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Rural Income Inequality in Mozambique: National Dynamics and Local Experiences*

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Abstract: This study examines the drivers of income inequality in a rural, developing economy. The analysis uses data from a national longitudinal survey of rural households and a case study in Mozambique's Limpopo River Basin and to investigate how economic integration affects income inequality within environmentally-embedded economies. Decomposition of the Gini coefficient finds increasing inequality of agricultural income at the national level. Qualitative findings suggest that economic change pressures smallholders to abandon traditional agricultural strategies, which increases environmental risk and contributes to higher inequality. Results indicate changing environmental-economic trade-offs are one mechanism behind rising inequality in rural societies integrating into the global economy.

Keywords: inequality, mixed methods, economic globalization, Africa, Mozambique

JEL Codes: 015, 018, 055, R11

1. INTRODUCTION

Evidence of rising inequality within countries highlights the importance of understanding mechanisms driving this phenomenon, particularly among the world's poorest societies (Milanovic, 2003, 2005, 2012; Heshmati, 2007; Meschi and Vivarelli, 2009; Chotikapanich et al., 2012; Rodríguez-Pose 2012). Rising inequality has been linked to lower economic growth, the erosion of social support networks, and weakened ability to cope with economic and environmental shocks (Alesina and Rodrik, 1994; Aghion, Caroli, and Garcia-Penalosa, 1999; Leichenko and O'Brien, 2008). Cornia (2004) finds that the more unequal a country's income distribution, the less rapidly its poverty rate falls. Moreover, the risks and costs associated with globalization, such as periodic global financial and economic crises, disproportionately affect citizens of the developing world, with the poor being most vulnerable (Nissanke and Thorbecke, 2006).

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Studies that examine the place-based mechanisms by which global pressures operate at the national and regional level are critical to understanding how the global economic order contributes to rising inequality. How people adapt to economic globalization depends on their initial position in their society, since this shapes their economic opportunities as well as their ability to mitigate risks and exposure to shocks and stressors (Sen, 1999; Leichenko and O'Brien, 2008). Examining inequality within the least developed countries (LDCs) in particular improves our knowledge of what drives shifts in the income distribution of the poorest of the poor.

Global institutions—and the policies they promote—are clearly influential in the LDCs. Domestic policies implemented to mitigate inequality may fail if they are undercut by stronger global forces. One way to test the contribution and interplay of global and national factors in driving inequality is to look at changing economic structures of LDCs that comply with international guidelines, such as the recommendations of the World Bank and IMF, and to examine whether or not rising inequality can be linked to the policies promoted by international institutions that encourage export-based development.

Mozambique provides a particularly useful case for studying the linkages between globalization, poverty, and inequality within an LDC. Since the late 1980s, the government has complied with recommendations of international institutions to liberalize its economy and adopt export-based development strategies, earning the praise of the World Bank and the IMF (IMF, 2007). For example, Mozambique liberalized its cashew sector in 1995 in response to pressure from the World Bank. The end of government-subsidized credit to small-scale traders ultimately contributed to the collapse of the cashew nut processing industry and production, resulting in the closure of all large, mechanized cashew processing factories (Hanlon, 2000; McMillan, Rodrik, and Welch, 2002). Notwithstanding these types of setbacks, the Mozambican government has maintained its commitment to liberalization and policies promoting privatization and export production.

Despite liberalizing its economy, Mozambique remains one of the world's poorest countries, with a GDP per capita of \$1,200 and an estimated 52 percent of people living below the poverty line (CIA, 2013). Mozambique also ranked 184 out of 187 countries on the United Nation's Inequality-adjusted Human Development Index in 2011 (UNDP, 2011), further illustrating the low quality of life experienced by many Mozambicans. The government aims to address poverty via development policies promoting international trade (GOM, 2001, 2006, 2011). Mozambique's original Poverty Reduction Strategy Paper (PRSP), written for the IMF and World Bank to qualify for debt relief and other international aid, specifically states that a key objective of its rural development policy is to assist smallholders in beginning or increasing agricultural production for the international market in order to raise rural incomes and the country's GDP (GOM, 2001). Subsequent PRSPs have continued to support a rural development strategy focused on increasing the production and sale of agricultural crops (GOM, 2006, 2011). Examples of such policies include the promotion of the private sector in the marketing of seeds, management of infrastructure, and provision of support services (GOM, 2001).

