>moderate</td>
<td>several varieties</td>
</tr>
<tr>
<td>Plate</td>
<td>low</td>
<td>small</td>
</tr>
<tr>
<td>Bowl</td>
<td>low</td>
<td>hemispherical</td>
</tr>
<tr>
<td>Sculptures</td>
<td>low</td>
<td>zoomorphic, anthropomorphic</td>
</tr>
<tr>
<td>Pitcher</td>
<td>low</td>
<td>variable size</td>
</tr>
<tr>
<td>Teapot</td>
<td>low</td>
<td>variable size</td>
</tr>
<tr>
<td>Caldero/Cauldron</td>
<td>low</td>
<td>variable size</td>
</tr>
<tr>
<td>Bucket</td>
<td>low</td>
<td>variable size</td>
</tr>
<tr>
<td>Stove set</td>
<td>low</td>
<td>miniature</td>
</tr>
</tbody>
</table>

Table 5.10. Variety in Non-Traditional Forms.

Non-traditional forms exhibit extensive variety, and three of the more common forms are illustrated in Figure 5.4. Flower pots (upper left) have a limited market, and chicken-shaped money banks (center) have wider appeal. The elephant-shaped money bank (lower left) is one of many four-legged money bank forms.
Figure 5.4 Examples of Non-Traditional Forms.
Market demand inspired the development of non-traditional forms (Stark and Longacre 1993). Although Dalupa potters manufacture traditional vessels (e.g., cooking pots) based on functional considerations, they produce non-traditional forms in response to consumer preference. For example, many Dalupa potters make a wide variety of money banks (see Table 5.10). These banks are valued primarily for display not use, since cash is scarce and most daily transactions in Pasil communities are barter-based rather than cash-based. So-called "photo plaques" are also made, although hardly any Dalupa households owned a camera in 1988. Flower pots and flower vases are popular non-traditional forms, despite the fact that Dalupa residents do not cultivate flowers for display.

**Production tools.** Production tools required for Dalupa pottery production are fairly limited. Potters were questioned about the sources for items contained in their toolkit, and their responses are listed in Table 5.11. Some pieces of a toolkit are passed on from one generation to the next (e.g., rotatable wooden bases, polishing stones), while other pieces are easily acquired and lost (e.g., rice sacks, cloth liners, and metal scrapers). Accordingly, several potters were not certain of the origin of their rotatable wooden base (chuyas) beyond the chain of inheritance that brought them the product. About one-half (26) of the potters possess at least one chuyas. Potters without chuyas borrow these platters from relatives (especially mothers, aunts and sisters) or friends. Four of these potters inherited their chuyas from their mothers, and two purchased theirs in Ableg (one in 1970 and one in 1985).
<table>
<thead>
<tr>
<th>TOOL NAME (ENGLISH)</th>
<th>TOOL NAME (KALINGA)</th>
<th>WHERE OBTAINED WHEN NEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotatable base (wooden)</td>
<td>chuyas</td>
<td>Tinglayan, Malucsad (rarely)</td>
</tr>
<tr>
<td>Rotatable base (metal)</td>
<td>plato</td>
<td>Bulanao/Dagupan Tabuk</td>
</tr>
<tr>
<td>Rice sack (for transporting clay)</td>
<td>sako</td>
<td>Bulanao/Dagupan Tabuk</td>
</tr>
<tr>
<td>Wooden pestle</td>
<td>salsal</td>
<td>Balbalan</td>
</tr>
<tr>
<td>Wiping cloths</td>
<td>anap, lapidas, usu-os</td>
<td>Locally produced from recycled clothing</td>
</tr>
<tr>
<td>Bamboo wand</td>
<td>kilkil</td>
<td>Locally made</td>
</tr>
<tr>
<td>Coconut shell scraper</td>
<td>ananas</td>
<td>Locally made</td>
</tr>
<tr>
<td>Metal scraper (tin can rim)</td>
<td>kaga-os</td>
<td>Locally made from recycled can</td>
</tr>
<tr>
<td>Bamboo stylus</td>
<td>gili</td>
<td>Locally made</td>
</tr>
<tr>
<td>Paddle</td>
<td>pikpik</td>
<td>Locally made</td>
</tr>
<tr>
<td>Anvil</td>
<td>bontoc</td>
<td>Locally (Pasil River)</td>
</tr>
<tr>
<td>Polishing Stone</td>
<td>idjidi</td>
<td>Locally (Pasil River)</td>
</tr>
</tbody>
</table>

Table 5.11. Components of a Dalupa Potter’s Toolkit.

The cost of tools in the kit varies. Many tools are already in every household’s possession (e.g., wooden pestles, rags, rice bags, an old tin can). Others are easily manufactured from locally available materials (e.g., coconut and bamboo implements), or procured from nearby areas at no expense ( anvils, which are unmodified river cobbles). Of the few valuable items in the potter’s toolkit, two are most important: the wooden chuyas and the polishing stone (idjidi). These objects are often shared with other work group members while the potter is active. Polishing stones and chuyas are passed to the next generation when the
potter retires or dies. Younger or less active potters often use the tools of their mother or other older female relatives. The mark of an active potter is her possession of a full tool kit.

Dalupa potters use the wooden bowl as a rotatable base for vessel construction. The chuyas was traditionally used throughout the Cordilleras as a serving platter for rice or other foods. Today, wooden platters are sold in tourist and curio shops in Baguio and Manila. These bowls are rarely made locally in the study area, and tend to come from the Tinglayan Municipality, southwest of the Pasil Municipality. Potters agree that chuyas production in source areas (e.g., Tinglayan barrios) had virtually died out by the early 1970s. These estimates are supported by the fact that potters' most recently acquired chuyas had been used an average of 19 years (median=18.0, s.d. 13.329, n=16).

Nearly all (49) Dalupa potters used chuyas for manufacturing some or all of their vessels. These wooden platters were available in abundance until the mid-1970s, when Kalingas shifted from wooden to enamelled serving ware. However, only one-third of the respondents (n=16) actually owned chuyas and they owned an average of 4 chuyas (median=3.5). Chuyas owners tended to be older part-time specialists, and they shared their platters with work group colleagues who lack their own chuyas. Technical reasons underlie the persisting popularity of this piece of the Dalupa toolkit. The chuyas is easier to rotate than the new enamelled plates that younger potters use, and the chuyas serves as a basal mold for larger vessels. Vessels made using the chuyas, potters say, are much easier shape into globular bodies with paddle and anvil than are those made using a metal plate.

Availability may be the main reason why some young potters (n=4) rely exclusively

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3. Two potters in the Sources of Materials for Potters Survey obtained their chuyas from Malucsad wood carvers.
on metal plates to make their pots. Older potters continue to procure chuyas through purchasing used, rather than newly manufactured, wooden plates from Pasil households (e.g., in Ableg, Cagaluan, Balinciagao, Guina-ang). The introduction of non-wood alternatives -- especially plastic and metal -- into the Cordillera highlands is one reason for the cessation of chuyas manufacture. Another reason may well lie in fairly recent prohibitions against harvesting hardwood trees from the Cordillera forests, a point discussed previously.

Polishing stones (idjidi) are a second valued item in the Dalupa potter’s toolkit. The idjidi is used to polish the interior and exterior surfaces of leather-hard vessels during the drying process. Ideal material for polishing stones is opaline, although other materials with exceptionally smooth surfaces can be used. Unlike the wooden chuyas plates which must be purchased, polishing stones are acquired through scavenging, gift-giving or inheritance. Rocky banks of the Pasil River provide one source for these objects, which are rare and highly valued.

Forty-seven polishing stones were recorded in Dalupa during 1988, which were owned by 62% (33) of the potters. Some potters share their polishing stones with their work group and/or with their daughters and nieces. Although the number of stones per potter ranged as high as 3, potters had an average of 1.4 stones (median=1.0, s.d.=0.614). Because stones are inherited, data reported here capture only the most recent user’s history or what might be called the "use-age" of the object. Polishing stone use-age data were highly variable (coefficient of variation=1.041), as estimates ranged from one to 33 years (s.d.=21.315). The mean use-age was 20.9 years (median=12).

Recognizing that use-life estimates based on informant-derived data are prone to error, data collected on the date of polishing stone procurement are still interesting. Hardly any
ethnoarchaeological studies have collected any data on polishing stones, and archaeologists often wonder at the paucity of polishing stones in excavated assemblages. One reason might be the extremely long use-lives of these tools, whose use is truncated more often by loss than by exhaustion of the tool (the latter happens, for example with grinding tools). The possession of polishing stones is not as clearly related to the relative expertise of the owner as is the case with the chuyas. Nor is the number of polishing stones in a household or work group area directly related to production intensity, as has been suggested in the Southwestern archaeological literature (Kisselburg 1987). Dalupa data suggest that using polishing stones to assess the intensity of pottery production at a settlement is problematic at best.

Manufacturing technologies: traditional and non-traditional forms. Two different technologies are employed to manufacture Dalupa ceramics, one for the traditional vessels (i.e., cooking pots and water storage jars) and another for the non-traditional forms. Traditional cooking and storage vessels are made through manufacturing techniques similar to those previously described for Dangtalan pottery production (Longacre 1981; Longacre et al. 1991). Some non-traditional form technology is derived from that used for making pots, while other forms require entirely new techniques.

When Dalupa potters mine clay, they often travel in pairs or take children along to help transport clay. Crude digging sticks or grub hoes are used to loosen clay deposits. Clay is collected in baskets or in rice bags, and potters carry sufficient clay back to the village to make approximately 10 medium-sized vessels or four large-sized rice cooking pots. Clay is first 'cleaned' by removing large pebbles during pounding that takes approximately twenty minutes. When the cleaning process has been completed, the potter shapes a lump of clay into a cylinder and the forming begins. She presses her fingers into the center of the cylindrical
lump, and pulls the clay away from the cylinder’s center to begin the building process. A series of coils is then added to the emergent vessel. When the vessel reaches a sufficient height, it is scraped smooth using a piece of bamboo. The neck and rim are shaped using a wet cloth and all three forms have everted rims. Paddle-and-anvil work produces the globular body shape characteristic of all traditional Pasil vessels.

Ocher (pula) is applied to vessels in several different ways and serves to distinguish functional types and production sources. Pasil ceramic vessels exhibit one of the following ocher applications: 1) around the perimeter of the vessel’s lip (exterior and interior) in combination with a band of red immediately below the neck (Dangtalan cooking pots); 2) around the perimeter of the vessel’s lip (exterior and interior) but not accompanied by a below-neck band (Dalupa cooking pots); 3) across the vessel’s entire exterior surface and interior lip (Dangtalan water jars); or 4) around the perimeter of the vessel’s lip (exterior and interior) in combination with geometric or floral patterns that are painted across the vessel’s exterior surface (Dalupa water jars).

The initial vessel-forming sequence lasts 15-25 minutes, after which the entire vessel is set aside to dry for 1-4 days. Drying time varies seasonally, as it depends on the relative humidity of the air. Pots are then fired in the open, bonfire-style. The entire production process (i.e., clay procurement and preparation, vessel formation, vessel drying, and firing) takes 3-6 days until completion and is dependent upon weather. An active Dalupa potter finishes between 10-15 vessels in a week, but this number fluctuates seasonally.

The technology of non-traditional forms (ay-ayam) varies according to form, but several technological aspects are found across categories. None of the forms requires paddle-and-anvil finishing, virtually all are covered with ocher before the drying stage, and all are
generously coated with resin immediately after firing. Two of the more common forms -- the money bank and the gusi jar -- utilize many aspects of the pottery technology, including (in many cases) coil-and-scrape building techniques that produced hollow objects. Flower vases have a highly variable technology that differs with each form (e.g., the hanging shell flower vase vs. the footed flower vase). The decorative plaques require an entirely different construction technique, and the drying time for plaques is significantly longer than that for traditional vessels since plaques are much thicker than traditional vessels. The application of ocher, so uniform across varieties of ay-ayam, is an important but hardly visible decorative touch: once fired, many non-traditional forms appear dark brown rather than red. Solheim and Shuler (1959:4) note a similar pattern in Bontoc pottery-making just south of the study region, where ocher decorations, once fired, are virtually invisible.

Potters use the same types of clays to make non-traditional forms as they do to make cooking pots and water jars. However, non-traditional forms may be made from a wider variety of clays than is the case with cooking pots and water storage jars. Some potters indicated that a few clay sources were suitable for non-traditional forms but could not be used in making cooking pots and storage jars. Dean Arnold (1985:31) notes a similar finding among Ticul potters: clays of poorer quality may be adequate for small items of pottery but not larger items. No consistent preferences were observed regarding the differential use of clay resources for pots vs. non-traditional forms, but as the latter industry is in its infancy, stronger preferences may emerge in the future.

Non-traditional forms also required slightly longer firing time because many have thick walls and are irregularly shaped. Despite the longer time allotted for firing ay-ayam, potters commented on the fragility of the forms and cited a higher firing loss with ay-ayam than with
traditional vessels. Since non-traditional forms require a new technology, the potters are still experimenting with construction and firing technologies used to produce ay-ayam.

Another potential source of failure for non-traditional forms occurs during the critical moments immediately after firing. Dalupa potters' two major criteria for beauty in ay-ayam are overall symmetry and the quality of the resin treatment. This latter criterion reflects both market demand for ay-ayam outside Pasil (discussed in Chapter Eight) and aesthetic preference. A narrow window of time exists after the forms are sufficiently fired and before the forms lose too much heat for smooth applications of resin on their surfaces. As the potters commented, a "poorly varnished ay-ayam" will not sell. To counteract this problem, potters often recruit several family members to help apply resin when firing large batches of non-traditional forms.

Summary

This chapter has described the technology of Dalupa pottery production and has explored aspects of the ceramic production environment. The manufacturing technology for traditional Dalupa pots parallels that described previously (Longacre 1981) for Dangtalan pots. However, the introduction of non-traditional forms, from flower vases to decorative plaques, entails an ongoing process of technological innovation that rarely resembles the hand-built Kalinga technologies described elsewhere.

One tenet of the Ceramic Ecology approach (sensu D. Arnold 1985; Kolb 1989) is that the ceramic production environment—including geology, climate, temperature, and locations of resources—plays a critical role in shaping the decisions that potters make regarding their activities. Whether environmental forces determine human decision-making or instead simply influence decisions is a matter of debate throughout the archaeological discipline today. What
remains irrefutable is that potters must find satisfactory (if not optimal) strategies for pursuing their vocation within a particular environmental setting. Dalupa pottery making is most affected by three key considerations: the household's economic status (discussed in Chapter Six), the agricultural cycle, and the weather.

Environmental degradation in recent decades has affected Dalupa pottery production in many respects. An interesting aspect of this problem in Kalinga is that the burden of responsibility for a deteriorating environment lies in the hands of Philippine governmental policy as it does in the hands of nature. Earthquakes, droughts and volcanoes have exacted tolls on the study region which have, in turn, affected the scale and nature of Dalupa pottery production. A series of droughts (particularly during 1983-1984) ruined crops, and earthquakes (such as that of 1990) destroyed houses and rice fields. These sorts of events have pushed women into pottery production for exchange.

But a more significant influence on Dalupa ceramic production patterns must be attributed to the nation-state. The government's leasing of forest tracts to private logging corporations has limited access to traditional resin and ocher sources. World Bank-funded efforts to construct the Chico dam system improved roads (which provided access to a wider market for Dalupa potters) and brought in outsiders whose requests generated innovations in the Dalupa ceramic repertoire. The government's refusal to grant native land titles to the Cordillera area (see Lynch 1982) has enabled private businesses like the Batong Buhay mines to establish operations in the Pasil municipality. This operation has polluted traditional riverine resources and provided wage labor to some, but not all, sectors of the Pasil population.

Clearly, any ceramic production system (including that of Dalupa) reflects a
combination of environmental and social/political processes. Potters make decisions based on a combination of factors, but feasibility and practicality are foremost on the list. The clays that Dalupas potters use all fit within a relatively wide latitude of workability. Within this range, potters choose materials based on criteria such as accessibility and relationship to owner. Resin sources also vary somewhat from one another, but potters purchase and use almost any resin that traders bring to the village. While potters prefer to use hardwood for firing their pots, they make do with available materials such as rice stalks and split bamboo.

In Dalupa, "optimal" solutions are as dependent on economic and social concerns as they are on performance characteristics. Having described the ceramic production environment in this chapter, we must examine organizational issues in Dalupa ceramic production. The next chapter describes parameters of ceramic production and documents recently observed changes in the production system that explain patterns observed during the field season. The scale of Dalupa pottery production is then evaluated, and the system is examined within the context of a community-based specialization system at the community and individual levels.
CHAPTER 6

PRODUCTIVE INTENSIFICATION AND DALUPA CERAMIC PRODUCTION

Can we identify the times and conditions under which pottery-making was transformed from a craft produced for home consumption to an industry producing for the market? (Shepard 1965:86)

Understanding the conditions under which craft specialization arises concerns a wide range of archaeologists throughout the world. Models of craft production, discussed in Chapter Two, rely heavily on ethnographic case studies to develop typologies and models of production. The Dalupa case study is valuable because of the abundance of documentation available on parameters that archaeologists commonly employ, such as context, concentration, scale and intensity (e.g., Costin 1991; Pool 1992). This chapter focuses on productive intensification as it is expressed through Dalupa ceramic production.

Wet-rice agriculture is, by definition, intensive, and Dalupa households' strategy of combining intensive agriculture with intensified craft production is a widespread pattern through Southeast Asia. Here, parameters of Dalupa ceramic production that define its organizational mode are explored. These parameters are drawn from synthetic research that employs a combination of archaeological and ethnoarchaeological data. Our attention then turns to answering the question of why some Dalupa households have specialized in ceramic production while others have not; relative household wealth plays a large role in Dalupa ceramic specialization. Finally, quantitative aspects of the 1988 Dalupa production system are examined in terms of production scale (sensu Rice 1987b:180-181), variability in goods produced, and variability in producer intensity across the Dalupa potter work force.
Organizational Issues and the Scale of Production

**Production parameters and varieties of specialization.** Craft specialization is an organizational mode that has many different manifestations, both organizationally and archaeologically (e.g., Brumfiel and Earle 1987; Costin 1991; Rice 1991:261-266). Craft specialists, as intensive producers, come in many varieties and this aspect remains poorly understood. While some part-time specialists rely on craft production for exchange to fill critical gaps in their household’s yearly cycle, others occasionally make goods to supplement reasonably predictable agricultural returns.

Two archaeological manifestations of craft specialization factor into discussions of part-time specialist systems: site and producer specialization (Rice 1991). **Site specialization** occurs when a village is intensively involved in commodity production for exchange. **Producer specialization** occurs when a system has a restricted production work force size relative to the size of the consumer market, or a ratio of production loci to consumers (also see Costin 1991:22-24). This restricted web of producers has greater technological skill that results from an increased production scale.

Variability that exists among part-time specialist production systems is better understood when selected organizational parameters are elucidated (see Costin 1991; Pool 1992; Rice 1987b, 1991): context, concentration, scale, and intensity. **Context** refers to the nature of control over production (i.e., attached vs. independent, [Costin 1991: 11-13]). **Concentration** refers to the relative spatial organization -- or 'segregation' (Pool 1992:279-280) -- of activities (Costin 1991:13-15). **Scale** refers to levels of inputs and outputs (Pool 1992:278-279). **Intensity** refers both to the relative level of inputs per production entity (Ibid.). Additional parameters and associated archaeological measures are discussed elsewhere.
The intensity parameter is multi-faceted and includes amount of time devoted to production (i.e., part-time vs. full-time), seasonality of production, production scale (i.e., level of output per producer or production entity), the development of technological innovations, and the relative richness and diversity in an assemblage (Costin 1991:16-18; Pool 278-279; Rice 1989, 1991). In response to greater intensity, systems shift toward year-round, full-time production with a higher production scale and, possibly, the introduction of technological innovations. These shifts may be gradual, and different aspects may change at different rates.

Trajectories in some aspects of intensity are complicated by several factors. Because the notion of intensity is producer-centered (rather than community-centered), directional changes are difficult to track at the community level (Rice 1987b:189). Gauging seasonality in production is also difficult in places whose climatic regimes are by nature highly seasonal (Rice 1987b:189) or among cultivators who combine farming with craft production.

Assemblage richness and diversity are two aspects of the intensity parameter whose directionality varies depending on the example. If one production center serves a regional distributional network in a marketless economy, assemblage diversity tends to increase as production intensifies (e.g., Balfet 1965:170; Rice 1984). However, when multiple ceramic production centers operate within a market-focused distributional network, assemblages can appear less diverse and rich. Each center may specialize in complementary functional categories to serve different demands within a consumer market (e.g., Chávez 1992; Nicklin 1981; Reina and Hill 1978).

Parameters of Dalupa pottery production. The Dalupa pottery production system observed in 1988 presents striking contrasts to previous descriptions of pottery production in
the area. Dozier's (1966) observations of Kalinga pottery making, from a Lubuagan perspective, suggested that pottery making was limited in scale and primarily intended for local use rather than exchange. Dangtalan research in the 1970s followed Dozier's thesis (Longacre 1981; 1985). Subsequent research suggests great variability in Dangtalan's production scale (Graves 1991; 1994), and Dalupa in 1988 had an intensified ceramic production system.

In terms of production context, Kalinga potters are independent producers rather than attached specialists. However, the relative intensity of Kalinga ceramic production systems varies through time and space. Researchers also differ in their interpretation of the same systems. Systems described by Dozier and Longacre are generalized production systems, whereas some Dalupa potters engaged in intensified production. Independent producers, often involved in work groups that link multiple households, make goods during most of the year. They produce a wider range of goods than do their Dangtalan counterparts, and production is oriented toward exchange.1

Concentration and scale of production. The context of Dalupa pottery production has remained independent even as production has intensified. Dalupa potters -- individually, or as parts of a single household -- are autonomous economic units. They determine their own production cycle and retain the goods obtained through exchange transactions for their respective households. The concentration of Dalupa pottery production varies slightly from that of Dangtalan. Dalupa women often organize themselves into production work groups who share production tools and responsibilities with one another. Work group membership is not

contingent upon kin ties, as close neighbors of similar technical expertise may work together as well. Thus any given work group may represent multiple households, who in some ways distribute the costs and benefits of production among all members. A few extremely productive potters manufacture their vessels independently but often join others to fire their vessels.

**Intensity of production.** Kalinga hand-building techniques do not employ mold technologies, and potters instead rely on the paddle-and anvil/coil and scrape methods described earlier in this chapter. Using these techniques, 41 Dalupa potters produced at least 4517 pots from January 1988 to January 1989. Monthly productivity figures at the village level fluctuate in response to the agricultural round, and in response to the subsistence needs of Dalupa households. This is a pattern that is repeated in the pottery exchange data, described in Chapter Eight.

While generalized producers fit pottery-making in around their agricultural cycle, intensive producers make goods year-round as a full-time occupation. Dalupa pottery production records from 1988 suggest that some potters continue to make pottery during periods of peak farming demands. From mid-May to mid-June in 1988, potters produced (i.e., made and fired) pots but many refrained from selling their stockpile of pots until harvesting and seedbed planting was completed. Figure 6.1 shows this discrepancy between production and exchange activities during May and June.

Examined over a twenty-year period, the Dalupa ceramic repertoire exhibits an increase in assemblage diversity that is commonly associated with increased intensity in production. Dalupa's increased assemblage diversity is manifest in modifications of traditional

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2. Frequency data used derive from pottery firing logs, which include most (but perhaps not all) firing episodes in 1988.
Figure 6.1. Discrepancy Between Production and Exchange Activities.
forms and in the introduction of myriad new varieties. The water jar (immosso), has undergone substantial stylistic and morphological changes since the late 1970s (Stark 1991b). The range of ceramic forms in the Dalupa assemblage has also increased enormously with the introduction of non-traditional forms or ay-ayam. Each type of change is briefly discussed in this chapter; previous studies have explored causes and rates of change (e.g., Stark 1991a; Stark and Longacre 1993).

Increases in Dalupa Assemblage Diversity

The case of the Kalinga water jar. The shift to intensified production has wrought morphological and stylistic changes in the water jar (immosso). Technological and stylistic changes in the immosso since the 1970s include: 1) simplification, as the amount of resin used has been reduced; 2) stylistic elaboration, with the introduction of ocher decoration; and 3) morphological innovation, with the appearance of a pronounced shoulder.

Traditionally, potters coat the complete exterior of the water jar with resin. Dalupa potters no longer invest as much effort in their post-firing application of resin or lebu. Resin coating is now restricted to the vessel’s interior surface and to the vessel’s exterior as far down as the shoulder. Resin is increasingly difficult to obtain, as discussed previously in Chapter Five. A drop in the number of resin traders, in response to economic alternatives, highway banditry, and military-NPA fighting activity in the western and northern forests, may also have driven up the price of resin.

Concurrent with the change in resin use is the elaboration of ocher decoration on water jar exteriors. Where traditional water jars had a uniform ocher wash applied to the exterior surface, Dalupa immosso sport elaborate ocher decorations on their exterior surfaces. Figure 6.2 illustrates one varieties of geometric ocher patterning, the sinaggikao, which are the most
Figure 6.2. Geometric Patterning and Incised Decoration on Dalupa Immusso.
common design style that Dalupa potters use and resembles designs employed by Bontoc potters to the south of the study area (Solheim and Shuler 1959:4).

One gesture by the Philippine government to placate angry Kalingas during the Chico River Dam era was the establishment of at least one craft cooperative (for backstrap loom weaving) in Lubuagan. Artisans in this cooperative, from several neighboring municipalities, suggested to visiting Dalupa potters that they try decorating their water jars with textile designs. Floral and anthropomorphic designs were also recorded on water jars during the 1987-1988 field season. The new ocher designs are quite popular throughout the Pasil Municipality, and some consumer villages (e.g., Guina-ang) prefer Dalupa decorated jars over Dangtalan’s traditional jars for aesthetic reasons (Aronson et al. 1991).

Dalupa water jars also underwent morphological change in the early 1980s. Many water jars observed during the 1988 season exhibited low, sharply angled shoulders, a change from the traditional globular water jar (Figure 6.3). Potters stated that this "Binontoc" (i.e., from Bontoc) style was initiated after two experienced Dalupa potters encountered the style among Bontoc potters who visited Lubuagan during the late 1960s.

The introduction of non-traditional forms. The development of non-traditional forms (ay-ayam) or novelty items has been the source of amusement and profit for Dalupa potters. Non-traditional forms are called "toys" because potters have always produced miniature pottery for their children’s play, such as miniature cups and water jars. A single "Origin of Non-traditional Forms Survey" was used to document each variety of ay-ayam (e.g., squash money bank, religious plaque) that every Dalupa potter produced during 1987-1988. This survey revealed that Dalupa potters currently manufacture at least 50 different types of non-traditional forms, ranging from candelabras and flower vases to money banks and
Figure 6.3. Vessel Profiles: Globular (Traditional) vs. Shouldered (Binontoc) Dalupa Water Jar.
imitation teapots (Table 5.10).

The production of non-traditional forms began in earnest during the late 1970s and early 1980s. Although the range in forms produced is highly diverse, several commonalities unite them: they lack an adequate manufacturing technology to produce reliable products, they are almost always bought rather than bartered (while pots are bartered), and they are non-utilitarian in every sense of the word. Inspiration for new forms comes from a variety of sources, from elementary school textbooks and calendar illustrations to drawings from customers and glimpses of novelty items in lowland markets. One common form, the decorative plaque, replicates bamboo plaques manufactured and sold in Baguio City and the Philippine lowlands; these are generally emblazoned with a religious saying.

Not all potters make non-traditional forms, and those who do tend to concentrate on a few types that have simple manufacturing technologies. Younger, less experienced potters tend to specialize in manufacturing non-traditional forms that do not resemble vessels (e.g., plaques, flower vases, money banks) while older potters specialize in making cooking pots, water jars, and pot-like ay-ayam such as earthenware gusi vessels (i.e., facsimiles of Chinese porcelain wine jars).

Both technical skill and ideology play roles in this specialization in forms. Most non-traditional forms require more ingenuity than mechanical ability, except for the imitation gusi jars that Dalupa potters now manufacture. This vessel form is conceptually similar to the traditional amuto jars (for basi storage), although the gusi jars do not serve the wine-storage functions that locally-made earthenware amuto once served. Only Dalupa potters older than 40 years of age manufactured gusi vessels of any size in 1988 (n=79). Most (88.6%) gusi forms were made by women who were past their childbearing years. Dead infants were
formerly interred in amuto vessels, and some Dalupa people believe that women with small children who make amuto vessels or facsimiles may cause the death of their own small children.

**Causes behind the increase in assemblage diversity.** Reasons why Dalupa potters adopted certain paths of innovation rather than others is complicated, and are explored more fully elsewhere (Stark 1991; Stark and Longacre 1993). Both types of assemblage changes reflect events associated with the Chico River Dam project and with re-activation of the Batong Buhay mines. Each of these economic developments brought new personnel into the area. The Philippine government founded a weaving cooperative in Lubuagan as one incentive for the dam project. Weavers there suggested to Dalupa potters that they adopt textile designs for use on their water jars, and a few enterprising potters started a trend.

Both the Chico dam project and the Batong Buhay mines brought an influx of non-Kalinga personnel (with cash) into the area, who were potential customers for Dalupa ceramic goods. Upon suggestions of some of these visitors, some Dalupa potters experimented with novelty forms for sale. What evolved was a uniquely Kalinga tradition of 'tourist art' (see Graburn 1984) in the ay-ayam forms. This 'tourist art' tradition has found ready customers within and especially beyond the Pasil Municipality’s boundaries.

One enduring legacy of the Kalinga Ethnoarchaeological Project is its commitment to a longitudinal research program. Regrettably for this question, the 1970s fieldwork concentrated on Dangtalan rather than Dalupa, and efforts to track the increase in Dalupa ceramic assemblage diversity are overly dependent on informant-derived data. A high degree of concordance in informant estimates lends confidence to data presented in the foregoing section, however, and the 1987-1988 field season now serves a benchmark for future longitudinal
research.

Dalupa Production Scale and Specialization

Theoretical rationale on craft specialization. Our understanding of craft specialization has grown through a burgeoning ceramic ethnoarchaeological literature (see Kramer 1985 and bibliography in Longacre 1991) and a growing array of ecological studies on craft specialization. Both these sources provide insights regarding the motivations and forces that shape the nature and duration of specialized production. Research in these areas suggests that archaeological definitions of "specialization" can incorporate multiple characteristics of a specialized system: 1) of the performer, in terms of skill and restricted work force size; 2) of the tasks, in terms of routinization and repetition; and 3) of the market of consumers, most especially in terms of scale (Rice 1991:261).

The ethnographic literature provides ample evidence on which models of specialist production, discussed previously, have been developed. Myriad cases have been documented of specialists who produce subsistence goods and operate independently of state-controlled institutions such as courts, markets and even (more recently) state-instigated artisan cooperatives. These individuals produce utilitarian goods in high volume for a fairly restricted network of customers. They, like Dalupa potters, operate in an independent context of production.

Archaeologists strongly associate attached specialization in prestige goods with state formation, but independent specialization in subsistence goods appears relatively unimportant to the development of complexity (Brumfiel and Earle 1987:6; Costin 1991:12). A state may harness the resources of independent specialists through tribute systems, but subsistence systems often operated independently of the state in antiquity (op.cit). Independent
specialization tends to be associated with areas of marginal agricultural land, especially with
with the onset of sedentism (e.g., D. Arnold 1985; Kaiser 1985) or and with agricultural
intensification (e.g., Feinman et al. 1984; Netting 1990). Specialization may include either
craft manufacture (e.g., pottery, baskets, wooden crafts) or productive specialization of
agricultural or forest products (e.g., grain crops, textile crops, maguey production), or both.

Pottery production represents one archaeologically relevant form of craft specialization
to study through an ethnographic lens. Contemporary households and communities worldwide
turn to specialized pottery production as an alternative subsistence strategy when faced with
insufficient agricultural landholdings (D. Arnold 1985:176), and Scheans (1960:9) maintains
that a similar relationship is found among potters in Ilocos Norte (northwest of the study
region). In contrast to subsistence agriculture, craft production often entails more risks and
more effort (D. Arnold 1980:147).

Craft specialization provides a poorer and less secure livelihood than does farming for
the Dalupa household, a common pattern worldwide (Netting 1990:60). Why do Dalupa
women choose this profession? The reason for the development of part-time ceramic
specialization is largely economic, and lies in age-related and household-based wealth
differences that are explored in the following sections.

The Dalupa potter’s life cycle. Many women learn the craft of pottery making as
young girls (Graves 1981) and occasionally make vessels with the assistance of adult female
relatives and neighbors who are potters. Most Dalupa potters say they learned to make pots
when they were approximately 24-26 years old (min=12; max=51; median=24; s.d.=10.254)
and began selling their pots within about two years. Many Dalupa women were probably
exposed to the craft at an early age but did not take up pottery making until much later, in
comparison with potters from West Africa and South America (cf. David and Hennig 1971; DeBoer and Lathrap 1979). Dalupa women rarely begin to manufacture the traditional inventory of vessels in earnest until their mid-twenties, when they are classified as beginners or "apprentice" potters.

For many young women, marriage and child-bearing interferes with pottery production for much of their twenties. Women in this age group manufacture pots, but on a limited basis. During the period following a birth, women often cease making pots altogether and a series of locally-held taboos reinforce this practice. When children are weaned, women make a restricted range of vessel types and sizes on a very part-time basis. They, or their close female relatives, peddle these wares in nearby barrios so that barter trips can be completed in the afternoon.

Figure 6.4 groups Dalupa potters into birth cohorts used by Graves (1981, 1985) in his Dangtalan research and adds new cohorts that encompass the youngest Dalupa potters. The oldest birth work cohort (i.e., pre-1921) is problematic: in the absence of birth certificates, this research relied on informants' assessments of their own ages, which were unreliable. The largest Dalupa birth cohort was born in the 1930s, and it is from this pool that the most active potters are drawn. Many potters in this cohort went through elementary schools under the American and Japanese occupations of Pasil. Another one-third of the potters were born between 1941 and 1960. These are the less experienced potters who tend to have small children and tend to produce fewer pots.

Constraints associated with childcare make non-pottery production alternatives attractive to young mothers in Dalupa. Many young Dalupa women turned to itinerant vending, which permitted them to sell goods at their convenience in various Pasil barrios.
Figure 6.4. Birth Cohorts of Dalupa Potters.
When children reach age ten years or older, women accelerate their pottery-making activity. Acquiring the expertise required to manufacture large-sized vessels takes several years, and women's potting expertise grows during their thirties. Only 2.6% of all large-size meat/vegetable cooking pots ($n=38$) and 4.7% of all large-sized rice cooking pots ($n=212$) were made by potters younger than age 40 in 1988.

Many young women concentrate on making non-traditional forms (ay-ayam) rather than on making traditional cooking and storage pots. One reason is that non-traditional forms are highly profitable, provided potters can reach the non-Pasil municipality settlements that are the ay-ayam market. Another reason is that inexperienced potters can also master the technology of non-traditional forms, since the technological tradition is in a nascent stage (although manufacturing failures are also common). In fact, at least five women and one man (non-potters) in the village have occasionally made non-traditional forms to sell.

