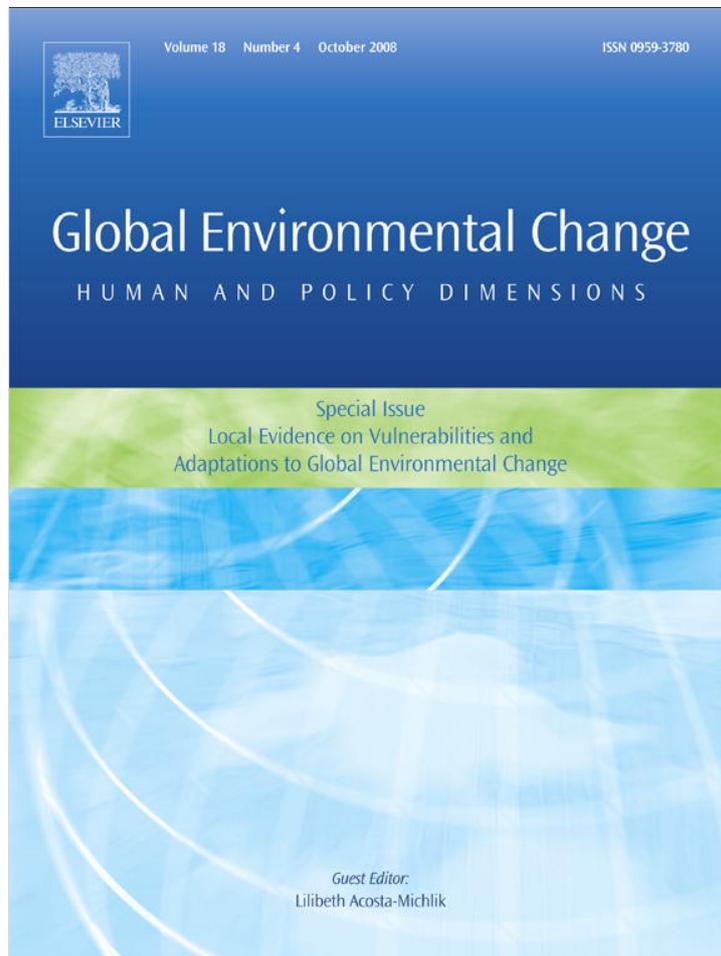


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Between structure and agency: Livelihoods and adaptation in Ghana's Central Region

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ABSTRACT

This article examines adaptation decision-making through a diversified livelihoods strategy that distributes risk across market and subsistence production in Ghana's Central Region. Specifically, it asks how this strategy, which is an adaptation to a relatively recent convergence of economic and environmental uncertainty in this context, is accepted and reproduced by society at large, even as this adaptation results in unevenly distributed benefits and costs. An examination of the case in question suggests that the persistence of this adaptation has little to do with its material outcomes. This adaptation persists because, despite its unequal and less-than-optimal material outcomes, it is rooted in the ability of men to link this adaptation to existing gender roles, thereby legitimizing the adaptation and the gendered roles it relies upon. This finding calls into question the very idea of a successful adaptation, and suggests that much more attention must be paid to the persistence of particular adaptations if we are to understand existing adaptations and build upon them to enhance local capacities for managing economic and environmental change.

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1. Introduction

In the current context of global environmental change and economic transformation, both viewed as at least somewhat inevitable,¹ the issue of adaptation has moved to the fore of conversations in both the Human Dimensions of Global Change (HDGC) and development literatures (Janssen, 2007). Adaptation is used to answer many key questions in HDGC research, ranging from concerns for how particular hypothetical actions might moderate the impacts of modeled changes in the future climate to the facilitation of practical, particular adaptation initiatives at the local level (Smit and Wandel, 2006). However, the question of what shapes adaptation decision-making, an issue critical for understanding adaptation across this broad range of purposes, remains unresolved in the literature.

This article approaches adaptation decision-making from an empirical standpoint. Typically, empirically based work on adaptation, what Smit and Wandel (2006, p. 285) call “the actual practices and processes of adaptation”, is heavily concentrated in

literatures related to food security, development and political ecology. These efforts, which rarely use the term adaptation explicitly, seek to identify and develop particular adaptive practices that emerge from and are tailored to the needs of a particular community. In this literature, understandings of local adaptation decisions emerge from empirical research in particular places, rather than general concepts or hypotheses. As a result, it valorizes the knowledge and experience of those living in particular places over that of “expert knowledge” developed outside of the context under investigation.

Empirical studies of adaptation aid us in understanding how the experiences of change in a particular community, and the means that community develops to address those changes, might “accommodate [externally-designed] adaptations or provide means of improving adaptive capacity” by telling us “what can be done in a practical sense, in what way and by whom, in order to moderate the vulnerability to the conditions that are problematic for the community” (Smit and Wandel, 2006, p. 285; see also Morduch and Sharma, 2002; Pahl-Wostl, 2002; Moss et al., 2001). However, in so doing they highlight the fact that particular adaptation and coping decisions are not only the result of complex interplays between consumption and production decisions, but also shaped by complex and locally specific social considerations (Adger, 1999; Pelling and High, 2005; Bohle et al., 1994; Morduch, 1995; Smit and Wandel, 2006).

I argue that we can organize this complexity through a focus on why particular adaptations are accepted or implemented within a group, even if the outcomes of those solutions result in

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¹ The physical science of greenhouse gases dictates some level of climate change for at least the next century (see Solomon et al., 2007). While there is no physical inevitability behind the transformation of the world economy into an ever-more neoliberal capitalist structure, the discursive construction of such transformation as good, beneficial and inevitable likely ensures the continuation of this trend in the immediate future (cf. Gibson-Graham, 2006).

uneven benefits for those in that group. Through such an approach, we can see that the most persistent adaptations are those that draw upon existing, naturalized understandings of society, environment and economy to ground particular decisions and lend them legitimacy. Approaching adaptation decision-making through an examination of the persistence of particular adaptations does not overlook the role of individual agency in shaping outcomes, but makes clear that individual decisions take place in a social context that is beyond the control of the individual decision-maker, and must be answered to if a particular decision is to become a socially sustainable adaptation.