Seventy percent of the Mozambican population lives in rural areas, which continue to rely heavily on subsistence agriculture (INE, 2008). On-going economic reforms have directly affected subsistence farmers. For example, development projects aimed at increasing access to credit and markets target smallholders engaged in export production or those seen as having higher potential to do so, while farming subsidies that were previously available to all producers have been eliminated. For many small-scale farmers, policy-induced shifts towards commercial

agriculture involve a transition to producing for nonlocal markets for the first time since the Portuguese colonial period ended in 1975. Thus, rural Mozambique provides a useful case for identifying the channels through which economic policy influences the incomes of people living in isolated rural places often considered to be at the margins of the global economy. Moreover, understanding how such processes work in these regions provide broader lessons, for facilitating development in other rural regions in LDCs.

This research expands on previous work on economic restructuring and rural livelihoods in Mozambique by examining how drivers of national income inequality may change in response to globalization. The study also responds to calls in the regional science and regional studies literatures for more applications of mixed methodologies and case studies (Pike, 2007; Barkley, 2008). In order to develop a better understanding of the dynamics influencing inequality in rural areas, this study integrates research strategies by supplementing a quantitative decomposition analysis of the Gini coefficient by income source at the national level with qualitative data from field study research in Mozambique's Limpopo River Basin.

Longitudinal data at the household level is limited for most LDCs, but a nationally representative survey of rural households in Mozambique exists for 2002 and 2005. Although 2002-2005 is a limited time span, research has found that income inequality can rise rapidly as developing countries integrate into the global economy (Azzoni, 2001; Benjamin, Brandt, and Giles, 2005; Ferreira, Leite, and Litchfield, 2008). Thus, studying a short period can provide some insight into the speed of inequality's change in very low-income countries such as Mozambique. Moreover, liberalization in Mozambique intensified during the period of the study. The nation's efforts to qualify for World Bank-sponsored debt relief led to more stringent promotion of private investment in the agricultural sector beginning in 2001. Mozambique also experienced several extreme weather events from 2002 to 2005. For example, two tropical cyclones made landfall in the country. Mozambique regularly experiences tropical cyclone events of this sort, on average one per year (Matyas and Silva, 2013). Drought, which is common in some parts of the country, also occurred during the period (Eriksen and Silva, 2009). Thus, the study period is relatively typical in terms of environmental shocks.

Silva, Eriksen, and Ombe, (2010) and Leichencko and O'Brien (2008) report that the interaction of economic globalization and extreme weather accelerates shifts in household livelihood strategies, particularly for agriculturalists. A decomposition analysis is used to examine how different income sources contribute to inequality and how their influences vary over time. Qualitative findings from case-study ethnographic research conducted in Mozambique inform the interpretation of the decomposition analysis and show how lived experiences of inequality relate to the economic restructuring taking place in the country. The analysis is then used to generate hypotheses for the causal processes behind the distributional changes occurring in Mozambique at the national level. Thus, this paper explores how localized explanations of inequality-enhancing processes illuminate national patterns of income disparities, which themselves are part of global changes and trends.

2. THEORETICAL APPROACHES TO INEQUALITY

Examining the mainstream theoretical underpinnings of contemporary development policy illustrates why some predictions for economic convergence may be inaccurate, particularly in LDCs. Perhaps the most popular theoretical view used to discuss the globalization-inequality relationship is international trade theory, which predicts that increased

global trade will decrease inequality within developing countries (Wood, 1994). Trade theory predicts trade can affect income inequality via (1) changing skill premiums, and (2) altering industry wages (Goldberg and Pavcnik, 2003, 2004). For example, the Heckscher-Olin model of international trade, and its accompanying Stolper-Samuelson theorem, predicts that wage premiums will converge within developing countries as they engage in international trade, because trade with wealthier countries will increase demand for unskilled labor relative to skilled labor.

Other economic theories suggest decreases in inequality will not necessarily accompany increased trade. Trade may lead to spatial inequality within countries by consolidating previous advantages (e.g., in power or in infrastructure) among certain groups or regions, such that inequality actually increases. This is suggested by theories of cumulative causation (Myrdal, 1957; Kaldor, 1970) and by the developments of new economic geography (Krugman, 1991). Although less influential in policy circles, theories of political economy also inform research on inequality. They suggest that the spread of capitalism, one outcome of globalization, contributes to higher levels of socio-economic inequality (Harvey, 1973, 1982; Smith, 1984; Massey, 1995; Peet and Hartwick, 1999). For example, Smith (1984) argues that capitalism exposes places to regional cycles of investment and disinvestment as producers seek out areas with low labor costs and high returns, which results in the economic marginalization of some disinvested places. Interregional divergence in incomes as a result of trade liberalization can potentially drive greater divergence of incomes within countries.