Craft Specialization and Intensive Rice Cultivators

Wet-rice cultivation produces the highest and most predictable yields of three cultivation modes (i.e., shifting, broadcasting and transplanting) that are found throughout Southeast Asia (Hanks 1972:56-57). Intensive cultivation is also associated with the highest population densities of all three cultivation modes, which often entails higher populations than can be accommodated through the traditional agricultural system. Wet-rice cultivation systems are uniquely suited to intensification in the process of "agricultural involution," (sensu Geertz 1962). In this process, households continue to boost agricultural returns by increasing labor investment. However, each field has its limits with respect to labor investment. How the household's additional labor power is absorbed, and what economic alternatives exist, is discussed below.
Subsistence demands have outstripped available resources such as rice fields and swidden land in the study region. The 1970s and early 1980s witnessed the strains of an ever-expanding population that unsuccessfully sought to feed its growing households (Lawless 1977). The invasion of cogon grass has made former swidden areas unsuitable for continued swidden agriculture (Eder 1981:103 describes parallel situation in Palawan). The lack of available land precluded the development of irrigated terraces in former swidden areas. Pasil’s situation resembles that of Uma (a neighboring community on Pasil’s western boundary), where the mid-1960s witnessed a slowing rate of expansion in rice field construction. Takaki (1977:189-191) believes this land shortage may have begun as early as World War II.

This burgeoning population has also created more labor than can be utilized on the extant rice fields, yet the demand continues to grow for rice to feed families. The average-sized Dalupa family (i.e., five adults, two children) requires at least 4.5 pounds of unhusked rice a day, or about 1,640 pounds of unhusked rice per year (see Hanks 1972:48). Rice deficits have characterized Pasil villages in the last fifteen years (Graves 1991:139), and household rice production in Dangtalan and Guina-ang provided only 4-6 months’ worth of rice during the 1988 year (Quimpo-Castaneda 1990:207). Indeed, most Dalupa households suffer a rice deficit each year that must be redressed by obtaining additional rice through trade or purchase.

Dalupa households use different strategies to deal with excess labor based on their economic standing. More affluent Dalupa households have the capital to invest in subsistence diversification (particularly coffee cultivation) or in emigration to locales outside Pasil to seek work or higher education. Less affluent Dalupa households adopt low-investment economic strategies that can be pursued in Dalupa.
Dalupa households responded to concomitant population growth and strain on resources by implementing one of two strategies: subsistence diversification and work-related emigration. The former strategy involves both cash-cropping (in Pasil, coffee cultivation) and intensified pottery production. Coffee cultivation is undertaken by individual households (efforts to establish a coffee cooperative in the early 1980s quickly fizzled), and coffee cultivation is limited in the Dalupa area because the village lacks sufficient land.

Table 6.1 provides one example of the relative returns associated with farming vs. craft production among intensive wet-rice cultivators in Southeast Asia (no comparable Philippine data were available). Clearly, craft production provides the lowest economic returns on rural Javanese women's labor. Pottery making in Kalinga may be more profitable than crafts listed in the Javanese example. However, several Dalupa families (with potters) emigrated (to Tabuk and Baguio) to engage in daily farm labor for the entire 1987-1988 field season, and many resident Dalupa women engaged in multiple trade activities including, but not limited to, pottery vending. In examining the relative returns per hour in several different occupations, rice farming -- even as a laborer on other people's land -- is the most remunerative occupation available for Javanese women.

Javanese economic alternatives resemble those available in the highland and lowland Philippines. In both regions, households commonly pursue multiple (low-wage) economic strategies to make ends meet (e.g., Anderson 1969:645-647; Davis 1973:97). Both economies revolve around irrigation rice farming, in which households employ numerous economic strategies for subsistence. The same alternatives available to rural Javanese women are

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3. Recent subsistence intensification in Palawan, in the form of commercial gardening, is another example of a local response to population-induced subsistence stress (Eder 1991).
available to the women of Dalupa, albeit in slightly different forms. Dalupa women may
cultivate rice on their own land or as tenants on others’ land, and they may engage in a
combination of agricultural wage labor, trade activities, and craft production.

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>ACTIVITIES</th>
<th>RUPEES/HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice cultivation (sharecropper)</td>
<td>full responsibility for farming 0.2 ha</td>
<td>12.5</td>
</tr>
<tr>
<td>Agricultural wage labor</td>
<td>transplanting, weeding, harvesting</td>
<td>10-12.5</td>
</tr>
<tr>
<td>Trade (on foot)</td>
<td>investing 1,000 rp capital</td>
<td>5-10.0</td>
</tr>
<tr>
<td>Crafts</td>
<td>weaving, pandanus leaf hat making, bamboo mat making</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Table 6.1. Relative Returns Per Hour (in Rupees) in Rural Javanese Women’s Occupations (Data Derived from Nag, White and Peet 1978:98).

Except in the very wealthiest of Dalupa households, women choose from a
combination of economic activities. These activities are selected to optimize time investment
given a woman’s age, her social network, the point in her family’s domestic cycle, and her
areas of personal expertise. Younger women have the stamina to travel on vending trips and
to work in the fields (provided that childcare is available) and they lack the necessary expertise
to produce a high volume of pottery. Older women who are expert potters have less physical
stamina and more skill in ceramic manufacture, so they get higher returns making pottery for
exchange than they might in trade or agricultural labor.

Chapter Three outlined employment opportunities for Dalupa men. Here, the variety
of work opportunities available to Dalupa women is explored. Agricultural alternatives are
first examined, and then attention shifts to the variety of trade options that Dalupa women
exercise. Craft production, in the form of ceramic production, is investigated throughout the
rest of the chapter.

**Agricultural alternatives: tenant farming and pango labor.** Within Pasil, individuals routinely engage in tenant farming and in daily agricultural labor for households that have large landholdings. The intensified concentration of landholdings into a few wealthy households (Magannon 1974:102) has necessitated the hiring of labor power. Daily wage labor described here differs from traditional forms of contract labor known as pango and practiced in association with intensive rice cultivation throughout the Cordillera highlands (see Wiber 1985 for Benguet example).

Both landholders and workers prefer tenant farming over wage labor. Kalingas believe that hard work and good fortune on tobaö lands may reap better returns than could be obtained through day labor (see also Maclachlan 1987:18). Whether tenant farming is indeed a better alternative for the landless household is a matter of debate. At its best, tenancy offers higher returns to labor and a degree of autonomy. At its worst, tenancy offers unpredictable yields and entails greater risks (e.g., Chibnik 1980). Tenant farming is not strictly a poor person’s profession. In Dalupa and elsewhere in Kalinga, rice-field tenancy (tobaö) is most often done when a household’s landholdings are spatially dispersed, and some tracts are too far away from the rest to make farming profitable (see Takaki 1977:546). Considerations of feasibility (especially with respect to travel time) mean that some of the wealthiest Dalupa families let their distant fields out to tenants, and also tenant farm other households’ fields located near the bulk of their fields as well.

Households with inadequate economic resources rely more heavily on daily agricultural labor through the Kalinga pango institution than on tenant farming to make ends meet. In the pango system, individuals from multiple households form cooperative labor parties to meet
labor demands during peaks in the cycle, and they receive payment in cash, rice, or in kind (occasionally in pots) for their work. Daily labor is particularly necessary during the planting and harvesting periods, although work is also sought to weed the fields (see Garming 1984; Magannon 1974:112-114). Most Dalupa potters were involved in farm labor during the first 1988 rice crop (i.e., January-June). Nearly two-thirds of the potters also participated in daily agricultural labor during at least one of the three peak labor periods, and more than half (63%) of the potters were involved in all three activities (i.e., planting, weeding, and harvesting). On average, potters spent about fifteen days working in others' fields as laborers during the onoy rice crop of 1988.

Local agricultural wage labor is not remunerative, convenient, or even predictable. The average wage in 1987-1988 was P20/day (ca. $1.00 U.S.), and the peak demand periods for field labor (i.e., planting and especially harvesting) pull labor from all households. Those seeking day labor must first complete tasks associated with their own fields before hiring on with someone else. Rice production is dependent upon climatic patterns, so that year-to-year yields vary, and with them varies the need to hire field hands. While day labor offers more predictable economic returns to the household, it lacks the potential for relatively large profits that is found in tobao (tenant) farming.

Most Dalupa potters agree that, were more agricultural land available to their households, they would gladly abandon pottery-making. Two-thirds of Dalupa potters polled (35 expressed a preference; six did not) preferred all types of agricultural labor -- including day labor for others -- over pottery production for exchange. In the late 1970s, most Dangtalan potters who were presented with such an option (their husbands were employed at the Batong Buhay mines) stopped making pottery altogether. This reflects a Southeast Asian-
wide trend for women and children to enter the labor force when subsistence returns are low and to leave when household income rises (Hart 1980:192). The preference for farming over potting is common throughout the world (e.g., Cook and Binford 1990:40; Foster 1965:46-47; Tax 1952:48).

**Varieties of commodity exchange: sari-sari, clothes, and pots.** Trade is an important form of employment for many Dalupa women, potters and non-potters alike. Although this study primarily focuses on pottery production for exchange, sari-sari (or "walking store") vending and clothes selling are two other sources of income for Dalupa households. Sari-sari trade occurs throughout the year in village stores and through women vendors (called "walking stores"). Clothes-selling, a recent innovation, occurs immediately after the coffee harvests bring cash to households in coffee-producing barrios. While clothes-selling is highly seasonal (associated with coffee harvests), sari-sari is done year-round.

Sari-sari trade derives its name from household-run, corner sari-sari stores in the Philippine lowlands which offer a limited variety of goods (e.g., matches, salt, and cooking oil, packaged snacks) and have flexible hours. Until recently, most Pasil residents obtained store-bought necessities through "walking stores:" Lubuagan women who visited Pasil barrios with basketloads of goods purchased from Lubuagan stores. Now sari-sari stores have cropped up in virtually every Pasil barrio. Dalupa had two small, household-run stores in 1988, which supplied goods for slightly higher prices than those in Tabuk.

These Pasil sari-sari stores have not supplanted the traditional "walking store" institution, however. Now the same suite of store goods that was formerly restricted to Lubuagan is available to potential vendors in every Pasil barrio. Thirteen potters engaged in occasional vending during 1988, selling goods to households in the same neighboring villages
(particularly Pogong and Malucsad) where they sell their pottery. Several other non-potters also engage in sarí-sari vending. Of the 34 potters who expressed a preference between making pots for sale and sarí-sari vending, two-thirds preferred to make pots than to sell sarí-sari goods. However, a small minority (17.6%) said they would rather work as "walking stores" than as potters.

Most of these potters who prefer to sell sarí-sari goods are younger and have small children and they tend to make fewer pots per year than average (mean=96; median=95; s.d.=60.959). For them, the attraction of sarí-sari vending lies in its flexibility: they can leave their children for the day with relatives to sell goods. But it is also risky, as the consumer market is unpredictable and days may pass without substantial sales. Sarí-sari vending yields low returns: generally enough to cover the woman's own household purchases of these items. Payment is in kind rather than in cash, and potters complain that their families literally eat profits gleaned from vending.

Clothes-selling, a highly profitable occupation for the few Dalupa women involved in it, had been an economic option for at least three years prior to the 1988 field season. Five or six Dalupa potters sold clothes in 1988, obtaining their goods from an Ableg or a Dalupa supplier; Pasil suppliers procure goods from Tabuk, Tuguegarao, or other major cities (also see Anderson 1969:650). Vendors receive 25-50% of the purchase price when clothes are sold (25-30% is most common), and can earn as much as 50 pesos a day ($2.50 U.S. in 1988). This figure is two and a half times the daily rate for agricultural labor in Dalupa.

Little room for market expansion exists in clothes-selling for Dalupa vendors. Trade is restricted to the months of December, January and February (excelsa and robusta coffee varieties are harvested and some barrios have cash), the clothes market is limited to barrios
with high coffee yields (primarily Pogong and Malucasad, but also Guina-ang), and supply is dependent upon intermediaries who obtain their goods in provincial centers.

How important are these income-earning activities for Dalupa potters? For a small group of potters, trading activities provide a sporadic source of income. At least eleven potters were sari-sari vendors, but their ceramic production scale is relatively low: most are mothers of young children. Only four potters were actively selling clothes, and these women were not exceptionally active potters. Both agricultural work and ceramic production provide more dependable returns on labor on a year-round basis than does vending. Why some Dalupa households have embraced these alternative strategies is explored in the next section.

Dalupa pottery production and household wealth. A variety of factors -- including population growth, the degradation of agricultural land, and the uneven accumulation of wealth -- narrow the range of traditional economic opportunities available to large segments of communities or regions (Hamer 1986). Although many researchers have identified a relationship between pottery specialization and a lack of agricultural land research (e.g., Arnold 1975, 1985; Costin 1991:12; Papousek 1981, few quantitative estimates of household wealth and of household ceramic production scale exist. Dalupa households were analyzed to determine whether co-variation exists between households with potters and relative household affluence. Results of the analysis suggest that ceramic production for exchange is strongly related to low household wealth in Dalupa.

Wealth distinctions are a well-entrenched part of Kalinga society that have been explored in previous research (e.g., Dozier 1966; Lawless 1978; Magannon 1974). Whether the economic stratification observable today has its roots in the American period -- when headhunting was replaced by entrepreneurial activity as a basis for status and prestige (e.g.,
Dozier 1966:66; Keesing and Keesing 1934:112) -- or whether the affluent baknang class has deep roots is unclear. What is clear is that economic differentiation continues to grow as employment opportunities become available for a small sector of the population (Lawless 1978).

In the traditional Kalinga economy, affluence is conceptualized in terms of land, prestige goods, and livestock (Barton 1949; Takaki 1977). Prominent among Kalinga wealth items are rice fields, granaries, houses (and houselots), antique Chinese porcelain, heirloom jewelry (e.g., gold earrings, gold bracelets, and Chinese glass bead necklaces), and water buffalo (Takaki 1977:432). Kalinga heirlooms are valued by the Kalingas for many times their value in lowland currency (Lawless 1977:93; also see Barton 1949:102; Dozier 1966:149). Such wealth can be inherited or acquired, and rice fields have the highest prestige value. More recent wealth forms include household appliances, motor vehicles, and homes in the provincial capital of Tabuk; these goods are extremely rare in Dalupa and are owned by the households that are deemed bacnang or rich by traditional standards.

Households that inherit wealth are doubly advantaged: they begin their domestic cycle with assets and they often use their capital to acquire more wealth. Wealth comes in the form of rice fields, coffee plantations, and educational opportunities for family members that provide them with access to government employment. Despite growing contact with the outside world through education and employment beyond Pasil, Kalingas continue to deeply value rice fields and often use their cash earnings to purchase fields (see Keesing and Keesing 1934:204-205; Voss 1987 for comparative examples). For this reason, traditional wealth categories still form legitimate measures of household income.

This analysis of Dalupa household wealth closely followed research in Dangtalan by
Trostel (1990). Three sources of data were collected to provide information on household wealth in Dalupa (as well as in Dangtalan): the Economic Questionnaire, the Additional Material Inventory, and the Population Census (Appendix 1). Data from 78 Dalupa households were included in the analysis (insufficient information was available on one household, which was excluded from analysis).

Each household was assigned a wealth value (in Philippine pesos) that was the cumulative value of multiple categories of goods. Peso values were assigned for wealth categories that met the following criteria: 1) they were viewed by Kalingas as legitimate wealth items; 2) they had standardized exchange or cash values (permitting quantification); and 3) they were found in many (but not all) Dalupa households. These include rice fields, houses and house lots, granaries, carabaos, pigs, dogs, heirloom jewelry (in Dalupa, Chinese glass bead necklaces, gold earrings and a gold bracelet that was jointly owned by four families), the previous year's rice and coffee harvests, and any wages earned by household members. In Dangtalan, these categories account for approximately 90% of the average household's property (Trostel 1989:33).

One confronts several problems in assessing relative wealth among Kalinga households. Foremost among these are the under-representation of wealth in older affluent households that have already begun to pass their goods onto children through inheritance (Graves 1991:139; Greenhalgh 1985). Another problem lies in the low visibility of Kalinga wealth: the economic elite eschew conspicuous consumption, so their physical surroundings and dress differ only slightly from less affluent neighbors (see also Takaki 1977:434 for Uma). Meat is a prestigious food in Kalinga which is reserved for special occasions. Wealthier families tend to butcher more animals for special occasions, so the total value of animals
butchered in the last year was included in the analysis. Another problem centers on the effects of household size on net income (Kuznets 1976:87). This problem was addressed in the second part of the analysis, which divided the household's total peso value by the number of persons in the household.

One goal of Dalupa research was to obtain information on the population -- rather than a sample -- of the village. Results of the analysis are presented in two forms. Household data are first presented using an interval scale that measures total peso value (pure wealth) of the household (Figure 6.5). The second analysis standardizes variation in household size by presenting adjusted wealth values based on ratios of total wealth/household size (Figure 6.6). These adjusted wealth values help separate out small but affluent young households from older, larger households whose pure wealth may appear similar.

Data presented in Figures 6.5 and 6.6 as well as Table 6.2 indicate several important economic characteristics about the village of Dalupa. First, economic stratification is apparent between households in terms of total peso income. A small group of households are the economic elite in Dalupa, and their total peso wealth far surpasses the total peso wealth of the village households (P73,228.46, or approximately $3661.42 U.S. in 1988). Secondly, many Dalupa households are quite poor relative to their wealthy neighbors. Table 6.2 indicates that individual household values range from P300.00 to P407,635.00. The median value of P49,297.50 more closely approximates the average Dalupa household. The poverty that exists in Dalupa is somewhat alleviated by kinship obligations that guard against total destitution. While starvation is unknown in Dalupa and other Pasil villages, a form of debt peonage is not. Wealth differences are sufficiently pronounced in Kalinga that Barton (1949) called this elite the 'incipient aristocracy.' Dalupa is a less affluent community than other Pasil villages
Figure 6.5. Total Wealth Values of Dalupa Households (Measured in Total Pesos).
Figure 6.6. Adjusted Wealth Values of Dalupa Households (Total Pesos/Household Size).
(Kobayashi 1989), but wealth is clustered in a few extended Dalupa families.

<table>
<thead>
<tr>
<th>TOTAL PESOS</th>
<th>ALL DALUPA HOUSEHOLDS (% IN CATEGORY)</th>
<th>HOUSEHOLDS WITHOUT POTTERS (% IN CATEGORY)</th>
<th>HOUSEHOLDS WITH ACTIVE POTTERS (% IN CATEGORY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-19,999</td>
<td>15 (19.2%)</td>
<td>6 (15.4%)</td>
<td>9 (23.1%)</td>
</tr>
<tr>
<td>20,000-39,999</td>
<td>18 (23.1%)</td>
<td>7 (17.9%)</td>
<td>11 (28.2%)</td>
</tr>
<tr>
<td>40,000-59,999</td>
<td>10 (12.8%)</td>
<td>3 (7.7%)</td>
<td>7 (17.9%)</td>
</tr>
<tr>
<td>60,000-79,999</td>
<td>9 (11.5%)</td>
<td>5 (12.8%)</td>
<td>4 (10.3%)</td>
</tr>
<tr>
<td>80,000-99,999</td>
<td>8 (10.3%)</td>
<td>4 (10.3%)</td>
<td>4 (10.3%)</td>
</tr>
<tr>
<td>100,000-119,999</td>
<td>5 (6.4%)</td>
<td>4 (10.3%)</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>120,000+</td>
<td>13 (16.7%)</td>
<td>10 (25.6%)</td>
<td>3 (7.7%)</td>
</tr>
<tr>
<td>TOTALS</td>
<td>78 (100.0%)</td>
<td>39 (100.0%)</td>
<td>39 (100.0%)</td>
</tr>
<tr>
<td>Mean</td>
<td>73,228.46</td>
<td>93,987.87</td>
<td>52,469.05</td>
</tr>
<tr>
<td>s.d.</td>
<td>75,357.38</td>
<td>92,005.88</td>
<td>46,446.08</td>
</tr>
</tbody>
</table>

Table 6.2. Total Wealth Values of Dalupa Households: With and Without Potters.

Dalupa potter households (n=39) clearly have fewer assets than do non-potter households (n=39). These wealth differences between pottery-making and non-pottery-making households are statistically significant (Mann-Whitney U Test statistic=1057.00; p = .003). The mean income of potter households was slightly over half the mean income of households lacking potters, and more than half of the potter households had total assets of P39,000 or less (U.S. $1950.00), substantially below the village mean.

What makes the distinction between wealth value in potter vs. non-potter households all the more striking is that the "potter household" group includes the whole suite of potters whose production scale varies greatly. Wealth-based differences between potter and non-potter households are sufficiently robust that the presence of upper-income, non-specialist potter
households in the "potter households" group does not affect the patterning. Potters in these upper-income households (i.e., above P100,000) produced far fewer pots than the work force average (mean=63 pots, s.d. = 7.874).

An inverse relationship was identified between pottery-making and household wealth when wealth was defined in terms of total pesos. When total household wealth (i.e., total pesos) is adjusted for household size, this picture of economic disparity is even clearer (Figure 6.6). The previous spread (in total wealth) across lower income categories has now disappeared, and a clear 'lower class' has emerged.

<table>
<thead>
<tr>
<th>Adjusted Wealth Value (in Pesos)</th>
<th>All Dalupa Households (% in Category)</th>
<th>Households Without Potters (% in Category)</th>
<th>Households with Active Potters (% in Category)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-9,999.00</td>
<td>40 (51.3%)</td>
<td>13 (33.3%)</td>
<td>27 (69.2%)</td>
</tr>
<tr>
<td>10,000.00-19,999.00</td>
<td>18 (23.1%)</td>
<td>10 (25.6%)</td>
<td>8 (20.5%)</td>
</tr>
<tr>
<td>20,000.00-39,999.00</td>
<td>14 (17.9%)</td>
<td>12 (30.8%)</td>
<td>2 (5.1%)</td>
</tr>
<tr>
<td>40,000.00-59,999.00</td>
<td>3 (3.8%)</td>
<td>2 (5.1%)</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>60,000.00-79,999.00</td>
<td>1 (1.3%)</td>
<td>1 (2.6%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>80,999.00+</td>
<td>2 (2.6%)</td>
<td>1 (2.6%)</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>TOTALS</td>
<td>78 (100.0%)</td>
<td>39 (100.0%)</td>
<td>39 (100.0%)</td>
</tr>
<tr>
<td>Mean</td>
<td>15,958.03</td>
<td>19,817.42</td>
<td>12,098.63</td>
</tr>
<tr>
<td>s.d.</td>
<td>17,207.11</td>
<td>18,339.32</td>
<td>15,266.18</td>
</tr>
</tbody>
</table>


Table 6.3 disaggregates household economic data based on the presence of potters and the potters' degree of activity. Analysis of differences between the two population distributions suggests they are statistically significant (Mann-Whitney U Test statistic=1081.00;
p=.001). More than twice as many potter households as non-potter households occupied the lowest income category. Non-potter households are evenly distributed in the three lower ratio classes, while potter households cluster in the lowest category. The unmarried potter household in the highest category (i.e., P80,000+) is a single woman with no dependents from a wealthy extended family who made 10 pots during the 1988 year. The potter household in the next category (i.e., P60,000-79,999) made 52 pots during 1988, a little less than half the average potter output.

The data presented on Dalupa household wealth clearly show that potter households are economically disadvantaged relative to their non-potter neighbors. This disparity has been measured in terms of prestige goods, but it is felt in terms of daily food supplies and most acutely in terms of rice. Pottery production is one of several strategies by which poorer Dalupa households meet their subsistence needs. Although pottery production is sensitive to seasonally-based climatic fluctuations, Dalupa pottery production for exchange provides relatively reliable returns throughout the year, provided that potters maintain a variety of consumer markets for their goods. Although this combination of craft production and intensive rice cultivation is common throughout Southeast Asia, little emphasis has been devoted to the ceramic production component of such systems.

Dalupa Ceramic Production: a Community-Based Specialization

Linked by the establishment and maintenance of peace pacts, Kalinga villages have a well developed tradition of community-based specialization and interregional trade (e.g., Dozier 1966:109; Scott 1977:315; Takaki 1977). Dalupa pottery production and distribution is embedded within this regional exchange system in which a variety of goods circulate from one community to the next. Productive specialization and exchange also help to meet subsistence
needs on a regular basis for Kalinga residents. "Productive specialization" as used here refers to the production of goods and raw materials that participate in the regional exchange network. The exchange (ngina) of manufactured goods and of raw materials supplements locally available resources and--in some areas--compensates for substantial resource deficits.

Ceramic specialization in Dalupa makes sense when placed in an economic framework. A paucity of wage labor opportunities in Pasil for those extra hands have obligated households to devise alternative economic strategies to increase the returns to their larders. Faced with a growing population and an incessant demand for rice, many Dalupa women make and sell pots to make ends meet. And although the Kalinga economy still revolves around the concept of a barter economy, each Kalinga child who seeks a higher education. Each Kalinga household that accrues medical expenses also needs hard currency, or at least goods that can be converted into cash. One strategy for Dalupa households is intensive pottery production.

It is easy enough to learn of Dalupa's status as a pottery-making community by asking other Pasil residents. One Cagaluan man referred to Dalupa as the "bang a (pot) factory of Pasil." And one need look no further than the village itself to see potters busily working on their craft. But what sort of production scale does this specialization entail? The next section examines the production scale of Dalupa pottery making in 1988.

**Dalupa production scale: 1988.** The term "production scale" as it is used here refers to the size and complexity of a ceramic production system (Rice 1987b:180-181). This includes the size of the work force, the quantity of goods produced, and the technological capabilities of the system. The technological capabilities of the system have been described in Chapter Five. This section focuses on the quantity of goods produced with respect to the size of the work force.
Pottery production data are derived from the pottery firing log (described in Chapter Four), which recorded all pots that each Dalupa potter fired between January 1988 and January 1989. The log was maintained through daily visits to all potters, and by attendance at as many firing episodes as possible. If the production figures presented are inaccurate in any respect, they underestimate the number of vessels produced. Dalupa potters therefore made at least 4500 vessels during a single calendar year.

Data collected in Dalupa permit analysis at the community, household (comprising one or more individual potters), and individual levels at the weekly or monthly rate. Data were collected daily, but since the production process often takes place over several days, daily production figures are less useful than are weekly or monthly figures. The total number of goods produced by Dalupa potters by month is presented in Figure 6.7.

Forty-five Dalupa women made pottery during the 1988 year, and their individual productivity figures were highly variable. The least active potters (n=3) made less than ten vessels each (minimum=3), while the most active potters manufactured 300 vessels or more (maximum= 368). The quantity of Dalupa ceramic goods produced varies from one month to the next and from one household to the next. Some Dalupa women who were listed as potters made no pots whatsoever during 1988, either because of infirmity, childcare demands, or other economic commitments.

Factors affecting the scale of monthly pottery production include work force size, seasonal agricultural demands, and the availability of other economic alternatives. Potters in households with greater agricultural commitments (i.e., more landholdings, greater involvement in day labor) may forego pottery-making in lieu of farming. Women generally cease pottery-making for as much as a year following childbirth to care for their infants. Some women
Figure 6.7.  Total Number of Ceramics Manufactured by Month: 1988.
continue to engage in sporadic sari-sari vending or day labor during this time.

Agriculture and ceramic production form complementary parts of the Dalupa household’s economy, so that peak production periods in each activity occur at different points in the year (Table 6.4). Fluctuations in annual precipitation cycles affect the precise timing of each farming period, and Kalinga agriculture does not operate strictly according to the Christian calendar cycle. Thus, periods of peak labor demand generally last between four and six weeks. During these periods, other economic activities -- particularly craft production and swidden farming (see Takaki 1977:192 for latter) -- are set aside.

Table 6.4 indicates the closeness of fit between peaks in labor demand for farming and for pottery-making. Intensive wet-rice cultivation entails highly seasonal labor demands. These periods occur at the following points in the wet-rice cultivation process: 1) in planting nurseries; 2) in transplanting (occurs about 30-40 days after planting); and 3) harvesting (Hanks 1972:50). Because Pasil Kalingas plant two crops each year, nearly half of the year requires heavy agricultural labor investment. February, June and November are generally the busiest months in the rice fields.

The degree to which periods in peak labor demand affect pottery production varies by household: in households with few rice fields and expert potters, pottery production is a better alternative than field labor. However, all Dalupa households are affected by peak periods because of the reliance on cooperative labor groups (pango) that draft labor from multiple households on a daily or weekly basis to meet labor demands. Women’s farming duties are lightest from August to late October, which is also the highest ceramic production period. For potters whose households have few farmholdings, their annual schedule is more flexible. Their annual schedule of pottery production is also less seasonal.
MONTH | KALINGA NAME | FARMING ACTIVITIES INVOLVED | LEVEL OF POTTERY PRODUCTION | LEVEL OF FARMING DEMAND
--- | --- | --- | --- | ---
January | kivang | plow ricefield; repair terraces, dikes | low | moderate
February | la dao | transplant; swidden | low | high
March | panaba | weed fields; swidden | high | low
April | adawoy | clean seedbed | high | low
May | akar | clean dikes; start nursery | high | moderate
June | kamadoyong | harvest, dry and store rice | low | high
July | waro | plow ricefield; repair terraces, dikes | low | moderate
August | bisbis | transplant; swidden | moderate | low
September | aradog | weed fields; swidden | moderate | low
October | boyboyag | clean dikes | high | low
November | gabboc | begin harvest, dry & store rice | low | high
December | opok | finish harvest; start nursery | low | low

Table 6.4. Periods of Peak Labor Demand in Annual Kalinga Agricultural and Pottery-Making Cycles (Data from Dozier 1966:137; Magannon 1972:36-40; Pottery Firing Log).

Variability in Dalupa productivity data may be examined from numerous perspectives. Ceramic production data for the year are presented in Table 6.5. A minimum of 4517 vessels were produced by village potters; pots reported here were recorded at the time of firing. At the grossest level, Dalupa potters produce the four functional categories discussed previously: three traditional forms (oppaya, ittoyom, and immosso) and a suite of non-traditional forms that fall under the rubric of ay-ayam.
Table 6.5. Total Number of Dalupa Ceramics in 1988 by Functional Category.

Differences exist in production scale among traditional vessels and between traditional and non-traditional forms. Production scale also varies by functional category, and the meat/vegetable cooking pot dominates the distribution. The remaining categories -- rice cooking pots and water storage jars and non-traditional forms are produced in roughly equivalent proportions. Production scale differences also exist in the sizes produced in each functional category (Table 6.6). Numerous variables affect the differential representation of vessel classes in an assemblage (Mills 1989:134). Some of these -- such as ceramic breakage rates, vessel curation rates, and vessel replacement rates -- affect the level of demand and hence of ceramic production of different functional classes in the Dalupa assemblage.

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4. Fourteen pots that lacked vessel type information were excluded from all analyses involving vessel types. Total number of vessels for such analyses = 4503.
The *oppaya* (meat/vegetable cooking pot) has the highest frequency in Pasil Kalinga household inventories because small and medium-sized *oppayas* are used daily, as often as three times a day. These are the pots in which the daily meat or (more often) vegetable is cooked, and so most households have several daily-use pots in storage. This high intensity of *oppaya* use leads to high breakage rates and thus to correspondingly high replacement rates:

---

5. No vessel type information was recorded on 14 pots, which were excluded from all analyses involving vessel types. Total number of vessels for such analyses = 4503.
the average use-life of the small and medium-sized oppaya is less than a year (Tani 1994). So there is a constant demand for small and medium sized meat/vegetable cooking vessels among Pasil customers. A small but constant demand exists for tiny (bang-banga) meat and vegetable cooking pots, which are used by elderly single women to cook their meals.

The market beyond Pasil where Dalupa potters also barter their wares has greater access to modern conveniences like running water, electricity and non-locally produced kitchenware. In these areas (particularly in the provincial capital of Tabuk), earthenware pots have largely been replaced by non-ceramic substitutes like cast iron and aluminum. However, the pervasive belief that meat and vegetables "taste better" when cooked in ceramic pots has created a lively market of oppaya vessels beyond the Pasil Municipality’s boundaries. Nearly two-thirds of all Dalupa goods traded outside Pasil in 1988 were meat/vegetable cooking pots, a proportion comparable to exchange patterns within the Pasil network.

The production scale of rice cooking pots is related to the size of the producer work force and to market demand. Dalupa potters most commonly produce large-sized rice cooking pots (ittoyom) today. The demand for small and medium ittoyom has ebbed since the late 1950s when metal calderos from the lowlands were introduced at least to the Madukayan (Scott 1969:71-72) and Lubuagan Kalingas (photograph in Dozier 1966:63). Large ittoyom are still preferred for communal cooking, and for cooking basi, the traditional sugar cane wine. Cost explains this preference as much as does custom. A comparably-sized metal pot costs five times as much as a large rice cooking pot. Production is closely linked to demand: potters rarely make these pots unless customers order them.

A low but continuous demand exists for water storage jars. Unlike meat/vegetable and rice cooking pots, water storage pots have low breakage and high curation rates. Most Pasil
households have one or two water storage jars in use, and some households have another stockpiled in case of breakage. While non-ceramic substitutes (e.g., plastic buckets, Ilocano ceramic jars with attached faucets, and metal containers) are available in Tabuk, none of these alternatives has stifled demand for the water jar. Water jars have a long use-life (7.18 years [Longacre 1985:343]), which leads to a lower replacement rate. The market for ocher-decorated Dalupa water jars is also expanding within Pasil. Dalupa immosso are even sought by Pasil consumers in barrios like Guina-ang, most of whom prefer Dangtalan cooking pots over Dalupa equivalents (Aronson et al. 1994).

Monthly or seasonal variability characterizes Dalupa ceramic production. This seasonality in production is illustrated in Figure 6.8, which presents production rates for each functional category through the annual cycle. At the broadest level, two peak periods in production are evident: March and April, and September and October. What is also clear is that different functional categories exhibit discrete patterns of seasonality throughout the year.

Patterning in production figures by functional category suggests several category-specific trends. Production scale for ay-ayam (non-traditional forms) in 1988, for example, seems to have been affected by the Kalinga Project’s museum collection process in March and April (see Chapter Four). However, a second peak in December (long after the departure of the KEP) probably results from an increased demand for ay-ayam to give as gifts during the holiday season. Although most Dalupa residents are not Christians, they and their Pasil Kalinga friends celebrate the Christmas season with gusto. Figure 6.8 illustrates that mid- to late December is also a lull in the agricultural cycle.
Figure 6.8. Proportions of Vessel Categories Produced by Month: Traditional Vs. Non-Traditional Forms.
Figure 6.9 presents data on the three traditional forms in the Kalinga repertoire: the oppaya (meat/vegetable cooking pot), the ittoyom (rice cooking pot), and the immosso. The highest production month for oppaya vessels is September. Because oppaya pots are the most frequently manufactured and exchanged ceramic type in the Dalupa inventory, the September peak may reflect a generally high production month. Interestingly, ittoyom production is highest between April and September. Most ittoyom manufactured are the large variety, which are used for communal celebrations and for basi wine preparation; perhaps the sugarcane wine production process generates a higher demand for these jars during the peak wine-making months. Although the immosso production peak in March and April reflects purchasing by the KEP, water jar production was highest in September and October in a similar pattern to that found among the oppaya pots.

The previous sections examined production figures by month and by functional category. Another extremely important source of variability exists in the Dalupa ceramic production system, and that is variability among individuals within the potter work force. For a variety of reasons, the intensity of production activity varies from one potter to the next. Some reasons behind these differences include the potter’s age, her family’s stage in the domestic cycle, and the variety of other economic strategies that are available to her household. The next section introduces the Dalupa potter work force and selects some aspects of this individual variability for analysis.

The Dalupa potter work force. The Dalupa potter work force for 1988 consisted of forty-five women from 38 households. The average Dalupa potter was between 45-46 years old (min=15; max=81; median=47, s.d.=15.490) and had been making pots for about two decades. Using Dangtalan data, Graves (1991:141) noted that the few active Dangtalan potters
Figure 6.9. Monthly Production Rates of Traditional Forms: 1988.
tended to be in their late forties or fifties. This is also the case with Dalupa potters (mean age=50.7, s.d.=13.1). There is a high likelihood (about 50%) that she cannot read or write, which means that her economic options are restricted to non-governmental employment. She speaks or at least understands Ilocano, which is the most commonly spoken language (other than Kalinga) in Kalinga-Apayao province. Ilocano is also the lingua franca for travelling throughout northern Luzon, and an asset during pottery trading trips beyond the Pasil Municipality's boundaries.