To illustrate the utility of focusing on the persistence of particular adaptations to the larger understanding of adaptation decision-making, I present a case study of adaptation decision-making in a rural setting in West Africa. This case study, set in Ghana's Central Region, illustrates that while decisions about adaptation serve to provide some measure of safety and certainty to the lives of those living in the research context, they do so at the cost of women's self-determination, overall household income and even overall household safety and certainty, all of which are sacrificed in an effort to maintain existing social orders. By focusing on their endurance in the face of these adverse outcomes, I demonstrate that the implementation and persistence of these adaptations is a result of how they call on and reproduce existing gender roles in the research context, and not their material outcomes. This finding is of importance to those working on adaptation and development initiatives, as it calls into question the definition of a successful adaptation, and the use of existing adaptations as the foundation for new initiatives.

2. Framing local adaptation decision-making

This article takes Smit et al.'s (2000) definition of adaptation as "adjustments in ecological–socio-economic systems in response to actual or expected" effects and impacts of particular stimuli. This construction of adaptation aligns nicely with the extensive empirical literature on local adaptations in that it integrates biophysical, social and economic processes with not only measurable outcomes of particular shocks or pressures, but also the perceived effects and impacts of those shocks and pressures. A broad empirical literature on adaptation (though rarely using that term) in development studies and political ecology focuses on the interplay of economy, environment and society, especially social difference, as a means of understanding particular adaptation decisions (e.g. Bigombe Logo and Bikie, 2003; Goebel, 2002; Jackson, 1993, 1998a,b; Carney, 1996; Carney and Watts, 1990; Schroeder, 1997, 1999; Barrientos et al., 2005; Bassett, 2002; Bryceson, 1995; Goheen, 1988; Grier, 1992; Harrison, 2001; Leach and Fairhead, 1995; Peters, 1995; Riley and Krogman, 1993; Rocheleau et al., 1996; Carr, 2005b). This literature highlights the importance of social power to the outcomes of decision-making, bringing to the fore the questions of who makes decisions about what constitutes a problem to be addressed through a new activity, and what the means of addressing that problem should be. This, in turn, raises the questions of winners and losers under particular adaptations, as the benefits and costs of any particular effort will not be distributed evenly through a social group.

Finding the winners and losers of particular adaptations is critical to understanding the material outcomes of these decisions. While local knowledge is an important component of adaptation decision-making, the identification of winners and losers in particular adaptation outcomes means that we do not have to uncritically valorize that knowledge, as this information prompts us to consider how the definitions and solutions of particular decision-makers work better for some members of a

given social group than others. In the political ecological and development literatures, this approach is particularly powerful because it is scalable, providing a set of considerations for the evaluation not only of local knowledge, but also of development agencies and governments that design and fund particular adaptation initiatives.

For example, the Government of Ghana recently revisited a plan to dam the Black Volta river for the purpose of hydropower generation, ostensibly in the interest of economic and energy self-sufficiency. This decision comes after a 2001 determination by the same government that energy from the project would be more expensive than other energy generation options, and in the face of clear evidence, in the form of repeated bouts of power rationing, that Ghana's current dependence on hydropower (via the Akosombo dam) has left the country's energy grid vulnerable to fluctuations in precipitation. When we consider winners and losers associated with this project, even if only at the broad institutional scale, the decision to move forward with this project becomes intelligible. The primary funding source for this \$620 million project is the Export–Import Bank of China. The primary construction agent is Sino Hydro, a Chinese firm. Therefore, China "wins" with this project, which represents a Chinese version of the much maligned "development industry"² that, while ostensibly spending money to improve the situations of those in the Global South, spends most of that money on Chinese contractors, generating jobs and wealth for China. The current government of Ghana also "wins" with this project, as the dam will attract capital and a large project to the country that can be used as a symbol of their efforts to improve the condition of all Ghanaians. Whether or not the dam actually generates the electricity needed by Ghana is not a critical consideration in the current decision, as the current president and much of the government will be out of office long before the project is completed. Further, these decision-makers do not live among the 2500 people likely to be displaced by the construction of the dam, or the thousands of others whose livelihoods and health will be impacted. Therefore, the attention to winners and losers in the development and political ecological literatures allows us to critically evaluate not only village-level adaptation outcomes, but also serves as a means of critically evaluating adaptation initiatives promoted by governments and aid agencies and the ways in which the needs of these institutions might shape understandings of local needs and adaptations.

The empirical literature addressing local adaptation therefore serves as a means of understanding the unequal outcomes of particular adaptations. However, understanding who the decision-makers are, and what inequalities result from particular adaptations at a particular point in time, does not provide a strong foundation for the evaluation of the future outcomes of these decisions under new conditions. I argue that we can refine our understandings of adaptation decision-making and its outcomes in the present, and better evaluate the sustainability of particular adaptations, by asking how particular adaptations are accepted and reproduced by society at large, even as the adaptations result in unevenly distributed benefits and costs. In other words, we must ask why those who "lose" under a particular adaptation continue to participate in that adaptation. We must identify and evaluate resistance to these definitions and their associated adaptations to understand why such resistance does not result in more just adaptation outcomes. Where there appears to be an absence of resistance, we must ask why, for no adaptation will result in equal outcomes for all.

² For discussions of the "development industry", see Escobar (1995, 1997), Esteva (1992) and Ferguson (1994).

Focusing on the persistence of adaptations allows us to extend current understandings of adaptation decision-making. At least implicitly, much of the empirical literature treats adaptation, whether developed locally or the product of top-down planning by a development agency, as meeting the material needs of those experiencing a particular stress or shock and protecting the prerogatives of the decision-makers in society (or in the context of a development project). In this paper I present evidence for a second general proposition about adaptations. A focus on the persistence of adaptations makes it clear that the adaptations that persist are those that mobilize *existing* social categories and power relations to achieve their dual goal. Without such mobilization, it is very difficult to legitimize any adaptation with unequal outcomes.

The rest of this article is devoted to illustrating this point, via an analysis of what I call the “diversified strategy”, an agricultural adaptation in Ghana’s Central Region. In the village settings I will explore below, this adaptation has markedly uneven outcomes for men and women of the same household, and puts the material well-being of the household at risk. Despite these issues, this strategy has functioned for decades (see Carr (2005b) for a discussion of these strategies in the 1960s and 1970s). As I will illustrate, the persistence of the diversified strategy is not a result of its material outcomes as much as it is a product of the ways in which this strategy calls upon widely held gender roles to legitimize these strategies and their outcomes, even among women who clearly lose under this adaptation.