The drivers of intra-regional inequality have been much less theorized despite empirical evidence that it can contribute a substantial amount to overall national income inequality in some countries (Azzoni, 2001; Milanovic, 2005, 2012), including Mozambique (Elbers et al., 2003). When Foster and Rosenzweig (2003a, 2003b) apply mainstream economic theory to explain income inequality in rural areas of India, however, they find evidence that the main mechanisms outlined in the theory affect local income dispersion as well as regional inequality. Their findings suggest that formal employment decreases income inequality by increasing demand for unskilled labor, which raises wage rates. The effected labor is largely supplied by holders of small land parcels who opt to engage in off-farm work to supplement their incomes. But incomes for wealthier small- and medium-scale farmers decline concomitantly due to labor scarcity as they are net employers of casual agricultural labor, which is also provided by small landholders. Other theories could also be “scaled-down” to describe drivers of inequality within rural regions. Following the predictions of political economy, any investments made in rural regions of low-income countries should be clustered in areas more important to urban economies (e.g., areas supplying agricultural produce to cities) which would lead to uneven economic opportunities and outcomes in rural spaces. Cumulative causation processes could also occur in rural regions, and lead to growing inequality within rural areas as capital investments make certain places more attractive (and profitable) to people (and enterprises), leading to a concentration of development in some rural locations at the expense of others. Thus, the dynamics outlined in popular theories explaining national-level inequality can occur in rural regions, although perhaps with less pronounced effects.

Empirical evidence concerning the relationship between globalization and income inequality is mixed. Numerous studies link globalization, often measured by trade levels, to rising inequality (Goldberg and Pavcnik, 2003; Silva and Leichencko, 2004; Wade 2004; Milanovic, 2005; Milanovic and Squire, 2005; Easterly, 2007; Meschi and Vivarelli, 2009).

Other studies find that globalization, as measured by international trade openness or higher export-orientation, decreases inequality in developing countries (Wood, 1994; Deininger and Squire, 1996; Bhalla, 2002; Dollar and Kraay, 2002; Sala-i-Martin, 2002), has no significant effects (Edwards, 1997; Beer and Boswell, 2001), or varies depending on contextual factors such as transportation costs (Krugman and Venables, 1995).

Despite the uncertainty regarding the relationship between globalization and inequality, many LDCs follow the advice of the World Bank and other international institutions and take an approach to development guided by international trade theory. In Mozambique and elsewhere, government policies promote economic integration through exports—ranging from agricultural commodities to tourism—reflecting the view that export-based development will decrease poverty and mitigate inequality. However, the inequality-reducing mechanisms proposed in mainstream trade theory, such as changing returns to wages, may fail to reflect the reality of subsistence farmers living in areas where barriers to formal and informal employment are very high. In places which are at the very fringes of the global market yet undergoing rapid integration, the economic theories that deal with trade's effects on inequality are often difficult to apply.

The case of rural China highlights the limitations of traditional theorizations of inequality. Considerable research has examined the interactions between economic liberalization, inequality, and rural poverty within China. Evidence suggest that liberalization contributes to rising inequality (both within and between regions) but that this operates through several channels, including foreign trade, foreign direct investment, targeted government investments, rural tax reform, migration to urban areas and remittances, increased agricultural production for sale, and changing needs and preferences (Fan, Zhang, and Zhang, 2002; Zhang and Zhang, 2003; Benjamin, Brandt, and Giles, 2005; Wan, Lu, and Chen, 2007; Benjamin et al., 2008; Gustafsson, Shi, and Sicular, 2008; Webber 2012). Some, but not all, of these drivers can be linked to policies promoting economic globalization. Economic policies that boost private investment in target areas (often to facilitate efficiency and competitiveness of exporting sectors) increases regional disparities in income, which contributes to high levels of inequality at the national level (Fan and Sun, 2008). In addition to policy-related drivers, the exposure to material goods that increases with globalization (via the media and increased participation in urban economies) also has an effect. For example, Webber (2008) finds that economic and social change accompanying China's integration into the global economy has led to the increased commodification of daily life in rural areas. The rising demand for cash (to pay for previously unavailable goods or for services that were once communally provided) leads to higher levels of engagement with capitalist markets for rural residents, mainly via migration to work in urban center and increased agricultural production for sale. Given that findings suggest economic globalization can increase market engagement among rural residents in poor regions, it could also influence income inequality via market mechanisms. Income disparities at the local level arise as some households gain access to remittances or labor and commodity markets while others do not.