Almost 60% (47) of Dalupa households contained women who knew how to make pots (55 women total), but a goodly number of potters (nine, in ten households) abstained from pottery-making during 1988. In fact, only slightly more than half (59.4%) of Dalupa households had a resident potter, and even fewer were active during the study season (mean = 0.557 potters/household; median=0, s.d.=0.635). Active pottery-making households averaged 1.15 potters/household (median=1, s.d.=0.370). Where more than one potter inhabited a household, this tended to be a mother-daughter pair.

The average Dalupa potter fired about 100 pots in 1988 (s.d.=93.065), or 8.3 pots each month. An average of 20-21 potters were active each month (s.d.=9.852), but number of active potters each month varied greatly. The minimum number of producers worked in February (n=5) and in November (n=8), while the largest work force was active in April (n=36) and May (n=32). To minimize the effects of a fluctuating work force size, ratios were calculated that divide the total pots by the number of active potters.

Peak production periods, both in terms of the size of the work force and production scale, occur in the dry season (March-April), after the rice harvest in July, and again in the September-October period (Figure 6.9). Three of these months (i.e., March, April, and July)
are associated with the highest standard deviations found in the monthly pottery output. High standard deviations during March and April reflect the impact of the KEP, since museum collections were made between mid-March and mid-May.

Not surprisingly, March and April have the largest work force numbers (25 and 36 potters, respectively), when some otherwise inactive potters took up their trade to produce KEP-commissioned ceramics. Approximately 432 ceramic items were commissioned from Dalupa potters during this three-month period, or 24.1% of their total output. The pottery purchasing period also corresponded to the dry season, which is traditionally a period of intensive pottery making.

Comparisons of monthly productivity ratios depicted in Figure 6.10 indicated that potters were more prolific in months that followed the KEP's tenure in Pasil (especially September) than they had been previously in 1988. The months of August, September and October are interesting because the size of the work force remained relatively constant but the mean number of pots each producer manufactured varied. These high standard deviations likely reflect two factors: 1) the increase in sample size, which increases variability in production rates; and 2) the entry of less active potters into the work force as time permitted, which produced highly variable monthly production rates.

In many respects, the "average Dalupa potter" is not actually representative of her work force. The mean number of pots made by each Dalupa potter in 1988 was 100.27 with a high standard deviation (s.d.=93.065). Because of multiple outliers associated with the productivity distribution, the median number of pots (i.e., 67) is more instructive. Observations during the field season suggested that several different kinds of potters could be found in Dalupa, and Dalupa residents used the terms "beginner," "active" and "expert" to
Figure 6.10. Number of Active Dalupa Potters and Number of Pots They Manufactured by Month: 1988.
characterize these differences. What those terms identified was a tripartite division that the
data from 1988 also reflect, and these subgroups are explored in the next section.

**Intensified production and part-time specialists.** Substantial differences are evident
among Dalupa potters in their annual output, both in terms of production scale and in terms
of the range of goods produced. These two axes of variability are not unrelated in the Dalupa
work force. Scalar differences in ceramic production are often related to distinct types of
manufacturing technologies (Arnold 1985), but technology does not explain differences in this
data set. Dalupa potters all use the same techniques for building traditional vessels, and most
share their ever-expanding range of techniques for producing non-traditional forms with one
another. Intra-work force differences in production scale are discussed first.

The local distinctions made to subdivide the Dalupa potter work force (i.e., "beginner,"
"active," and "expert") conflate two different variables: activity level and expertise. Some
potters are "experts" who are inactive, while some "active" potters manufacture an above-
average number of vessels. Production scale during 1988 was used to partition Dalupa potters
into three categories: 1) occasional potters, who make pots for their own use, and for
infrequent barter; 2) active potters, who supplement their farming returns with pottery
exchange; and 3) production potters, who rely on ceramic production as their economic
mainstay. The individual potter may switch categories several times through her lifetime,
depending on a variety of factors.

For purposes of analysis, Figure 6.11 splits these groups according to production
output. Potters were labelled as occasional potters if their output equalled or fell below the
mean number of pots produced by the entire work force (i.e., 100 pots). Potters whose output
exceeded the mean plus the standard deviation (i.e., 200 pots) were labelled as "production"
Figure 6.11. Dalupa Productivity Rates of Part-Time Specialists and Occasional Potters in 1988.
potters. This left a third group of potters whose output exceeded the mean, but remained within one standard deviation, and these are the "active" potters.

A variety of factors affects the volume of ceramics that a Dalupa potter generates, such as the developmental point in her household's domestic cycle, the availability of other economic alternatives, and to a far lesser extent, her age. Age is only important in distinctions between the "occasional" potters (mean age=42.9 years, s.d.=16.124) and the collective part-time specialists (mean age=50.7, s.d.= 13.1). Slight differences are evident among grades in the part-time specialists. "Active potters" averaged 52.1 years (s.d.=17.291) while "production" potters averaged 49.1 years (s.d.=6.744) in age. These two categories (i.e., active and production potters) will thus be grouped together under the "part-time specialist" label.

Two-thirds of Dalupa potters made pots occasionally for their household's use and for limited exchange. Economic motivations separate the occasional from the part-time specialist potters, as the latter group was oriented toward pottery production for exchange. Table 6.7 illustrates that economic disparities in household wealth explain differences in productivity, where adjusted wealth values are aggregated into three village groups: non-potter households, all potter households and part-time specialist households (a subset of potter households).

The previous analysis of household wealth suggests that many poor Dalupa households manufacture pots to make ends meet. One might also assume that variation in production output (measured in terms of total vessels made in 1988) is directly related to relative household wealth. Part-time specialist households tend to headed by women ranging in age from 40-60, where few or no additional income sources are available. Six households contain two potters each, and the relationship between the number of producers per household and total household wealth is statistically significant (Kruskal-Wallis test statistic=10.506, p=.005),
a relationship that also holds when adjusted wealth values are employed instead of total peso wealth (Kruskal-Wallis test statistic=10.354, p=.006).

### Table 6.7. Adjusted Wealth Values (in 1988 Pesos) of Dalupa Households: Non-Potter, Potter and Production Potter Households.

<table>
<thead>
<tr>
<th>ADJUSTED WEALTH VALUE (IN PESOS)</th>
<th>HOUSEHOLDS WITHOUT POTTERS</th>
<th>HOUSEHOLDS WITH ACTIVE POTTERS (% IN CATEGORY)</th>
<th>HOUSEHOLDS WITH PART-TIME SPECIALISTS (% IN CATEGORY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9,999.00</td>
<td>13 (33.3%)</td>
<td>27 (69.2%)</td>
<td>12 (80.0%)</td>
</tr>
<tr>
<td>10,000.00-19,999.00</td>
<td>10 (25.6%)</td>
<td>8 (20.5%)</td>
<td>3 (20.0%)</td>
</tr>
<tr>
<td>20,000.00-39,999.00</td>
<td>12 (30.8%)</td>
<td>2 (5.1%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>40,000.00-59,999.00</td>
<td>2 (5.1%)</td>
<td>1 (2.6%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>60,000.00-79,999.00</td>
<td>1 (2.6%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>80,999.00+</td>
<td>1 (2.6%)</td>
<td>1 (2.6%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>TOTALS</td>
<td>39 (100.0%)</td>
<td>39 (100.0%)</td>
<td>15 (100.0%)</td>
</tr>
<tr>
<td>Mean</td>
<td>19,817.42</td>
<td>12,098.63</td>
<td>5,923.33</td>
</tr>
<tr>
<td>s.d.</td>
<td>18,339.32</td>
<td>15,266.18</td>
<td>3,889.65</td>
</tr>
</tbody>
</table>

Several striking patterns in Table 6.7 warrant comment. Not only do potter households as a whole exhibit lower adjusted wealth values than non-potter households; those households containing part-time specialist potters had the lowest wealth value of the lot. Dalupa households with no potters have an adjusted wealth value that is more than three times that of households containing part-time specialist potters. Among potter households, it is equally clear that pottery specialization is closely related to low household wealth. On average, these part-time specialist potters made twice as many pots as the occasional potters.
(s.d.=84.216) and had mean wealth values that were only 48% of those of occasional potters. That these relationships are statistically significant is borne out through the use of the Kruskal-Wallis test (Kruskal-Wallis test statistic=11.290; p=0.004).

It is possible that the emergence of these part-time specialist potters has occurred relatively recently. Although Dalupa has long been known for its pottery production, economic changes in the late 1970s and early 1980s apparently accelerated the scale of ceramic production. Chico Dam employment had subsided, and a September to May (1983-1984) drought devastated both the December and subsequent June rice harvests. This rice shortage strained already thin resources of many village households, and spurred three types of economic changes.

Several entire families moved out of Dalupa in search of off-farm employment, while retaining their homes in Dalupa. Potters who were already active expanded their exchange system, seeking Tabuk barrios as new markets for their goods. And at least six or seven of the active potters in 1988 were women who began to make pottery for sale to meet the demands of their household during this time. The expansion of the consumer market, and an influx of producers, collectively escalated the scale of Dalupa pottery production. Which of the options each household pursued depended on both individual skills and external opportunities.

The foregoing section has evaluated variability in the pottery production at the community (potter work force) and subworkforce levels. Dalupa data presented on production parameters of production scale, assemblage diversity and -- among the most active potters -- intensity suggest a system of part-time ceramic specialization. At the regional level, Dalupa is the primary Pasil pottery supplier. Ceramic production ceased years ago in the communities of
Cagaluan and Balatoc, and pottery production for exchange involves a very small work force in Dangtalan. Within Dalupa are a group of part-time specialists who derive a large proportion of their household subsistence from making pots for exchange.

**Product specialization.** As ceramic production systems intensify, an increasingly complex division of labor often develops. Tasks become compartmentalized, and multiple producers join forces in nucleated workshops (see Peacock 1982 and van der Leeuw 1977) in what can develop into industrial-level craft production. This development of a division of labor is also evident in less intensified production systems. Specialization in functional categories has been documented in which different villages concentrate on the production of one or several distinct vessel forms (e.g., Chávez 1992; Crossland and Posnansky 1978; Dietler and Herbich 1989; Gosselain 1992; Papousek 1981; Reina and Hill 1978).

As stated previously, when a region depends on a single ceramic production center, a similar division of labor can operate in which potters specialize in different vessel forms within a single work force (see Arnold 1991:46). When Dalupa data from the part-time specialists are examined, some specialization in functional categories by producers is detectable. This question may be explored from two viewpoints. At the assemblage level, do certain potters contribute disproportionately to the total number of items produced in a single functional category? And at the individual producer level, do certain potters concentrate proportionately more of their efforts on producing a particular functional category? These two questions are now addressed.

The broadest distinction in the Dalupa ceramic assemblage is found in traditional (i.e., oppaya, ittoyom, and immosso) vs. non-traditional forms (i.e., av-avam). Almost one-third (12 occasional, 1 part-time specialist) of all potters have never ventured into the world of non-
traditional forms. Many younger, less active potters with less-developed technological skills concentrated on making non-traditional forms, where creativity is valued over technique. Almost all of them (excluding one, who made only non-traditional pots, n=9) also made some traditional pots.

Reliance on ay-ayam production is hardly a viable economic strategy. Even the production output of the most zealous ay-ayam part-time specialist -- who single-handedly produced 22.4% of the village's non-traditional forms -- included only 57.3% ay-ayam. Most (80%) part-time specialists produced both ceramic categories with a much heavier emphasis toward the traditional pots (i.e., 90% or more). Three of the part-time specialists spent significant time making non-traditional forms and collectively made nearly 43% of all non-traditional forms recorded.

Among the three functional categories within the traditional Kalinga ceramic repertoire, some exhibit stronger evidence for specialization by potter than others. The least specialization by producer is visible in the oppaya, which is widely made. Forty-four of the 45 potters (excluding a potter mentioned previously who made nine non-traditional forms) manufactured meat and vegetable cooking pots for their own use and for exchange. Some potters specialize slightly in this functional category, as the four most prolific oppaya producers manufactured 26.7% of all small and medium-sized oppaya during the year. One part-time specialist manufactured 31.5% of all large meat and vegetable cooking pots.

Rice cooking pots (ittoyom) are produced far less frequently than are oppaya for reasons described earlier in this chapter. As discussed previously, only the large-sized (lallangan) rice cooking pot has not been replaced by the metal caldero pots from the lowlands. Almost half (47.0%) of the ittoyom made by Dalupa potters in 1988 were large
(lallangan) in size. The fact that over one-third (35.6%) of Dalupa potters made no ittoyom in 1988 suggests some degree of specialization by potter. However, ittoyom production (all sizes) constituted more than 10% of the output for only two potters (12.86% and 11.97% respectively). Production of large rice cooking vessels was dominated by three part-time specialists, who collectively produced 41.9% of all the large rice cooking pots.

Most (77.8%) Dalupa potters manufactured at least one water storage jar during 1988. Dalupa water jars are now quite popular within Pasil, and have overtaken Dangtalan’s market in Pasil villages like Guina-ang (Aronson et al. 1994). Their popularity, say Guina-ang residents, lies in the exterior decorations that Dalupa potters now add to their vessels. Two part-time specialists each produced over 10% of the total water jars made in the village (11.87% and 10.87% respectively). Neither expressly specialized in immosso production, as this category comprises approximately 20% of their total production.

The previous analysis suggests that a limited amount specialization by vessel type (and, in some cases, by size) exists in Dalupa. Potters apparently specialize in particular vessel forms at the expense of others for several reasons, most notably technological expertise, individual production scale, and consumer market. One might expect to see a greater degree of vessel-based specialization in similar production modes under one of two conditions. Either production scale and intensity must be higher than that documented for Dalupa, or several production centers must operate within a single regional economic network. Part-time specialists in Dalupa must produce a wide variety of goods to meet the demands of the consumer market. Perhaps if other Pasil communities engaged in ceramic production for exchange, a stronger pattern of producer-based specialization in vessel forms might be present.
Summary

This chapter has examined productive intensification and Dalupa ceramic production. Organizational issues were first addressed at the theoretical level and then examined in the context of the study region. The context, concentration, scale, and intensity of production have been explored through various analyses in this chapter. Increases in Dalupa assemblage diversity have also been described, focusing on the water storage jar (immosso) and the emergence of non-traditional forms. Factors that encouraged this expansion in assemblage diversity were also discussed, and social and political developments were emphasized as important catalysts for change.

Data on Dalupa ceramic production scale were then presented, following a discussion of theoretical frameworks that underlie archaeological approaches to craft specialization. The ethnoarchaeological nature of this study required some examination of craft specialization in the context of intensive rice cultivation in Asia. Accordingly, comparative data were presented to illustrate the linkage between low household wealth and the adoption of craft specialties among intensive rice cultivators. That this relationship exists in Dalupa was demonstrated through an examination of relative household wealth: potter households were shown to be poorer, per capita, than their non-potter neighbors.

Craft specialization poses an alternative to agricultural intensification that has often been associated with landless households or with communities in marginal agricultural areas in the agrarian ecology literature (e.g., Netting 1990). Two agricultural alternatives are available to low-income households in Dalupa -- tenant farming and pango labor -- and the comparative returns from each of these strategies was explored. Dalupa women also engage in varieties of trade, specifically in sari-sari vending, clothes-selling, and pottery exchange. Each of these
economic strategies confers different benefits, and reasons why women select certain strategies were explored.

This chapter concluded by examining Dalupa ceramic production as a community-based specialization. Examination of Dalupa production scale from 1988 revealed important patterns in work force and production intensity within the Dalupa potter work force. The production data corroborated the "emic" classification of potters given by Dalupa informants: occasional potters, active potters, and production potters. The last two types of potters (one-third of the work force) are semi-specialists who produce and sell more goods than the rest of the potter work force. Two indicators of specialized ceramic production, production scale and specialization by vessel form, were examined.

The Dalupa case involves potters who have intensified their production into a part-time specialization in response to insufficient resources. Individual differences in Dalupa production scale suggest the presence of part-time specialists in the potter work force. This pattern has been identified through year-long records of individual pottery production that provide a finer resolution than is generally possible in ceramic studies. Results of analyses presented here support a general association between household income and ceramic specialization, but also emphasize the importance of alternative economic strategies in a household's search for income.

Two inter-related components contribute to archaeologists' understanding of how ceramic specialization operates. The first documents behavioral factors (e.g., household wealth, production scale) and was addressed in this chapter. The second examines relative variability in the manufactured goods and is examined in the next chapter. Ceramic specialization studies of archaeological ceramics rely on a series of largely untested hypotheses
that concern the relationship between production scale and product standardization (Rice 1991:278). Some of these are investigated in Chapter Seven.
Community-based productive specialization has a long tradition in the study region, and goods circulate through an active regional exchange network (Keesing and Keesing 1934:202; Scott 1974:315; Takaki 1977:167). The previous chapter explored the social environment that encourages Dalupa women of economically disadvantaged households to specialize in ceramic production for exchange. This chapter examines morphological standardization in the goods that they produce. It is only through ethnoarchaeological research that production parameters (e.g., production intensity, production scale) can be evaluated in relation to product standardization. Ethnoarchaeological research thus holds potential for generating inferences regarding relationships between production behavior and material patterning.

This chapter examines one set of material correlates of specialized production -- product standardization -- in the context of a particular organizational mode. Theoretical concerns in current research on ceramic standardization are first considered. Despite the recent flurry of standardization-oriented studies (e.g., Hagstrum 1985; Hegmon et al. 1991; Longacre et al. 1988; Mills and Vint 1991; Rice 1981; Sinopoli 1988), basic assumptions regarding variability in pottery or the direction and strength of their relationship to productive organization remain largely untested (cf. B. Stark 1991). Three commonly used dimensions of archaeological ceramic standardization (i.e., stylistic, compositional, and morphological) are then discussed.

Attention is turned first to Dalupa pottery production, where morphological standardization is analyzed in multiple dimensions. Comparisons are presented that illustrate differences in organizational modes. Dalupa and Dangtalan are the only two pottery-making communities in the
Pasil River Valley, but their pottery exhibits few differences in relative standardization despite the clear differences in production intensity and scale.

Analysis then focuses on variability within the Dalupa ceramic inventory. Few studies have adequate sample sizes and data control to examine patterning within functional categories by size class. The following comparisons of Dalupa and Dangtalan data demonstrate that, for some vessel sizes in some functional categories, standardization reflects differences in production intensity and scale. The meat/vegetable cooking pot is examined first, as it represents the most commonly produced and most frequently traded functional category. Water storage jars, made by fewer (and more experienced) potters, are analyzed next.

The extent to which patterning within the Dalupa assemblage relates to individual variability is next evaluated. Chapter Six illustrated the link between household wealth and production intensity, and used production data from 1988 to identify part-time specialists among Dalupa potters. Are the products of these part-time specialists more uniform than those of the rest of the potters? Relative standardization in goods manufactured by part-time specialists is compared with that of occasional potters to answer this question. Finally, individual variability in products that is age-related is explored.

General Considerations in Ceramic Standardization Research

Theoretical issues. Prehistoric state formation is associated with full-time craft specialization (e.g., Brumfiel and Earle 1987; Sinopoli 1988). Distinguishing full-time from part-time specialization in archaeological ceramic assemblages, therefore, may provide one key for understanding prehistoric sociopolitical structures. Identifying part-time specialization (and its associated exchange networks) in the archaeological record may be equally informative in studies of small-scale societies.
By archaeological convention, craft specialization increases the scale of output and increases efficiency in the production process. Assumptions from classical economics have permeated our view of specialization as "economizing behavior" (Clark and Parry 1990:292-293). Although ceramicists have used several approaches to monitor increased efficiency in production (e.g., the "production step measure" [Feinman et al. 1981; Hagstrum 1988]), theoretical concepts underlying standardization research remain poorly defined. A common form of ceramic specialization research focuses on the relationship between intensified production and product standardization.

Chapter Two discussed the concept of standardization as an outgrowth of specialized production strategies, and as the concepts have been applied to archaeological assemblages. That the two processes are not isomorphic has been the cause of some discussion (e.g., Beale 1978; Rice 1989, 1991; B. Stark 1991) and remains an unresolved issue. On the one hand, specialized production is associated with specialization in one or a few highly uniform types, and multiple producer communities within a single economic network may 'specialize' in their exports (e.g., Chàvez 1992). On the other, increased specialization is associated with increased assemblage diversity (e.g., Birmingham 1975:382; Foster 1965:52-53). In cases where producers manufacture standardized forms that include numerous subvarieties for different consumer markets, some subvarieties may be more standardized than others.

This study follows Rice's (1991 et passim) definition of product standardization, as the relative degree of homogeneity or reduction in variability in the characteristics of the pottery or [to] the process of achieving that relative homogeneity (Rice 1991:268).

Therefore, product standardization refers to the degree to which one form exhibits uniformity from one object to the next. How standardization is measured varies according to the
attributes under study (e.g., paste, design, morphology). However, most approaches address ceramic standardization through a series of statistics that examine the degree of variability (or dispersion) within a single assemblage. Ideally, assemblages should include a restricted class of goods that all share a production source (or analytic group, sensu Bishop et al. 1988). Because archaeologists rarely attain this degree of analytic precision, assemblages are often defined by temporal or typological parameters.

Studies increasingly rely on indices of diversity to examine standardization in archaeological ceramic assemblages (Leonard and Jones 1989; Rice 1991:273). Three diversity measures used in ceramic standardization research include richness, evenness, and standardization (Cowgill 1989; Kintigh 1984; Leonard and Jones 1989; Rice 1981, 1989). Richness refers to the number of classes present in a given assemblage. Evenness is a measure of the dispersion of cases within each class in an assemblage. Assemblage-level diversity is often examined in terms of richness and evenness, whereas variation within categories is examined through standardization indices.

Translating these concepts into ceramic production behavior is problematic, as opposite patterns might both reflect specialized production. On the one hand, a specialized (i.e., standardized) ceramic assemblage might exhibit high richness and low evenness when compared with a non-specialized ceramic assemblage (Rice 1981). On the other, regional systems with multiple ceramic production centers (e.g., Kramer, personal communication 1993; Nicklin 1981; Chávez 1992) might well reflect exhibit low richness and high evenness. An important consideration is whether goods that are produced for export exhibit less variability than those designed for home consumption.

Ethnoarchaeological studies provide one key to untangling relationships between
productive organization and product homogeneity. Ethnoarchaeological research provides data sets with which to evaluate assumptions regarding specialization, since one can evaluate variability across multiple ceramic attributes under different organizational conditions. Ethnoarchaeological research that monitors the economic organization of production and the variability of its ceramic products may clarify relationships between producer intensity, producer skill, and product homogeneity.

**Dimensions of ceramic standardization: stylistic, compositional, and morphological.** A variety of attributes have been tested for ceramic standardization using archaeological data. These dimensions of standardization encompass the range of extant ceramic standardization research. This discussion uses categories identified by Hegmon et al. (1991:3-4): 1) stylistic; 2) compositional; and 3) morphological (including formal and technological aspects). The use of stylistic attributes of ceramics to identify social groupings has a long tradition in the New World and elsewhere.¹

Fewer archaeologists have examined compositional variability (c.f. Hegmon et al. 1991; Mills and Vint 1991; Rice 1981). Underlying this research is the assumption that standardization accompanies product specialization standardization in raw material procurement and preparation (Mills and Vint 1991). Additional ethnoarchaeological research (e.g., Aronson et al. 1994) should enhance behavioral theories of resource selection.

Standardization studies of vessel morphology have been especially intriguing, since forming behavior requires the use of technological skills that are largely unconscious (Costin 1991:35; Gosselain 1992). Morphological standardization research often compares ethnographic

¹ Comprehensive reviews of stylistic analyses in archaeology, especially in the American Southwest, are found in S. Plog (1983) and Hegmon (1993).
and archaeological data sets (D. Arnold and Nieves 1992; Benco 1988; Longacre et al. 1988; Riley 1979; Sinopoli 1988). Most standardization focuses on this dimension for various reasons, including expediency and low cost of measurement. Implicit in studies of morphological variability is the assumption that differences in certain attributes reflect differences in the productivity levels and the degree of skill involved.

A second approach, focusing on size and shape of homogeneity in given assemblages, is problematic from an ethnographic viewpoint. On the one hand, highly variable assemblages (with respect to shape) may reflect household-level production in which each production source manufactures the entire suite of vessel shapes used by consumers. On the other hand, a highly variable assemblage may reflect multiple production sources (even using the same clays) that market their goods at a centralized distribution point, such as a market. Moreover, production sources for functionally discrete vessel forms often vary spatially, as different communities specialize in different vessel types (e.g., Chávez 1992; Foster 1965:54).

Several factors may affect morphological variability in ethnographic and archaeological ceramic assemblages. The use of measurement devices has been documented among household-level producers (P. Arnold 1991) and specialist potters (D. Arnold and Nieves 1992) in different areas of Mexico. Products made using such devices are likely exhibit less variable, irrespective of organizational mode, than those found in systems that lack such devices. The context and concentration of ceramic production also influence dimensional standardization: where production is centralized, metric morphology may also be less variable because of the ratio of producers to the sample of products measured (Sinopoli 1988; B. Stark 1991) and the degree of competition for consumers (Blackman et al. 1993:76). Finally, archaeological samples are also prone to "cumulative blurring" problems, in which the samples under study reflect multiple production
events by several different producers (Blackman et al. 1993:74). The current enthusiasm for identifying standardization in archaeological assemblages must be tempered with an acknowledgment that we still understand relatively little about the relationship between measures of metric morphology and producer specialization.

Ceramic Standardization from a Dalupa Viewpoint

This section examines one dimension of standardization, metric morphological data, for which data were collected during the 1987-1988 field season. An earlier analysis of Dangtalan ceramics also relied on morphological data (i.e., Longacre et al. 1988) and provides a baseline for this study. The stylistic dimensions of Kalinga ceramics -- both the incised decoration and painted ocher designs on the water jars -- should be studied in future standardization research using Kalinga ceramics.

Data recording and analytic units. Standardization research reported here focuses on the traditional suite of vessels that Dalupa potters make: the rice and meat/vegetable cooking pots (ittoyom, oppaya) and the water storage jar (immosso). Greatest emphasis is given to the small-sized cooking pots because most Dalupa potters make these vessels, more small cooking pots are manufactured than any other functional/size category within the repertoire, and small cooking pots are used by nearly every consumer household that Dalupa potters supply within and beyond Pasil’s boundaries. Households may substitute plastic jugs or Ilocano stoneware jars for earthenware water jars, and metal pots (calderos) are quickly replacing the traditional clay rice pot, but earthenware vessels are still in high demand. Non-traditional forms are excluded from this analysis. This nascent tradition is characterized by high richness and low evenness, a pattern that may be widespread when technological innovation affects an assemblage (e.g., B. Stark 1991).

Data collection procedures followed those used in previous research reported in Longacre
et al. (1988). Newly-fired vessels were first recorded in the Pottery Firing Log throughout 1988, during which time vessel dimensions were also measured. Not all pots fired could be measured, since field recorders were dependent upon potters' good will and scheduling flexibility to conduct the time-consuming measurements. A cloth measuring tape was used to obtain measurements on vessel aperture, maximum circumference, and vessel height. Height measurements were obtained using this tape measure technique, rather than by employing a stationary measuring device with two straight planes. For this reason, height measurements tend to vary more than do the other dimensions in any vessel type and size category.

Size class assignment followed the indigenous chupa-based measurement system that uses one-half chupa increments (Table 5.9). Kalingas assign vessel sizes through one of two approaches: 1) use of nominal categories like small, medium, and large; or 2) the use of chupa-based measurements to determine the vessel's volume. The chupa is a pan-Philippine standard of measurement that generally employs an Alaska brand evaporated milk can, and measures approximately 350 cc in dry (i.e., hulled/pounded) rice. Size classes for this study were collapsed into one-chupa intervals (i.e., 2.0-2.5 chupas=2 chupa class) to minimize variability between data recorded by two different field assistants during 1988.

Earlier Dangtalan standardization research relied on the nominal measurement system (i.e., small, medium, large), in which each size category contained multiple chupa-based classes. For example, "small"-sized meat/vegetable cooking pots have volumes ranging from 2.5 to 5.5 chupas. Statistics used to describe variation are dependent on how the ceramic classes or types are defined (Longacre et al. 1988:106). Therefore, the relatively high coefficients of variation reported in the earlier analysis of Dangtalan vessels (Longacre et al. 1988) probably reflect differences in size class assignments in the two studies as much as metric variation in products
from the two villages.

Statistical techniques. Descriptive statistics are presented for functional types in single chupa size classes at multiple levels: 1) Dalupa vs. Dangtalan work force; 2) the entire potter work force; 3) the occasional potters vs. the part-time specialists; and 4) age grades. The samples used to examine each level of variability vary. Inter-village comparisons are made using a single size class (3 chupa cooking pots) to identify potential differences in product homogeneity as they relate to organizational scale. A broader range of size classes is used to examine variability within the Dalupa potter work force that may be linked either to production scale (one index of producer intensity) or to relative skill (as expressed by the number of years potting).

Descriptive statistics used in previous standardization studies (e.g., D. Arnold and Nieves 1992; P. Arnold 1991; Benco 1988; Hagstrum 1985; Longacre et al. 1988; Sinopoli 1988) to describe the degree of variability in a distribution are used. These include sample means, standard deviations (s.d.) and coefficients of variation (C.V.). The coefficient of variation describes sample homogeneity by dividing the sample's standard deviation by its mean (Blalock 1979:84) and corrects our picture of variability for possible size differences between samples, if any exist.

Ceramic standardization research relies on relative measures of homogeneity, whether one examines paste composition, decorative style, or morphology (Rice 1991:268-269). Comparison of relative standardization between multiple samples is necessary to understand the relationship between product standardization and organizational mode in different societies. Ideally, these samples should refer to the same manufacturing tradition and to the same functional categories (D. Arnold and Nieves 1992:94; Rice 1989:112,116: B. Stark 1991). When researchers have compared relative variability between different vessel types (e.g., Benco 1988; Longacre et al. 1988; Riley 1979), differences may reflect functionally-specific dimension requirements rather than
the degree of standardization.

Currently lacking in the ethnoarchaeological literature is research that examines data from multiple communities in the same culture area, where potter groups use similar manufacturing technologies to produce the same functional categories of goods (see also P. Arnold 1991:365). Also lacking are "comparably sized, representative collections ... from comparable spans of production time or numbers of production episodes" (B. Stark 1991:8). In short, more work is needed that controls for culture area, manufacturing technology, vessel type, and size categories before the relationship between producer specialization and product standardization can be well understood.

This analysis examines ceramic vessels made in the Pasil River Valley by two Dalupa and Dangtalan potters. These potter communities utilize similar raw materials, practice nearly identical manufacturing technologies, and produce the same suite of functional categories within a narrowly-defined range of size classes based on volume. Although dimensional standardization is examined throughout the full range of utilitarian categories (i.e., two types of cooking pots, water jar), attention is devoted to the small-sized meat/vegetable cooking pot.

Most data sets presented in the following tables are disaggregated by category (i.e., part-time specialist vs. occasional potter) to explore the relationship between production intensity and product standardization. Non-parametric tests, including the Brown-Forsythe (or BF) test (Brown and Forsythe 1974) and the Mann-Whitney U Test Statistic (Conover 1980), are used to statistically evaluate the equality of variances between selected samples. The BF-test in particular is less sensitive than the F-ratio (which has used in previous ceramic standardization studies) to conditions of non-normality (Longacre et al. 1993).
Variability by Functional Category

The ittovom and oppava. Most Dalupa potters devote their manufacturing activities to making cooking pots, which comprised the largest functional group of ceramics made and traded in 1988. Differing levels of demand dictate that potters devote far more effort to making meat/vegetable cooking pots than to producing rice cooking pots. Morphological attributes that distinguish these functional types are first described to provide a foundation for the inter-sample comparisons that follow.

Morphological ratios serve as the primary means by which Kalingas distinguish functional pottery categories. Meat/vegetable cooking pots tend to be shorter and have wider apertures than do rice cooking pots. Large rice cooking and water storage pots are comparable in height but water jars have smaller apertures. These morphological distinctions can be expressed as aperture/height ratios, where a lower ratio indicates a taller vessel with a more restricted aperture. For example three chupa rice cooking pots have a lower mean aperture/height ratio (mean=0.11, s.d.=0.0108) than do three chupa meat/vegetable cooking pots (mean=0.13, s.d.=0.0085). Among rice cooking pots, this ratio drops as size increases: for example, 13 chupa pots have a mean aperture/height ratio of 0.09 (s.d.=0.0049). This low ratio may be explained by the virtual monopoly of large pot production by experienced potters (who are often part-time specialists).

Kalinga potters do not employ measuring devices for making their pots. Thus, while all potters produce functional categories that exhibit similar ratios, metrical dimensions in individual potters’ products vary considerably. Some of this variability is related to lack of skill among beginner potters, a point that is explored in a later section of this chapter. In listing attributes of beauty in a ceramic vessel, Dalupa potters included pronounced lip eversion, tall necks, uniform burnishing, and morphological symmetry. This latter attribute may account for some variation in
vessel dimensions within chupa-based size classes.

Rice cooking pot data are presented first (Table 7.1). The prevalence of metal substitutes for small and medium-sized (i.e., 1.0-10.5 chupas) rice cooking pots has greatly depressed the demand (and thus, production level) for this functional category. Although most potters make some rice cooking pots, part-time specialists manufacture proportionately more of this vessel class. Only data for size classes with minimum samples of 40 are included to maximize comparability between data sets. This cut-off point eliminated several size classes from the ittoyom data set and left a bimodal size distribution of "small" (2-4 chupas) and "large" (12-13 chupas) vessels, presented in one chupa increments.

Two clear trends are evident in the three chupa-based classes that fall within the "small" category (Table 7.1). First of all, C.V. values for circumference are much more uniform than either aperture or height within each chupa-based size class. Secondly, the work of part-time specialists is more standardized than that of occasional potters. In only one case (circumference in the 2.0-2.5 chupa category) is the C.V. value lower for occasional potters than for part-time specialists, and this difference is not statistically significant.