3. Dominase and Ponkrum: environment, economy and responsibility

The villages of Ponkrum and Dominase are located in Ghana’s Central Region, about 8 km to the northwest of Elmina at the extreme southern edge of the Upper Guinea Forest (Fig. 1). These two villages have, since their founding in the 1820s, existed in a primary-satellite settlement configuration. Today the village of Dominase (population 12)³ is the junior partner of this pairing (Ponkrum has an official population of 211). The farmers of these villages work plots that are so thoroughly interspersed throughout the surrounding land that it is common to see a farmer from one of these villages pass through the other to get to his or her farm. Further, the residents of Dominase and Ponkrum live along the same road, have the same access to transportation, send children to the same schools, and even draw their traditional leadership from one another.

These residents of these villages have seen significant economic and environmental change over the past century, ranging from the introduction of cash crops like cocoa, to the end and fall of logging as a source of local non-farm employment (NFE), to the steady degradation of local soils brought on by shifting precipitation patterns (Solomon et al., 2007; Waylen and Owusu, 2007) and the loss of tree cover in the area (see Gyesei et al., 1995). The context of uncertainty that exists in these villages today was created as various specific manifestations of these broad pressures came together in Dominase and Ponkrum in the late 1960s. It was at this time that local NFE (in the form of local logging) collapsed due to rapidly declining prices on the world market (Carr, 2002). The end of this local industry not only removed a source of NFE from these villagers, it also led to the

decline of the road network (as the logging company built and maintained the road) that linked these villages to NFE opportunities and markets for their agricultural products. The result was a restructuring of the local economy, from one that supported a mixture of NFE and farm activities to one where agriculture dominated all livelihoods (Carr, 2005b). The residents of these villages were thrust back on their farms for their livelihoods during a period of shifting patterns of seasonality for rainfall. This shift, from a major and a minor rainy season (that facilitated the cultivation of two sets of crops each year) to a major rainy season and a continuous supply of lighter rain for months after the end of the major season (Waylen and Owusu, 2007), challenges the food and livelihoods security of those living in these villages because this new pattern is much less conducive to a second planting season. In short, the residents of this area have become increasingly dependent on their natural environment for their livelihoods over the past 40 years, while at the same time the local environment has shifted from its historical patterns and become, from a local perspective, difficult to predict and understand.

Severe environmental and economic shocks are becoming a way of life in Dominase and Ponkrum. In 1998 the major rainy season simply did not occur, stunting crops and compromising the livelihoods of the residents of these villages. From the fall of 1999 to the summer of 2000, the Ghanaian Cedi lost half its value against major currencies due to a crisis in global cocoa markets. For the residents of these villages, this meant spiraling costs of goods including basic materials for work and shelter such as machetes and roofing sheets, with no commensurate rise in farm gate prices for the crops they relied upon for their incomes. In 2005, excessive rain fell during the major rainy season, causing farms on otherwise-stable slopes to wash away, and stream beds that had been dry for more than a decade to run, flooding farms that had been planted in them. The result of these changes, and their associated shocks, is more than just heightened uncertainty in a critical aspect of local livelihoods at particular times of the year—uncertainty has become the normal situation in these villages.

The approximately 110 adult residents of these villages have livelihoods centered on agriculture, though many augment their agricultural production with other, relatively small amounts of income through activities such as petty trading or irregular wage labor. The farms associated with Dominase and Ponkrum are rain-fed, generally quite small (farms larger than 5 ha are unusual, and always incorporate several hectares of low-labor acacia and mature oil palm) and the labor for these farms usually comes from the household.⁴ These residents follow Akan land tenure practices in which the male head of household acquires land from his clan for the entire household, and then allocates that land to members of the household. Once the land is allocated, the person working it gains sole control over the land and its products (Egyir, 1998; see also Quisumbing et al., 1999, 2001; Brydon, 1987; Awusabo-Asare, 1990). Thus, in Dominase and Ponkrum the household becomes a problematic term for describing economic production, as this domestic unit often contains at least two ostensibly autonomous agricultural producers (Carr, 2005a). As I will illustrate below, the economic autonomy of those belonging to a household creates a situation in which “household” decision-making, in the sense of a unitary household, where members “behave as if they are in agreement on how to best combine time,

³ Despite appearances, Dominase is not merely an appendage of Ponkrum. Dominase is an autonomous political unit that has its own stool, a symbol of settlement autonomy among the Akan. It is also worth noting that the official statistics for Dominase record only five inhabitants. However, during my fieldwork I observed four households and some 15 residents living in this village.

⁴ Some households do hire day labor to work in their farms. However, these households tend to use such labor to clear a new field, or for a few days each year during times of crucial planting or harvesting. No farm associated with these villages is run through substantial hired labor. Impromptu communal labor efforts to clear new fields are also common, but such efforts are also for a limited time and purpose.