Engagement with commodity markets can also increase inequality among rural agriculturalists as the risks associated with farming are devolved from the state to individual farmers, leaving those with lower capacity, less capital, less profitable land, or more exposure to environmental shocks or degradation more vulnerable to crop loss than others (Webber, 2012). In addition, Liu and Sicular (2009) find that disparities in educational attainment contribute

substantially to income inequality. These findings indicate that policy-induced economic reforms can have significant impacts on inequality in rural regions, a dynamic that may occur in other countries with large rural populations such as Mozambique.

3. PROCESSES OF SOCIAL DIFFERENTIATION IN MOZAMBIQUE

Mozambique's tumultuous transition from colonial, to socialist, and then neoliberal economic regimes has been extensively documented (Isaacman and Isaacman, 1983; Hanlon, 1991, 1996; Abrahamsson and Nilsson, 1995; Isaacman 1996; Wuyts, 1996, 2003; Hall and Young, 1997; Bowen, 2000; Mittleman, 2000; Pitcher, 2002; Hanlon and Smart, 2008). The country experienced protracted armed conflicts during this period: the war of independence against Portuguese colonial rule (1961-1974) and a civil war (1977-1992). Processes of social differentiation in rural Mozambique during the colonial and socialist periods were driven by economic crisis and war (Hermele, 1988; Wuyts, 2003). Since the adoption of neoliberal reforms, evidence points to a continuing rise in socio-economic disparities within the country, both between regions and within communities (Elbers et al., 2003; Simler and Nhate, 2005; Pfeiffer, Gimbel-Sherr, and Augusto, 2007). Agrarian policies have long played a prominent role in shaping rural inequality. Throughout Mozambique's many upheavals, the state, in its various incarnations, has attempted to alter agricultural production strategies of smallholders to increase national income, most often with negative effects on income distribution.

The forced cultivation of cash crops, especially cotton, during the colonial era and the post-colonial socialist government's attempt to collectivize smallholder agriculture greatly reduced food security among rural households (Isaacman, 1996; Bowen, 2000; Pitcher, 2002). In response to these coercive agrarian policies, rural smallholders attempted to disengage with commercial production, preferring subsistence farming supplemented, when possible, by wage labor (Isaacman, 1996; Bowen, 2000). Uneven access to employment, driven first via colonial regulation and after independence by greater job scarcity in South African mines, fueled social differentiation (Wuyts, 2003). Imbalances in power and wage income resulted in uneven agricultural production within and between communities.

Rural resistance to socialist agrarian policies ultimately undermined attempts to transform the agricultural sector in Mozambique and the rural populace remains largely subsistence farmers. By the early 1980s, deteriorating financial conditions and an ongoing civil war led the Mozambican government to begin enacting neoliberal structural adjustments. In line with IMF recommendations, the country adopted an export-based economic development strategy. The next 25 years witnessed the federal state's withdrawal from direct intervention in rural production, marketing, and price controls. Economic insecurity and inequality deepened dramatically over this period as food prices increased and structural adjustment programs dismantled the few social protections available to the poor (Pfeiffer, Gimbel-Sherr, and Augusto, 2007).

In many ways the agrarian policies that followed post-1980s economic reform mirrored those of the past in that they emphasized agricultural exports (via policies, such as agricultural extension programs, that target export-producing farmers), neglected chronic shortages of farming inputs in rural areas, and ignored the rural population's dependence on wage labor to achieve food security. This allowed some historic processes of social differentiation to continue. But the state's previous reliance on physical force was replaced by several factors that have motivated smallholders to engage in market-based agriculture, including further decreases in

employment, the need to pay for social services such as education and medical care, and an increased availability of manufactured goods (Sheldon, 2002; Wuyts, 2003).

Although many rural Mozambicans lack access to global commodity markets, the government aims to address poverty via policies promoting international trade (GOM, 2001, 2006, 2011; IMF, 2007). Macroeconomic policies have focused on increasing food security and fostering economic growth by enabling all agricultural producers—large agribusinesses and small-scale farmers alike—to export more agricultural goods. At the same time, there has been a great shortage of public and private investment in infrastructure. So the elements required to support a shift to a more commercial agricultural sector (e.g., roads, irrigation schemes, agricultural supply stores) remain in short supply.