Data from "small" rice cooking pots are also suggestive of increased standardization with increased vessel size. One reason why dimensions may be more standardized in slightly larger vessels may relate to the frequency with which they are produced. Although sample sizes in Table 7.1 are similar for all three size classes represented, potters tend to make more 3 chupa size vessels than miniature vessels, a point explored in Chapter Six. It may also be the case that extremely small-sized vessels are more difficult to shape than are larger versions, both in the forming and scraping stages of manufacture.
<table>
<thead>
<tr>
<th>CHUPAS (CATEGORY OF POTTERS)</th>
<th>N POTS (N POTTERS)</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0/2.5 (All)</td>
<td>45 (12)</td>
<td>mean=14.72 s.d.=1.04 c.v.=0.071</td>
<td>mean=55.81 s.d.=2.63 c.v.=0.047</td>
<td>mean=13.89 s.d.=0.92 c.v.=0.066</td>
</tr>
<tr>
<td>2.0/2.5 (Part-time specialists)</td>
<td>22 (10)</td>
<td>mean=14.55 s.d.=0.74 c.v.=0.051</td>
<td>mean=56.30 s.d.=2.71 c.v.=0.048</td>
<td>mean=13.84 s.d.=0.87 c.v.=0.062</td>
</tr>
<tr>
<td>2.0/2.5 (Occasional potters)</td>
<td>23 (9)</td>
<td>mean=14.89 s.d.=1.26 c.v.=0.085</td>
<td>mean=55.35 s.d.=2.53 c.v.=0.046</td>
<td>mean=13.94 s.d.=0.99 c.v.=0.071</td>
</tr>
<tr>
<td>3.0/3.5 (All)</td>
<td>63 (24)</td>
<td>mean=16.19 s.d.=0.16 c.v.=0.077</td>
<td>mean=62.10 s.d.=0.40 c.v.=0.051</td>
<td>mean=15.45 s.d.=0.13 c.v.=0.067</td>
</tr>
<tr>
<td>3.0/3.5 (Part-time specialists)</td>
<td>44 (9)</td>
<td>mean=16.30 s.d.=1.19 c.v.=0.073</td>
<td>mean=63.06 s.d.=2.76 c.v.=0.044</td>
<td>mean=15.65 s.d.=0.94 c.v.=0.060</td>
</tr>
<tr>
<td>3.0/3.5 (Occasional potters)</td>
<td>19 (15)</td>
<td>mean=15.95 s.d.=1.33 c.v.=0.084</td>
<td>mean=59.90 s.d.=2.98 c.v.=0.050</td>
<td>mean=15.00 s.d.=1.12 c.v.=0.075</td>
</tr>
<tr>
<td>4.0-4.5 (All)</td>
<td>46 (19)</td>
<td>mean=16.60 s.d.=0.83 c.v.=0.050</td>
<td>mean=67.09 s.d.=1.95 c.v.=0.029</td>
<td>mean=16.74 s.d.=0.76 c.v.=0.045</td>
</tr>
<tr>
<td>4.0/4.5 (Part-time specialists)</td>
<td>32 (11)</td>
<td>mean=16.55 s.d.=0.73 c.v.=0.044</td>
<td>mean=67.00 s.d.=1.96 c.v.=0.029</td>
<td>mean=16.70 s.d.=0.67 c.v.=0.040</td>
</tr>
<tr>
<td>4.0/4.5 (Occasional potters)</td>
<td>14 (8)</td>
<td>mean=16.71 s.d.=1.03 c.v.=0.062</td>
<td>mean=67.32 s.d.=1.99 c.v.=0.030</td>
<td>mean=16.82 s.d.=0.95 c.v.=0.057</td>
</tr>
</tbody>
</table>

Table 7.1. Variability in Small Rice Cooking Pots: Dalupa Potter Work Force by Production Intensity.
In comparing rice cooking pot data from the small and large groups (Table 7.2), one sees relationships between production scale, artisan expertise and relative degree of standardization. The trend toward increased standardization with increased size, suggested in the "small" rice cooking pots, is also apparent in "large" vessels. All three metric morphological attributes of large (i.e., 12-13 chupas) rice cooking vessels are much more uniform than are those of small (i.e., 2-4 chupas) vessels. Neither sample size nor producer ratio explain this patterning: the ratio of producers relative to the sample size is almost identical in the 4.0-4.5 and the 13.0-13.5 chupa size classes.

<table>
<thead>
<tr>
<th>CHUPAS (CATEGORY OF POTTERS)</th>
<th>N POTS (N POTTERS)</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0/12.5 All</td>
<td>57 (16)</td>
<td>mean=21.78</td>
<td>mean=96.73</td>
<td>mean=24.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=1.41</td>
<td>s.d.=2.74</td>
<td>s.d.=1.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.065</td>
<td>c.v.=0.028</td>
<td>c.v.=0.044</td>
</tr>
<tr>
<td>12.0/12.5 (Part-time specialists)</td>
<td>38 (8)</td>
<td>mean=21.75</td>
<td>mean=96.80</td>
<td>mean=24.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=1.39</td>
<td>s.d.=2.56</td>
<td>s.d.=1.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.064</td>
<td>c.v.=0.026</td>
<td>c.v.=0.045</td>
</tr>
<tr>
<td>12.0/12.5 (Occasional potters)</td>
<td>19 (8)</td>
<td>mean=21.84</td>
<td>mean=96.58</td>
<td>mean=24.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=1.49</td>
<td>s.d.=3.13</td>
<td>s.d.=1.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.068</td>
<td>c.v.=0.032</td>
<td>c.v.=0.044</td>
</tr>
<tr>
<td>13.0/13.5 (All)</td>
<td>40 (17)</td>
<td>mean=21.95</td>
<td>mean=97.55</td>
<td>mean=24.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.89</td>
<td>s.d.=3.34</td>
<td>s.d.=0.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.041</td>
<td>c.v.=0.034</td>
<td>c.v.=0.037</td>
</tr>
<tr>
<td>13.0/13.5 (Part-time specialists)</td>
<td>30 (11)</td>
<td>mean=21.90</td>
<td>mean=97.35</td>
<td>mean=24.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.87</td>
<td>s.d.=3.02</td>
<td>s.d.=0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.039</td>
<td>c.v.=0.031</td>
<td>c.v.=0.039</td>
</tr>
<tr>
<td>13.0/13.5 (Occasional potters)</td>
<td>10 (6)</td>
<td>mean=22.10</td>
<td>mean=98.15</td>
<td>mean=24.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.99</td>
<td>s.d.=4.29</td>
<td>s.d.=0.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.045</td>
<td>c.v.=0.044</td>
<td>c.v.=0.033</td>
</tr>
</tbody>
</table>

Table 7.2. Variability in Large Rice Cooking Pots: Dalupa Potter Work Force by Production Intensity.
Reasons for this discrepancy include low production and use rates for small rice cooking pots, as well as producer expertise. Manufacturing large rice cooking pots requires technical skills that only the experienced potters possess. The C.V. values for circumference and aperture in the 13.0/13.5 chupa rice vessels suggest that occasional potters have less motor control over their vessel shapes than do the part-time specialists. The relationship between specialized production and standardized goods is sufficiently robust in the Dalupa assemblage as to appear even within the rice cooking pot category, which has far lower frequencies than meat and vegetable cooking pots.

More morphological data are available on meat/vegetable cooking pots than on any other functional category (Table 7.3). Unlike rice cooking pots, where circumference is generally the most (and aperture the least) uniform variable, oppaya standardization varies across attributes and chupa-based size classes. Also unlike the rice cooking pot data sets are the large sample sizes for meat/vegetable cooking pots. With larger samples comes an increase in the number of producers that are represented in the sample. Information is thus obtained across a wider selection of potters in both communities, and this wider base of producers should reduce the impact of particularly intensive potters in either sample.

Because so many potters manufacture oppayas, this category is appropriate for comparing products of artisans within Dalupa and between Dalupa and Dangtalan potters. Most Dalupa potters make meat/vegetable cooking pots either for their own household’s use or for exchange. Small and medium-sized oppaya vessels have the shortest use-life and highest replacement rates in the Kalinga ceramic assemblage (Longacre 1981). The demand for this functional category is consistently high, providing good sample sizes in terms of pots and producers.
<table>
<thead>
<tr>
<th>CHUPAS (CATEGORY OF POTTERS)</th>
<th>N POTS (N POTTERS)</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0/2.5 (All)</td>
<td>299 (39)</td>
<td>mean=16.66</td>
<td>mean=57.17</td>
<td>mean=13.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.88</td>
<td>s.d.=3.88</td>
<td>s.d.=0.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.053</td>
<td>c.v.=0.068</td>
<td>c.v.=0.066</td>
</tr>
<tr>
<td>2.0/2.5 (Part-time specialists)</td>
<td>176 (15)</td>
<td>mean=16.58</td>
<td>mean=56.79</td>
<td>mean=13.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.88</td>
<td>s.d.=4.22</td>
<td>s.d.=0.79</td>
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<td>c.v.=0.053</td>
<td>c.v.=0.074</td>
<td>c.v.=0.060</td>
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<tr>
<td>2.0/2.5 (Occasional potters)</td>
<td>123 (24)</td>
<td>mean=16.77</td>
<td>mean=57.70</td>
<td>mean=13.46</td>
</tr>
<tr>
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<td>s.d.=3.28</td>
<td>s.d.=0.97</td>
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<td></td>
<td>c.v.=0.052</td>
<td>c.v.=0.057</td>
<td>c.v.=0.072</td>
</tr>
<tr>
<td>3.0/3.5 (All)</td>
<td>826 (41)</td>
<td>mean=18.56</td>
<td>mean=63.88</td>
<td>mean=14.65</td>
</tr>
<tr>
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<td>s.d.=0.93</td>
<td>s.d.=2.85</td>
<td>s.d.=0.87</td>
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<td>c.v.=0.050</td>
<td>c.v.=0.045</td>
<td>c.v.=0.060</td>
</tr>
<tr>
<td>3.0/3.5 (Part-time specialists)</td>
<td>299 (15)</td>
<td>mean=18.59</td>
<td>mean=64.20</td>
<td>mean=14.61</td>
</tr>
<tr>
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<td>s.d.=2.63</td>
<td>s.d.=0.87</td>
</tr>
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<td></td>
<td></td>
<td>c.v.=0.049</td>
<td>c.v.=0.041</td>
<td>c.v.=0.059</td>
</tr>
<tr>
<td>3.0/3.5 (Occasional potters)</td>
<td>527 (26)</td>
<td>mean=18.50</td>
<td>mean=63.36</td>
<td>mean=14.71</td>
</tr>
<tr>
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<td></td>
<td>s.d.=0.97</td>
<td>s.d.=3.31</td>
<td>s.d.=0.88</td>
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<td>c.v.=0.052</td>
<td>c.v.=0.052</td>
<td>c.v.=0.060</td>
</tr>
<tr>
<td>4.0/4.5 (All)</td>
<td>509 (38)</td>
<td>mean=19.79</td>
<td>mean=69.61</td>
<td>mean=16.16</td>
</tr>
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<td>s.d.=2.65</td>
<td>s.d.=0.89</td>
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<td>c.v.=0.047</td>
<td>c.v.=0.038</td>
<td>c.v.=0.055</td>
</tr>
<tr>
<td>4.0/4.5 (Part-time specialists)</td>
<td>336 (15)</td>
<td>mean=19.87</td>
<td>mean=69.74</td>
<td>mean=16.16</td>
</tr>
<tr>
<td></td>
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<td>s.d.=0.89</td>
<td>s.d.=2.59</td>
<td>s.d.=0.94</td>
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<td>c.v.=0.045</td>
<td>c.v.=0.037</td>
<td>c.v.=0.058</td>
</tr>
<tr>
<td>4.0/4.5 (Occasional potters)</td>
<td>173 (23)</td>
<td>mean=19.62</td>
<td>mean=69.34</td>
<td>mean=16.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.99</td>
<td>s.d.=2.75</td>
<td>s.d.=0.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.051</td>
<td>c.v.=0.040</td>
<td>c.v.=0.049</td>
</tr>
</tbody>
</table>

Table 7.3. Variability in Small Meat/Vegetable Cooking Pots: Dalupa Potter Work Force by Production Intensity.
Table 7.3. Variability in Small Meat/Vegetable Cooking Pots: Dalupa Potter Work Force by Production Intensity (cont.).

Large samples in oppaya size classes provide some flexibility in comparing subsets of data. However, the high number of potters involved in oppaya production also introduces non-directional variability into the data set. In some size classes (e.g., 3.0/3.5, 4.0/4.5, 6.0/6.5 chupas), circumference is the most uniform variable, while in others (2.0/2.5, 5.0/5.5) the aperture is the most uniform. Oppaya aperture follows a size-based trend toward increased standardization (seen in rice cooking pots) in four consecutive size classes (i.e., 2.0/2.5-5.0/5.5 chupas) but then is most variable in the largest size class (6.0/6.5 chupa). Height C.V. values follow no perceptible trend:
they drop in the first three size classes (2.0/2.5-4.0/4.5 chupas), rise (5.0/5.5 chupa) and then fall again (6.0/6.5 chupa).

Are any trends evident in the oppaya data set? The answer is yes, but they are not simple or straightforward. For all size classes except one, two or more variables on vessels made by part-time specialists have comparable or lower C.V. values than those variables on the pots of occasional potters. That is, two or more variables from vessels made by part-time specialists have comparable or lower C.V. values to those of occasional potters. A glaring exception lies in the 6.0/6.5 chupa class, where the products of occasional potters are clearly less variable than those of part-time specialists. This discrepancy is indeed puzzling.

Is this patterning explained by the relatively small number of producers who are represented in this particular size class, or what B. Stark (1991) calls the "ratio factor"? One means to quantify the "ratio factor" lies in dividing the number of producers by the number of pots in a given sample to obtain a "producer/product" ratio. This "producer/product" ratio helps standardize comparisons between data sets of varying sample size. For example, the "producer/product" ratio for 3.0/3.5 chupa oppaya sample made by part-time specialists (299 pots made by 15 producers) is 0.050. Higher ratios indicate that many producers contributed to a sample (relative to its size), while lower ratios suggest that relatively few producers contributed to a sample of a particular size.

Clearly, each potter contributing 3 chupa pots to the meat/vegetable cooking pot sample in this analysis has a small influence on the overall variability of that assemblage ("producer/product" ratio=.05). In contrast, the 6.0/6.5 chupa sample of oppayas made by occasional potters has a high "producer/product" ratio (.35). The lower C.V. values for circumference and height in the larger pots may reflect the lower number of "hands" involved in
producing the sample rather than simply a more standardized product.

Why fewer potters produce this single, chupa-based size class among meat/vegetable cooking pots is not entirely clear but may be related to producer skill. In both types of cooking pots studied, larger chupa-based size classes tend to exhibit greater dimensional standardization (Kruskal-Wallis test statistic=13.1767, p=.0403). As noted previously, larger vessels (including oppaya) require more technical skill than the beginning potters possess; thus, fewer (and more skilled) producers are involved in making larger vessels.

Small sample size posed potential problems in analyzing dimensional standardization in the rice cooking pots. The inordinately large sample sizes for chupa-based classes of meat/vegetable cooking pots, on the other hand, may have introduced variation into the C.V. values. Did variability in producer/product ratios exact the same toll on the data sets for Dalupa cooking pots? The relationship between pooled variability and the "ratio effect" is examined by plotting grouped data for all three variables for each size class in the rice and meat/vegetable cooking pots (Figure 7.1). If the "ratio effect" strongly influences variability in Dalupa data, the plotted C.V. values should fall within a .05 confidence band of the regression line. In fact, only half of all values fall within this interval, and producer/product ratios are not correlated with C.V. values (r=.01678; r²=.0282).

Patterning in the dimensional data of Dalupa cooking pots thus reflects complicated behavioral processes (including, but not limited to, differing sample sizes) rather than the "ratio effect." Examination of a third functional category in the Kalinga assemblage, the water storage jar, illuminates trends in the dimensional variability of the Dalupa assemblage. Water storage jars are more commonly used than the rice cooking pots, but are less abundant than meat/vegetable cooking pots. Most Kalinga households have at least one water jar, and it is to morphological
Figure 7.1. Relationship Between Pooled Variability and the "Ratio Effect" in Rice and Meat/Vegetable Cooking Pots.
variability in water jars that we now turn.

**Water storage jars.** In some respects, water jars are poor candidates for morphological standardization studies because they are made in a bimodal size distribution (Figure 7.2). Each mode exhibits a wide size range in volume, from 5.0 chupas to 14.0 chupas. Kalingas use two size categories to classify their water jars. The first size class includes miniature (0.5-2.0 chupas) and small (2.5-5.5 chupas) vessels, which are collectively called **im-immosso.** The frequency distribution of water storage jars in the standardization data set roughly conforms to Kalinga size class distinctions. **Chupa-based** size classes employed in this study are inappropriate for the miniature size, whose volume varies from one potter to the next. For this reason, miniature vessels are excluded from metric morphological analysis.

The second category of water jar is the 'standard' size, which is only loosely anchored to specific, **chupa-based** size classes. Within the standard size are two subvarieties in body shape (globular and shouldered), and a very few water jars have built-in ring bases that preclude the use of woven rattan ring bases. The traditional Pasil water jar is globular in shape, and both Dalupa and Dangtalan potters manufacture this type of vessel. The traditional water jar has an exterior surface that is coated with red ocher and, immediately after firing, with resin. Only Dalupa potters manufacture the shouldered subvariety of water jar, and this subvariety has a pronounced shoulder mid-way between the neck and the base (refer to Figure 6.3).

Dalupa potters claim that they adopted this shouldered style from Bontoc potters who visited southern Kalinga, specifically Lubuagan (Stark 1991; Stark and Longacre 1993). These shouldered water jars have slightly different dimensions than globular jars, which introduce more variability into the water jar category. Vessel volume across the water jar sample (n=483)
Figure 7.2. Histogram of Chupa-Based Sizes in Water Storage Jars.
averages 12.3 chupas (s.d.=3.685) with a median of 13.0 chupas. Most (440) water jars recorded were "standard"-sized vessels, averaging 13-14 chupas in size (mean=13.340, s.d.=1.93, median=14). For purposes of consistency, water jar data are presented in several chupa-based size classes within the "standard" size category (Table 7.4).

Inspection of water jar dimensions illustrates a problem in applying the chupa-based size classification to this functional category. Kalingas do not conventionally assign volumetric size classes to 'standard'-sized water jars. The chupa system bases its size classes on the dry rice measure vis-à-vis its cooked volume, and water jars are never used for cooking. Stated immosso sizes range from 6.0-20.0 chupas; 'standard'-sized water jars are commonly 12.0-15.0 chupas in volume although size assignments vary considerably. For example, vessels recorded as 15.0/15.5 chupas appear smaller than those recorded in the 14.0/14.5 chupa class for no apparent reason.

Several trends are apparent in the water jar data set. As with rice cooking pots, circumference is the least variable attribute in each size class. Water jar aperture is generally the most variable attribute, but mean aperture and height dimensions vary between immosso and comparably-sized rice cooking pots. In the 12.0/12.5 chupa size class, for example, water jars and rice cooking pots have different mean aperture values (water jars=20.18 cm, s.d.=10.42; rice cooking pots=21.78 cm, s.d. = 14.14). Mean aperture/height ratios also differ between rice cooking pots (mean=0.904 cm, s.d.=0.083) and water jars (mean=0.866 cm, s.d.=0.052). That these two categories have similar shapes but different aperture/height ratios may be instructive for studies of prehistoric ceramics.

---

2. Thirteen water jars (2.6% of the total) were excluded from analysis because they lacked chupa-based size class information. This included 1.2% of traditional (i.e., globular) water jars and 5.4% of the shouldered jars.
<table>
<thead>
<tr>
<th>CHUPAS (CATEGORY OF POTTERS)</th>
<th>N POTS (N POTTERS)</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0/12.5 (All)</td>
<td>95 (19)</td>
<td>mean=20.18</td>
<td>mean=96.98</td>
<td>mean=23.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=1.04</td>
<td>s.d.=2.60</td>
<td>s.d.=0.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.052</td>
<td>c.v.=0.027</td>
<td>c.v.=0.036</td>
</tr>
<tr>
<td>12.0/12.5 (Part-time specialists)</td>
<td>74 (14)</td>
<td>mean=20.18</td>
<td>mean=97.21</td>
<td>mean=23.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.99</td>
<td>s.d.=2.44</td>
<td>s.d.=0.77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.049</td>
<td>c.v.=0.025</td>
<td>c.v.=0.033</td>
</tr>
<tr>
<td>12.0/12.5 (Occasional potters)</td>
<td>21 (10)</td>
<td>mean=20.21</td>
<td>mean=96.19</td>
<td>mean=23.02</td>
</tr>
<tr>
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<td></td>
<td>s.d.=1.22</td>
<td>s.d.=3.05</td>
<td>s.d.=1.06</td>
</tr>
<tr>
<td></td>
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<td>c.v.=0.060</td>
<td>c.v.=0.032</td>
<td>c.v.=0.046</td>
</tr>
<tr>
<td>13.0/13.5 (All)</td>
<td>67 (19)</td>
<td>mean=20.84</td>
<td>mean=98.72</td>
<td>mean=24.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=1.80</td>
<td>s.d.=4.23</td>
<td>s.d.=1.16</td>
</tr>
<tr>
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<td></td>
<td>c.v.=0.086</td>
<td>c.v.=0.043</td>
<td>c.v.=0.047</td>
</tr>
<tr>
<td>13.0/13.5 (Part-time specialists)</td>
<td>12 (9)</td>
<td>mean=20.25</td>
<td>mean=95.92</td>
<td>mean=24.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=1.20</td>
<td>s.d.=4.00</td>
<td>s.d.=1.17</td>
</tr>
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<td></td>
<td>c.v.=0.059</td>
<td>c.v.=0.042</td>
<td>c.v.=0.048</td>
</tr>
<tr>
<td>13.0/13.5 (Occasional potters)</td>
<td>55 (13)</td>
<td>mean=20.97</td>
<td>mean=99.33</td>
<td>mean=24.64</td>
</tr>
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<td></td>
<td>s.d.=1.89</td>
<td>s.d.=4.07</td>
<td>s.d.=1.17</td>
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<td>c.v.=0.041</td>
<td>c.v.=0.047</td>
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<td>89 (22)</td>
<td>mean=21.27</td>
<td>mean=101.74</td>
<td>mean=24.80</td>
</tr>
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<td>s.d.=4.38</td>
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<td>c.v.=0.043</td>
<td>c.v.=0.044</td>
</tr>
<tr>
<td>14.0/14.5 (Part-time specialists)</td>
<td>74 (12)</td>
<td>mean=21.42</td>
<td>mean=102.10</td>
<td>mean=24.76</td>
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<td></td>
<td>s.d.=1.39</td>
<td>s.d.=4.06</td>
<td>s.d.=1.05</td>
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<tr>
<td></td>
<td></td>
<td>c.v.=0.065</td>
<td>c.v.=0.040</td>
<td>c.v.=0.042</td>
</tr>
<tr>
<td>14.0/14.5 (Occasional potters)</td>
<td>15 (7)</td>
<td>mean=20.53</td>
<td>mean=99.97</td>
<td>mean=25.03</td>
</tr>
<tr>
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<td>s.d.=5.52</td>
<td>s.d.=1.25</td>
</tr>
<tr>
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<td></td>
<td>c.v.=0.061</td>
<td>c.v.=0.055</td>
<td>c.v.=0.05</td>
</tr>
</tbody>
</table>

Table 7.4. Variability in "Standard"-Sized Water Jars: Dalupa Potter Work Force by Production Intensity.
Data presented in Table 7.4 suggest that water jars produced by occasional potters are at least as uniform in their morphology as those produced by part-time specialists. In only one chupa-based size class are immosso made by occasional potters more standardized than those made by part-time specialists: the odd, 15 chupa category in which vessel dimensions are actually smaller for the 15 chupa size than they are for the 14 chupa size. Where C.V. values are nearly identical (e.g., 13.0/13.5 chupa circumference and height), part-time specialists have a higher producer/product ratio than occasional potters (.75 vs .23 respectively) which introduces variability into the sample. Water jars in the 12.0/12.5 chupa size class are the most uniform class of "standard" water jar, and part-time specialists produce the most standardized 12.0/12.5 chupa water jars.

The previous analysis evaluated dimensional variability for all water jars in each chupa-based size class, and found some relationship between product standardization and production intensity. The presence of two subvarieties of water jar (globular and shouldered) introduces
another source of variability into the water jar assemblages. Although globular jars continue to exhibit higher frequencies in every chupa-based size class than shouldered jars, the shouldered jars are found in every size class. Metric morphological differences are clear in some size classes when water jars are examined by subvariety (Table 7.5).

Shouldered water jars display considerable morphological variability. Because shouldered jars are a recent innovation (rather than a well-entrenched technology), this subvariety may be inappropriate for standardization analyses. Thus, the reasonable expectation that mean circumference of shouldered jars should be larger than that of globular jars is only partly supported in the data. Shouldered jars in some size classes (i.e., 14.0/14.5, 15.0/15.5 chupas) have significantly larger circumferences, but others (e.g., 12.0/12.5, 13.0/13.5) do not. Whether this discrepancy in circumference values reflects ambiguity in size class assignment or other factors is not clear. Shouldered jars tend to have smaller aperture diameters than do globular jars. This pattern may reflect slightly different manufacturing steps that are required for making the two vessel forms. Producing the requisite sharp angle in the vessels' body for a shouldered jar might also require modifications of the aperture diameter for structural reasons.

Examination of C.V. values in the water jar data does not reveal consistent findings regarding the relative standardization of globular vs. shouldered water jars. In one case (e.g., 13.0/13.5 chupa), shouldered jars are more uniform than are globular jars; in another case (12.0/12.5 chupas), globular jars are more standardized. If shouldered water jars continue to be popular, the shouldered jars of the future should show considerably more dimensional standardization than those measured for this analysis. Continuing morphological research is needed to monitor the development of this new technological tradition.
<table>
<thead>
<tr>
<th>CHUPAS (SUBVARIETY)</th>
<th>N POTS (N POTTERS)</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0/12.5 (Globular)</td>
<td>77 (23)</td>
<td>mean=20.29 s.d.=0.98 c.v.=0.049</td>
<td>mean=96.96 s.d.=2.36 c.v.=0.024</td>
<td>mean=23.32 s.d.=0.84 c.v.=0.036</td>
</tr>
<tr>
<td>12.0/12.5 (Shouldered)</td>
<td>18 (9)</td>
<td>mean=19.72 s.d.=1.13 c.v.=0.057</td>
<td>mean=97.08 s.d.=3.54 c.v.=0.036</td>
<td>mean=23.31 s.d.=0.93 c.v.=0.040</td>
</tr>
<tr>
<td>13.0/13.5 (Globular)</td>
<td>49 (18)</td>
<td>mean=21.07 s.d.=1.89 c.v.=0.090</td>
<td>mean=99.08 s.d.=4.32 c.v.=0.044</td>
<td>mean=24.77 s.d.=1.18 c.v.=0.048</td>
</tr>
<tr>
<td>13.0/13.5 (Shouldered)</td>
<td>18 (12)</td>
<td>mean=20.22 s.d.=1.39 c.v.=0.068</td>
<td>mean=97.72 s.d.=3.93 c.v.=0.040</td>
<td>mean=24.08 s.d.=0.97 c.v.=0.040</td>
</tr>
<tr>
<td>14.0/14.5 (Globular)</td>
<td>53 (14)</td>
<td>mean=21.51 s.d.=1.43 c.v.=0.067</td>
<td>mean=101.34 s.d.=4.20 c.v.=0.041</td>
<td>mean=24.82 s.d.=1.10 c.v.=0.040</td>
</tr>
<tr>
<td>14.0/14.5 (Shouldered)</td>
<td>36 (15)</td>
<td>mean=20.92 s.d.=1.28 c.v.=0.061</td>
<td>mean=102.33 s.d.=4.63 c.v.=0.045</td>
<td>mean=24.78 s.d.=1.22 c.v.=0.049</td>
</tr>
<tr>
<td>15.0/15.5 (Globular)</td>
<td>58 (17)</td>
<td>mean=20.81 s.d.=1.24 c.v.=0.059</td>
<td>mean=99.42 s.d.=3.26 c.v.=0.033</td>
<td>mean=24.74 s.d.=1.14 c.v.=0.087</td>
</tr>
<tr>
<td>15.0/15.5 (Shouldered)</td>
<td>38 (10)</td>
<td>mean=20.83 s.d.=1.37 c.v.=0.066</td>
<td>mean=101.55 s.d.=3.20 c.v.=0.031</td>
<td>mean=24.67 s.d.=0.82 c.v.=0.033</td>
</tr>
</tbody>
</table>

Table 7.5. Variability in "Standard"-Sized Dalupa Water Jars: Globular vs. Shouldered.

Table 7.6 summarizes information on selected size classes within functional categories of Dalupa pottery. General size classes (i.e., small, medium, large) that Kalingas use and that were employed in the previous analysis of Dangtalan ceramic standardization (Longacre et al. 1988) are included, as are the more narrowly-defined chupa-based sizes that demarcate groupings in this analysis. Measurements presented in this analysis illustrate the necessity of using multiple measurements in standardization research. Had the analysis focused only on circumference, for
example, Dalupa cooking pots would have appeared more uniform than is actually the case; alternately, research restricted to vessel aperture would have generated even more striking contrasts findings.

Examination of these data yields insights on the relationship between dimensional standardization, functional type, vessel size and degree of morphological specialization. Some hypotheses offered previously regarding relationships between producer specialization and dimensional standardization can be examined in the light of Dalupa data. First, no consistent relationship obtains between vessel size and degree of standardization in the Dalupa assemblage. For example, larger rice cooking pots are actually more uniform than smaller vessels because large pots are only made by more experienced potters. Second, comparisons of traditional and new water jar shapes also support the idea that product standardization is affected by the time depth of a technological tradition (B. Stark 1991).

Analysis of meat/vegetable cooking pots confirmed a relationship between production intensity and product specialization when the "ratio effect" was taken into account. In some cases, the "ratio effect" may be as important in determining the degree of standardization as producer skill. Comparison of C.V. values in the tiny (2.0/2.5 chupa) vs. small (3.0/3.5 chupa) meat/vegetable cooking pots illustrate how greater variability may be generated when relatively higher proportions of producers contribute to the ceramic sample. Figure 7.3 illustrates this relationship by plotting C.V. values for tiny and small oppaya dimensions. Dimensions are coded by letter (a=aperture, c=circumference, h=height) and size classes are distinguished by volume (e.g., "2A"=aperture of 2 chupa pot). Use of the producer/product ratio should reduce the effect of producer sample size on measures of dimensional variability. Viewed in this manner, only the circumference measurements of the two size classes appear different from one another.
Figure 7.3. Comparison of C.V. Values for Tiny and Small Meat/Vegetable Cooking Pots.
Table 7.6. Dimensional Variability Across Functional Categories: Summary information.

Few ethnoarchaeological studies have examined ceramic standardization within size classes of different functional categories. Obtaining adequate sample sizes for different functional classes is difficult, and obtaining accurate information on production frequency for different size classes requires extended fieldwork in a study community. The foregoing analysis has suggested that, while comparisons of relative standardization across communities is important, it is equally important to understand dimensional variability in vessel morphology within and between functional types.

From an archaeological viewpoint, comparisons of vessels between producer communities
is at least as important as understanding variability within the assemblage of a single production center. Comparisons of variability across functional categories or across geographic regions often produce impressive differences in measures of dispersion. However, these differences often reflect temporal differences, geographically distinct ceramic traditions, and differences in size and functional classes under analysis. Are similarly impressive outcomes obtained when one controls for these temporal, geographic, size-based and functional differences? The following comparisons between two communities with similar technological traditions can furnish some answers.

**Organizational Modes and Intercommunity Variability:**

**Dalupa vs. Dangtalan**

Archaeological hypotheses regarding specialization and standardization suggest that differences in the degree of standardization should vary between communities that exhibit different organizational modes. One reason that previous standardization studies have reached conflicting results is that data sets using separate manufacturing technologies and from radically different geographical locations have been compared (D. Arnold and Nieves 1992:94). This analysis avoids such problems by comparing pots within the same functional category (meat/vegetable cooking) of identical sizes from two producer communities in the same river valley.

Box-and-whiskers plots display the distribution of values recorded for each attribute in Dalupa and Dangtalan meat/vegetable cooking pots (Figure 7.4). Median values in each distribution are marked by a center vertical line, the hinges encase the interquartile range (or Hspread), and the "whiskers" (horizontal lines) show the range of values that fall within 1.5 Hspreads of the hinges. Values that are greater than 1.5 Hspreads beyond the upper or lower

---

3. The median for Dalupa height falls on the upper hinge (median=150) so no median line is visible in the box.
Figure 7.4. Box-and-Whiskers Plots of Morphological Dimensions for Dalupa and Dangtalan 3 Chupa Meat/Vegetable Cooking Pots.
hinge are plotted with asterisks. Values that are greater than 3.0 H spreads outside the upper or lower hinge are demarcated with empty circles (Wilkinson 1990: 167). Median values on each attribute differ between Dalupa and Dangtalan, as does the degree of dispersion in the distribution.

Inspection of box plots in Figure 7.4 suggest that each village has a unique (if subtle) vessel shape for its meat/vegetable cooking pot. Dangtalan pots are shorter and have wider mouths than their Dalupa counterparts. The Dangtalan tradition of painting a band of ocher around a cooking pot’s exterior and dimensional variation in their oppaya pot (most distinctly expressed in the aperture/height ratio) express village identity in a passive, or isochrestic (sensu Sackett 1990) fashion. This ‘Dangtalan style’ oppaya is most distinct among two active potters (who manufacture extraordinarily wide-mouthed oppaya), for which a strong local (i.e., Dangtalan) market now exists.

Previous research in Dangtalan suggested that pottery production is an occasional occupation for all but a few potters there. Dangtalan’s production scale and intensity are lower than Dalupa’s, and Dangtalan pottery exchange is minimal relative to that of the Dalupa merchants to the east. Given that the productive organizations of Dalupa and Dangtalan differ, can we observe differences in the morphology and the degree of dimensional standardization of their products?

Data displayed in Table 7.7 illustrate the relationship between organizational mode and product standardization in these villages. Differences in C.V. values are not as robust as one might hope, although fine-grained statistical tests (described below) indicate that Dalupa’s vessels are less variable. The fact that each community is involved in part-time, rather than full-time, specialization affects the relative variability that pots from each community exhibit.
Table 7.7. Variability in 3 Chupa Meat/Vegetable Cooking Pots from Dalupa vs. Dangtalan.

Table 7.7 indicates that relative standardization in aperture and circumference is roughly comparable between Dalupa and Dangtalan three chupa meat/vegetable cooking pots. Slightly lower C.V. values in Dalupa dimensions may reflect differences in sample size and in the number of producers represented, as Dalupa has more active potters and a higher sample size than does Dangtalan. Coefficients of variation are significantly different between the villages in vessel height: Dalupa vessels are taller than those of Dangtalan and the height dimension is more uniform among Dalupa pots. Accordingly, Dalupa’s height/aperture ratio is also less variable than that of Dangtalan.

Slight differences in the coefficients of variation in several attributes suggest the possibility that one class of Dalupa cooking pots is more standardized than Dangtalan pots. The Brown-Forsythe (or BF) test (Brown and Forsythe 1974) is used to evaluate the equality of variances between these two samples, since the BF test is a particularly robust procedure for use on distributions that are not normally distributed (Longacre et al. 1993). Data for each attribute were first transformed (or standardized) by obtaining the absolute deviation from the class sample median for each observation within each class. A one-way analysis of variances was then

<table>
<thead>
<tr>
<th>VILLAGE (SAMPLE SIZE)</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
<th>APERTURE/HEIGHT RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalupa (n=826)</td>
<td>mean=18.56</td>
<td>mean=63.88</td>
<td>mean=14.65</td>
<td>mean=0.14</td>
</tr>
<tr>
<td></td>
<td>s.d.=0.93</td>
<td>s.d.=2.85</td>
<td>s.d.=0.87</td>
<td>s.d.=0.01</td>
</tr>
<tr>
<td></td>
<td>c.v.=0.050</td>
<td>c.v.=0.045</td>
<td>c.v.=0.060</td>
<td>c.v.=0.007</td>
</tr>
<tr>
<td>Dangtalan (n=114)</td>
<td>mean=19.00</td>
<td>mean=63.36</td>
<td>mean=13.54</td>
<td>mean=0.14</td>
</tr>
<tr>
<td></td>
<td>s.d.=0.93</td>
<td>s.d.=2.64</td>
<td>s.d.=0.99</td>
<td>s.d.=0.01</td>
</tr>
<tr>
<td></td>
<td>c.v.=0.049</td>
<td>c.v.=0.042</td>
<td>c.v.=0.073</td>
<td>c.v.=0.009</td>
</tr>
</tbody>
</table>
performed on the transformed values (see Longacre et al. 1993 for discussion).