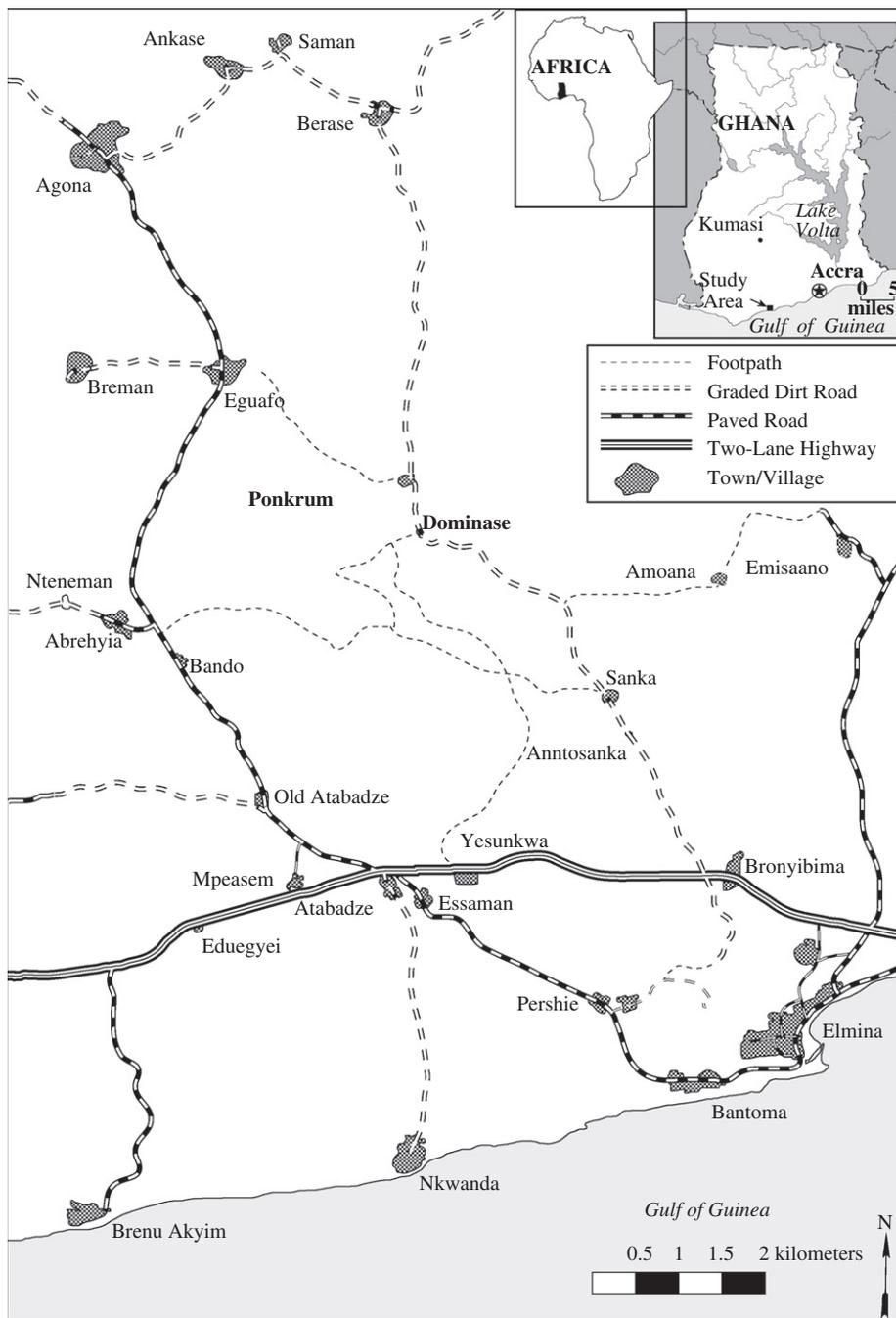


Fig. 1. Locator map of the study area, with Dominase and Ponkrum at center.

goods purchased in the market, and goods produced at home, to produce commodities that maximize some common welfare index” (Haddad and Hoddinott, 1994, p. 543), is very rare. These households are better described as non-cooperative, in which the household is a site where individualized economies are linked by the reciprocal claims members of the household can make on one another (e.g. Doss, 1996; Fapohunda, 1988; Haddad and Kanbur, 1990).

While problematic as an economic institution, the household⁵ is a meaningful institution through which gender roles are

organized in these villages. Men and women have distinct and broadly agreed-upon responsibilities to the household. Men are responsible for obtaining land for the household, clearing that land to ready it for farming, and deciding how much land each member of the household gets. Men also pay school fees, buy

(footnote continued)

farm on his own. Further, his second wife lived in a village some 10 km from Dominase and Ponkrum, so she was not able to help in day-to-day agricultural work. These facts resulted in the household adopting a transitional strategy other than those under examination in this paper. It is not surprising that there is only one polygamous household in these villages, as all residents agree that a man can only take more than one wife if he can afford to provide for her. As virtually all of the men in this village earn less than \$600 a year, there are few candidates who meet this standard.

⁵ While polygamy is allowed among the Akan, only one household in these villages is polygamous. This household is not included in this study because the male head of this household had recently injured his knee, and was barely able to

school uniforms and books, purchase clothing for their children, and provide money for daily food purchases. Women are responsible for managing all domestic duties, childcare, making food for funerals (though the man must buy the ingredients), transporting crops to market in nearby towns, and purchasing pots, buckets and other household goods. Men and women share responsibility for the purchase of kerosene and charcoal for lighting and cooking.

The residents of Ponkrum and Dominase agree that, in a monogamous household, if a person cannot or will not meet his or her obligations to the household, the spouse will try to meet those obligations with his or her own income. This is especially true of expenses related to children, such as school fees or clothing. Under Akan kinship, children belong to the family of the wife, and therefore the wife (and her extended family) has ultimate responsibility for their well-being. If, therefore, the husband cannot or will not pay for school fees, the wife must try to meet that expense herself.

3.1. Methods

The data represented in this article were gathered in May and June of 2005, when I engaged 46 residents of these villages (22 men and 24 women) in semi-structured interviews focused on understanding local agricultural and economic practices such as crop selection, the amount of income different farmers gained annually from each crop, and the role of NFE in the household economies of residents. The speed and detail of these interviews were facilitated by my 8 years of experience in these communities, and two previous field seasons exploring these issues in particular. The formal questions for these interviews, which ranged from the simple enumeration of crops to discussions of gendered responsibilities, were developed by refining previous questions I employed in 2000 and 2004 to examine the same subjects. In previous sampling (Carr, 2005a), I used a continuous design model to identify the necessary sample size and appropriate population (which included women and men of all the clan lineages in these villages and a range of ages from 22 to 70 for women and 24 to 77 for men). I ceased interviews when I achieved theoretical saturation, or the point at which concepts and answers were repeating themselves across the entire sample population to such an extent that new paths of inquiry were no longer opening (Glaser and Strauss, 1967, pp. 61–62, 111–112). Even capping my sample through this method, I interviewed approximately half of the adult population of Dominase and Ponkrum. I also mapped and inventoried all farm plots associated with those I interviewed to better understand differences in access to land and cropping emphasis. In the course of the 2005 field season I interviewed 46 residents, 10 fewer than in 2004, as several previous interviewees were not available. Though there were fewer interviewees in 2005, the answers to my questions, and the lines of inquiry they raised, still reached theoretical saturation before the sample was exhausted.

In May and June of 2006, I returned to Dominase and Ponkrum to conduct another round of interviews and farm inventories. This fieldwork provided the opportunity to speak directly with residents about the patterns and trends in agriculture and economy discussed below. The interpretations I offer were therefore discussed with focus groups of residents from different household types and livelihoods strategies, segregated by gender. These groups helped to focus and clarify these interpretations where necessary.

3.2. Managing uncertainty: gender, income and agriculture

Households in Dominase and Ponkrum with both a husband and wife have adapted to the current economic and environ-

mental uncertainty of this context through one of two major livelihoods strategies centered on agricultural production. When I refer to a strategy in this article, I am using an outsider's shorthand for a set of tacit understandings of and practices related to environment, economy and society. Thus, in this context, adaptation is not a change in a single behavior, but a suite of beliefs and practices related to risk and its management that takes shape under locally specific conditions of uncertainty. In a setting where individuals experience ongoing challenges to their well-being as a result of ever-changing economic and environmental conditions, these beliefs and practices become integral parts of everyday decision-making about life and livelihoods, making adaptation and livelihoods inseparable.