Mozambique's export focus has nevertheless had some success. For example, in 2009 Mozambique's exports grew over 10 percent. This was however mainly driven by higher world demand for aluminum, which accounts for over one-third of the country's exports (allAfrica, 2010; CIA, 2013). Moreover, and despite theoretical claims that neoliberal reforms reduce poverty, the majority of rural Mozambicans live in absolute poverty. In 2003, 55 percent of the rural populace lived below the poverty line (MPD/DNEAP, 2010) and 48 percent of all rural children under five suffered from chronic malnutrition (GEAN, 2009). Hanlon and Smart (2008) argue that the Mozambican government has continued to follow a neoliberal path of economic reforms despite persistent poverty in order to maintain political power. Whether or not that is true, studies suggest that rural poverty has increased over the past two decades, and that agricultural productivity has actually declined (Mather, Cunguara, and Boughton, 2008; Cunguara and Hanlon, 2010).

4. RESEARCH DESIGN

This study takes a mixed-methods approach to examining drivers of income inequality in rural areas of Mozambique between 2002 and 2005. The use of mixed methods means combining quantitative and qualitative analyses in a way that builds on the strengths and minimizes the limitations of each approach to enable an in-depth and yet comprehensive investigation of research question(s) (Tashakkori and Teddlie, 2003; Creswell, 2007, 2008). For example, while quantitative methods often allow for the identification of generalizable patterns they typically are unable to ascertain the true causes of specific processes, let alone the net direction of their effect(s). Qualitative techniques, such as case studies, enable more-detailed information regarding the drivers and consequences of economic processes, but such findings are generally not readily applied to a broader variety of contexts. The two approaches combined can confirm findings from different data sources and enhance the interpretation of findings from each method, leading to greater research insights.

Drawing on quantitative analyses using nationally representative data to decompose income inequality by income source and case study research in Mozambique's Limpopo River Basin, the article specifically addresses two research questions: (1) How do changing livelihood strategies, as revealed through income composition, affect levels of inequality at the national level? (2) How do lived experiences of smallholders in rural areas of Mozambique's Limpopo River Basin help explain the drivers of altered livelihood strategies in the context of increasing inequality?

Studying the relationship between globalization and inequality over the 2002-2005 period offers important insights into Mozambique's longer-term political economy. First, the Mozambican government has pledged to continue following a neoliberal development path (GOM, 2006, 2011). So the economic policies in place during the study period are representative of future policy-induced market integration. Second, the period was marked by extreme weather events that typically occur in the country, including two tropical cyclones as well as a severe drought. The IPCC (2007) predicts that during this century, southern Africa will experience decreased annual rainfall and increased warming. Moreover, this warming is likely to be larger than global mean predictions. To the extent that economic policies and bad weather factor into the processes examined in this paper, these will likely remain important drivers of future change.

4.1 4.1 National-level data and variable construction

The quantitative component of the study involves a national-level analysis of changes in income inequality among Mozambican farmers. First, patterns of income are analyzed to examine national shifts in livelihood composition. Then total income inequality for 2002 and 2005 is broken down by income sources using a decomposition of the Gini coefficient. The analysis uses household-level micro-data from the longitudinal National Agricultural Survey of Mozambique (Trabalho de Inquérito Agrícola, TIA) for 2002 and 2005, produced by the Mozambican Ministry of Agriculture and Rural Development (MADER, 2002, 2005). Data were collected each year from a nationally representative sample of households. The samples were stratified by the country's ten major geographical regions and agro-ecological zones. Of the country's 138 rural districts, 80 are included in the sample. The surveys provide longitudinal data, including demographic characteristics, household economic activities and income, and agricultural production, for 4,104 rural households across Mozambique.

For the purpose of the decomposition analysis, every sample household's total income for each year is derived by calculating income from agricultural crop and livestock production, agricultural wage labor, non-agricultural wage labor, non-agricultural self-employment, sale of natural resources, and pensions and remittances.¹ Since the bulk of food consumed in rural areas is produced by households for their own consumption, agricultural production income is calculated as the sum of crop and livestock sales and imputed income from own production consumed by the household. The income totals were calculated following the procedures used by Mather, Cunguara, and Boughton (2008) to make the results comparable with prior studies that used the TIA surveys. All income figures for households are population-weighted. To control for household size, per capita income figures were calculated by dividing a household's total income by the number of its members.