Results of the BF-test suggest that Dalupa's 3 chupa meat/vegetable cooking pots are statistically more standardized than are Dangtalan's in terms of aperture (B=7.008, p=0.00869), circumference, (B=3.690, p=0.0560), and height (B=13.127, p=0.0004). From a statistical viewpoint, we can reject the null hypothesis (i.e., that morphological variability in the two samples is equivalent). However, this relationship is complicated by differences in sample size, the use of a commonly produced vessel type, and most importantly, the fact that the two production systems are located at different points along the same organizational mode of part-time specialization. B. Stark (1991) encountered a similar problem in her analysis of comparative Melanesian data. Dalupa potters outstrip Dangtalan potters in production scale and intensity, but ceramic manufacture remains a part-time occupation.

Comparison of Dalupa and Dangtalan data highlights a major problem in studies of pottery specialists whose households also engage in agricultural production. A discrepancy exists between site specialization and producer specialization (see Muller 1987:15; Rice 1987). Pottery making is quite clearly a community-based craft specialization, and most Pasil villages rely on Dalupa's ceramics for daily use. However, individual output varies in production scale and relative degree of standardization.

Analysis of ceramic standardization between communities illustrates a second problem that is related to the nature of the Dalupa economic system. Many traditional farming systems today (and undoubtedly countless systems in the past) combine craft and agricultural production as complementary economic activities. In such systems, craft production is an independent, part-time specialization that fills economic gaps. Production intensity -- and, likely, the degree of standardization -- varies from one producer unit (or household) to the next in relation to economic
need. Metric morphological data from such systems, when compared with one another, may or may not capture nuances in relative intensity from one system to the next.

Perhaps salient differences in degree of ceramic standardization are only visible at more intensive levels of production, either organizationally (Sinopoli 1988:593) or technologically (B. Stark 1991). Are differences more or less visible when we examine variability within a single producing community? The next section focuses on Dalupa morphological data by first presenting general patterning and then comparing categories within the data set.

**Individual Variability in the Dalupa Cohort**

Little ethnoarchaeological research has focused on intra-community variability in productivity that compares individual potters with one another, or that compares subgroups within a community that contain individuals who share a similar production scale. If specialization and standardization proceed together, then this relationship should be most visible at the intra-community level in two respects. Part-time specialists should make more uniform vessels than the occasional potters, and more experienced potters should produce more standardized vessels.

Three chupa meat/vegetable cooking pot data sets are used to examine these two propositions to capture the largest net of producers. Histograms of the three metric variables (Figure 7.5) illustrate that distributions of the three attributes are generally normal (outliers seen in the circumference histogram were not eliminated from analysis). Most Dalupa potters make small meat/vegetable cooking pots, so that the sample includes a large number of producers. However, the oppaya may, because of sheer popularity, also be the most standardized vessel in the assemblage and therefore be less sensitive to scalar differences that concern us in this analysis.

**Production frequency.** Production frequency here relies on distinctions in production output between occasional and part-time specialists (Figure 6.11). Part-time specialists and
Figure 7.5. Histograms of Morphological Dimensions for Dalupa 3 Chupa Meat/Vegetable Cooking Pots.
occasional potters had nearly identical "producer/product" ratios for part-time specialists and occasional potters (.050, .049 respectively). Each category includes potters within a wide range of production outputs (e.g., occasional potters produced 3-100 vessels). Use of these broad categories obscures some product variability, but use of smaller ranges generated still lower C.V. values because fewer producers contributed to the samples.

Differences in circumference values indicate that the work of occasional potters was more variable than that of part-time specialists (Mann-Whitney U Test Statistic=63240.50, p=0.000). The fact that C.V. values for aperture and height were similar between the two groups is also important. Overall sample size for the least productive potters was quite low since they produced very few pots per capita in 1988. The low variability in the work of occasional potters was matched by work done by part-time specialists who manufactured far more vessels.

<table>
<thead>
<tr>
<th>CATEGORY (N POTTERS IN SAMPLE)</th>
<th>N POTS</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time Specialists (n=15)</td>
<td>527</td>
<td>mean=18.59</td>
<td>mean=64.20</td>
<td>mean=14.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.91</td>
<td>s.d.=2.63</td>
<td>s.d.=0.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.049</td>
<td>c.v.=0.041</td>
<td>c.v.=0.059</td>
</tr>
<tr>
<td>Occasional potters (n=26)⁴</td>
<td>299</td>
<td>mean=18.50</td>
<td>mean=63.36</td>
<td>mean=14.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.97</td>
<td>s.d.=3.31</td>
<td>s.d.=0.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.052</td>
<td>c.v.=0.052</td>
<td>c.v.=0.060</td>
</tr>
<tr>
<td>All Potters (n=41)</td>
<td>826</td>
<td>mean=18.56</td>
<td>mean=63.89</td>
<td>mean=14.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.93</td>
<td>s.d.=2.92</td>
<td>s.d.=0.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.050</td>
<td>c.v.=0.046</td>
<td>c.v.=0.060</td>
</tr>
</tbody>
</table>

Table 7.8. Variability in 3 Chupa Meat/Vegetable Cooking Pots Between Part-Time Specialists and Occasional Potters in Dalupa.

⁴ No measurements were made on oppaya manufactured by 4 occasional potters.
Little difference is evident in the aperture and height means between the groups, suggesting that potters share a dimensional template for the Dalupa cooking pot. Circumference means vary considerably, as the cooking pots of occasional potters have smaller maximum widths than do those of part-time specialists. Cooking pots made by occasional potters also presumably had smaller volumes, a pattern paralleled in comparisons of cooking pots data from Dangtalan and Dalupa pots (Table 7.7). Why circumference is more sensitive to producer intensity is not entirely clear, although it may be related to degree of technical skill as expressed during the shaping process, a point discussed in the following section. Alternately, the part-time specialists may be more responsive to market-based size classes than are the occasional potters.

Differences in standardization between products made by part-time specialists and occasional potters are also evident in other functional categories that have much smaller sample sizes than those found in 3 chupa meat/vegetable cooking pots. For example, 3 chupa rice cooking pots made by part-time specialists have more uniform circumference (Mann Whitney U Test Statistic=168.500, p=0.000) and height dimensions (Mann Whitney U Test Statistic=261.50, p=0.017) than do those made by occasional potters. The fact that the relative degree of standardization varies among vessel attributes and within size classes of functional categories in the Dalupa sample underscores our need for more detailed research on ceramic standardization.

Effect of skill on product standardization. If product standardization increases as motor skills develop (see Balfet 1965; Hagstrum 1985), then Dalupa potters with more experience should manufacture more standardized pots. No ceramic ethnoarchaeological research project has obtained ideal data set for evaluating skill and experience, which could involve the continuous monitoring of a potter’s activity over several decades. However, data collected on the number of years the potter has made pots provide a gross index for measuring skill.
Dalupa children grow up surrounded by potters, and many of them experiment with pottery making in their youth. However, women do not consider themselves potters until they begin making pots in earnest for exchange or for their own households in their mid-twenties (mean=26.67, s.d. 10.25, median=24). Across the work force, one-half of the potters had been making pots in earnest for 12.0 years or less (mean=18.82, s.d.=16.01). Part-time specialists had been making pots slightly longer (median=22.0, mean=24.47, s.d. = 0.63) than the rest of the work force.

Producer skill and production intensity are not correlated in a simple fashion in Dalupa. The relationship between skill (as expressed in number of years potting) and production intensity is complicated by several factors that affect a woman's decision to make pottery in a given year (see section in Chapter Six entitled "The Dalupa Potter's Life Cycle"). Some experienced potters made few pots in 1988 (thus placing them in the "occasional" category) while nearly one-third of the part-time specialists were relative newcomers, having made pots for twelve years or less. This pattern is clear when skill (as expressed in number of years potting) is plotted against production output in 1988 (Figure 7.6). Two subgroups of occasional potters (designated as "B") are evident, and these groups split at about 20 years.

Metric morphological data from three chupa meat/vegetable cooking pots (Table 7.9) illustrate the lack of close fit between individual producer skill and product standardization. Intervals use the median (12.0) rather than the mean (18.82) number of years potting to define smaller categories within the data set. The "producer/product" ratio is roughly comparable across groups, ranging from .037 (37-49 years potting) to .061 (25-36 years potting). These low ratios also suggest, however, that the work of individual producers may affect C.V. values assigned to each attribute.
Figure 7.6. Relationship Between Experience and Production Level.
If producer skill is directly related to product standardization and skill increases steadily through time, then the first group (1-12 years' experience) should produce pots with the most variable dimensions. In fact, this is not the case for any of the three variables measured. Pots made by the most experienced potters (i.e., those with 37-49 years' experience) are slightly more variable than those made by the least experienced potters, and it is potters with an intermediate amount of experience (from 13-36 years' experience) who make the most uniform meat/vegetable cooking pots.

<table>
<thead>
<tr>
<th>YEARS SPENT POTTING (N POTTERS IN SAMPLE)</th>
<th>N POTS</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-12 (19)</td>
<td>364</td>
<td>mean=18.51</td>
<td>mean=63.82</td>
<td>mean=14.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.94</td>
<td>s.d.=2.81</td>
<td>s.d.=0.86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.051</td>
<td>c.v.=0.044</td>
<td>c.v.=0.058</td>
</tr>
<tr>
<td>13-24 (5)</td>
<td>113</td>
<td>mean=18.30</td>
<td>mean=63.34</td>
<td>mean=14.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.82</td>
<td>s.d.=2.53</td>
<td>s.d.=0.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.045</td>
<td>c.v.=0.040</td>
<td>c.v.=0.045</td>
</tr>
<tr>
<td>25-36 (8)</td>
<td>131</td>
<td>mean=18.88</td>
<td>mean=64.32</td>
<td>mean=14.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.87</td>
<td>s.d.=3.15</td>
<td>s.d.=0.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.046</td>
<td>c.v.=0.049</td>
<td>c.v.=0.061</td>
</tr>
<tr>
<td>37-49 (8)</td>
<td>218</td>
<td>mean=18.58</td>
<td>mean=64.01</td>
<td>mean=14.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.96</td>
<td>s.d.=2.86</td>
<td>s.d.=0.96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.052</td>
<td>c.v.=0.045</td>
<td>c.v.=0.066</td>
</tr>
</tbody>
</table>

Table 7.9. Variability in 3 Chupa Meat/Vegetable Cooking Pots Based on Number of Years Spent Making Pottery.

A tendency for one small group of women (13-24 years potting) to make smaller and more uniform 3 chupa cooking pots distorts our view of skill-based trends in the data set. If dimensional attributes are also considered as stylistic attributes, then perhaps this potter group has
its own morphological style. This argument supports Graves' (1981, 1985) previous identification of Dangtalan potter cohorts whose products varied stylistically from one cohort to the next.

No clearer picture emerges when the products of occasional potters are disaggregated by relative experience, using the 20 year cut-off identified in Figure 7.6. In some respects, the work of less experienced occasional potters (i.e., those making pots fewer than 20 years) appears more uniform than that of more experienced potters (i.e., those making pots 20 years or more) in the same category. C.V. values for aperture are nearly identical for the less and more experienced potters (0.052, 0.051 respectively). However, both circumference and height values for less experienced occasional potters are lower than those for more experienced potters (circumference=0.042 vs. 0.069; height=0.053 vs. 0.063). The "ratio effect" cannot explain away this pattern: less experienced occasional potters have a slightly lower producer/product ratio (.0738) than do their more experienced peers (.1146).

The foregoing analysis underscores difficulties in establishing linear relationships between production intensity, skill, and the degree of morphological standardization in Dalupa meat/vegetable cooking pots. When one controls for relative skill, might production intensity still be related to product standardization among part-time specialists? Table 7.10 presents data on potters who have made pots for 12 or fewer years. Producer/product ratios for these groups are also quite low (part-time specialists=.030, occasional potters=.070): thus, variability in one or two potters in each group may significantly affect results.

Results of this analysis are indeed equivocal: the two groups of equally experienced potters make comparably uniform pots. Part-time specialists have more standardized apertures, while occasional potters make vessels with more standardized heights than do the part-time specialists. Coefficients of variation for circumference are comparable between the two groups,
although part-time specialists tend to make vessels with larger circumferences.

<table>
<thead>
<tr>
<th>CATEGORY (N POTTERS IN SAMPLE)</th>
<th>N POTS</th>
<th>APERTURE (cm)</th>
<th>CIRCUMFERENCE (cm)</th>
<th>HEIGHT (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time Specialists (n=5)</td>
<td>164</td>
<td>mean=18.67</td>
<td>mean=64.62</td>
<td>mean=14.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.90</td>
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<td>s.d.=0.89</td>
</tr>
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<td></td>
<td>c.v.=0.048</td>
<td>c.v.=0.043</td>
<td>c.v.=0.060</td>
</tr>
<tr>
<td>Occasional potters (n=14)</td>
<td>200</td>
<td>mean=18.38</td>
<td>mean=63.16</td>
<td>mean=14.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>s.d.=0.96</td>
<td>s.d.=4.65</td>
<td>s.d.=0.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.052</td>
<td>c.v.=0.042</td>
<td>c.v.=0.054</td>
</tr>
<tr>
<td>All Potters (n=19)</td>
<td>364</td>
<td>mean=18.51</td>
<td>mean=63.82</td>
<td>mean=14.76</td>
</tr>
<tr>
<td></td>
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<td>s.d.=0.94</td>
<td>s.d.=2.81</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>c.v.=0.051</td>
<td>c.v.=0.044</td>
<td>c.v.=0.058</td>
</tr>
</tbody>
</table>

Table 7.10. Variability in 3 Chupa Meat/Vegetable Cooking Pots Among Potters with Twelve Years' Experience or Less.

Examination of dimensions of vessels made by artisans of similar skill levels and different levels of production intensity does not support the contention that production intensity affects relative standardization. In fact, variability in the goods of potters with the most experience was similar to that in goods that were produced by the least experienced potters. Lack of support in the oppaya data set does not refute the general relationship. Instead, the "skill" variable used in this analysis (i.e., number of years potting) does not accurately monitor the relative intensity of production over the number of years that a potter has been active.

Another approach to this problem lies in examining potter age. A Dalupa potter's age and the number of years she has made pots are closely related ($r=0.789$). Data presented in Chapter Six indicate that women become more active potters as they age, as illustrated in Figure 7.7. Do potters peak in their 50s and 60s and decline as they move into their 70s? Birth cohorts used in
previous Dangtalan research (e.g., Graves 1981; 1985) were applied to potters, including two new
cohorts to accommodate the younger Dalupa potters. The last cohort (i.e., 1971-1988) was
excluded from this analysis because no 3 chupa meat/vegetable cooking pots were measured from
the single potter in this cohort.

Relative variability in the three attributes by birth cohort are presented in Figure 7.8,
which also controls for the "ratio effect" by plotting C.V. values against producer/product ratios.
The three variables are distinguished using letters (a=aperture, c=circumference, h=height), and
birth cohorts are coded from 1 (oldest, before 1921) to 6 (youngest, 1961-1970). Producer/product
ratios ranged from .039 (1921-1930 cohort) to .085 (cohort born before 1921), suggesting that
each potter within each cohort contributed a similarly large number of pots to the sample.

The hypothesis that the oldest potters would decline in their pottery-making skills is not
supported using the dimensional data from 3 chupa meat/vegetable cooking pots. In fact, the
dimensional variables exhibit different trends through the cohorts. C.V. values for aperture
diameter are similar throughout the cohort except for the oldest group ("1A"), and circumference
C.V. values fluctuate unpredictably from one cohort to the next. The oldest potters make oppaya
with the most standardized apertures, while the second oldest birth cohort (women in their 60s)
make pots with the most consistent circumference. Again, the "ratio effect" is insignificant in this
patterning, as the oldest and second oldest cohorts have the highest and lowest ratios respectively
(.085, .039).

Use of the BF-test supports the relationship between age and aperture (p=0.0291) and
height (p=0.000) but not between age and circumference (p=0.1124). Use of the Tukey HSD
multiple comparisons test provides one avenue for investigating different influences on the patterns
described. Examination of matrices of pairwise comparison probabilities generated through the
Figure 7.7. Relationship Between Age and Production Levels Among Dalupa Potters.
Figure 7.8. Relative Standardization in Goods By Birth Cohort.
Tukey test indicates that one potter birth cohort, born between 1941 and 1950, influences this patterning more than others. All three pairwise comparisons involving this cohort are statistically significant (0.0000, 0.0135, 0.0000), and 60% of all significant probabilities in the matrix derive from this cohort. Many of these women, in their forties and fifties, are classified as part-time specialists.

The relationship between relative skill and morphological standardization is extraordinarily complicated. For example, if the learning curve for pottery production is relatively steep and short, then potters might achieve the needed motor control within a year or two of learning the craft. Moreover, the production intensity in the years that follow a woman's entry into the potting profession will vary with the individual. Although most Dalupa women say they learn to make pots during their mid-20s, potters hit their stride (in terms of production intensity) nearly two decades later. Other activities and technical choices may also affect the formal properties of a finished product, such as the amount of clay used to produce a pot and the visibility of other vessels during the manufacturing process (M.B. Schiffer, personal communication 1993).

Relationships between ceramic specialization and product standardization are not linear across societies (Cowgill 1989:135; Rice 1991; B. Stark 1991). Western assumptions concerning efficiency may be inappropriate for studying craft production in traditional societies, either contemporary or ancient (D. Arnold and Nieves 1992; Brumfiel 1980). Social factors as well as motor habits (e.g., Muller 1984:492), utterly invisible to the archaeologist, affect the degree of standardization in any ceramic assemblage.

Close social relationships between producer and consumer in Pasil guarantee the potter a "sale" because consumers are obligated by custom to buy goods from their relatives or friends. But product appearance is linked to personal reputation, and consumers judge potters on their
success in replicating the template for what constitutes a high quality pot. The template specifies a symmetrical body, an aperture diameter smaller than the body’s diameter, a uniform burnishing, and, for large (jallangan) rice cooking pots, long necks. Part-time specialists whose consumer market extends beyond Pasil largely operate outside the constraints of social relations with their customers. For these potters, appearance (including dimensional standardization) is less important than production scale.

One of the most critical sources of variability in this analysis lies in idiosyncratic (or individual) preferences and aesthetics. Some very inexperienced potters make extraordinarily uniform pots. Potter #255 had a single year’s experience, produced pots primarily for Pasil consumers and made 3 chupa meat/vegetable cooking pots with very low C.V. values: 1) aperture=0.000; 2) circumference=0.003; 3) height=0.017 (n=12). On the other hand, Potter #219, who ranked second in production output in 1988 (n=324), has rather variable C.V. values for her meat/vegetable cooking pots (aperture=0.057; circumference=0.038; height=0.057 [n=59]). This lack of standardization neither affected her market nor impeded her productivity. Perhaps the relationship between production intensity and product standardization varies on a case-by-case basis.

Summary

This chapter has examined the relationship between producer specialization and morphological standardization using multiple approaches. Several analyses supported some relationship between production intensity and product standardization: at the aggregate level, pots made by part-time specialist potters are more uniform than those made by less intensive producers. However, numerous (and largely unsuccessful) attempts to link product standardization with producer skill and age demonstrate that the relationship between morphological variability and
individual producer intensity is complicated indeed.

Craft specialization represents an ever tighter focus on a narrow range of productive economic activities, and both the scale and the intensity of ceramic production must come under study (Costin 1991). Many obstacles face archaeologists who wish to use ethnoarchaeological data on ceramic standardization, and one of the biggest problems surely stems from an ethnoarchaeological focus on producer rather than on site (or community-level) specialization. At the producer level, specialization and standardization often are not related in a linear fashion. The luxury of an ethnoarchaeological study lies in the potentially fine resolution in data sets. The difficulty in using such data lies in translating such results into the time scale and analytical units of prehistory.

Another problem is that most ethnoarchaeological standardization studies (including this one), use the whole pot as the analytic unit while archaeologists grapple with sherds and reconstructible vessels (Skibo et al. 1989). The attributes measured thus also differ: ethnoarchaeologists generally measure whole vessel dimensions (e.g., vessel height, circumference, aperture diameter) while archaeologists generally measure rim sherd attributes (e.g., rim wall thickness, collar height). More ethnoarchaeological work is needed that utilizes archaeologically meaningful units of measurement. More research is also needed to determine which vessel attributes are most sensitive to change (if change always occurs) as the organization of ceramic production intensifies through time.

The greatest weakness of current standardization research lies in the paucity of theoretical discussions on the subject. Only a handful of scholars have investigated factors that condition the general relationship between craft specialization and product standardization (e.g., D. Arnold and Nieves 1992; Rice 1984, 1989, 1991; B. Stark 1991). Untold dozens of archaeologists have
discussed the relationship between craft specialization and state formation. But the gulf remains between methodological studies (i.e., how we measure specialization in material culture) and the theoretical studies of specialization as economic process in complex societies.

Linking arguments between methodological and theoretical approaches are few, and require development. Such work begins with carefully documented case studies of production and distribution systems worldwide. Having explored the Dalupa production system in previous chapters, the next chapter turns to the ceramic distributional network.
CHAPTER 8

THE DALUPA EXCHANGE NETWORK: 1988

An integrated approach examines both ceramic production and distribution within a system, since the two are intimately related (e.g., Bey and Pool 1992; Rice 1987b:168). Physical aspects of traditional ceramic distribution systems -- including quantity, distance, differential directionality of distribution and specialization in production for particular markets (Kramer 1985:96) -- hold useful information for the construction of spatial models of ceramic distribution. Social aspects of pottery distribution systems -- including the nature of exchange transactions, forms of producer-consumer relationships, and exchange media involved (Solheim 1965:264) -- may also yield insights into a society's economic organization.

Parameters of Dalupa pottery production have been explored in the previous three chapters (from raw material procurement to production scale), and this chapter focuses on the distributional component of the Dalupa ceramic system. Village-based productive specialization in the Kalinga area has operated in the context of regional economic networks for at least two centuries (Antolin 1970 [1789]; Keesing and Keesing 1934:202-207; Schadenberg 1889; Scott 1977:315). Community specialization, organized at the household level, traditionally involved the production and trade of multiple commodities such as tobacco, salt, metal products, cloth and clay pots. The relative intensity and concentration of these village-based specialties, however, is poorly documented.

This chapter explores several aspects of the distributional network in which Dalupa potters ply their wares. Ecological and archaeological frameworks for probing the relationship between productive specialization and economic networks are first discussed, followed by a description of this relationship across the Kalinga area. Systems of community-based
specialization have linked Kalinga communities across sub-ethnic boundaries for centuries, and continue to do so today.

The structure of the Dalupa ceramic distribution network, emphasizing several aspects of the network: exchange media (and sources of variability in exchange rates), mechanisms of pottery distribution, and the scale of 1988 Dalupa pottery exchange. Distributional spheres in Dalupa's multi-centric pottery economy have ill-defined (yet perceptible) boundaries. Each sphere is structured by a different type of economic personalism: the Pasil network on kinship and mutual obligation, and the extra-Pasil network on trade partnerships built on reciprocity and trust. Archaeological implications of the Dalupa case study are then explored.

Productive Specialization and Economic Networks:

A General Perspective

Prehistoric economic networks are hidden in the spatial patterning of artifact distributions in the archaeological record. The array of behaviors that moves ceramic vessels through space is huge, and includes myriad formation processes. Bridging the gap between spatial patterning in artifact distributions and prehistoric economic networks is difficult.

Archaeological frameworks that place productive specialization systems into regional networks tend to focus on centralized distribution systems in complex societies (e.g., Brumfiel 1980, 1987; Earle 1987; Kipp and Schortmann 1989; Sinopoli 1988; Wright and Johnson 1975). Such economic systems stand in clear contrast to those found among non-state societies in terms of context, concentration, intensity, and geographic scale. These qualitative and quantitative differences suggest that economic models for non-state societies require a different approach with, perhaps, different underlying assumptions regarding how the system operates.
Archaeologists seeking models of economic systems in non-state societies have two alternatives: either 'scale down' economic models developed for state systems (which are often centralized), or look elsewhere for models of productive specialization and exchange. Fortunately, cultural anthropologists have a longstanding interest in productive specialization and exchange systems among tribal and peasant societies. To understand variability in productive specialization at any level of social complexity, one must examine the social and economic linkages that comprise exchange networks (Bates and Lees 1977:826).

Economic anthropology's earlier focus on multi-centric economies in small-scale societies provides archaeologists with insights on the structure of distributional systems (Bohannan and Dalton 1962; Ross 1978; Sahlins 1972). One Melanesian exchange system, with its prestige (kula) and subsistence (gimwali) exchange spheres, is familiar to archaeologists (e.g., Malinowski 1920), and this multi-centric quality of marketless economies is quite common cross-culturally (e.g., Sahlins 1972:231-246). Although theoretical models of multi-centric economies (e.g., Bohannan 1967:124) emphasize the mutual exclusivity of these spheres, such spheres often overlap, and the boundaries of spheres commonly blur.

Ecological and economic anthropology also address aspects of production and distribution processes, and thus yield insights for archaeologists. Studies of human ecosystems are particularly useful in their attention to scale and directionality in distributional systems (e.g., Cashdan 1987; Cook and Binford 1990; Ellen 1990; Harding 1967; Ross 1978; Specht 1974). The exchange spheres in multi-centric economies may also involve different spatial ranges. For example, a nested system of exchange involving local, regional, and long-distance networks characterizes the eastern Moluccas of Indonesia (Ellen 1990). Exchange network boundaries in the local trading network may overlap, so that some settlements simultaneously
belong to multiple local networks (Ellen 1990:210).

Cultural anthropology has also contributed to a growing literature on the social relations of exchange networks that may help archaeologists to reconstruct organizational parameters of ancient economic networks. Social dimensions of exchange transactions that characterize commodity movement across ethnic boundaries have been explored in a variety of societies (e.g., Barnes and Barnes 1989; Healey 1984; Sahlin 1972). Equally important is research on dyadic personal relationships between producers and consumers in economic systems (e.g., Clark 1991; Davis 1973; Russell 1987; Trager 1981).

Not only does such literature provide social and empirical foundations for the model-building archaeologist, it also elucidates human-material relationships. For example, dyadic producer-consumer relationships produce skewed distributional patterning in the systemic context that archaeologists would otherwise associate with restricted distributional networks. Fall-off curves might exhibit "plateaus and kinks" (Hodder 1980:152) that reflect social relations between producers and consumers. Separate (but overlapping) distributions of ceramic types within a geographic region might reflect the operation of multiple exchange spheres (e.g., prestige, subsistence) rather than differential access to goods based on political power.

The following analysis of Dalupa ceramic exchange draws some concepts from the cultural anthropological literature to understand the shape, range, and directionality of the economic networks in which Dalupa potters participate. The multi-centric economy model is used to understand variability within the Dalupa exchange network, including the media of exchange, exchange rates, and the impact of roads on the system. Social relations of ceramic distribution are then explored, focusing on differences exhibited in relationships and goods that
move in multiple spheres within the Dalupa exchange network.

Productive Specialization and Kalinga Networks

Multiple exchange spheres in Kalinga: prestige goods and utilitarian goods.

Efforts to fit Pacific economies into one of three types -- marketless, peripheral, or market (sensu Bohannan and Dalton 1962) -- are fraught with difficulty (see Sahlins 1972:300-301), and the Kalinga example is no exception. Pasil clearly lacks a market economy (no marketplaces are found for miles around), and the Pasil system typologically lies somewhere between a marketless and a peripheral market. Basic contrasts between 'market economies' and 'marketless economies' help to outline the structure of Pasil's economic system. Whereas 'market economies' have physical marketplaces (either centralized or peripheral) and a single system of currency by which goods circulate, 'marketless economies' lack physical marketplaces, operate according to a market principle, and utilize multiple currency systems in distinct transactional spheres (Bohannan and Dalton 1962:3). These multiple exchange spheres may be marked by different material items, by different kinds of participants, and by different principles of exchange.

This multi-centric exchange model that operates outside the market setting aptly characterizes regional economic networks throughout the Cordillera highlands (Lewis 1989 provides parallel Benguet example). Fifteen separate marketplaces operated in the Kalinga sub-province in the 1980s (Philippine Census 1984:160). The concentration of markets in larger, more populated areas (e.g., Tabuk, Lubuagan, Pinokpok) and the absence of such markets in smaller municipalities (i.e., Pasil, Tinglayan, and Tanudan) suggests qualitative differences in the regional economic systems in different municipalities. The closest markets to Pasil are located in the provincial capital of Tabuk (a 2-10 hours' truck ride), and poor
development of a transportation network may be one reason why Pasil's economic system is not dependent upon the extant market systems.

A thriving barter economy operates in the Pasil River Valley, and cash transactions are much less common than those involving barter. This barter economy relies on a complicated but consensual system of equivalencies according that assigns values to all manner of goods, from woven hats and cooking pots to houses and gold heirloom jewelry (see Takaki 1977:331-450). Descriptions of the Kalinga economic system have been presented elsewhere in great detail (e.g., Dozier 1966; Takaki 1977; Trostel 1989) and only salient points will be addressed here. This discussion focuses on types of economic transactions in multiple exchange spheres that characterize Dalupa's multi-centric economy.

Kalinga economic transactions take place through a system of barter that conforms to Sahlins' (1972) model of "balanced reciprocity." Goods are more or less simultaneously exchanged according to a system of equivalencies, with the possibility of some bargaining. Barter ("balanced reciprocity") and gift-giving ("general reciprocity") are qualitatively different means by which Kalinga goods circulate in the Pasil economy. Although barter may seem more "economic" and gift-giving more "personal," both transactional modes occur within a nexus of social relationships:

It is notable of the main run of generalized reciprocities that the material flow is sustained by prevailing social relations; whereas, for the main run of balanced exchange, social relations hinge on the material flow (Sahlins 1972:195).

The Kalinga economy involves two primary spheres and one secondary sphere: the prestige or wealth sphere (sensu Earle 1982, 1987), the subsistence sphere (Takaki 1977), and the cash sphere. The first two spheres (prestige and subsistence) comprise the majority of economic transactions within the Pasil economy. Cash is rarely used to obtain goods from
either of these traditional spheres. Peso earnings are largely restricted to purchases of non-local goods (e.g., radios, wristwatches, metal cooking pots, ready-made clothing), and some of these goods are also acquired using barter equivalents.

Exchange currency in the prestige sphere includes highly valued water buffalo. Pigs and chickens are also used in the livestock system of exchange value (Takaki 1977:744). "Big-ticket" items like houses, rice fields, porcelain, and heirloom jewelry circulate within the prestige economy through a system of equivalences based on livestock values (Barton 1949:107; Scott 1969:70). For example, a rice field might be worth one water buffalo, while a gold earring might be worth one house (see Takaki 1977:724-757). Wealth is assessed by the possession, display and transfer of these goods.

Goods that circulate in the staple sphere are necessary for subsistence, such as food, household goods (baskets, pottery, frying pans, metal pots), clothing, and agricultural tools (e.g., hoes, harvesting knives). Every Kalinga household requires subsistence goods, and must obtain some goods from elsewhere. Rice (bundled or pounded) forms the exchange media for goods within the subsistence sphere, so that 10 chupas of pounded rice might be traded for an earthenware pot or for a rattan basket. Whereas the number of porcelain dishes a Kalinga family owns reflects their relative wealth, the number of household goods that a family owns reflects more about demographics and the domestic cycle.

Currencies used in one sphere occasionally get used in the other. A complicated system of equivalencies enables Kalingas to obtain some prestige goods (e.g., small livestock) using currency usually associated with the subsistence sphere. Periodically, households with cash income will also use cash in lieu of barter equivalents to obtain wealth items. Earthenware pottery, like other household goods, generally moves within the subsistence
sphere of the Pasil regional system.

**Historical context.** Spanish documents describe extensive highland-lowland economic trade networks observed on the peripheries of the Cordillera mountains (see Junker 1993; Scott 1974:41). Highland gold was exchanged for lowland livestock (pigs and water buffalo), among other goods (Keesing and Keesing 1934; Scott 1974:42; Tegengren 1964:553). Spanish colonial administrators were never successful in subjugating the northern Luzon highlands, so little documentation exists regarding intra-Cordillera trade in the 16th and 17th centuries (but see Scott 1970:700-701, 713).

Community-based specialization and regional networks within the Cordilleras were observed firsthand in the late nineteenth century (Schadenberg 1888), and such trade networks flourished by the early 1900s. The establishment and maintenance of a peace pact between two Cordillera villages ensured the safety of traders from each village as they travelled in the other's region (Barton 1949:173; Dozier 1966:212-213). Were a region to hold multiple peace pacts with neighboring regions along a trade route, each of the pact-holders was obligated to protect traders along their routes.

The peace pact institution of the Cordilleras (including Kalinga) has a long tradition with documents dating to 1820 (Flameygh and Scott 1978:286). However, opinions differ regarding the peace pact's importance prior to the American administration in the early 20th century (see Bacdayan 1967; Flameygh and Scott 1978). Colonial administrators such as Lt. Governor Walter Franklin Hale (in Lubuagan) required every region to establish a network of bilateral non-aggression pacts with its neighbors. The primary motivation behind establishing peace pacts was to reduce tribal warfare and headhunting in areas under the American administration. Road construction facilitated the entry of the Philippine Constabulary, whose
policing activities reduced the level of tribal war under the American administration.

An unintended result of American administrative policy was to increase the intensity of indigenous regional trade throughout the Gran Cordillera Central (Bacdayan 1967:190; Dozier 1966:198). Road and trail networks facilitated inter-village communication, and the combination of police and peace pact agreements ensured traders' safety during travels. Reports from this period describe extensive regional trade networks of community-based specialties that linked communities across provinces in the Cordilleras with one another (see Jenks 1905:158). Myriad goods moved through these regional networks, including prestige goods (Chinese porcelain jars and plates, gongs, livestock -- particularly carabaos and cattle) as well as utilitarian goods and subsistence foods such as rice (Bacdayan 1967:190).

Specialization for exchange operated at the village and multi-village community or 'district' levels. Today these 'districts' closely correspond to municipalities. Traders from western Kalinga communities (from villages in the Balbalan, Lubuagan and Tinglayan municipalities) travelled to Abra province to exchange rice, coffee, cacao, earthenware pots, and wooden spears for goods. Kalingas from the northeast (i.e., sections of Pinokpok and Tabuk municipalities) traded rattan, baskets, mats, brooms and leaf raincoats to the Itave residents of Tuao and other towns in the Cagayan province (Keesing and Keesing 1934:207). This trade reached its height in the late 1930s, and subsided after World War II as a result of economic developments in the Cagayan valley (Lawless 1978:146).

The southern portion of Kalinga was known as the "rice granary" of the Mountain Province. Southern Kalingas bartered rice and forest products for crafts (especially textiles) and livestock in Bontoc (Mountain province) to the south; they also sold rice for cash in Bontoc stores (Keesing and Keesing 1934:189, 204; Wilson 1956:24,26,32). People from the
southern (i.e., Pasil, Lubuagan, Tinglayan) and northern (Balbalan) districts also exported gold in exchange for such prestige goods as porcelain and livestock. Kalingas in all areas adjacent to the lowlands also traded sugarcane wine, crude sugar, and mung beans for lowland goods. Kalingas may have participated in this system of community-based specialization on a part-time, rather than on a full-time basis (see Dozier 1966:109, 127-128; Takaki 1977:167).

In the Pasil system studied during the 1980s, individual households specialized in subsistence goods for exchange in crafts or produce. Many communities are recognized for particular specialties because multiple households in the community produce a particular good. This community-based specialization in the subsistence sphere does not require that all households in a given settlement specialize, nor does it require that specialist households abandon other economic activities. This type of community-based specialization is more difficult to quantify and to identify in the material record than is full-time specialization.

The community of Dalupa supplies the majority of earthenware vessels used in Pasil to households throughout the river valley, although a few Dangtalan potters actively engage in limited exchange activities (Graves 1991). Dalupa’s role as a ceramic production center cannot be understood outside its context within the regional economic system of subsistence exchange. Nearly every Pasil village is known for craft or produce specialties, and traffic between communities in agricultural and craft commodities is a daily event. The self-sufficiency that previous researchers (e.g., Dozier 1966, Takaki 1977) have ascribed to individual villages is misleading, as no single village produces all the subsistence goods that it uses.