My first identification of these two strategies came through interviews focused on the different motivations held by men and women for their economic activities, especially agriculture. In 2000, when conducting the initial interviews that form the basis for this research, I found that farmers in Dominase and Ponkrum tend to categorize crops in one of five ways: for consumption, for consumption more than sale, for sale and consumption equally, for sale more than consumption, and for sale only.⁶ When comparing the categorizations of men and women, I found that in some households men oriented most of their agricultural production toward market sale, while the women tended to grow crops for subsistence. Such an approach distributes risk between two different modes of production, where subsistence production can preserve life and well-being in times of market adversity, and market production can provide income to purchase necessities in times of shortage created by environmental shocks. Households that functioned under this “diversified” approach⁷ had limited access to stable NFE, and as a result they were heavily reliant on their farms for their livelihoods. In other households, all farmers in the household, regardless of gender, emphasized the production of crops for market sale. This strategy relies on the maximization of cash income to build a reserve with which to address economic or environmental shocks. While these “market” households had greater access to stable NFE that further augments incomes than “diversified” households, they were still heavily reliant on agricultural production for their livelihoods. Continued fieldwork in 2004, 2005 and 2006 have both confirmed these patterns in the households of Dominase and Ponkrum, and refined my understanding of these patterns (for an extended discussion of these strategies, see Carr, 2005a).

One point that has emerged since my initial work in 2000 is that the strategy adopted by a particular household is closely linked to the income of the male head of household. When a household head reports earnings more than \$340⁸ a year, the household adopts the market strategy. When a household head reports less than \$340, the household adopts the diversified strategy. There are very few exceptions to this rule, and in all cases

⁶ The categorization of a particular crop is only partially tied to the amount of the crop cultivated. While there is a general trend toward greater market production as the amount of a crop cultivated increases, this general trend masks a great deal of variance in this relationship between individuals in these villages. As I will discuss below, the decision of what to farm, and why to farm it, is a product of both access to land and gender roles in these villages.

⁷ In a previous publication (Carr, 2005a), I referred to this as the “balanced strategy”, but I find that the term diversified better captures its character.

⁸ While I have earnings data for all of the farms discussed in this article, this data is very rough and unreliable. For example, farmers in these villages rarely sold their entire crop at a single time, instead selling off parts week by week, but they did not keep account books. Further, there is a general understanding in the literature that, for various reasons, when asked about their finances the Akan tend to underestimate income and overestimate expenses (Deaton, 1997; Aryeetey, 2004). I therefore do not consider this data very reliable except as a measure of relative earnings. All dollar values in this paper are converted from Ghanaian Cedis at the time of the interview(s) on which they are based.

the exceptions result from some sort of economic transition, usually pregnancy or the birth of a child, that prevents the woman from undertaking her usual amount of agricultural labor. For example, though Kwesi, a farmer living in Dominase, reported earning less than \$340 a year when I interviewed him in 2004, both he and his wife Esi adopted a diversified strategy within their own farms, instead of between their relative farming emphases. In this case, this somewhat muddled farming picture is a product of Kwesi's other main economic activity, distilling *akpeteshi*, a powerful local liquor. At the time of the 2004 interview, he was waiting to begin distilling and was farming a very small area, mainly to keep up appearances. When I arrived to conduct fieldwork in 2005, Kwesi's *akpeteshi* production was in full swing and this household's strategy had fallen into a "diversified" pattern. I interpret this division by men's income to be a reflection of the minimum amount a man can earn and feel confident of his control over the household, regardless of the agricultural strategy adopted by his wife. Therefore, \$340 is not an amount to be looked for across contexts (or even over time in this context), as it will shift depending on the economic and social situation of the village. I present support for this interpretation below.

To obtain agricultural data related to the livelihoods strategies described above, I mapped and inventoried the farms of all interviewees. The farms were mapped by taking a centerpoint GPS reading of each plot, and making a sketch map of the plot. Upon my return from fieldwork, I identified each plot on a Quickbird image of the study area, and using ArcGIS created shapefiles of the area of each crop in each plot, from which the spatial data below was calculated. In 2005 I had reliable data for the total area under cultivation for every crop on the farms of 31 of the 46 people I interviewed (cloud cover obscured at least part, and often all, of the remaining farms in that year's satellite imagery). I created a whole integer ordinal scale for the use of each crop, where 1 represented a crop for consumption only, 2 represented for consumption more than sale, 3 was for sale and consumption equally, 4 was for sale more than consumption, and 5 represented a crop for sale only. To understand the overall orientation of a farm, I took the perceived use values for each crop in a farm, weighted them by the amount of area under cultivation,⁹ and then averaged the weighted scores to get an aggregate score for the entire farm.

When we look at the relationship between market orientation and area under cultivation in Dominase and Ponkrum, it is clear that those with less land (and therefore less surplus production) have a greater subsistence orientation to their overall farm, while those with more land (and therefore more surplus production) have a greater orientation toward market sale. Fig. 2 is a scatterplot of this relationship for all of the farms for which I have spatial data from 2005. The overall relationship between area under cultivation and market orientation in Dominase and Ponkrum is not surprising, as one would expect increased cultivation to result in an increase in surplus production that can be marketed. However, these two variables do not determine household strategy, nor do they explain the particular allocation of land resources in the household. For example, as I will illustrate

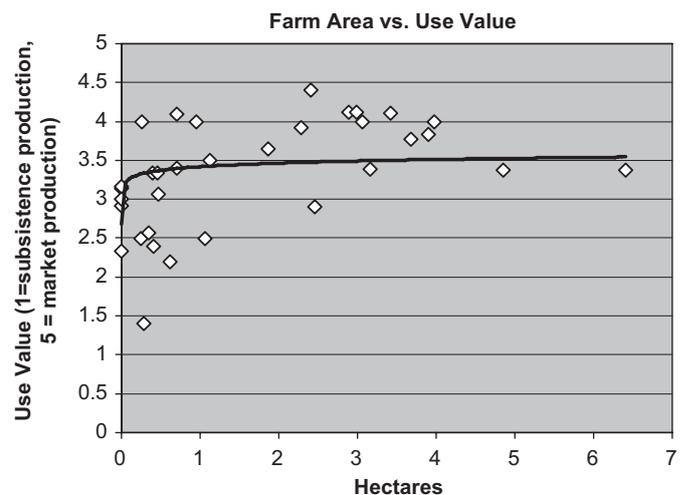


Fig. 2. A scatterplot of farm areas and production orientation for individuals for all 33 individuals in Dominase and Ponkrum for which I have complete spatial data from 2005. The trendline indicates an increase in market orientation as the size of the farm increases.

below, women in some households in these villages have very limited access to land, and yet produce more income per hectare than their husbands. This appears to make little sense, as limiting women's production results in a net loss of income and/or food for the household. In the uncertain environmental and economic context of these villages, such outcomes lower the capacity of these households and their members to address the various stresses and shocks that are endemic to these villages. Further, women's limited access to land reduces their incomes and opportunities relative to those of men.