1.2 Decomposition of inequality by income source

Decomposition analyses of the Gini coefficient, a popular measure of inequality, identify how different income sources contribute to inequality (Adams and He, 1995; Leibbrandt, Woolard, and Woolard, 2000; Wan, 2001; Kanbur, 2006; Liu & Sicilar 2009). In this study, decompositions are carried out for two years—2002 and 2005. For the income-source decomposition analysis, I assume that households within the sample derive income from k

¹ The choice of income categories is consistent with other decomposition analyses in the literature (Adger, 1999; Ferreira, Leite, and Litchfield, 2008; Davis *et al.* 2010). Agricultural wage labor consists of off-own-farm agricultural employment and natural resource income consists of net profits earned by harvesting and selling resources-based goods including forest products, charcoal, and fish. The other categories are self-explanatory.

different sources. As seen in Equation (1), the effect of source k on total income inequality can be broken down into three components. Following Lerman and Yitzhaki (1985), the Gini coefficient for the distribution of total income within the sample is expressed as:

$$1) \quad g = \sum_{k=1}^k s_k g_k r_k$$

where s_k is the income component k 's share in total income. g_k is the Gini coefficient measuring the income distribution from source k , and r_k is the correlation between the income derived from source k and total income.

The relative share of inequality attributable to any income source k is expressed as

$$2) \quad i_k = \frac{s_k g_k r_k}{g}$$

where the sum of i_k is one. Following Adger (1999), comparing the relative size of a source k 's income share (s_k) with its contribution to inequality (i_k) can be interpreted as the direction and magnitude of each income source's relationship to inequality. The inequality effect is either negative (signifying that the income source contributes less to inequality than its share of total income) or positive (signifying that the income source contributes more to inequality than its share of total income). Comparing decompositions from different years allow us to infer how much inequality can be attributed to different economic activities and how the magnitude of these contributions to inequality may change over time.

1.3 Case study approach

The qualitative component of this analysis uses semi-structured interview data collected during field studies in Mozambique's Limpopo River Basin from 2002-2004 (See Figure 1). Mozambique's portion of the Limpopo River Basin is generally characterized by high agricultural potential, low population pressures, and vulnerability to recurring environmental hazards (Boudreau, 2001). The region's geographic proximity to South Africa and Mozambique's capital city, Maputo, integrates it more tightly with the national and greater African regional economy than are central and northern areas of the country. Still, as a result of poverty and widespread market failures, the majority of residents rely on the physical environment to meet their basic needs, including food and shelter (SARDC, 2002). Subsistence agriculture is practiced by almost all families living in the Basin (LRAK, 2011).

Field work was conducted in two farming communities after an investigatory trip to the area and consultations with local authorities. These villages were selected based on three criteria: (1) location in the fertile agricultural zone along the Limpopo River, (2) dependence on subsistence farming as the main livelihood activity, and (3) different levels of market access. One village (Massavasse) has a relatively high degree of market access, and another (Matidze) is more isolated. In 2002, 30 and 33 household semi-structured interviews were carried out in Matidze and Massavasse, respectively. Interviewees were selected through a systematic random sampling of household registry lists provided by village authorities. During interviews, respondents were asked to discuss how their livelihoods, including income sources, were changing, what prompted these changes, and how the changes affected their quality of life and status within their community. All interview respondents were asked the same questions, but responses were open-ended, thus allowing the answers to be as detailed (or as brief) as each

Figure 1: Map of Mozambican Case Study Sites

respondent wished. Of the agriculturalists interviewed for this study, 97 percent ($N=61$) farmed 5 hectares or less, thus meeting the Mozambican government's criterion of a smallholder. Three focus groups and a dozen key informant interviews were conducted in the two villages to capture a broader spectrum of opinions on the factors driving socio-economic inequality. Follow-up, in-depth interviews with key informants and 20 households from the original sample were conducted in 2002 and again in 2003 in order to investigate how certain livelihood activities,

particularly more commercial forms of agriculture, affected household income and status.² Interviews and focus groups were conducted in Portuguese with assistance of students from Eduardo Mondlane University, who interpreted to the local language (Xichangana) when necessary. Responses were written down in English on the survey instrument at the time of the interviews.

The resulting qualitative data were analyzed following methods outlined by Strauss and Corbin (1990). First, the transcribed interviews were read in order to identify common themes regarding changes in livelihood strategies and the resultant impacts on well-being (e.g., increased vulnerability to poverty). The interview responses were then analyzed to summarize key ways in which people explained the dynamics underlying these themes. This allowed for a detailed examination of how farming strategies had or had not changed in response to new contextual environments, the challenges associated with traditional or new strategies, and the consequences people faced when employing these strategies. Finally, illustrative quotes were selected to present some commonly described opinion, process, explanation, or outcome.