The regional system has two inseparable components that are distinguished by proximity. The first sub-system is restricted to villages located in a core area in the Pasil
River Valley, and that lie within three to four hours' walk from any other village within the core. The second subsystem includes a network of communities located in municipalities that neighbor Pasil. Both subsystems are essential to the regional economic network, but the Pasil subsystem supplies goods on a more frequent basis than does the extra-Pasil system.

Basic subsistence goods supplied by villages in the Pasil system are listed in Table 8.1. Community-based specialties may be divided into two forms. The first category is goods that every community produces, but that some villages produce in excess (e.g., white beans, coffee, rice). The second category involves goods that certain communities produce as a specialty either because of proximity to raw materials, or because the community has carved a niche in the production of this good. For example, villages located at higher altitudes (and thus closer to forested areas) procure and trade forest goods (e.g., rattan, lumber, resin, ocher, wild game). One settlement cluster (Cagaluan) located near the river specializes in coconut production. Dalupa and (to a much lesser extent, Dangtalan) have carved out a niche in ceramic production, and Magsilay has begun cultivating orange trees as a specialty.

The two western communities (Balatoc and Colayo) are peripheral to the core system, although Colayo traders occasionally visit with baskets and Balatoc traders visit with ocher. Several factors underlie this marginal role, the foremost being physical distance. Balatoc lies 5-10 km west of the core communities, while Colayo lies 23 km further west of Balatoc. Ethnicity is a second factor; Colayo have closer genealogical and cultural ties to Tinglayan communities than to Pasil. Balatoc's mining activities have made a 'melting pot' of the community that includes many extra-Pasil (and even non-Kalinga) residents. Finally, Colayo's economic ties apparently lie to the south and west, as might Balatoc's network. Unlike all other Pasil communities, Balatoc has electricity and relatively abundant cash; in many respects,
Balatoc is more similar to the provincial capital of Tabuk than to its Pasil neighbors.

Two non-Pasil communities are active participants in the Pasil exchange network. Pasil villages obtain white beans, a cash crop developed in the 1960s, from Uma settlements (Takaki 1977:136-137) as well as a variety of other goods. Settlements in the Lubuagan area are known for their textiles, and store goods are available as well. Both these areas lie within the Lubuagan municipality, and when tribal warfare does not intrude, both are regular participants in the Pasil economic system.

<table>
<thead>
<tr>
<th>VILLAGE</th>
<th>SPECIALTY GOODS TRADED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalupa</td>
<td>pottery, bananas, ginger, onions</td>
</tr>
<tr>
<td>Dangtalan</td>
<td>pottery, coffee, coconuts</td>
</tr>
<tr>
<td>Malucsad</td>
<td>white beans, coffee, lumber</td>
</tr>
<tr>
<td>Pogong</td>
<td>white beans, coffee, lumber</td>
</tr>
<tr>
<td>Ableg</td>
<td>store goods</td>
</tr>
<tr>
<td>Balincsiagao</td>
<td>woven pot stands, sleeping mats, wooden pestles,</td>
</tr>
<tr>
<td></td>
<td>resin, oranges, coffee, lumber</td>
</tr>
<tr>
<td>Magsilay</td>
<td>sweet potatoes, watercress, sleeping mats,</td>
</tr>
<tr>
<td></td>
<td>resin, wooden pestles, bananas, oranges,</td>
</tr>
<tr>
<td></td>
<td>coffee, taro</td>
</tr>
<tr>
<td>Cagaluan</td>
<td>coconuts, sugar cane wine, mung beans, machetes,</td>
</tr>
<tr>
<td></td>
<td>hoes</td>
</tr>
<tr>
<td>Guina-ang/</td>
<td>sleeping mats, rattan shoots, coffee, white</td>
</tr>
<tr>
<td>Galdang</td>
<td>beans, green beans, coffee, chili, mung beans,</td>
</tr>
<tr>
<td></td>
<td>pigeon peas, rattan, woven pot stands</td>
</tr>
<tr>
<td>Bagtayan</td>
<td>Lumber, resin, wild deer, wild pigs, sleeping</td>
</tr>
<tr>
<td></td>
<td>mats, rattan shoots, white beans, chili,</td>
</tr>
<tr>
<td></td>
<td>coffee, squash, ocher, onions</td>
</tr>
<tr>
<td>Balatoc</td>
<td>resin, ocher, lebu</td>
</tr>
<tr>
<td>Colayo</td>
<td>rattan baskets, winnowing baskets</td>
</tr>
<tr>
<td>Uma (Lubuagan)</td>
<td>white beans, sweet potatoes, watercress taro,</td>
</tr>
<tr>
<td></td>
<td>resin, ocher, grub hoes, hats, rice harvesting</td>
</tr>
<tr>
<td></td>
<td>knives, baskets</td>
</tr>
<tr>
<td>Lubuagan</td>
<td>store goods (salt, sugar, matches, soap, alcohol)</td>
</tr>
<tr>
<td></td>
<td>textiles, tobacco</td>
</tr>
</tbody>
</table>

Table 8.1. Community Specialties within the Pasil Regional Economic System.
Traders from the Balbalan municipality to the north (i.e., Salegseg, Balbalasang) sporadically visit Pasil with metal products, ocher, resin, and wooden mortars and pestles. Pasil residents also occasionally visit the Balbalan area to purchase those goods as well as lumber and water buffaloes. Traders from Tinglayan municipality in the south also visit Pasil villages with their wooden and rattan products.

Pasil residents feel the growing influence of a lowland cash-based economy in many parts of their lives. Few Pasil Kalingas wear traditional clothes on a daily basis (except for older women), and the norm is western-style clothes. Households with access to cash through wage labor, government employment or cash crops have a variety of goods (e.g., watches, plastic goods, magazines, the occasional radio) purchased in the provincial capital and elsewhere. The intrusion of the lowland system into the study region has not yet affected the integrity of the barter economy. Whether this reflects the relative unimportance of cash in Pasil or indigenous resistance to an externally-imposed system is unknown. Barter transactions remain the norm, and pottery is a common medium of exchange in the local economy.

Introduction to the Dalupa Pottery Exchange Network

The Kalinga area is bound by a network of kinship ties and, where direct ties cannot be found, by a reckoning of affinity (Barton 1949:83). This web of social relations channels the distribution of material goods within and among Pasil Kalinga communities. Gift-giving and barter, at the household and community levels, continuously reinforce this social network (Garming 1981:31; Takaki 1977:59-60). Similar relationships, based on reciprocity that involves gift-giving and mutual aid, also bind lowland Filipinos into social networks (Anderson 1969; Kaut 1961).
Dalupa potters circulate their wares through three basic transactional types of varying importance: barter (or exchange), gift-giving, and cash purchase. Barter transactions are the most common, and all types of subsistence goods are bartered between households. On a typical day, a Dalupa household may engage in barter transactions to obtain household goods or food with neighbors or traders from other communities. "Walking store" women appear in the village quite often, bearing loads of store goods and textiles to exchange for rice or pottery.

Gift-giving is an essential thread in the fabric of Kalinga social life, and pots are an important form of gift. For example, Dalupa pots are given to visitors from other communities during peace pact celebrations (also see Takaki 1977:170) and to visitors to ailing Dalupa acquaintances during sick visits. Dalupa vessels also change hands through gifts to younger female relatives when they start their own households (in Dalupa or elsewhere) and to women from different villages who visit during the holiday season. Pots (and other goods) are also given to young women on the occasion of their first pregnancy.

Media of exchange, exchange rates and seasonal fluctuations in exchange rates. Dalupa pottery is commonly exchanged for rice in either pounded (more common) or bundled (less common) form. Most women trade pots with the explicit goal of obtaining rice for their families. Potters prefer rice over cash as their medium of exchange, since they receive a lower net price when cash is used. Rice is the single most important component of the Kalinga diet: only the poorest of the poor eat tubers as their daily staple. Households procure rice through all means necessary, even when travel to distant communities (to exchange goods for rice) requires armed protection to get safely past villages whose peace pacts with the travellers’ home villages have been broken (e.g., Scott 1969:9-10).
In theory, these exchange rates are fixed prices based on vessel volume. The theoretical exchange rate of a twelve *chupa* rice cooking pot thus costs twelve *chupas* of pounded rice. However, discrepancies often occur between the customary price and the actual exchange price of a pot, both of which are referred to as *ngina* (see Takaki 1977:354). Although supply-and-demand affects exchange rates for pottery throughout the agricultural cycle, Kalingas also attach cultural importance to customary exchange values:

One observes with wonder the scene at which the Uma villagers who have bargained hard for one half *chupa* less of the proposed sale value of a pot are acting as generous hosts feeding their negotiation partners with twice as much of the rice argued over moments ago (Takaki 1977:423).

The exchange value of Dalupa pots varies with the phase of rice production, the history of social and economic transactions between producer and consumer, and the site of the transactions. Exchange values plummet during pre-harvest rice shortages, and are most pronounced immediately before the harvest of the second crop in September and October (see also Lawless 1977:81; Takaki 1977:422). When potter households experience severe subsistence stress, household members borrow rice from wealthy households in exchange for field labor and potters barter their pots for lower exchange values. Households with adequate rice supplies channel their 'surplus' into exchange transactions for pots and other goods to take advantage of the low exchange rates (Takaki 1977:535-536).

The exchange value of a pot also fluctuates according to location and social distance. Exchange values are most stable in Dalupa but may increase by 150-200% in some Tabuk and Balbalan localities where prices are higher. Dalupa potters increasingly visit Balbalan localities because of their excellent exchange rates, and many potters profit by their knowledge of the geography of pottery prices in areas beyond Pasil’s boundaries. Uma farmers working
in Salegseg (Balbalan) during the mid-1960s obtained payment in rice that was double that of Uma and its neighboring regions (Takaki 1977:169).

In localities where potters have no established relationships with consumers, potters employ higher exchange values for their goods. In some areas like Balbalan, the chupa measure has a higher volume than it does in Pasil. In other areas, an alternative system to the Pasil measurement system may be used initially that benefits the potters. In one Tabuk-area community, customers initially gave potters nearly twice the traditional exchange value by filling the vessel up to its neck with rice. Consumers eventually demanded lower exchange values to a level that approximates the Pasil exchange rate.

**Mechanisms of distribution.** Dalupa pots change hands through three basic transactional types (i.e., barter, gift, sale), and pots are physically distributed through two types of distribution: primary distribution (i.e., from producer to consumer) and secondary distribution (i.e., with an intermediate step between producer and consumer). Primary distribution is the traditional form of pottery exchange, and most pots move directly from producer to consumer (also see Graves 1991:119-123). However, secondary distribution is becoming increasingly important and may be related to the increased production scale of Dalupa pottery-making.

Secondary distribution generally involves pottery traders or intermediaries from Dalupa. Some Dalupa potters now consign—or barter—their pots to one of a few pottery merchants, who take the goods to distant settlements that have higher exchange values in rice than those in the Pasil system. Traders barter Pasil pots for utilitarian goods and raw materials (e.g., wooden mortars and pestles, resin, store goods). Dalupa potters receive (at the least) the customary value of the pot, and stand to receive more if the intermediary’s profit margin is
sufficiently high. How this introduction of pottery intermediaries has affected social relations within the Dalupa exchange system has been discussed elsewhere (Stark 1992).

One form of secondary distribution -- a kind of down-the-line exchange -- occurs much less frequently and largely relates to distance from production center. In such cases, a consumer acquires vessels directly from the producer and then barters or gives away these vessels to a second consumer who has no relationship with the producer (also see Graves 1991:123). In localities where pots are not directly accessible from the producers, pots travel through more hands during their distribution.

Primary distribution of Dalupa ceramics assumes several forms. Some potters never leave Dalupa to barter their goods, as customers come to them. Social, economic or political visits often include not only gift-giving but pottery barter as well. Most potters have customers from different Pasil settlements, frequently linked through kin ties, who visit Dalupa to obtain their pots. Some of these 'regular customers' have longstanding relationships with their potters, and the relationship is inherited by potters' children who later become potters.

Dalupa potters occasionally barter their vessels with "walking stores" who visit Dalupa from the Lubuagan area. Several "walking stores" have kin ties with Dalupa families, making the community a popular barter destination for "walking stores." Lubuagan men had murdered a Dalupa potter's husband while he worked in his rice fields one month before my fieldwork began in Dalupa, which severed the peace pact between the two communities. No settlement was reached during my tenure in Dalupa, and Dalupa residents avoided Lubuagan for fear of more violence. Almost all Lubuagan visitors to Dalupa during this time of tribal warfare were "walking stores," who continued to ply their goods on a regular basis and were apparently free from the constraints of inter-village conflict.
Pots are most commonly distributed during barter trips that Dalupa potters make by foot to settlements within the Pasil economic system (Figure 8.1). Dalupa potters generally travel in groups of two or three women on their barter trips, although some also travel alone to neighboring communities. Potters from the same work groups tend to travel together on barter trips, and bring along previously ordered goods or a variety of types and sizes for potential consumers. Trips within the Pasil system, rarely more than 10 km round-trip, are usually completed within a single day (these are called ka-wili [Magannon 1972:13]). Trips to more distant villages in the network (i.e., greater than 10 km round-trip) entail an overnight stay, particularly if the potters have relatives in the consumer villages.

The types of ceramic forms a potter carries with her on a barter trip depend on economic, logistical and social factors which vary from locality to locality. Two determinants are the barter equivalents desired from the village the potter visits, and village-specific demand for certain types and sizes of vessels, transmitted word-of-mouth from other potters, and through orders placed by those consumers. Potters with small children or farming responsibilities may ask relatives to barter or deliver their goods: daughters, sisters and unrelated potters may get involved in barter trips to other communities. Dalupa men rarely -- if ever -- deliver pots to other settlements for their wives.

Many part-time specialists now use truck transportation from Ableg to trade their goods in localities in the Tabuk municipality (along the Chico River) and in the Balbalan municipality (an hour's ride away). Distance entailed in these trips necessitates overnight visits. Expansion in the distributional network has taken place since the early 1980s for a variety of reasons that have been explored in detail elsewhere (Stark 1991, 1994). Foremost among these are the strain of population pressure on household economies, environmental
Figure 8.1. The 1988 Dalupa Pottery Exchange Network: Pasil and Extra-Pasil Systems.
degradation, and political strife associated with the Chico River Dam era. The Chico River Dam era (particularly the late 1970s and the early 1980s) witnessed a weakening of traditional social institutions (especially the peace pact) as inter-ethnic contacts increased through dam-related projects.

One outgrowth of the Chico River Dam era was greater pressure on Kalingas to acculturate to lowland (i.e., non-Kalinga) cultural values. Another was the expansion of a road network and of motor transportation systems that linked many communities to one another. Although the road network has not provided an effortless distribution strategy (as was the case Guatemala, [Tax 1952:59]), the operation of a transportation system has enabled some potters to expand their market greatly.

Roads and the geography of Dalupa pottery exchange. Indigenous trails doubtless linked river valleys to one another prior to the 16th century, but the Spanish colonial administration widened extant trails and expanded the trail network throughout the Cordilleras. These trails (one of which crossed through the study region) connected portions of the northern and the southernmost Cordilleran groups to lowland communities in Abra and to the south. Southern Kalinga communities remained relatively isolated from lowland culture (Dozier 1966:35). With the help of the Philippine Constabulary, the American administration established a relatively safe and extensive road/trail network. These roads facilitated communication between communities in the Cordilleras and linked some mountain villages to neighboring lowland areas.

After World War II, this extensive road network was so poorly maintained that some routes became impassable by vehicle and are now only fit for foot travel. A few "national roads" (these appear on Philippines road maps) are passable using motor vehicles, except when
heavy rains cause landslides. The Dangwa Transportation company briefly operated a bus route in southern Kalinga from the 1960s (when Dozier visited Lubuagan) until approximately 1977. Service ceased after a flurry of ambushes in the Pasil/Lubuagan area, and no buses run today in the area. The Kalinga Liner bus line, operated by a congressman from a Tabuk barrio, serviced the Lubuagan-Pasil area for about a year in the late 1960s.

The Pasil River is a tributary of the Chico River, and the "national road" flanks the north bank of the Chico River. Today, several privately owned Ford Fiera trucks shuttle passengers and freight between communities on the Pasil and Chico rivers to the provincial capital of Tabuk. Truck owners hire drivers whose routes include stops at several communities in Tabuk, Balbalan, Pinokpok and Pasil. Truck traffic volume varies seasonally and in response to political conditions. Eruptions of tribal warfare and conflict between the Philippine military and the New People’s Army (NPA) slow the truck traffic. Drivers and passengers alike risk getting caught in the cross-fire, encountering land mines in the roads (as happened in February 1988), or being targeted for revenge killings.

Pasil has two road segments within its boundaries that are interconnected and facilitate movement through southern Kalinga and adjacent areas. These are the "national road" (with multiple segments) and a provincial road that leads to the Batong Buhay mines. The introduction of truck transportation along the national road has enabled Dalupa potters to expand their system’s boundaries as far as the provincial capital of Tabuk. Potters have not used the Batong Buhay road (confined as it is within the Pasil boundaries) to expand their system westward or southward.

Dalupa potters go no farther east than Tabuk (about a 2-3 hour ride), although the road’s eastern segment (constructed by the mid-1960s, Bacdayan 1967:29-30) connects the
provincial center of Tabuk with the Cagayan valley. Potters restrict their travel to the national road’s western segment (Route #6), which connects the Pasil municipality to the provincial center of Tabuk. At Cagaluan Gate, Route #6 splits into two segments: the southern segment leads to Lubuagan and to points further south (e.g., Tinglayan, Mountain Province), while the northern segment leads to Ableg (and to points further north like Balbalan) and to Batong Buhay. This northern road segment that leads into the Balbalan municipality is also important for Dalupa potters.

Expansion and maintenance of road networks in southern Kalinga is sporadic and unpredictable: road funds are occasionally re-directed toward private investments by road construction personnel. Although most portions of the national road and the Batong Buhay road are unpaved, their construction has opened up new economic opportunities for potters and non-potters alike (see Takaki 1977:169). Dalupa potters continue to test potential market communities along the eastern (i.e., Tabuk area) and northern (i.e., Balbalan area) segments of Route #6. Roads and truck transportation are indispensable to the extra-Pasil pottery exchange sphere that potters utilize, while neither is important in the Pasil exchange network.

Having described the mechanisms of pottery distribution and Dalupa potters’ use of the road network to circulate their pots, discussion now turns to issues of geographic scale. Pottery exchange transactions were recorded for a 12 month period, providing information on seasonal fluctuations in the scale and directionality of Dalupa pottery exchange in 1988. Basic data are described in the next section to provide a foundation for comparisons of pottery exchange in the two spheres in which Dalupa goods circulate.

Scale of exchange: functional categories. Dalupa potters exchanged nearly 3200 ceramic items during 1988. Two hallmarks of pottery specialization in Dalupa are that potters
trade all the functional categories that they make, and that they make one category (non-traditional forms) for exchange rather than for personal use. Thus, both types of cooking pots -- one for rice, the other for meat/vegetables -- are traded, as are water storage jars. A dazzling variety of non-traditional forms are available for customers, ranging from ashtrays and flower vases to fish-shaped banks and miniature stove sets. New varieties are added upon request from customers, or upon the whim of a particular potter.

Exchanges of 3179 ceramics were recorded in the Pottery Exchange log during 1988. This figure includes ceramics that were commissioned by the Kalinga Ethnoarchaeological Project for museum collections in Manila (National Museum of the Philippines) and Tucson (Arizona State Museum). These 400 KEP-commissioned vessels are excluded from all analyses of Dalupa pottery exchange because their inclusion distorts the relative frequency with which different functional categories are exchanged. Excluding the commissioned ceramics does not erase the project’s presence from the exchange data base but instead lessens the degree of bias; this analysis uses an adjusted total (n=2779).

This adjusted total represents the closest approximation to Dalupa production scale that could be obtained. Potters were interviewed daily during my stay in Pasil, and on a twice-weekly basis by a field assistant following my departure. Like production estimates for 1988, Dalupa exchange estimates represent the minimum number of Dalupa-made vessels that circulated during that year.

Data collection techniques could not filter out the 'stockpiling effect' -- of exchange involving vessels made before 1988 -- although one inactive potter traded four vessels during the year. Production events during two months were conceivably overlooked during August and December, discrepancies in the number of ceramics produced vs. the number of ceramics
exchanged may indicate the 'stockpiling effect' (Figure 6.1). Dalupa potters also reported stockpiling behavior during May and June in anticipation of the August-October period of heavy exchange activity. Gift-giving may be the most under-represented transactional form in the exchange data base, since gift-giving is so pervasive in Kalinga culture as to be a daily event (Stark 1992; Takaki 1977:282-285).

Comparison of gross production and exchange figures reveals an intriguing pattern in Dalupa pottery economics. Although Dalupa potters manufacture large amounts of goods for consumption beyond their own households, nearly one-third of the ceramics that Dalupa potters produced did not circulate through exchange transactions. This pattern is too robust to dismiss as data recording error, and instead probably reflects the fact that Dalupa ceramic production lies at the least intensive end of a continuum of part-time specialization.

The frequency of Dalupa ceramic goods exchanged in 1988 is first presented by functional category in Table 8.2. Frequencies are presented as proportions within each functional category, and as proportions of the total assemblage. At the assemblage level, Dalupa pottery exchange is dominated by meat/vegetable cooking pots (oppaya). Water storage jars are the second most commonly traded category, while rice cooking pots and non-traditional forms are traded in equal frequencies. The demand for meat/vegetable cooking pots remains high throughout the distributional network despite the introduction of metal substitutes.

Equally interesting is the variability within sizes in each functional category. Sizes, as used in this analysis, refer to ranges of chupa-based classes that are presented in Table 5.9. Among the oppaya, small vessels are exchanged most frequently; recall that this size range includes the 3 chupa size class that all Dalupa potters manufactured in 1988. Among the rice
cooking pots, the largest size vessels are exchanged most frequently, although small and large rice cooking pots are traded at more comparable rates than are these sizes within the meat/vegetable functional category. Large rice cooking pots are primarily used for communal feasting, which makes this a special-purpose size. Not unexpectedly, most water jars exchanged in 1988 were standard-sized.

<table>
<thead>
<tr>
<th>FUNCTIONAL CATEGORY &amp; SIZE</th>
<th>FREQUENCY</th>
<th>PERCENT OF FUNCTIONAL CATEGORY</th>
<th>PERCENT OF TOTAL ASSEMBLAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat/Vegetable Cooking Pot (Oppaya): All Sizes</td>
<td>1903</td>
<td>100.0¹</td>
<td>68.5</td>
</tr>
<tr>
<td>Small</td>
<td>1665</td>
<td>87.6</td>
<td>59.9</td>
</tr>
<tr>
<td>Medium</td>
<td>206</td>
<td>10.8</td>
<td>7.4</td>
</tr>
<tr>
<td>Large</td>
<td>31</td>
<td>1.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Rice Cooking Pot (Ittoyom): All Sizes</td>
<td>271</td>
<td>100.0²</td>
<td>9.8</td>
</tr>
<tr>
<td>Small</td>
<td>96</td>
<td>35.4</td>
<td>3.5</td>
</tr>
<tr>
<td>Medium</td>
<td>51</td>
<td>18.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Large</td>
<td>123</td>
<td>45.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Water Storage Jar (Immosso): All Sizes</td>
<td>323</td>
<td>100.0³</td>
<td>11.6</td>
</tr>
<tr>
<td>Miniature</td>
<td>31</td>
<td>9.5</td>
<td>1.1</td>
</tr>
<tr>
<td>Standard</td>
<td>292</td>
<td>90.4</td>
<td>11.6</td>
</tr>
<tr>
<td>Non-Traditional Forms (Ay-Ayam)</td>
<td>281</td>
<td>100.0</td>
<td>10.1</td>
</tr>
</tbody>
</table>


¹. 2 oppaya lacked size data.
². 1 ittoyom lacked size data.
³. 2 immosso lacked size data.
Functionally discrete categories exhibit different peaks in exchange frequency, although the period from August-October displays the highest exchange frequencies across categories (Figure 8.2). For example, the highest demand for meat/vegetable cooking pots (oppaya) is in the months of August, September and October, and September is the peak month. Demand for rice cooking vessels (ittoyom) remains high from June through October, although the highest number of ittoyom was exchanged in August. Water storage jars make their biggest showing in October.

Traffic in non-traditional forms has a slightly different pattern, in which October and December are peak months. Interestingly, non-traditional forms are exchanged in more constant proportions than are any of the other functional categories. The spike in March reflects the KEP influence. Although commissioned forms were excluded from this analysis, the KEP’s high demand for non-traditional forms likely accelerated production and, consequently, exchange.

How closely these peaks correspond to differential market demand for particular functional categories is not clear. Pressure on extant rice supplies is highest from August through late October, and over half of all ceramic goods (including those made by occasional potters) are exchanged outside of Pasil during this time. Potters apparently saturate the local (i.e., Pasil) market toward the beginning of their August-October exchange cycle. They must then venture out of Pasil on barter trips more frequently as the months pass and their household rice supplies remain low.

Because Dalupa pottery production is a part-time (rather than a full-time) specialization, most potters manufacture most types of goods, and most potters manufacture
Figure 8.2. Monthly Rates of Ceramic Exchange: By Functional Category.
some of their output for exchange. Differences that exist in the goods that specialists and occasional potters produce for exchange are those of degree, rather than kind (Table 8.3). For example, part-time specialists clearly produce a higher proportion of large rice cooking pots and water jars than do the occasional potters. Occasional potters, who devote more of their manufacturing activity to production for household use, produce greater numbers of small meat/vegetable cooking pots than expected.

<table>
<thead>
<tr>
<th>FUNCTIONAL CATEGORY</th>
<th>OCCASIONAL POTTERS</th>
<th>PART-TIME SPECIALISTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat/Vegetable Cooking Pot (Oppaya): All Sizes</td>
<td>32.6% (621)</td>
<td>67.4% (1282)</td>
</tr>
<tr>
<td>Small size</td>
<td>33.8% (563)</td>
<td>66.2% (1102)</td>
</tr>
<tr>
<td>Rice Cooking Pot (Itoyom): All Sizes</td>
<td>21.0% (57)</td>
<td>79.0% (214)</td>
</tr>
<tr>
<td>Large size</td>
<td>22.8% (28)</td>
<td>77.2% (95)</td>
</tr>
<tr>
<td>Water Storage Jar (Immosso): All Sizes</td>
<td>14.2% (46)</td>
<td>85.8% (277)</td>
</tr>
<tr>
<td>Standard size</td>
<td>14.7% (43)</td>
<td>85.3% (249)</td>
</tr>
<tr>
<td>Miniature size</td>
<td>9.7% (3)</td>
<td>90.3% (28)</td>
</tr>
<tr>
<td>Non-Traditional Forms: All Types</td>
<td>24.6% (69)</td>
<td>75.4% (212)</td>
</tr>
<tr>
<td>Combined Categories</td>
<td>28.5% (793)</td>
<td>71.5% (1986)</td>
</tr>
</tbody>
</table>

Table 8.3. Frequency of Dalupa Ceramics Exchanged in 1988: By Production Intensity.

In a more intensified production system than Dalupa’s, more pronounced specialization might exist in the types of goods produced by specialists. While it is clear that the part-time specialists make more vessels than do occasional potters, some occasional potters still 'specialize' in one functional category. For example, one occasional potter 'specializes' in making non-traditional forms: only three part-time specialists manufactured more ay-ayam.
than she did in 1988. Limited evidence exists for specialization in types of goods: about one-third of Dalupa potters did not exchange water storage jars in 1988, and only about one-half of all potters traded non-traditional forms.

**Directionality of exchange: localities visited.** Dalupa potters exchanged almost two-thirds (n=1786) of their vessels in villages within the Pasil economic system. Part-time specialists, who exchanged 71.5% of the ceramics, also trade a significantly higher proportion of their goods in the extra-Pasil system than occasional potters. The importance of the extra-Pasil exchange network varies seasonally within the Dalupa community of potters (Figure 8.3). Part-time specialists exchange more goods in this network than in the Pasil economic system during both periods of subsistence stress (April-May and September-October), while occasional potters traded substantially more goods in the extra-Pasil network during October.

The entire Dalupa ceramic distributional network is illustrated in Figure 8.4, and includes communities in four municipalities beyond Pasil. Most of these communities are located less than a two hours’ walk away (less than 8 kilometers) from Dalupa. The remaining pots were distributed to localities outside the Pasil system’s boundaries to over 25 settlements, many of which are clustered into larger communities (e.g., Soyang, GaoGao) that are enclosed by circles in Figure 8.4. Travel time to these settlements, using a combination of motor transportation and foot travel, ranges from one to four hours (barring vehicle break-downs).

Each potter supplements her constantly growing suite of customers in various settlements by bartering her wares in other settlements. She may accompany other Dalupa potters to settlements where her companions have customers, or she may ‘test’ potential markets in previously unvisited settlements. Distance, the presence of producer-consumer
Figure 8.3. Monthly Rates of Ceramic Exchange: Occasional Potters Vs. Part-Time Specialists.
Figure 8.4. Barter Localities Within the Dalupa Pottery Exchange Network.
relationships, and the relative safety of the transportation route all affect potters’ selections of consumer communities. These situational, intertwined factors that influence considerations of distance in the Dalupa system muddle archaeologically-derived fall-off curves that rely on pure distance measures (Renfrew 1977).

This balance between logistics and social relations is especially clear within the Pasil economic system, in which myriad consumer localities involve day-long barter trips (i.e., within a 4-5 km radius of Dalupa). The proportion of potters visiting each consumer village in the Pasil system (from 1980-1987) was examined by relative distance from Dalupa in Figure 8.5. Distance measurements presented are straight-line [geodesic] estimates that produce shorter estimates than pheric distance. The Y axis refers strictly to the percentage of Dalupa potters who visited each village, not to the frequency of their visits. The LOWESS smoothing technique (Cleveland 1979) used in this graph indicates that the relationship between these variables is not perfectly linear, and in fact, changes with increased distance.

Dalupa potters may bypass neighboring communities to visit more distant localities if well-entrenched partnerships there will ensure successful barter trips. The percentage of potters visiting each locality is also sensitive to consumer market size and the presence of pottery production in other consumer localities (i.e., Dangtalan). Pronounced "plateaus and kinks" (Hodder 1980:152) are evident in Dalupa ceramic patterning that reflect social relationships between producers and consumers. Dalupa potters made barter trips to 17 communities (some include multiple settlements) in the extra-Pasil system during 1988. A primary incentive behind barter in the extra-Pasil system was higher exchange values. Consumers in several localities filled vessels up to their necks (instead of using the Pasil measurement system), which nearly doubled the exchange value of a pot.
Figure 8.5. Relationship Between Proportion of Potters Visiting Locality and Distance From Dalupa.
On average, potters visited 2-4 communities each month (mean=3.33, s.d. 2.387), and no visits were made during February. Some potters sought extra-Pasil localities more regularly than others, as supplements or as replacements to Pasil communities. This pattern is especially clear in the Balbalan municipality, where some potters flocked to Salegseg and Balbalan in the later months of 1988. Overall, barter trips peaked in frequency once during April and again (even more strongly) during the August-October period. Potters visited more than twice the mean number of localities during the latter period. The number of communities visited corresponds closely to periods of high-volume ceramic exchange.

Dalupa potters favor several barter localities outside of Pasil in the Balbalan and Tabuk municipalities. The most popular locality is Salegseg in the Balbalan municipality, an easy hour ride from Ableg (fare=6-10 pesos). Dalupa potters had begun to visit Salegseg during the 1988 seasons, and potters bartered pots in Salegseg on 36 visits during seven separate months of the year. Other Balbalan communities (i.e., Balbalan, Balantoy/Pantikyan) were also heavily visited by Dalupa potters. Cheaper rice in Balbalan inflates the pottery exchange rate, which is about 1.6 times higher than that found in Pasil. Many Dalupa potters also exchange their goods for resin or for building material (lumber) in the Balbalan municipality.

In the Tabuk municipality, the GaoGao community (i.e., GaoGao, Patiking, Bollaguiyan, Dupag, Tommiangan) and Bulanao were the most popular barter destinations for Dalupa potters. Bulanao lies adjacent to the provincial seat of Dagupan, so the five barter trips recorded to this community in 1988 were likely embedded into trips with other purposes. The GaoGao community provides higher exchange values for pots than those found in Pasil and is located next to the Pasil municipality's eastern boundary. Dalupa potters made 14
separate barter trips during six separate months to the GaoGao area during 1988. Most walked to Ableg and took the truck (for 10 pesos) while a few walked to the GaoGao area from Cagaluan, which lies four km (one to two hours’ walk) to the west.

The distance travelled affects the number of pots that Dalupa potters carry with them to barter: the greater the distance, the greater the number of pots carried. The relationship between geodesic distance and the number of pots carried to communities throughout both distributional spheres is statistically significant (Pearson’s $r=0.702$, $p=0.011$), if not perfectly linear. Within the Pasil economic system, Dalupa potters carry the fewest vessels per trip to the neighboring settlement of Ableg (<1.0 km distant) and the most vessels per trip to more distant settlements (2.0-3.0 km) such as Balinciagao and Cagaluan. This relationship is partly explained by the presence of family members who have married into Balinciagao and Cagaluan. Other factors that affect the number of pots carried include the purpose of the visit (i.e., social vs. commercial), the length of the trip, and the mode of transportation.

Distance also affects the frequency with which Dalupa potters visit a particular consumer village, especially for communities that lie within a 10 km radius of Dalupa. Two villages with lower than expected values are Dangtalan and Lubuagan. Dalupa potters rarely barter pots in Dangtalan (ca. 0.7 km away in geodesic distance) where resident potters largely supply the community’s needs. Lubuagan’s failure to pay restitution for the murder of a Dalupa man meant that Dalupa potters visiting Lubuagan (ca. 4.0 km away in pheric distance) risked their lives until the peace pact was re-established. Higher than expected values in Figure 8.6 are explained by the presence of close relatives (e.g., married children or siblings) in some Pasil barrios, who some potters visited frequently in combination with barter trips.
Figure 8.6. Relationship Between Number of Barter Trips to Pasil Localities and Distance from Dalupa.
The previous section has identified general relationships regarding the scale and directionality of Dalupa pottery exchange during 1988. Production intensity is an important source of variability that influences, in part, the types of vessels produced for exchange and the distributional spheres in which these goods move. The next section explores these dual distributional spheres, the Pasil economic system and the extra-Pasil system, to gain understanding of how one pottery distribution system operates within a multi-centric economy.

Multiple Exchange Spheres in the Dalupa Network

The Dalupa pottery economy is characterized by slightly overlapping exchange networks (i.e., Pasil vs. extra-Pasil) that are marked by different transactional types and goods. These two exchange spheres differ from one another in the nature of exchange transactions -- in media of exchange, in exchange values, in geographic area, and in principles of exchange -- but no distinct boundaries can be demarcated to separate one sphere from the other. Social relations and space structure the differences that are evident in the two spheres (i.e., Pasil, extra-Pasil) of Dalupa pottery exchange.

The importance of kin in structuring daily life cannot be overemphasized in Kalinga (see Takaki 1977:59-60): social relations affect personal success, household economics, and, in times of tribal warfare, personal safety. The idiom of kinship includes a wide array of kin and kin-like relationships, including those involving affinal relations or spatial co-residence (Magannon 1984:241-242). These nested social relations include "faction" (descent group) affiliation, village division, village, portion of Pasil (i.e., Upper vs. Lower), municipality, and subprovince. Exogamous marriages link webs of kin to one another, so that most Dalupa potters have many kin or kin-like relationships in every Pasil settlement. This web of kin is bound together through contractual obligation, and comprises a potter's maximal social
obligation network (sensu Kaut 1961).