I argue that if we intend to understand adaptation decision-making in this context, we must move beyond the patterns represented by the trendlines in Fig. 2, and examine the variability that these lines smooth. This variability should not be seen as the product of idiosyncrasy, but evidence for the intersection of economizing decision-making with other contextual factors. These other factors are not merely local particularities, but critical factors shaping the viability and persistence of particular adaptations. To illustrate this point, I turn to a close examination of the "diversified" strategy. This example shows that while men clearly have some decision-making power with regard to adaptation because of their control over access to land within the household, this ability only partially explains the unequal outcomes of this strategy, and cannot address its persistence.

3.3. The diversified strategy

In the 2005 sample there were nine households¹⁰ comprised both a husband and wife in which the husband reportedly earned less than \$340 a year. Two of these households did not fit the "diversified" pattern of agricultural strategy because they were experiencing social and economic transitions such as shifts in livelihood and childbirth.¹¹ Thus, there were only seven households from which to draw information about gendered patterns of

⁹ Following my observations on income data in footnote 7, I do not consider income data from these farmers reliable enough to act as an index of importance for crops. Further, when I directly asked farmers about the relative labor involved in raising different crops, they tended to differentiate by the length of time one would tend a given crop. Thus, they saw maize as much easier to tend than palm not because palm was more labor-intensive, but because one would have to care for palm for decades. In short, the farmers in Dominase and Ponkrum did not distinguish between "high-labor" and "low-labor" crops in my interviews, and therefore I could not use labor-intensiveness to weight the importance of crops in particular farms. I therefore use the area under cultivation for each crop for this purpose.

¹⁰ When considering the strategies employed by different households in Dominase and Ponkrum, I have only included those households for which I was able to interview both the husband and wife.

¹¹ One household had a husband shifting into agriculture after years of intense NFE, two households were dealing with new children that required extra attention, and one household was an older couple that decided to start farming together for the first time because they felt their labor was inadequate to sustain separate farms.

Table 1
Gender patterns of cropping as observed in the diversified households of Dominase and Ponkrum in 2005

	Men (n = 7) (%)	Women (n = 7) (%)
Acacia	71.43	0.00
Banana	0.00	14.29
Cassava	100.00	100.00
Cocoa	14.29	0.00
Coconut	28.57	0.00
Corn	71.43	100.00
Garden Egg	28.57	85.71
Orange	57.14	14.29
Palm	85.71	14.29
Papaya	0.00	14.29
Pepper	42.86	100.00
Pineapple	57.14	0.00
Plantain	42.86	14.29
Sugarcane	14.29	0.00
Tomato	28.57	85.71
Wateryam	0.00	28.57

Each row represents a crop, and the share of men and women, respectively, reporting that they raised that crop.

agriculture under this strategy. The average farm of a man in a diversified household is 2.60 ha, nearly four times the size of the average woman's farm (0.66 ha). The average reported earnings of a man in a diversified household are \$232.04, of which \$74.25 (21.2%) comes from NFE. The average reported earnings of women are \$118.15, of which \$41.30 (35.0%) comes from NFE. Thus, the average diversified household earned a reported \$350.19 in 2005, with \$115.56 (33.0%) coming from NFE.

As described above, in "diversified" households men direct their agricultural production toward market sale, while women work their farms with the goal of raising subsistence crops for consumption in the household. In Table 1 we see that there are 16 different crops to be found on the various farms associated with "diversified" households. Men farm 5 of these 16 crops (31.3%) exclusively. Men farm two (12.5%) other crops (orange and palm) in much greater proportion than women. Women farm three crops (18.8%) exclusively. Further, three crops (18.8%) are farmed in much greater proportion by women than by men. In these households, 13 of 16 crops (81.3%) are clearly associated with either women or men.

There are not only clearly gendered crops in the fields of these households but also clearly gendered patterns of agricultural strategy that, in most cases, are much more closely aligned with the gender of the farmer than with the crop in question. One means of assessing agricultural strategy is to interrogate the motivations behind planting particular crops. There are eight crops farmed by both men and women in these households. However, three of these crops have only a single woman farmer, making the motivations for planting them potentially idiosyncratic. If we consider only the motivations for planting the remaining five crops, we find that for four crops (80.0%) the perception of what these crops are to be used for diverges significantly (Fig. 3), with men seeing the crop as more for market sale than women. Maize is the exceptions to this trend, as men and women both tend to perceive it as for market sale. This convergence of motivations seems to stem from the fact that maize is a household staple whose centrality to local foodways creates a constant demand both within and beyond the household.

Both men and women in diversified households, when directly questioned about their agricultural roles, acknowledge the gendered roles apparent in the agricultural data above. Further, the members of the households using this diversified strategy are aware that women farm less land (18.6% of the amount farmed by

men) and earn less money from their agricultural (48.7% of the amount earned by men) and NFE (55.6% of the amount earned by men) activities than their husbands. As a result, women's total income in these households is about 50.9% the total income of men. Further, evidence suggests that women are more productive per unit area of land farmed. While men produce \$60.69 of income per hectare, women produce \$116.43 of income per hectare, though some of this higher productivity is likely a product of the intensive attention women can pay to their crops in a relatively limited farm area. As this last statistic is a measure of area and income far more precise than that accessible to farmers in these villages, there is some question as to whether or not the members of these households are aware of this discrepancy between the per unit area productivity of their farms. Even if this last measure is not recognized by those living in diversified households, the absence of dissent in conversations about these outcomes is remarkable, as women are aware of the other inequalities that mark their situation.

Given the clearly unequal outcomes of this strategy within these households, and the *seemingly* illogical distribution of land within the household, we must consider how the diversified strategy persists in its current form. We can examine this general acceptance of this strategy and its outcomes through a contradiction between this adaptation and local land tenure rules that emerged through repeated semi-structured interviews on agricultural strategy and the household economy. An exploration of this contradiction and its resolution reveals a site of women's resistance to this adaptation strategy, and makes visible the various social processes that legitimize this adaptation and its unequal outcomes.