5. RESULTS

Inequality in rural regions of Mozambique rose from .568 in 2002 to .585 in 2005, according to the Gini coefficient calculated using the TIA surveys.³ This effectively translates into a 3 percentage point increase within three years—a fairly substantial rise in inequality over a short period of time (Ferreira, Leite, and Litchfield, 2008) and a rate of increase slightly higher than those recently observed in the U.S. and China, two countries noted for rising inequality (CIA, 2013). Moreover, the base level of inequality in Mozambique is significantly higher than in the U.S. or China.

The pattern of increasing inequality over the 2002-2005 period corresponds to a well-documented global trend of rising income disparities both within and between countries over the last 30 years (Milanovic, 2005; World Bank, 2006, 2009). National-level studies suggest rapidly growing levels of national income inequality in Mozambique since the adoption of neoliberal economic reforms in the 1980s (Hanlon, 1996; Fauvet, 2000; Pitcher, 2002; Hanlon and Smart, 2008; Cunguara and Hanlon, 2010). For example, calculations of the national Gini coefficient, which became possible starting in 1996, rose from .40 in 1996/97 to .46 in 2008 (James, Ardent, and Simler, 2005; CIA, 2013). And case studies of inequality and poverty in particular localities of Mozambique identify increasing social disparities at the community and village level (Pfeiffer, Gimbel-Sherr, and Augusto, 2007; Silva, 2008; Brück and Schindler, 2009).

5.1 Shifting composition of rural household income at the national level

Table 1 presents national rates of participation in a variety of different income-earning categories by rural households from across Mozambique, as reported in the TIA surveys. Two measures of household participation are considered: *participation share* and *income share*. *Participation share* measures the percentage of households in the sample that receive income

² A more detailed account of the field studies' methodology and a copy of the questionnaire can be found in Silva (2005).

³ Following Ferreira, Leite, and Litchfield, (2008) and others, Gini coefficient calculations exclude households reporting zero income (less than 1 percent of the sample). Also, the top 1 percent of cases for each year is removed in order to control for outliers. Other measures of inequality, including the Theil Index and the Atkinson's Social Welfare Index, also show an upward trend in inequality for the same time period. Only Gini coefficients are reported, for reasons of space considerations. Results of other inequality calculations are available from the author upon request.

Table 1: Participation and Income Component Shares

Income Source	Year							
	2002			2005			2002-2005	
	Households Participating	Household Participation Share	Total Income Share	Households Participating	Household Participation Share	Total Income Share	Change Household Participation Share	Change in Total Income Share
Agricultural Production Income	3960	0.99	0.49	3873	0.97	0.47	-0.02	-0.02
Agricultural Wage Income	270	0.07	0.03	718	0.18	0.04	0.11	0.01
Non-agricultural Wage Income	535	0.13	0.24	636	0.16	0.22	0.03	-0.02
Natural Resource Income	762	0.19	0.07	681	0.17	0.06	-0.02	-0.01
Remittance/Pension Income	882	0.22	0.06	1052	0.26	0.07	0.04	0.01
Self-employment Income	1123	0.28	0.12	1578	0.39	0.16	0.11	0.04
Total N	4000	1.00	1.00	4000	1.00	1.00		

Source: Author's calculations using the TIA 2002 and 2005 panel sample.

from the given source. *Income share* measures the share of overall income earned by all households in the sample that came from that source.

The vast majority of households earned income from agricultural crop and livestock production in 2002 and 2005, underscoring the importance of the farm economy in rural Mozambique. Approximately half of total income for the entire sample in both years came from agricultural production. The share of households with agricultural production income and the share of total population income coming from this source both decreased by 2 percent over the study period. This finding comports with those of Mather (2009) and Cunguara and Hanlon (2010), who report declines in rural agricultural production since 2002. The declines appear to be the result of extreme weather events during the period. The only other income category to experience a decrease in share of participating households was income from natural resources (e.g., sales of firewood). The biggest rise in participation was in the percentage of households earning agricultural wage income and self-employment income: this source grew by 11 percent. The increase in participation shares is not matched by corresponding increases in income shares which grew by 1 percent and 3 percent for agricultural wage and self-employment, respectively. This suggests that more households began to participate in agriculture for wages and in self-employment. In any case, the level of time devoted to the activity is either small or participation is poorly remunerated. The small increase in income share of agricultural employment and self-employment earnings, despite a large increase in the number of participating households, also suggests possible downward pressure on wages for people employed in these sectors.

5.2 Decomposition analysis

Tables 2 and 3 report the results of the decomposition of the Gini coefficient by income source for the two years. Two key points can be drawn from this analysis. First, income share (s_k) and relative contribution to inequality (i_k) are of similar size for most income sources and this is consistent over the two points in time. The exceptions to this trend are non-agricultural wage employment and agricultural production.