The parameters of kin and space in the realm of Dalupa pottery exchange are analyzed in the following sections. Pottery exchange is one form of subsistence commodity exchange in a broader economic system. Some patterning evident in pottery movement might thus be echoed in other manufactured subsistence goods, although additional research is required to examine these alternative material classes. Spatial dimensions of the Pasil and extra-Pasil systems have already been illustrated. Other characteristics that distinguish the two systems are compared below, including seasonality in demand, specialization in goods for different spheres, types of exchange transactions, and the effect of social relations on patterns of pottery movement.

**Seasonality in demand.** Dalupa potters exchange more goods in the Pasil economic system than in the extra-Pasil system during every month of the year (Figure 8.7). This pattern suggests that pottery exchange within the Pasil system thus satisfies the needs of the majority of Dalupa potters during most of the year. Exchange outside the Pasil system provides an additional (if periodic) market for Dalupa ceramics during periods of peak subsistence stress.

The highest frequency of exchange transactions outside Pasil corresponds to periods of rice scarcity immediately before each of the two annual harvests. The two months in 1988 during which potters hardly traded pots outside the Pasil system were general lulls in the production/exchange cycle. Only 3% of the year’s output was exchanged during those two months. Paralleling the production output data presented in Chapter Six, the highest levels of exchange activity occurred during the period immediately before the second harvest (September-early November).

Seasonality in pottery exchange is especially pronounced when exchange patterns of
Figure 8.7. Proportion of Dalupa Pots Exchanged Outside Pasil: 1988.
part-time specialists and occasional potters are compared by month (refer back to Figure 8.3). Pottery exchange in each of the groups is responsive to seasonally-induced subsistence stress during the first (i.e., March-April) and the second (i.e., August-October) rice crops. However, part-time specialists exchange a greater proportion of their goods in each of these lean periods than do the occasional potters. Exchange transactions for both groups plummet during periods of high agricultural demand: the first planting season (January-February) and during the second season’s harvest (November).

**Specialization in production for different spheres.** There is some evidence for specialization in the goods that are exchanged in different spheres. However, these differences are in degree rather than in kind. If Dalupa’s limited production scale and intensity were higher, or if multiple pottery production centers operated in the Pasil River Valley, these differences might be more pronounced. Some functional categories (and sizes) circulate more frequently in one exchange sphere than do others.

Some functional categories are primarily exchanged within the traditional Pasil system. The exchange of one functional category, the rice cooking pot (ittoyom), is largely restricted to the Pasil system. Less than 10% of all ittoyom were traded in extra-Pasil localities, and almost half of these were traded during October. Two-thirds of all meat/vegetable cooking pots (oppaya) were exchanged in the Pasil system throughout the year. This pattern is echoed in monthly exchange figures with one exception, October, when 58.8% of all oppaya were traded in the extra-Pasil system. In one size class, the medium oppaya (n=206), vessels were exchanged in nearly equal proportions in the two spheres.

Two functional categories display evidence for specialization in exchange in the extra-Pasil sphere: the immosso and non-traditional forms. These two functional categories also
exhibit the greatest degree of technological change. Consumer demand -- and the possibility of developing new markets -- clearly played a role in the types of innovations that have succeeded in these two types of ceramics.

Slightly over one-half of all water storage jars were exchanged in extra-Pasil localities over the annual cycle, a pattern that is repeated in the monthly exchange figures. Immosso are a necessary but small portion of a Kalinga household assemblage, as most households have one or two water jars. The water jar's long use-life (discussed in Chapter Six) means that the Pasil market for immosso is quickly saturated, which is one reason why potters trade their water jars in extra-Pasil locations.

The majority of non-traditional forms were traded outside the Pasil system during 1988. In six separate months, two-thirds of ay-ayam were exchanged outside the Pasil system. For two months of the lowest productivity (i.e., February and November), all non-traditional forms were exchanged within the Pasil network. Only in December, and undoubtedly for the holiday season (i.e., Christmas and New Year's), were more nontraditional forms exchanged locally than in the extra-Pasil network.

Types of exchange transactions. The nature of exchange transactions depends both on the goods that are exchanged and on the system in which ceramics circulate. Here, the type of good includes either traditional (i.e., cooking pots and water jars) or non-traditional (i.e., ay-ayam) forms. Systems include the Pasil and the extra-Pasil distributional spheres. In general, traditional pots are bartered using customary exchange values and non-traditional forms are sold for cash. Patterning in transactional types is examined in different goods that circulate within each sphere.

All ceramics included in this study (n=2779) were disaggregated by general type (i.e.,
pots vs. non-traditional forms) and by exchange sphere (i.e., Pasil vs. extra-Pasil). To standardize wide discrepancies in sample sizes for each functional category, each type/sphere combination includes proportions of the total. These data are presented in Figure 8.8, which presents interesting contrasts between the two distributional spheres and between general types within each sphere.

Within the Pasil system, nearly all traditional cooking and water storage pots are obtained through barter using the ngina (customary price). An equally small proportion of pots are obtained through cash purchase or gift-giving. This pattern is the traditional Kalinga exchange system described previously by Takaki (1977). Occasionally, traditional pots are exchanged for other subsistence goods such as mortars, pestles, baskets and even wooden architectural beams. Over one-half of the non-traditional forms that circulate within the Pasil system (only 8.0% of all non-traditional forms) was purchased with cash.

In the extra-Pasil system, cash transactions are more common for traditional pots although most pots are still exchanged through barter. The most striking difference is that disproportionate numbers of non-traditional forms (92%) are exchanged in this sphere, particularly in Balbalan and Tabuk. Pasil Kalingas find the ay-ayam appealing and occasionally purchase them to give as gifts. Consumers in extra-Pasil municipalities are even more charmed by such goods and purchase them as novelty items. Cash transactions and non-traditional forms are hallmarks of the extra-Pasil system.

Social relations of Dalupa exchange and the suki institution. A third important difference between the two spheres lies in the nature of social relations that characterize the producer-consumer relationship. Intra-Pasil exchange transactions are characterized by fictive kin relationships and balanced reciprocity. Potters prefer certain barter localities which contain
Figure 8.8. Types of Exchange Transactions Involving Non-Traditional Forms and Pots: Pasil and Extra-Pasil Networks.
suites of well-established customers in the Pasil system. Dalupa potters frequented (i.e., made repeated trips) to only three extra-Pasil localities in 1988: the GaoGao/Tommiangan area, Balbalan, and Salegseg. Indeed, of the three that potters frequented, only Salegseg was visited as often as Pasil consumer villages.

The presence of relatives (especially children, siblings, cousins, in-laws) is a major determinant in which Pasil villages a Dalupa potter visits. Potters visiting a Pasil consumer village on barter trips stay with relatives (or kin-like) hostesses. These hostesses are obligated by Kalinga traditions to find customers for the potters' products; in effect, they provide both 'marketplace' and 'market' for the potters. The pottery exchange records thus grossly underestimate social relationships in both distributional spheres because records contain information solely on the relationship of producer and the consumer. Because most Pasil exchange transactions outside of Dalupa involve hostess intervention, most pottery exchanges that occur in the Pasil system constitute kin, or kin-like transactions.

Two indices of social relations in the exchange data are gift-giving behavior and the relationship between producer and consumer. Kin and kin-like relationships are characterized by extensive gift-giving. Gift-giving not only expresses good will between the donor and the recipient, but it fulfills morally imperative kin obligations and reinforces mutually cooperative relationships (Takaki 1977:283). Potters who stay in a hostess' home are obligated by custom to give gifts to their hostesses, and gift-giving is recorded in the exchange data base.

Returning to Figure 8.8, the proportion of gifted goods is small in each sphere and type combination and likely underrepresents the number of gift-giving events associated with pottery exchange. Still, distinctions between Pasil and extra-Pasil systems remain clear. Potters gave a higher proportion of pots as gifts to consumers within the Pasil system than in
the extra-Pasil system. Many of these gift pots were given during exchange transactions to the
same women who obtained other pots through barter; these transfer processes are qualitatively
different.

The presence of kin ties between producer and consumer is a second measure of
social distance. Kalingas technically reckon kin to the third cousin degree of relationship
(Dozier 1966:69-82), although a far wider net of individuals are considered as kin. The
pottery exchange records include data on producer-consumer kin relationships that extend
slightly beyond the third cousin degree to include an amorphous category of "distant relative."
Use of this "distant relative" category cannot encompass the range of kin-based relations that
exist, many of which are important but unspecified. Even so, differences emerge when
proportions of kin-based transactions are examined in the Pasil and extra-Pasil spheres (Figure
8.9).

A much higher proportion of Pasil pottery transactions involve kin relations than do
the extra-Pasil transactions. Social relations of exchange outside Pasil are imbued with the
cordial impersonality of unrelated strangers. The potter’s familiarity with her consumer is one
index of social distance. Consumers’ names are listed (where known) for each transaction in
the pottery exchange log. Although potters exchanged goods with unnamed (and presumably,
relatively unknown) consumers in both systems, potters knew the names of consumers for
86.2% of goods that circulated within the Pasil system. In contrast, potters only knew the
names of consumers for 59.8% of the ceramics that moved within the extra-Pasil exchange
sphere.

This 'trade' economy transfers goods across social boundaries and is characterized by
entrepreneurial behavior not frequently seen in economic relations within the Pasil system,
Figure 8.9. Kin Vs. Non-Kin Exchange Transactions: Pasil and Extra-Pasil Networks.
where personal obligation affects economic decision-making. In Pasil, potters know their customers, exchange values are fixed, and haggling over prices (as occurs in Ableg, Malucsad and Pogong) is considered unseemly. When first venturing into villages beyond Pasil, Dalupa potters seek high profit margins, customers haggle over the offered prices, and potters often do not learn the names of their customers.

How do Dalupa potters succeed in marketing their pots outside a traditionally kin-based exchange network? They have begun to forge economic and social relationships with their consumers. As potters establish niches in extra-Pasil communities, they transform the social relations of exchange. Prices drop and become stable, potters learn about their customers’ preferences, and trade relationships develop with women in that community. This pattern occurred in the Soyang and GaoGao communities during the field season, and one potter (#211) visited the GaoGao area on four separate barter trips.

Kalinga trading partnerships, or aboyog, may be ephemeral or enduring, but they bind individuals into a pact of mutual obligation of hospitality and protection (Dozier 1966:83). This type of long-term trading partnership has facilitated cross-cultural exchange for centuries (Curtin 1984), establishing trust and reducing risk for both parties involved (Davis 1973; Mintz 1961; Szanton 1972). The lowland Filipino term (used in all major languages [Anderson 1969]) for such economically-based relationships is suki, which translates roughly as 'special customer' (Davis 1973:217) or "regular exchange partner" (Szanton 1972:97).

Throughout the Philippines, suki relationships involve complex patterns of reciprocal exchange that create greater feelings of mutual obligation than impersonal producer-consumer relationships might warrant. These relationships can involve myriad forms of social reinforcement (Szanton 1972:99). Suki partnerships link socially distinct groups of producers,
customers, intermediaries, and market vendors who are all involved in the movement and consumption of numerous commodities, from fresh produce (Davis 1973) to electrical appliances (Dannhaeuser 1979).

Suki-like relationships between producers and consumers also have a long tradition in the study region. Pasil consumers 'patronize' particular potters from one of the two pottery-making villages and pass these relationships on to their children. This pattern is clear in the frequency with which potters visit different Pasil villages. Most potters have one or two Pasil localities that they regularly visit.

Dalupa potters do not refer to trade partners as sukis, but instead call them "friends." The pottery exchange log did not directly identify suki relationships in trade transactions, but the occurrence of a particular customer's name in transactions involving one potter's goods over several different months is suggestive of suki relationships. Patterns of gift-giving in the absence of a defined kin relationship might also indicate trade partnerships, although the pottery exchange logs contain very little evidence for this behavior.

For Dalupa potters who work the extra-Pasil exchange system, trade partnerships forge alliances across social boundaries by ensuring successful economic transactions (Barton 1949; Lawless 1978). A suki-like pattern is present, for example, in Salegseg (Balbalan) barter transactions for two of the three potters (#207 and #211) who visited Salegseg frequently (i.e., five times or more) during 1988. These potters knew most of their customers' names, had 'regular' customers who obtained most of their pottery from one of the two potters, and occasionally gave pots to such customers as gifts. Other Dalupa potters (e.g., #201, #206, #219, #231) who visited Salegseg less frequently knew fewer names of their customers. Interestingly, one of the potters with 'regular' customers in Salegseg also bartered pots in the
neighboring community of Balbalan.

Such dyadic relationships between producers and consumers are not restricted to the Cordillera highlands, but instead take varying forms in Philippine marketplaces (Davis 1973; Russell 1987; Szanton 1972). Such relationships elsewhere in the world may be either friendly or potentially antagonistic (e.g., Alexander 1987; Bodley 1979; Clark 1991; Mintz 1961; Ross 1978; Trager 1981), the latter being found in some large marketplace settings (e.g., Geertz 1978). Suki ties between producers and consumers often bridge social and ethnic boundaries (e.g., Bodley 1979:49-52; Trager 1981:136), as happens when Dalupa potters venture into other Kalinga areas with residents who are linguistically and socially distinct from people in Pasil.

Trade partnerships such as the suki benefit both producers (or intermediaries) and consumers by reducing risks involved in economic transactions. Producers have a guaranteed market for their goods, and consumers receive high-quality, reasonably-priced goods (e.g., Anderson 1969:652-656). In areas of political stability, trading partnerships also ensure that partners travel safely from one area to the next (e.g., Bodley 1979:52).

Suki relationships vary in duration and intensity, and require regular maintenance as they pass through stages of development (Szanton 1972:100-101). Mature suki relationships operate on trust and loyalty, and provide the greatest benefits to both parties (Davis 1973:224-226). Whether the emergent suki relationships between Dalupa potters and their customers flourish or fade depends on exchange intensity, and tribal warfare that interferes with potters' travel to certain communities. Dalupa's exchange system remains marketless, and production remains a part-time activity, but the emergence of intermediaries and of suki relationships suggests an increasingly market-oriented outlook.
Discussion

Ethnoarchaeological research on ceramic distributional networks is important to archaeological interpretation in several respects. The first links spatial patterning with social systems: ideally, ceramic ethnoarchaeological studies should explain the structure of distributional networks while providing information on their respective geographic scales. Distributional studies also complement archaeological research (most of which focuses on consumption patterns) and production-oriented ceramic ethnoarchaeological research to further the understanding of economic processes. Ethnoarchaeological research on ceramic distribution concentrates on a commodity that is often overlooked by economic and ecological anthropologists. Ceramic ethnoarchaeologists might, potentially, add to the economic and ecological literature from which archaeologists derive so many models.

This analysis of pottery exchange considers the social context of Dalupa pottery exchange as part of a system of production and social relations (Hodder 1982:203). Throughout the 1980s, Dalupa women increasingly adopted pottery production for exchange as an alternative economic strategy. Since a major constraint on expanding production is the need for an ever-growing clientele, Dalupa potters were forced to expand their consumer network by seeking customers beyond the traditional Pasil economic system.

The primary goal of this analysis is to present detailed information on aspects of one ceramic distributional system. To that end, spatial and social parameters of ceramic distribution have been explored. If another goal in describing a regional system like Dalupa’s is to transcend the particulars and reach for generalities (Ellen 1990:220), then this study of Dalupa pottery exchange holds several insights for studies of prehistoric distributional networks. The first concerns equifinality in spatial patterning of distributional networks. The second concerns
scalar differences in distributional systems of generalized vs. specialized ceramic production modes.

Distributional patterning in the Dalupa pottery exchange network illustrates problems of equifinality in interpreting spatial patterning in the archaeological record (also see Fry 1980; Hodder 1980). Material patterning produced by Dalupa potters reflects two very different levels of production intensity in the community of potters (i.e., part-time specialist vs. occasional potters) whose exchange spheres largely overlap. Differences in degree distinguish these two spheres from one another. Certain functional categories of goods tend to be exchanged within the Pasil system (i.e., rice cooking pots) and in the extra-Pasil system (i.e., water jars, non-traditional forms), and it is the part-time specialists who tend to make these goods.

Formal mathematical approaches to studying Dalupa exchange are not as straightforward as the archaeologist might like. Relationships between geographic distance and exchange (e.g., number of pots carried, frequency of visits) are rarely linear but they are highly patterned: social factors affect decision-making at the individual and group level. Less disheartening is the finding that such relationships also falter at the edges of distributional networks. Pottery-making communities are located in most river valleys of the Kalinga subprovince (Figure 8.10). Ceramic distributional networks are largely complementary, and only overlap subethnic boundaries in areas of extensive ethnic co-residence (e.g., the Tabuk municipality) or when neighboring ceramic production centers display very different organizational scales.

Processes of secondary distribution may complicate interpretations of exchange patterns as well. In Pasil communities that are located at greatest distance from Dalupa,
Figure 8.10. Pottery-Making Communities in Selected Kalinga Municipalities (Adapted from Kalinga-Apayao Census, 1970 [National Census and Statistics Office, Manila]).
Dalupa-made pots often change hands several times prior to reaching their ultimate consumers. Interestingly, these communities are also located along Pasil boundaries, where the Pasil subethnic group (sharing language and material culture) stands distinct from those of neighboring river valleys. Boundaries are commonly the locus of intense inter-ethnic interaction (e.g., Hodder 1979), and secondary distribution processes blur the boundaries between Pasil, Balbalan, and Tabuk.

The presence of trade partnerships also contributes to the systematic patterning of material goods. Suki relations between producer and consumer act to spatially concentrate goods produced by a single potter in communities where suki partnerships exist. Spatial clustering in archaeological ceramic distributions is often interpreted as the result of restricted access by more powerful community members than others. We still do not understand enough about systemic processes (including post-exchange processes such as re-use and deposition) to support such hypotheses. The ethnographic literature is rife with examples of trade partnerships that operate on an egalitarian basis. Perhaps material patterning in relatively egalitarian economic networks with trade partnerships resemble those with elite-controlled distributional systems more closely than archaeologists might like.

This study of the Dalupa pottery exchange network provides some insights on general differences in production modes. Pottery production in Dalupa represents the least intensive type of specialized system that is ethnographically visible. By specialization is not meant all "production of alienable, durable goods for nondependent consumption" as Clark and Parry (1990:297) suggest. Rather, these are generalized systems that differ in kind from intensified production systems. Intensified production systems, as discussed here, involve production that yields returns on which households and portions of communities depend to survive (Befu
The exchange parameters of systems with part-time craft specialists differ from those with generalized producers, and both systems differ from those with full-time independent or attached specialists (sensu Costin 1991). This latter point is critical for archaeologists, because the enormous variability inherent in part-time specialist systems is lost when facile comparisons are made between specialized (i.e., centralized, full-time) production and non-specialized (i.e., non-centralized, part-time) production. Not surprisingly, these comparisons are commonly developed for prehistoric state societies, where clear differences are evident between types of producers.

Archaeologists who work with non-state societies generally flounder in explanations of exchange patterns because models that adequately explain economic networks outside of state systems are rare. The first (and often) last resort is to state-derived economic models, which are then forced on recalcitrant data with little success. This study of the Dalupa pottery exchange network does not provide the ultimate theoretical model. General models of exchange and distribution are best built on multiple case studies from small-scale societies. But comparisons between part-time specialists and occasional potters in Dalupa illustrate some organizational distinctions in commodity distribution between generalized and part-time specialist systems.

At least five organizational parameters distinguish generalized production systems from those of part-time specialists, and these are summarized in Table 8.4. Exchange media differ, as does the level of differentiation in exchange spheres. Whereas occasional production for exchange in generalized systems cements social relationships and supplements a household's subsistence, part-time specialist production fills critical gaps in a household's economy.
The consumer market for generalized producers is kin-based, whereas intensive producers must range farther to secure a sufficiently large market for their goods. Exchange intensity also differs in the two systems: generalized producers occasionally make and trade goods whereas, for part-time specialists, exchange is more regularized and less seasonal. Geographic ranges of the two exchange networks also contrast: in the Dalupa system, most occasional potters (as generalized producers) restrict their geographic range to the Pasil network while part-time specialists range far and wide in search of new markets.

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>GENERALIZED PRODUCTION</th>
<th>PART-TIME SPECIALIST PRODUCTION</th>
</tr>
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<tbody>
<tr>
<td>Media of Exchange</td>
<td>Barter</td>
<td>Barter + cash</td>
</tr>
<tr>
<td>Exchange Spheres</td>
<td>Same goods circulate in multiple spheres</td>
<td>Different goods circulate in each sphere</td>
</tr>
<tr>
<td>Consumers</td>
<td>Kin-based</td>
<td>Kin + non-kin; development of suki partners</td>
</tr>
<tr>
<td>Intensity</td>
<td>Part-time, seasonal</td>
<td>Full-time, less seasonal</td>
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<tr>
<td>Geographic range</td>
<td>Restricted</td>
<td>Enlarged</td>
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</tbody>
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Table 8.4. Parameters of Distribution in Generalized and Part-time Specialist Production Systems.

Contrasts presented in Table 8.4 rely on organizational parameters of distributional systems that are most accessible through ethnographic research. Only the fifth parameter, geographic range, has material correlates that might be reflected in the archaeological record. Both the array of factors that affect spatial patterning and the links between organizational parameters and material patterning must be understood in order to derive ceramic distribution models from ethnoarchaeological data.
Summary

Chapters Five through Seven concentrated on aspects of the Dalupa production system, from the materials involved to the degree of standardization in goods that Dalupa potters manufacture. Commodity production and exchange are closely related within a pottery economy. The kinds of goods produced, the size of the consumer market, and manufacturing technologies all affect the distributional spheres in which ceramics circulate (Earle 1982:8). The foregoing chapters sought to demonstrate the nature of connections between production and distribution in Dalupa's ceramic economy.

This chapter has explored distributional aspects of the Dalupa pottery-making system. General perspectives on how productive specialization operates within economic networks were first discussed, focusing on multi-centric economies and the social relations of exchange. Attention then turned to productive specialization in Kalinga economic networks, employing an historical perspective to emphasize how entrenched these dual institutions are in the Kalinga culture. For at least a century, Kalinga communities have engaged in regional exchange networks based on productive specialization at the household or the community level. These networks intensified with the reduction in tribal warfare during the American period (i.e., 1900-1941), but the regional economic systems that Americans described were built on an indigenous, pre-American economic structure.

Dalupa pottery exchange is best understood within a broader system of petty commodity production. Pottery is one of numerous subsistence goods that circulate through specific exchange media and relying on customary exchange values or ngina. How ceramics circulate within the greater system was explored, focusing on exchange rates, mechanisms of distribution, and the geographic and exchange scales involved at this regional level. Important
factors contributing to the system as it operated in 1988 include penetration of the world economy through government-sponsored projects, environmental degradation resulting from myriad sources, and a burgeoning population in the study region.

Understanding exchange systems such as Dalupa’s cannot help but improve archaeological interpretation, if only through elucidating the myriad social factors that complicate traditional models of ceramic distribution. Social relations and exchange spheres within a multi-centric economy structure the Dalupa pottery exchange network. Differences in exchange spheres are examined, from the exchange media involved to the social relations that mediate the movement of goods. Kalinga resistance to lowland culture and the institutions that it includes has never relented, and the extra-Pasil pottery exchange network combines aspects of the traditional Kalinga economy and lowland institutions.
CHAPTER 9
CONCLUSIONS

What good is a model that permits generation of numerical predictions if the predictions are not very good? Better vague and weakly quantitative predictions that are usually right...than predictions that have a more exact look but are often wrong (Cowgill 1993:556).

Ethnoarchaeology, as a research strategy, enables students of human behavior to delve deeply into social and ideational realms that so persistently elude archaeologists. Yet this window into another society is a two-edged sword, and the embarrassment of data that ethnoarchaeological research provides both entices and maddens the diligent scholar. Not only must one analyze quantities of carefully collected data, but one must wade through a daunting array of sociological, geographical and historical material in order to place one's data into cultural perspective.

This concluding chapter reflects on the methodological approach taken in this dissertation research, and discusses the nature and goals of ethnoarchaeological research today. Ethnoarchaeology is one of the most (if not the most) commonly used sources of ethnographic data for archaeological interpretation. This is because problems that such 'actualistic' (sensu Binford 1983) studies concentrate on involve the material implications of human behavior. Discussion then returns to Dalupa's ceramic production system to evaluate the substantive contributions of this study. Dalupa pottery production is a dynamic system -- in its personnel, production scale, and economic distributional range -- and is thus responsive to myriad factors through time. Prospects for the future of Dalupa's ceramic system are explored.

Ethnoarchaeology as an Interpretive Source

Ethnoarchaeology is both a research strategy and an interpretive resource that
archaeologists use to establish parameters for building models of human behavior. At its best, ethnoarchaeology uses material culture studies to investigate processes of human behavior. Such research is highly empirical and requires extensive knowledge of the culture under study. At its worst, ethnoarchaeology involves poorly conceptualized, impressionistic research that yields few insights for archaeologists or ethnologists (see Stark 1993).

Data collection and analysis techniques used to produce ethnological information that archaeologists seek often lie outside the realm of traditional ethnography. To understand the nuances of human-material relationships, archaeologists must do much of this work themselves (see Hayden and Cannon [1984:210]). Ethnoarchaeological research can provide archaeologists with a different set of conceptual and empirical tools than those available from most cultural anthropologists, and for this reason it should be a critical element in the discipline.

The scope of ethnoarchaeological research today -- topically, theoretically and methodologically -- is almost as broad as the topical specialization found among prehistoric archaeologists. Ethnoarchaeologists who study hunter-gatherers, for example, are rarely conversant with ethnoarchaeological research on ceramic production and distribution (and vice versa). Theoretical frameworks are equally broad, and inadequate attention has been paid to the way that paradigmatic differences structure the results of ethnoarchaeological studies (cf. David 1992).

Many prehistoric archaeologists view the bulk of ethnoarchaeological research with skepticism and argue that little about the past can be learned from studies of the present. Archaeologists of this ilk think analogical reasoning holds no place in archaeological model-building; they do not fully understand the nature of archaeological inference and confirmation (see Kelley and Hanen 1988:256-269; Wylie 1985). However, the majority of unbelievers find little applicable material in the ethnoarchaeological literature. Either cases under study lack
contemporary analogues (e.g., Kelly and Todd 1987), the ethnographic perspective lacks sufficient depth to generate reasonable inferences regarding long-term patterning (e.g., Jochim 1991; Kramer 1979:12), or archaeologically pertinent approaches are not used in actualistic research.

**Producers and consumers of ethnoarchaeology.** Whereas cultural anthropological contributions to archaeological interpretation are largely unintentional, ethnoarchaeologists explicitly seek to contribute to the formation of the archaeological record. Few ethnoarchaeologists take the time to consider our clientele: Who are ethnoarchaeology’s consumers, and what do they want? What prehistoric archaeologists most definitely do not want are more "buckshot" and "spoiler" approaches (sensu Yellen 1977), in which a single ethnoarchaeological example is used to support or refute an archaeological interpretation (also see Simms 1992). Establishing standards for research and ensuring relevance in ethnoarchaeological research cannot help but improve credibility, which in turn might persuade some archaeologists to re-evaluate their positions. Traditional archaeological research is governed by a clearly defined set of standards regarding field methods and analytic techniques, which are reinforced through critiques of studies and discussions of methodology in the literature. Entire books have been written on field methods and subspecialties in archaeology, yet no comparable texts exist for the interested student of ethnoarchaeology.

Since no established standards exist to ensure that only high-quality ethnoarchaeological research is published, it is no surprise that the subfield suffers from a credibility gap. Few ethnoarchaeological studies provide adequate descriptions of methodology and field collection techniques (cf. Kramer 1982). Fewer still provide extensive data for re-analysis by interested researchers (cf. Hayden and Cannon 1984). The quality of ethnoarchaeological data would doubtless increase if standards regarding field methods and data availability were established.
Research quality might also rise if more ethnoarchaeological research was subjected to the scrutiny that archaeological research currently receives.

All research on the relationships between human behavior and the material-spatial-environmental matrix in which it takes place (Schiffer 1978:230) is important. However, some ethnoarchaeological topics are more directly relevant for archaeologists than are others. Ethnoarchaeology is not simply the handmaiden of archaeology, since ethnoarchaeological research can contribute to archaeological theory in unexpected ways. At the same time, ethnoarchaeological work should be done to answer archaeologically relevant questions (Simms 1992). Although conceptions of relevance vary, relevant questions provide partial explanations for variability in archaeological patterning at a multiplicity of levels.

Relevant questions that ethnoarchaeologists address through their research often concern the development of "Rosetta stones" (Binford 1981:25) for deciphering formation processes of the archaeological record. An equally important area of ethnoarchaeological research lies in the development of models that explore organizational components of societies (e.g., Yellen 1977:6). Both approaches are important areas of study, although archaeologists differ on the relative importance of each approach for archaeological interpretation (e.g., Wobst 1989:139).

As 'producers' of what Wylie (1985) has called 'source-side' research, ethnoarchaeologists can certainly improve the quality and relevance of their research for archaeological interpretation. One criticism that ethnoarchaeologists cannot address so easily, however, is that of comparability. Against all odds, archaeologists still expect ethnoarchaeologists to find and study pristine societies. Optimally, these are utterly traditional communities that lack modern trappings and that provide perfect analogues with societies from the prehistoric past. For some archaeologists, ethnoarchaeologists' failure to find pristine indigenous cultures -- and their study instead of
societies that bear scars of Western contact -- invalidates ethnoarchaeology as a source-side research strategy.

The indignation or dismissal with which some prehistorians treat ethnoarchaeology for lack of comparability is indeed puzzling. For at least a decade, cultural anthropologists have recognized that most indigenous cultures have been in direct or indirect contact with outside influences for centuries (Wolf 1984). One hallmark of Kalinga custom, brass gongs used in Kalinga dances, were introduced by Chinese merchants into the Philippine archipelago sometime after the tenth century A.D. Water buffalo, the acme of prestige in Kalinga society, were in large part imported from the lowlands. The very traditionalism of Kalinga culture stems from a resistance to outside, acculturation pressures and from government neglect rather than from an isolated existence.

Even in cases where the historical descendants of an ancient culture are studied, few easy analogies can be made between specific ethnoarchaeological and archaeological examples because of a variety of historical factors (e.g., Tschopik 1950). But these discontinuities in material culture traditions do not invalidate research on how humans and materials interact. Despite the wealth of ethnoarchaeological research now underway, the needed bridges between ethnoarchaeological and archaeological data are still in nascent form. Ethnoarchaeological studies too rarely offer specific theories that address particular aspects of the relationships between human behavior vis-à-vis material culture.

The foregoing section has suggested reasons why ethnoarchaeology is viewed skeptically by some prehistoric archaeologists, and contends that ethnoarchaeology stands to gain from critical evaluation of its goals and methods. The implementation of established standards and regular evaluations of archaeological relevance would increase the quality of ethnoarchaeological research.
The only means by which truly resistant archaeologists will be persuaded of the utility of ethnoarchaeological research lies in making substantive and theoretical contributions to archaeological areas of study (Simms 1992:188). This study of Dalupa ceramic production and distribution has made several such contributions, and these are outlined in the following section.

**Dalupa as an Ethnoarchaeological Case Study**

**Contributions of research.** Two basic goals structured the ethnoarchaeological research presented in this study. The first was to systematically define relationships between one form of economic behavior and material culture patterning. The second was to explore ways in which features of observable behavior were reflected in the Kalinga material record (Kramer 1979:1). Efforts were made throughout the study to provide detailed data on production and distribution for future research. Comparative research on ceramic production systems requires detailed "ethnometrics" (Clarke 1972:46) from individual case studies. 'Ethnometrics' provided in this study include (but are not limited to) data on individual and community production levels, morphological standardization, and numbers and types of vessels that potters circulate in different areas of their distributional networks.

This study's central contribution to archaeological interpretation lies not in ethnometrics, but instead in weakly quantitative predictions that concern various aspects of ceramic production systems. These predictions fall far short of law-like generalizations that archaeologists find appealing, being (as George Cowgill [1993:556] notes) "usually" -- but not always -- right. Yet such probabilistic generalizations about human behavior provided by previous ethnoarchaeological research have proven quite useful (see review in Watson et al. 1984:259-265).

The study's first contribution lies in re-conceptualizing ceramic specialization as one variety of productive intensification. Intensification -- that is, increased labor inputs into the
production process -- occurs across a wide spectrum of activities. Processes involved in productive intensification are similar, regardless of goods that are involved. Intensified production systems often involve multiple domains, such as farming and commodity production. Ethnoarchaeological research on ceramic specialization rarely places ceramic production within the broader economic system in which it is found; indeed, this is only done in the best sorts of economic anthropological studies (e.g., Cook and Binford 1990).

Part of the problem underlying the narrow focus on ceramic specialization stems from theoretical misconceptions discussed above, and part stems from the structure of current archaeological research. The archaeological field has compartmentalized to a point at which most archaeologists lack the broad understanding necessary to be conversant in more than a few subspecialties. Most research is restricted to studying a single artifact class (at the exclusion of other productive activities), while studies that examine the full range of economic activities are rare indeed (but see J. Arnold 1992; Earle and Costin 1987). Because prehistoric economies involved multiple productive activities, archaeological research -- and interpretation -- should cast a wider, if more intractable, net in building frameworks of economic systems. Such an approach requires collaborative research and a broader interpretive scope than most specialists currently employ. This study's emphasis on productive specialization, and its examination of multiple distributional spheres, suggests new directions for future ethnoarchaeological research.

If this ethnoarchaeological study has not avoided a kind of theoretical myopia, then at least it has faced the problem squarely. Most attention during fieldwork was absorbed by studying pottery economics. Had more members of the Kalinga Ethnoarchaeological Project focused on complementary aspects of the economic system, more certainly would have been understood regarding distributional spheres. Dalupa is involved in a multi-centric economy, but only the
multiple distributional spheres of one commodity (ceramics) have been explored. How much more complex -- but accurate -- would the system have been depicted if other specialties could have been tracked as well.

The study's second contribution lies in its successful efforts to synthesize a vast but disparate Kalinga literature. Herculean efforts in the Sagada (Bontoc) area by one dedicated historian, William Henry Scott, provide a model for this attempt at synthesis. And though my efforts fall short of Scott's life work, perhaps Philippine researchers and Kalingas alike will consult this study to understand what has been a largely unwritten history. Efforts are made throughout the dissertation to tie local events into a broader historical and political framework. Theorists of political economy (e.g., Roseberry 1988) rightly point out that local communities form in response to larger forces of colonialism, state formation and international trade. The fact that Pasil Kalingas live on the periphery of a complex nation-state cannot be ignored: nation-wide and global events cause ripples in the Philippine hinterlands that reach the heart of the study region, and affect the very vessels that Dalupa potters produce.

Another contribution of the study is its explicit discussion of methodology in Chapter Four. Implicit in archaeological research is the expectation that sampling strategy, methods and potential biases in the data will be discussed. Ethnoarchaeological work is conducted with much greater freedom, but such research gains reliability when research methods and data collection strategies are described. These issues are described in painfully honest detail, as discussion focuses on types of informant-derived and observational data that form this study's empirical foundations.

Any systematic description of a ceramic production environment is a contribution to the comparative literature on ceramic ethnoarchaeology. Chapter Five's focus on production resources
provides metric distances that may be incorporated into future comparative research whose approach parallels Arnold (1985). Discussions of how and why resource access changes through time provide insights on sources of cultural variability that affect such mundane activities as raw materials selection. As compositional research continues to identify sources of materials variability, studies of human decision-making with regard to production resources are a needed complement.