When interviewed on the subject of this adaptation strategy, both men and women noted that the broad conditions of economic and environmental uncertainty in Dominase and Ponkrum, and the very limited resources these households have for managing that uncertainty, made household access to both cash and food important. It seems obvious that for the diversified strategy to function as a means of managing uncertainty with limited resources, a husband and wife within a given household must pool together their subsistence (women) and market (men) production to create a diverse set of resources upon which the household can draw to negotiate different kinds of economic and environmental shocks. However, under commonly held understandings of Akan land tenure in this community and the academic literature (Egyir, 1998; see also Quisumbing et al., 1999, 2001; Brydon, 1987; Awusabo-Asare, 1990), there is no such thing as a household or "shared" income. There are only the incomes of the individual farmers within the household who, regardless of gender, have control over the proceeds of their respective farms. Thus, one would expect that if access to cash and food is important to members of these households, they would diversify their individual farms. Instead, men and women adopt polarized strategies that require some form of combination to manage uncertainty.

Examining this apparent disjoint between idealized general understandings of Akan land tenure and the actual on-the-ground practices in these households provided an interesting point of entry into the investigation of household livelihoods dynamics. When questioned about this seeming break with local land tenure rules, men in these households referred to a pool of "shared" resources, comprised both men's and women's earnings, used to manage uncertainty. Women generally contested this definition, referencing local land tenure rules to argue that any earnings from their farms were their own (Fig. 4). However, when examining the patterns of household expenditure for men and women in these households, I found that women were often paying for things that are otherwise classified as "men's responsibilities". For example,



Fig. 3. Visual representation of the motivations for planting the crops found on multiple men's and women's farms in the seven "diversified" households observed in 2005. Each block represents the average motivation for planting the crop in question among those who planted that crop (the number of men or women planting each crop is represented by an *n* value next to the crop name in each column). Darker colors indicate a greater market orientation in the motivation for planting a particular crop (Garden Egg, *Solanum aethiopicum*, is a small, egg-shaped version of the common eggplant).

Men's Claims	Women's Claims
<ul style="list-style-type: none"> • "I control the shared income" • "I keep the shared money, and have final say over it" • "The crop money is for both of us, but I decide what to do" • "We spend the money on school fees, and share the rest between [husband and wife]" • "The money is for both of us, but I make the decisions" 	<ul style="list-style-type: none"> • "The money from crops is for the person planting [those crops]" • "The farm is for me, so I get the profits." • "The palm and the coconut are for my husband. The rest is for me." • "I use my crop money for buying fish for soup. [My husband] uses his for himself."

Fig. 4. Representative men's and women's quotes about the ownership of agricultural production.

women in these households reported spending an average of \$13.80 on school fees and \$39.26 on children's clothes each year. Together, these are expenses equal to 44.9% of the total average reported earnings of women in these households (Egyir (1998) notes that similar outcomes are common in the broader Akan context). I am certain that the data on expenses is incomplete (see footnote 7), but these expenses alone suggest that men are able to control the ways in which women use a significant portion of their income.

To understand how this practice of redirecting women's income, for which there is no basis in Akan land tenure, takes shape and persists despite women's resistance, we must examine the relationship of power in these households and the understandings of the world it produces. Our point of entry into this relationship comes through an examination of how men come to have control over the ways their wives use their income. While men cannot simply take their wives' money because of the land tenure practices still in place in the village, both men and women in these households report that men withhold their income from the household when they have a dispute with their wife. Sometimes these men simply refuse to pay for household needs, and in other cases use their income to purchase personal items like alcohol, or batteries for a portable radio that, when carried away by the male owner, does not benefit the entire household.

Whether or not men meet their financial responsibilities to the household, the need for the items and costs for which they are

responsible persist. For example, if a man refuses to pay school fees for the children of his household, the woman must (and usually does) pay these fees. If she does not, the children will be barred from school until the fees are paid.¹² Women and men report that this withholding does not meet with passive acceptance, as women can retaliate by refusing to cook or clean for their husband, or even refuse to have sex with them. Such retaliation may eventually lead the man to meet at least part of the responsibility in question, but it does not appear to discourage the overall practice of withholding income.

Given these acts of resistance do little to change men's behavior, we must therefore ask why women limit their resistance to these acts. For example, why is it that women who could plant crops for market sale do not? There is no taboo against women farming crops for market sale. Further, nobody is telling these women what to plant—they decide for themselves what crops to raise. These points suggest that women have internalized the role of subsistence producers in their understanding of the management of uncertainty, and are enacting that understanding in their agricultural production.

When asked directly why their wives farm for subsistence while they farm for market sale, men in diversified households often respond that women do not have enough land to allow for market production. Further, men claim that women are incapable of working more land than they already have. Women generally agree that they have so little land that they have to focus on subsistence production, though they do not always agree that they are farming as much land as they could manage. If we examine the relationship between market orientation and total farm area for men and women in these households (Fig. 5), we see a rapid rise in market orientation as area increases (as suggested by the trendline in Fig. 5) that suggests that when women farm even a little more land much of that new production will be oriented toward market sale. Their current farm sizes allow them to meet the subsistence needs of the household with minimal surplus, so they do not need more land to play their assigned role in the diversified strategy. But this data clearly shows that women are capable of farming more land than is needed for subsistence, and therefore we have clear evidence of men constraining women's production. Thus, access to land is an important factor explaining adaptation outcomes in Dominase and Ponkrum.

¹² This is less of an issue today, as the Government of Ghana has used the funds freed up by debt relief to set up a capitation fund that pays the school fees of all primary school-aged children in the country.