One of the primary conclusions of the materials discussion is that Dalupa potters are opportunists whose livelihood depends on a certain degree of flexibility. When resin and ocher availability waned in the early 1980s, potters developed new forms of water jars that required less resin and had the additional advantage of a jaunty ocher design. When access to the Marcelo clay source was cut off, potters opted for alternative sources whose clay was adequate for production. Predictive models of resource acquisition, based on cross-cultural examples, gain their elegance from overlooking such social and political conditions. The picture blurs considerably when social and political contexts of resource procurement are examined in different societies. If the Dalupa example is at all representative, then resource access fluctuates greatly through time and is influenced by relationships with neighboring systems.

The annual record of pottery production discussed in Chapter Six provides detailed information on production levels in functional categories (and sizes within each category). Estimates of artifact use-life (e.g., Nelson 1991; Shott 1989) generally rely on consumption information contained in household pottery inventories. Production information on types and sizes of vessels may enrich use-life studies. The pottery production data also illustrate annual fluctuation in one potter community’s production level.

The pottery production data also provide an empirical, quantitative basis for examining
producer intensity. One measure of producer intensity -- the number of pots a producer manufactured during a twelve-month cycle -- is used to distinguish between part-time specialists and occasional potters within the Dalupa potter community. This distinction adds another level of control over the variability in the production data sets. The resulting categories are used to illustrate how part-time specialists tend to produce certain classes of goods (i.e., those that require the most technical skill) and to produce a higher diversity of types than do occasional potters. These trends are dim (but perceptible) echoes of the division of labor one might observe in full-time specialist systems.

Ceramic standardization research that compares the output of multiple potter groups using similar technologies and producing similar repertoires of goods is rare. Chapter Seven undertakes a series of comparisons between such groups to examine differences in production scale in relation to dimensional standardization. Larger quantities of well-documented data on dimensional morphology, so necessary for examining assumptions about the relationships between producer specialization and product standardization, are available in the Dalupa data sets. Several analyses in Chapter Seven support a general correlation between production intensity and product standardization, and the research suggests that careful control of size categories significantly reduces the variability in dimensions.

Comparisons between the dimensional variability in products at the inter-community and intra-community levels are made. Dalupa cooking pots exhibit slightly more dimensional standardization than do Dangtalan cooking pots. The slightness in differences in variability between samples from two communities is equally important for ceramic standardization research. Dalupa is the undisputed production center of Pasil, and yet the goods that Dangtalan potters manufacture are almost as standardized. Pottery production in both villages involves part-time
specialization, but they lie at opposite ends of the continuum.

Comparisons of goods produced by part-time specialists and occasional potters in Dalupa yield similarly weak patterning. This absence of robust relationships at the inter-community and intra-community levels reveals more about organizational mode than about the standardization hypothesis. Previous comparisons of Pasil pottery industries with full-time Philippine specialists (Longacre et al. 1988) reveal clear differences in the relative standardization of goods. However, differences in the relative standardization of multiple groups (e.g., contrasting villages, potters of varying experience levels) become less clear when increasingly finer scales of analysis are employed.

In some respects, results reported in Chapter Seven demonstrate the practical limits of standardization research among part-time craft specialists. Some part-time specialist communities (i.e., Dalupa) invest more inputs into ceramic production than do others (i.e., Dangtalan), and some potters invest more energy into craft production (i.e., part-time specialists) than do others (i.e., occasional potters). In some cases, these differences disappear under the kind of close inspection adopted in this study. These same differences then reappear in comparison with dimensional data from full-time specialists.

The focus on pottery exchange in Chapter Eight addresses the scale, directionality and media of pottery exchange systems. A twelve-month pottery exchange log provides exhaustive information regarding the goods that Dalupa potters exchanged during 1988. Such research requires a long-term commitment to a study region, and a twelve-month record is the smallest unit of time that can capture seasonal variability in distributional behavior. Even Dalupa's distributional system as it is reported in Chapter Eight underestimates the geographic range and the shape of the distributional network as archaeologists would reconstruct it in 25-50 year
Study of Dalupa pottery production provides some insights regarding the operation of independent specialization within a 'peripheral market' or 'non-market' economy (sensu Bohannan and Dalton 1962). Only one consumer settlement that Dalupa potters visit on barter trips contains a formal marketplace, and this is the provincial capital of Tabuk. Pottery exchange trips to the provincial capital are embedded in other activities (e.g., hospital visits, coffee selling, family visits, governmental affairs) and take place outside the marketplace between individuals with established relationships. In the broader Kalinga economic system, markets (at least occasional) facilitate the circulation of certain classes of goods. Pots are excluded from this economic sphere, and Pasil Kalingas do not depend on markets to obtain necessities.

Nuances in the Dalupa pottery exchange network were examined throughout a twelve-month cycle in Chapter Seven, the first of its kind. This record of Dalupa pottery production provides evidence of intra-annual variability in the goods that Dalupa potters trade and the markets that they seek from one season to the next. In a part-time specialist system such as Dalupa’s, pottery production and agricultural production are interlocking parts of a larger economic strategy. Pottery-making households use multiple economic strategies to adapt to varying levels of subsistence stress (e.g., pottery exchange, clothes selling, sari-sari selling) throughout the annual cycle. The extra-Pasil market provides an extra 'cushion' during peak stress periods.

One of the most useful findings from the study of Dalupa ceramic exchange is that goods move in multiple distributional spheres, and that core areas for each distributional network are identifiable in material patterning. Boundaries of these systems overlap: they do not form the clearly demarcated spheres for which archaeologists yearn. That each network is characterized by a distinct set of social relations is also interesting, because the clustered patterning resulting
from non-local (i.e., extra-Pasil) dyadic relationships might be misinterpreted by archaeologists as evidence for political hierarchy and centralized control over the distribution of goods.

Analysis of the Dalupa exchange network yields insights regarding the form of distributional systems in general. The physical shape of subsistence exchange networks among independent specialists may be highly dependent upon the existence (or the successful establishment) of social ties between producers and consumers. Complex societies that involve state intervention in production and distribution systems might operate differently, as would luxury exchange networks.

The range (or size) of subsistence exchange networks is clearly responsive to multiple factors, such as market demand, travel time, and production scale. Dalupa potters encounter the same constraints as producers in non-motorized systems, except that their travel costs are reckoned in terms of time and truck fares. Dalupa potters have expanded their distributional network to its maximal extent in some areas (e.g., Balbalan municipality), where they barter goods on the periphery of neighboring networks. If production scale continues to escalate, then Dalupa potters may reach their geographic threshold in other directions (e.g., east toward Tabuk) or risk harm in tapping new networks to the south (e.g., Lubuagan area).

**Longitudinal approaches in ethnoarchaeological research.** Insights gained from this study were only made possible by a longitudinal approach. Methodologically, such an approach entails multiple field seasons (as circumstances permit) over one's professional career. A longitudinal approach provides a deeper understanding of dynamics within a material culture system than is attainable in a single season's project. Research reported here on Dalupa ceramic production and distribution is enriched by information from earlier work as part of the Kalinga Ethnoarchaeological Project. Only through the use of a longitudinal approach has it been possible
to document parameters of change in Dalupa’s ceramic production system. Hopefully, future research will rely on this study for baseline information, and will further expand our knowledge of one production system through time.

One goal in this study has been to situate the Pasil River Valley and its pottery making communities historically. Decisions as basic as materials selection are affected by political and social considerations, as are success rates for innovations that Dalupa’s potters introduce. Had the Philippine government not pursued the Chico Dam project, the transportation system might have ceased altogether and extra-Pasil markets would be effectively cut off. Had tribal warfare not flared in recent years, perhaps Dalupa potters would have headed south, not east, to sell their goods.

Prospects for change in Dalupa. Nearly six years after this ethnoarchaeological research project began, Dalupa potters continue to make and sell pots. Three of the older potters who were active in 1988 have died, and another four potters have either retired or are now inactive. Meanwhile, three of the occasional potters have joined the part-time specialists, and another three potters are vigorously selling clothes (even outside the peak coffee harvest season). Eight Dalupa potters have given birth thus far in 1993.

In some respects, the political situation in the study region is no more stable than it was at my departure. Cholera swept through the Pasil municipality in August of 1993; both Dalupa and Dangtalan people’s lives were spared. Highway banditry erupted into tribal warfare between Lubuagan and Balatoc, and tensions have escalated in recent months as people from those communities and Dangtalan have been ambushed, wounded, or killed. Where Dangtalan goes, so goes Dalupa, and regardless of the cause of internal feuding (see DeRaedt 1991:361), the cycle of Kalinga warfare continues. All of these events deeply affect decisions that Dalupa potters
make, and some of these decisions affect the ceramic production system.

What are the prospects for Dalupa’s ceramic production system? So much is contingent upon local events, whose outcome could push Dalupa’s system toward greater intensification or toward extinction. Were transportation networks to become more dependable and tribal warfare to cease to the south, the Dalupa system could continue to grow. The producer work force might grow and the diversity in the assemblage expand, while potters extend their webs of consumer localities. Were tribal warfare to continue, and transportation systems to shut down, supply of pottery would quickly outstrip consumer demand in the Pasil network. Such changes would shrink the size of the producer work force, Dalupa women might diversify into other areas.

So much is also dependent upon national events, since the Dalupa ceramic production system is intimately connected to larger forces of capitalist penetration. Trade networks throughout the Cordillera highlands first expanded in response to American colonial administration and American efforts to subdue tribal warfare. Among the many factors that encouraged the Dalupa trade network to expand, government entry into the area -- throughout the Chico River Dam project and through land leases to lumber companies, is one of the most important.

Strong indigenous resistance to the Marcos government’s Chico River Dam and Cellophil projects began to politicize the Cordillera populations from north to south. Legislative efforts to create a separate administrative region for the Cordillera began in 1985 by the Cordillera People’s Alliance, and continue to the present (see Rood 1991 for recent review). The apparent unity in culture across the five provinces of the Central Cordillera mountains is counterbalanced by linguistic diversity (seven major indigenous languages are spoken) and a wide variety of indigenous structures (DeRaedt 1991). If the Cordillera Autonomous Region is established, Kalingas may enjoy more economic and political autonomy, which in turn will affect the future
of Dalupa ceramic production and distribution.

Conclusions

This study of Dalupa pottery economics has explored aspects of one ceramic production system that is inextricably anchored to a particular time and place. Viewed closely, many aspects of Dalupa’s pottery making system are unique, including the political and social forces that affected production and the goods that potters manufacture. Viewed broadly, however, Dalupa shares many characteristics with neighboring Cordillera populations, with other intensive cultivators, and with other petty commodity producers throughout the world. Dalupa’s particular circumstances are as important as Dalupa’s similarities to other pottery-producing systems, and this point is emphasized repeatedly throughout the study.

After all the philosophies of science are said and done, archaeological interpretation, like religious devotion, requires a "leap of faith" (Yellen 1977:272). Methods for documenting spatial patterning in archaeology grow ever more sophisticated, and compositional techniques that identify the sources of goods involved in such patterning continually improve. Such methods and techniques undergo continual refinement, and are extremely useful tools for the archaeologist. But such tools can only be used with instructions, and these instructions are no more than educated guesses by researchers who utilize the fullest range of information available to them.

As the corpus of research on ceramic production systems grow, so, too does our ability to refine models of ceramic production and distribution. The form and focus of study that models use varies widely, as does the manner by which they relate observations to archaeological theories of hypotheses (Clarke 1972:1-2). The sturdiest models are built on cross-cultural comparisons, and such comparisons require the production of fine-grained data and thoughtful results. If this study provides either of these requisites, then it has achieved its goal.
APPENDIX 1

FIELD FORMS AND LOGS

This appendix contains field forms and logs that were used to collect data analyzed in this dissertation. Forms and logs were developed during the field season and mimeographed at the municipal center (Pasil Poblacion). Completed forms have been included in this appendix to illustrate the range of data collected using each survey instrument. Portions of the demographic and economic questionnaires were also used in Dangtalan and in Guina-ang by other project members; potter questionnaires (but not logs) were administered to Dangtalan potters as well. The extensive use of Kalinga terms in the instruments facilitated data collection with Kalinga research assistants. Most information from each of these forms has been computerized using a coding system on file at the Department of Anthropology at the University of Arizona.

The poor quality of the reproductions result from the use of mimeograph paper purchased in the Philippines. All forms are being reproduced on acid-free paper for archival preservation at the University of Arizona. Examples of the following forms and logs are included in this appendix: (1) Household Pottery Inventory; (2) Population Census; (3) Economic Questionnaire; (4) Additional Material Inventory; (5) Production Potter Survey (Parts I and II); (6) Sources of Materials for Potters Inventory; (7) Pottery Firing Log;\(^1\) (8) Standardization Measurements (entitled "Traditional Pots: [Non-Household]"); (9) Pottery Exchange Log; (10) Origin of Non-Traditional Forms Survey; and (11) Non-Pasil Municipality Trade Survey. Names of Dalupa residents have been omitted to maintain confidentiality.

\(^1\) An example of the potter productivity log was not included in this appendix, as it consisted of graph paper on which daily production figures were recorded.
### Household Inventory: Pots

<table>
<thead>
<tr>
<th>POT NO.</th>
<th>TYPE</th>
<th>GILI</th>
<th>WHERE MADE AND NAME OF POTTER</th>
<th>RELA TIONSHIP</th>
<th>WHERE &amp; HOW OBTAINED</th>
<th>WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Amineso</td>
<td>none</td>
<td>Dalupa</td>
<td>end cousin</td>
<td>Dalupa</td>
<td>1926</td>
</tr>
<tr>
<td>002</td>
<td>Amineso</td>
<td>none</td>
<td>Dalupa</td>
<td>gift from daughter</td>
<td>Dalupa</td>
<td>1928</td>
</tr>
<tr>
<td>003-004</td>
<td>small uppaya</td>
<td>none</td>
<td>Gobo-Gobo Tabik</td>
<td>none</td>
<td>won from Gobo-Gobo; brought from Ethel's potter</td>
<td>1928</td>
</tr>
<tr>
<td>005</td>
<td>small uppaya</td>
<td>none</td>
<td>Dalupa</td>
<td>gift</td>
<td>Dalupa</td>
<td>1931</td>
</tr>
<tr>
<td>006</td>
<td>small uppaya</td>
<td>none</td>
<td>Dalupa</td>
<td>gift</td>
<td>Dalupa</td>
<td>1932</td>
</tr>
<tr>
<td>007</td>
<td>medium baggan (5)</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1934</td>
</tr>
<tr>
<td>008</td>
<td>medium baggan</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1935</td>
</tr>
<tr>
<td>009</td>
<td>lallangan kitayim</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1936</td>
</tr>
<tr>
<td>010</td>
<td>medium uppaga</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1937</td>
</tr>
<tr>
<td>011</td>
<td>lallangan baggan</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1938</td>
</tr>
<tr>
<td>012</td>
<td>lallangan kitayim</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1939</td>
</tr>
<tr>
<td>013</td>
<td>lallangan kitayim</td>
<td>none</td>
<td>Dalupa</td>
<td>2nd cousin</td>
<td>Dalupa</td>
<td>1940</td>
</tr>
</tbody>
</table>

1. Household Pottery Inventory.

---

*Note: She picked it up again if were fired by Naling because it was broken.*

---

*The note is for “Mingo.”*
### Household Inventory: Pots

<table>
<thead>
<tr>
<th>Pot No.</th>
<th>Type</th>
<th>Gill</th>
<th>Where Made and Name of Potter (Potter No.)</th>
<th>Relationship</th>
<th>Where &amp; How Obtained</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>0016</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0017</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0018</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0019</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0020</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0021</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0022</td>
<td>Lallangan Othym</td>
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<td>Dalupa</td>
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<td>unknown</td>
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<tr>
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<td>Lallangan Othym</td>
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<td>Dalupa</td>
<td>unknown</td>
<td>unknown</td>
<td>1972</td>
</tr>
<tr>
<td>0024</td>
<td>Lallangan Othym</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>Longayan</td>
<td>Dalupa bought</td>
<td>1981</td>
</tr>
<tr>
<td>C-1010</td>
<td>Chinyas</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>purchased</td>
<td>1975</td>
</tr>
<tr>
<td>C-1011</td>
<td>Chinyas</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>purchased</td>
<td>1975</td>
</tr>
<tr>
<td>C-1013</td>
<td>Chinyas</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
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<td>1981</td>
</tr>
<tr>
<td>C-1020</td>
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<td>unknown</td>
<td>purchased</td>
<td>1983</td>
</tr>
<tr>
<td>C-1009</td>
<td>Chinyas</td>
<td>⃝ ⃝ ⃝ ⃝ ⃝</td>
<td>Dalupa</td>
<td>unknown</td>
<td>purchased</td>
<td>1980</td>
</tr>
</tbody>
</table>

1. Household Pottery Inventory (cont.).
1. Household Pottery Inventory (cont.).

<table>
<thead>
<tr>
<th>#</th>
<th>Christian Name</th>
<th>Kalina Name</th>
<th>Relationship</th>
<th>Sex</th>
<th>Age</th>
<th>Occupation</th>
<th>From</th>
<th>Occupation</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Total number of people living in the house: 5

5. Family members living in barrio in another house: N/A

6. Members of family no longer living in barrio:

<table>
<thead>
<tr>
<th>#</th>
<th>Christian Name</th>
<th>Kalina Name</th>
<th>Relationship</th>
<th>Sex</th>
<th>Age</th>
<th>Occupation</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. No. of children born: 7

8. Family members with high school or college education:

|        |             |             |             |             |             |             |             |             |
|--------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

**Burro: Lapat Dalupa**

**Family members with wage earning occupations:**

<table>
<thead>
<tr>
<th>Employer and Location</th>
<th>Occupation</th>
<th>Hours Long?</th>
<th>Pay Form or Location</th>
<th>Income in Last 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Tabor</td>
<td>Teacher</td>
<td>2.4 yrs.</td>
<td>Full-Time</td>
<td>Php 2,000.00</td>
</tr>
<tr>
<td>Deep Tabuk</td>
<td>Social Worker</td>
<td>1 year, 1987-88</td>
<td>Full-Time</td>
<td>Php 1,000.00</td>
</tr>
<tr>
<td>Ramon Pintor</td>
<td>Accountant</td>
<td>6 months, 1987-88</td>
<td>Full-Time</td>
<td>Php 1,500.00</td>
</tr>
</tbody>
</table>

**Family members who have worked outside the barrio and returned N/A**

<table>
<thead>
<tr>
<th>Employer &amp; Location</th>
<th>Occupation</th>
<th>Hours Long?</th>
<th>Income/ Period of Time</th>
</tr>
</thead>
</table>

**Potters in the family: N/A**

<table>
<thead>
<tr>
<th>How Long Making Pots?</th>
<th>Household Use</th>
<th>Sold/Skirted</th>
<th>Sold/Skirted</th>
<th>Do You Make Ceramic Items?</th>
</tr>
</thead>
</table>

**Note: House (Kanselag) in the family: N/A**

<table>
<thead>
<tr>
<th>From whom was skill learned?</th>
<th>How Long Making Baskets?</th>
<th>Where Sold or Skirted?</th>
<th>Are you teaching anyone else to make these products?</th>
<th>What?</th>
</tr>
</thead>
</table>

* The family (mean in last 12 months) if it is not known.
* Nuclear family
* In school: 1. High School 2. College
* 6's finished job (contract job) in February 1988 but remains inbalance

2. Population Census (cont).
3. Economic Questionnaire.
### ADDITIONAL MATERIAL INVENTORY

<table>
<thead>
<tr>
<th>ITEM</th>
<th>KALINGA</th>
<th>QTY</th>
<th>WHERE AND WHEN OBTAINED</th>
<th>DETAILED DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolos</td>
<td>Bachang</td>
<td>2</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Bolos Sheaths</td>
<td>San-Iney</td>
<td>1</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Harvest Knives</td>
<td>Locomb</td>
<td>1</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Axes</td>
<td>Wapsy</td>
<td>1</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Shovel</td>
<td>Pain</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpenter Tools</td>
<td>Mantillo Legaci, etc.</td>
<td>1</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Mechanic Tools</td>
<td>Wrench, Files, etc.</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Flashlights</td>
<td>Linti</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>School Barrow</td>
<td>Kalwana</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Latches</td>
<td>Ulas</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Clocks</td>
<td>Ulas</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Lamesas</td>
<td>Cameras</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Rice Mortar &amp; Pestle</td>
<td>Lusong, (Al-u)</td>
<td>3</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Coffee Mortar &amp; Pestle</td>
<td>Lusongsong &amp; Al-al-u</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Pig Trophys</td>
<td>Atutung</td>
<td>1</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Plastic Jugs</td>
<td>Timba</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Abundances (Shaman) Items</td>
<td>1</td>
<td></td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Artisan Items</td>
<td>0</td>
<td></td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
<tr>
<td>Coconut Bowls</td>
<td>Chuyuk</td>
<td>0</td>
<td>1977 (J. T.)</td>
<td></td>
</tr>
</tbody>
</table>

Do you have:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>KALINGA</th>
<th>QTY</th>
<th>MAKER</th>
<th>WHEN &amp; WHERE OBTAINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Pot Rest</td>
<td>Chalpna</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sama Fire Gates</td>
<td>Chalpna</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceramic Fire Gates</td>
<td>Chalpna</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OTHER QUESTIONS:

How many times did family head go to Tabuk in 1987?  
How many times did family head go to Tuguegarao in 1987?  
Where did your Kalinga Name (Surname) come from? (Father, Grandfather, etc.)  

Did you butcher Animals in 1987?  

<table>
<thead>
<tr>
<th>ANIMAL</th>
<th>QTY</th>
<th>VALUE</th>
<th>WHY BUTCHERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>1</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>2</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>2</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

4. Additional Material Inventory.
PRODUCTION POTTER SURVEY

Barrio: Dapua

Date: 04/21/87

Potter Name and I.D. #: (207) 85

Date of Birth: 1939

1. What year did you begin making pottery? 1951

2. What year did you begin making pottery for sale or exchange? 1951

3. Do any of your close relatives make pottery?

<table>
<thead>
<tr>
<th>NAME</th>
<th>RELATIONSHIP</th>
<th>BARRIO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sister</td>
<td>Dapua</td>
</tr>
<tr>
<td></td>
<td>Wife of my son</td>
<td>Dapua</td>
</tr>
<tr>
<td></td>
<td>Daughter</td>
<td>Dapua</td>
</tr>
</tbody>
</table>

4. Do you make pottery during the rainy season (June - December)? Y

5. Do you make pottery during the dry season (January - May)? Y

6. Do you produce the following types?

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FREQUENCY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uppaya</td>
<td>Y</td>
<td>Frugal</td>
</tr>
<tr>
<td>Ittigam</td>
<td>Y</td>
<td>&quot;</td>
</tr>
<tr>
<td>Inmox</td>
<td>Y</td>
<td>&quot;</td>
</tr>
<tr>
<td>Sylkong</td>
<td>Y</td>
<td>&quot;</td>
</tr>
<tr>
<td>Gual</td>
<td>Y</td>
<td>Plain bat or color</td>
</tr>
<tr>
<td>Amuit</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Volsav</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Plaques: God Bless</td>
<td>Y only on order</td>
<td></td>
</tr>
<tr>
<td>Plaques</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashtray:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Flower Vase Style</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Flower Vase</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Flower Pot</td>
<td>Y</td>
<td>In vase only</td>
</tr>
<tr>
<td>Pencil Holder</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>(Cup (has handle))</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Goblet (no handle)</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Serving Platter</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Money banks (most common have asterisk)</td>
<td>Pig Dog Cat, Chicken Fish Cow Carabao Elephant Shell (with quill)</td>
<td></td>
</tr>
</tbody>
</table>

5. Production Potter Survey (Part I).
7. Do you receive pots from other potters?

<table>
<thead>
<tr>
<th>NAME</th>
<th>RELATIONSHIP</th>
<th>BARRIO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>close friend</td>
<td></td>
</tr>
</tbody>
</table>

8. How many vessels do you produce:

- A. In one day: 
  - RAINY SEASON: 5
  - DRY SEASON: 3

- B. In one week: 
  - RAINY SEASON: 4
  - DRY SEASON: 9

9. Do you exchange or sell pots outside your barrio? Y

10. Do you exchange or sell pots outside Pasil? Y

11. At what times of the year do you exchange or sell the most vessels? Summer

12. Which barrios do you supply? (Asterisks by most frequent)

<table>
<thead>
<tr>
<th>BARANGAY</th>
<th>SUPPLY (Y/N)</th>
<th>HOW OFTEN</th>
<th>WHICH BARRIOS OR SITIOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colayo</td>
<td>Y</td>
<td>3X year</td>
<td></td>
</tr>
<tr>
<td>Balatong</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Bagtayan</td>
<td>Y</td>
<td>2X month</td>
<td></td>
</tr>
<tr>
<td>Guinang</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Panga</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Malungad</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Maginlay</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Balinciegos Sur</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Balinciegos Norte</td>
<td>Y</td>
<td>3X month</td>
<td></td>
</tr>
<tr>
<td>Camaluan</td>
<td>Y</td>
<td>1X year</td>
<td></td>
</tr>
<tr>
<td>Dulao</td>
<td>N/Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abled</td>
<td>Y</td>
<td>1X year</td>
<td></td>
</tr>
<tr>
<td>Dapitan</td>
<td>Y</td>
<td>1X year</td>
<td></td>
</tr>
<tr>
<td>Uma</td>
<td>Y</td>
<td>1X year</td>
<td></td>
</tr>
<tr>
<td>Dagupan (Tabuk)</td>
<td>Y</td>
<td>1X year</td>
<td></td>
</tr>
<tr>
<td>Lobsangan</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Barangays</td>
<td>Y</td>
<td>1X year only</td>
<td>N/A</td>
</tr>
</tbody>
</table>

5. Production Potter Survey (Part I) [cont.].
PRODUCTION POTTERT SURVEY

Date: 12/31/87
Potter Name
Potter I.D. # 207

Barrio: Canopia

13. Can you name people in each barrio which you supply?

<table>
<thead>
<tr>
<th>Barrio</th>
<th>KALINGA NAME</th>
<th>CHRISTIAN NAME</th>
<th>GIFTS/EXCHANGE/</th>
<th>CASH</th>
<th>RELATIONSHIP</th>
<th>WHEN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canopian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bagayan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lalayan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canayan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nalayan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tayan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. How many pots do you carry to each barrio?

<table>
<thead>
<tr>
<th>Barrio</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canopian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bagayan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lalayan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canayan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nalayan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tayan</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Do people from different barrios order certain forms of pots from you? Which kinds?

16. Do people from different barrios order certain styles of pots from you? Which kinds?

7. How many vessels have you produced in the last year?

8. How many vessels have you traded in the last year?

How do you decide how many pots to carry to each barrio?

5. Production Potter Survey (Part I) [cont.]
1. What level of schooling did potter finish? - [Answer]
2. Why did potter stop schooling? - [Answer]
3. Can potter read? [ ] Can potter write? [ ]
4. Can potter speak the following dialects?
   - [Checkboxes]
   - English
   - [Other languages]
5. What is the translation of the potter’s tiling name, and does it have a social meaning? [ ]
6. Why did the potter begin to sell pots outside her dwelling? [Answer]
7. (If applicable) Why did the potter stop selling pots outside her dwelling? The pots are attractive.
8. Does potter own/ purchase pots from other potters for her own household use? [ ]
9. List last 5 pots purchased.
   - [List]
10. What are the three to four most prominent potters in the village (name, relationship)?
   - [List]
11. For LOCATION
    - [Describe]
12. For HOUSEHOLD
    - [Describe]
13. For POTTER
    - [Describe]
14. For PAYMENT
    - [Describe]
15. For SURVEY
    - [Describe]
13. Do potters prefer to work in the fields or to make and sell pots? Why?
   The potters work in the fields because they do not attend the work.

14. (If applicable) Do potters prefer to sell earthenware clothes or to make pots at different times of the year? Why?
   The potters make pots rather than sell earthenware clothes because they are lazy to go out.

15. From whom do the potters learn to make pots (name, relationship)?
   Own - I - And Conmi

16. How many potters taught others to make pots (name, relationship)?
   N/A

### C. MULTIPLE PATRIMONY

Do potters receive help from friends or relatives in the following stages of pottery-making?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Help (relationship)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firing (cooking)</td>
<td>-</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Wet (cooking)</td>
<td>-</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Molding (cooking)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Molding (pottery)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Potters (cooking)</td>
<td>-</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Painters (cooking)</td>
<td>-</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Glass (cooking)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Iron (cooking)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Molding (pottery)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Molding (pottery)</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

5. Production Potter Survey (Part II) [cont.]
1. **FITA (Clay)**
   a) Locations where procured:
   1) Legok - owned by...  
   2) Legok - owned by...
   3) Legok - owned by...
   4) Torong - owned by...
   b) Who owns FITA source (relationship)? May she get FITA anywhere?

   c) Does she have preferred FITA sources? Why?

2. **CHUYAN (Serving Plate)**
   a) Barrio(s) supplying CHUYAN (currently? Previously? When?):
   1) Alwanyan
   2) Coalgara
   4) 
   b) When did she get last CHUYAN? Did she go to supplying barrio, or did traders come to her barrio?
   **1972** – Yes - She went to buy in Talagang
   c) How much did CHUYAN cost?
   **1/2 peso** - 1 CHUYAN
   d) Does she have her own CHUYAN? How many?
   **3**
   e) Does she use someone else’s CHUYAN (relationship)? Does she share here (relationship)?
   **Yes** - Ince (Distant relative)
   f) Does she also use metal plates as CHUYAN? For what types and sizes of vessels?
   **Yes** - Small size
   g) Does she have a preference for metal or wood?
   **No** - She likes both CHUYAN and metal plate

3. **PUJA (Utensils)**
   a) Barrios supplying PULA:
   1) Bajugan
   2) Bahan
   3) 
   b) When did she get last PULA? Did she go to supplying barrio, or did traders come to her barrio?
   **1987-90** - Trades from Bajugan come here to sell PULA

---

6. Sources of Materials for Potters Inventory.
4. LEBU (Resin)
   a) Barrios supplying LEBU:
      1) Bagagens Unca... 3) Bulots... 5) Sanugen...
      2) Bulabon...
   b) When did she get last LEBU? Did she go to supplying barrio, or did traders come to her barrio?

5. HAMARGA (POTTERY-MAKING)
   c) How much does LEBU cost?

6. Sources of Materials for Potters Inventory (cont.)
6. Sources of Materials for Potters Inventory (cont.).
<table>
<thead>
<tr>
<th>DATE</th>
<th>PUTTERS FILING (NAME, IN #)</th>
<th>NUMBER AND TYPES OF PIECES</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-1-5-88</td>
<td>(206)</td>
<td>1 ashtray</td>
</tr>
<tr>
<td>11-29-88</td>
<td></td>
<td>1 tallowayan</td>
</tr>
<tr>
<td>11-29-88</td>
<td></td>
<td>1 immosod</td>
</tr>
<tr>
<td>11-29-88</td>
<td></td>
<td>2 egan large</td>
</tr>
<tr>
<td>11-29-88</td>
<td></td>
<td>1 flower vase</td>
</tr>
<tr>
<td>2-1-29-88</td>
<td></td>
<td>1 immosod</td>
</tr>
<tr>
<td>2-1-29-88</td>
<td></td>
<td>2 wong (allangan)</td>
</tr>
<tr>
<td>2-1-29-88</td>
<td></td>
<td>1 ash tray</td>
</tr>
<tr>
<td>3-12-88</td>
<td>fired alone</td>
<td>23 small oppaya</td>
</tr>
<tr>
<td>2-13-88</td>
<td>fired alone</td>
<td>1 egan medium</td>
</tr>
<tr>
<td>2-13-88</td>
<td>fired alone</td>
<td>50 small oppaya</td>
</tr>
<tr>
<td>2-17-88</td>
<td>fired with</td>
<td>1 tallowayan</td>
</tr>
<tr>
<td>2-17-88</td>
<td>fired with</td>
<td>4 small oppaya</td>
</tr>
<tr>
<td>3-21-88</td>
<td>fired with</td>
<td>1 ash tray</td>
</tr>
<tr>
<td>3-21-88</td>
<td>fired with</td>
<td>1 tallowayan</td>
</tr>
<tr>
<td>3-21-88</td>
<td>fired with</td>
<td>3 small oppaya</td>
</tr>
<tr>
<td>3-21-88</td>
<td>fired with</td>
<td>1 tallowayan</td>
</tr>
<tr>
<td>5-27-88</td>
<td>fired with</td>
<td>3 egan (small)</td>
</tr>
<tr>
<td>5-1-88</td>
<td>fired with</td>
<td>1 ashtray</td>
</tr>
<tr>
<td>5-1-88</td>
<td>(fired alone)</td>
<td>1 small oppaya</td>
</tr>
</tbody>
</table>

7. Pottery Firing Log.
8. Standardization Measurements (entitled "Traditional Pots: [Non-Household]").
<table>
<thead>
<tr>
<th>DATE</th>
<th>NAME OF SELLER AND POTTER</th>
<th>NUMBER AND KIND OF POTS</th>
<th>EXCHANGED WITH WHOM</th>
<th>NAME AND RELATIONSHIP</th>
<th>EXCHANGED FOR WHAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-12-27</td>
<td>(201)</td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td>3 shillings</td>
</tr>
<tr>
<td>10-3-27</td>
<td>(201)</td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td>2 shillings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall pitcher</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall pitcher</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall pitcher</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td>1 dollar p délai</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tall jug</td>
<td>Deluga</td>
<td>Deluga</td>
<td></td>
</tr>
</tbody>
</table>

1. Name of form (English) ________________________
2. Name of form (Killing) ________________________
3. May include the following variations:
   a) ________________________
   b) ________________________
4. When did you begin to make this form? ________________________
5. How did you get the idea to make this form? ________________________
6. Did you learn to make this form from anyone else? ________________________
   a) ________________________
   b) ________________________
7. How many forms have you made? 1-2/3-6/7-10/More than 10 ________________________
8. How many of these forms can you make in a day? ________________________
9. Did she ever tell you the first or her part in making the form? (Name, Relationship) ________________________
10. How did she get the idea to make this particular form? ________________________
11. Based on her plan ________________________
12. What year did she begin to make this form? ________________________
13. Which sister in your family makes the greatest number of this particular form? (Name, Relationship) ________________________
14. Which sister in your family makes the most of this particular form? (Name, Relationship) ________________________
15. Why do another form to be the best? ________________________
   Well - done, nice-looking ________________________

1. Name of location (Barrio, Municipality): Deluza, Balaban
   May include: Balaban, Da-D
2. What year did potter begin selling pots in this location? 1978
3. Why did potter decide to sell pots in this location? People from Balaban who can't afford to sell (gas began more)
   so she decided to try them.
4. How often does potter sell pots in this location? (list year potter stopped selling pots in this location and reason, if applicable)
   X A month (sometimes 6x month)
5. Does potter sell other goods in addition to her pots in this location? (list items and frequency of selling these items)
<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>X once/2</td>
</tr>
<tr>
<td>Mango</td>
<td>X once/3</td>
</tr>
<tr>
<td>Rice</td>
<td>X once/4</td>
</tr>
</tbody>
</table>
6. Does potter travel with companions? (list names, relationship)
   (Distant: ) (Niece: )
7. Mode of transportation employed (list fare where applicable):
   a) To get to this location: Walk to Balaban, ride to Balaban (4-1978) X
   b) To return from this location: Walk back to Balaban (X)
8. What are least popular types that potter sells in this location? (list types and prices)
9. List current prices/barter equivalents for the following items potter sells in this location:
<table>
<thead>
<tr>
<th>Good</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>(Peso)</td>
</tr>
<tr>
<td>Mango</td>
<td>(Peso)</td>
</tr>
<tr>
<td>Rice</td>
<td>(Peso)</td>
</tr>
</tbody>
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