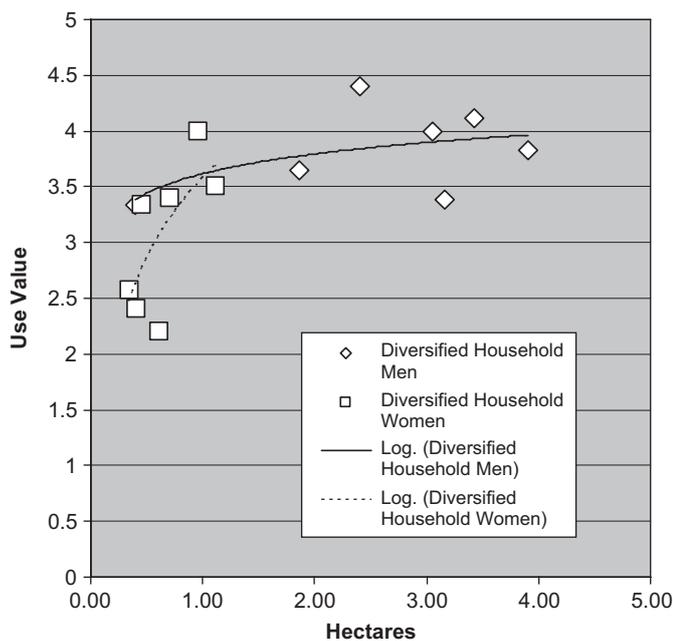


Fig. 5. A scatterplot of farm areas and production orientation for individuals in the diversified households of Dominase and Ponkrum. The trendlines smooth a lot of variation to indicate an increase in market orientation as the size of the farm increases.

However, knowing that men decide how much land to allocate to the different members of the household only tells part of the story. Limited access to land does not explain why women who can freely choose their crops continue to farm for subsistence. When men withhold their income from the household, they are putting into play a set of gendered responsibilities to the household that go beyond the simple expectation that women tend to the material upkeep of the household via domestic work while men earn the money that allows for key purchases and payments. While men and women may meet certain specific, agreed-upon responsibilities to the household, these responsibilities are specific instances of a general gendered responsibility to meet the needs of the household with whatever resources they might have before addressing their own wants and needs. Men, on the other hand, by taking responsibility for cash income, and by limiting their use of that income for the household by withholding money and forcing their wives to pay for things otherwise classified as a man's responsibility, (re)create a gender category in which they meet their own needs and desires first, and then provide for their household.

Therefore, a woman's decision to farm for subsistence is a rational decision in the context of this livelihoods strategy because a woman's role as provider for the household first is a responsibility easily extended to agricultural production, where women's subsistence production is oriented toward household needs first, and, because it tends to produce little surplus, women's personal needs second. A man's economic role is also rational within this strategy, for in producing crops for market sale, men ensure a ready supply of cash that not only pays for their household responsibilities and meets half of the households' strategic need for diversity in the face of uncertainty, but also creates a financial resource (cash) that men can easily convert into either household or personal uses. In short, explaining women's agricultural decisions through access to land oversimplifies this process. Instead, it is the interplay of access to land, local understandings of how to manage economic and environmental uncertainty, and local gender roles that shapes such decisions.

Because their subsistence production meets clearly defined needs of the household, women will not abandon this production for market production until they meet the needs of the household. Once they have met these needs, any additional production is oriented toward market sale. The fact that the farms of women in these households shift rapidly toward a market focus as they increase in size suggests that their farm size is balanced near a threshold of production that allows them to meet the needs of the household while affording very little surplus that might be used to generate income for women's personal use. This organization of women's production is therefore not intended to maximize women's incomes (even though such income is usually employed in the reproduction of the household), but to maintain existing social relations, even at the expense of additional financial resources that might aid in the management of the uncertainties that are endemic to this context.

3.4. Discussion

In the diversified households of Dominase and Ponkrum, it is clear that adaptation decisions balance the interests of men with meeting the material needs of the household. Thus, it serves as another example of the "double-edged" character of adaptation decisions illustrated elsewhere in the empirical literature. However, this adaptation is problematic for more than its ability to reinforce the authority of men. The decision to limit women's production lowers the household income, reducing the resources available to address the stresses and shocks endemic to these villages. Further, the limitation of women's production limits the subsistence side of the household strategy to a small area (often a single plot) that could be greatly impacted by a single shock. Finally, this adaptation encounters some resistance from women, which not only demonstrates that women are aware of the unequal results of this adaptation, but also could be a long-term barrier to social cohesion within these households.

All of these points make it clear that the persistence of this adaptation over time is not tied to its material outcomes, which while meeting the needs of the household, do so in a very precarious way and minimize surpluses that might be used to improve the circumstances of the household over time. Instead, this adaptation persists because it mobilizes existing, naturalized gender roles in these households, extending them into the arena of agricultural production. Material outcomes, at least at this point, may lead to some dissent, but do not appear to drive adaptation decision-making in the diversified households of Dominase and Ponkrum.

This finding is critical to our interpretation of data on agricultural strategy and decision-making in these villages and beyond. I argue that we can see the tension between economic maximization and other social considerations in the diversified strategy through such things as the relationship between market orientation and farm size. As illustrated above, there are clear trends in the data that link access to land and both the perception of particular crops and the overall production orientation of farms. However, these trends smooth out a great deal of variance between individuals, households and strategies that we cannot dismiss as idiosyncratic. I argue that this variability is evidence of the combination of access to land with other factors, such as gender roles and the need to conserve men's authority over their households, which have a substantial influence on both adaptation decision-making and the long-term viability of a particular adaptation.

4. Conclusion

The case of Dominase and Ponkrum moves the conversation about adaptation decision-making from a focus on either key

actors or structural determinants to one where we focus on how and why people take up and internalize particular adaptations, even as they are disadvantaged by these adaptations. Thus, when I say that adaptation decision-making in Dominase and Ponkrum is always double-edged, I am not arguing that men force their will on the members of their households. Instead, men's ability to shape the decision-making of their wives rests on their ability to create adaptations that call upon naturalized gender roles to legitimize the gender differentiation in production roles and outcomes related to these strategies. Men, therefore, are never in complete control of these strategies or their outcomes, because they must answer to gender roles not of their making. It is in the interplay of particular goals (maintaining one's authority over one's household) and broader social processes (the formation of gender roles) that specific adaptations emerge. These adaptations are neither idiosyncratic nor structural, but an outcome of the interplay of both.

These findings pose a fundamental challenge to the definition of a successful adaptation in these villages. Is success to be defined by meeting the needs of the household, potentially bettering its situation, and doing so in an equitable manner, or does success lie in the durability of an adaptation? At least in the case of the diversified strategy in Dominase and Ponkrum, we cannot have both, as a socially-just outcome would result in unacceptable challenges to men's authority in these households while a persistent, durable adaptation, as we have seen, at best barely meets the material needs of the household while falling short of the other goals. How we might foster adaptations that lead to both social justice and material security is a central question in studies of adaptation. Understanding the persistence of current, unjust adaptations that minimally meet the material needs of the societies that implement them is an important step toward answering that question.

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