The relative contribution of non-agricultural wage employment to inequality is greater than its income share in both years. In 2002, the difference is 11 percent and this decreases to 7 percent in 2005. This suggests that non-agricultural wage employment is the largest driver of inequality, a finding that comports with the wider literature on Mozambique's history and political economy. However, the inequality-enhancing effect has diminished over time suggesting that, nationally, rural Mozambicans gained better access to this type of income between 2002 and 2005, causing it to be more evenly distributed over the population. The Gini correlation (r_k) is highest for non-agricultural wage income in both years, signifying that wealthier households disproportionately earn more income from this source.⁴

Agricultural production income has the opposite effect on inequality. The relative contribution to inequality made by agricultural production is less than its income share by 16 percent in 2002 and 8 percent in 2005, signifying that this income source has an inequality-mitigating effect but that this effect has weakened considerably over time. Since the vast majority of rural Mozambicans have access to agricultural land (Tscherley and Benfica, 2001;

⁴ The decomposition analysis alone cannot determine the direction of the causality of the relationship (i.e., do richer households get these types of jobs or do households get richer once they get these jobs). A mixed methods approach is used to illuminate the direction of causality later in the paper through the analysis of case study interviews to help interpret decomposition analysis findings. However, the causality of this relationship needs merits increased attention at the national level.

Table 2: Gini Decomposition by Income Source, 2002

Income Source	Income Share (s_k)	Gini Correlation (r_k)	Gini Coefficient (g_k)	Absolute contribution ($s_k * r_k * g_k$)	Relative contribution (i_k)	Inequality Effect ($i_k - s_k$)
Natural Resource Income	0.066 (0.009)	0.687 (0.043)	0.954 (0.005)	0.043 (0.008)	0.077 (0.014)	0.010
Remittance/Pension Income	0.055 (0.005)	0.746 (0.020)	0.952 (0.003)	0.039 (0.005)	0.069 (0.008)	0.014
Agricultural Wage Income	0.029 (0.004)	0.615 (0.034)	0.976 (0.002)	0.017 (0.003)	0.030 (0.005)	0.002
Non-agricultural Wage Income	0.241 (0.015)	0.893 (0.009)	0.924 (0.004)	0.199 (0.013)	0.351 (0.022)	0.109
Self-employment Income	0.122 (0.010)	0.738 (0.023)	0.916 (0.005)	0.083 (0.009)	0.145 (0.016)	0.023
Agricultural Production Income	0.486 (0.013)	0.749 (0.013)	0.511 (0.008)	0.186 (0.009)	0.328 (0.017)	-0.158
Total	1.000	1.000	0.568	0.568	1.000	

Source: Author's calculations using the TIA 2002 and 2005 panel sample.

Note: Standard errors are in parenthesis.

Table 3: Gini Decomposition by Income Source, 2005

Income Source	Income Share (s_k)	Gini Correlation (r_k)	Gini Coefficient (g_k)	Absolute contribution ($s_k * r_k * g_k$)	Relative contribution (i_k)	Inequality Effect ($i_k - s_k$)
Natural Resource Income	0.055 (0.006)	0.608 (0.041)	0.951 (0.004)	0.032 (0.005)	0.054 (0.009)	-0.001
Remittance/Pension Income	0.067 (0.006)	0.709 (0.022)	0.943 (0.003)	0.045 (0.005)	0.076 (0.008)	0.010
Agricultural Wage Income	0.037 (0.004)	0.527 (0.040)	0.953 (0.003)	0.019 (0.003)	0.032 (0.006)	-0.005
Non-agricultural Wage Income	0.218 (0.013)	0.831 (0.012)	0.916 (0.005)	0.166 (0.012)	0.283 (0.020)	0.065
Self-employment Income	0.155 (0.009)	0.726 (0.019)	0.882 (0.005)	0.099 (0.008)	0.170 (0.014)	0.014
Agricultural Production Income	0.468 (0.012)	0.781 (0.012)	0.616 (0.008)	0.225 (0.011)	0.384 (0.018)	-0.084
Total	1.000	1.000	0.585	0.585	1.000	

Source: Author's calculations using the TIA 2002 and 2005 panel sample.

Note: Standard errors are in parenthesis.

Jayne et al., 2003), a key asset in subsistence-based rural areas, this likely accounts for the inequality-dampening effects of agricultural production (Corina, 2004). The decreasing magnitude of this effect could have several drivers. For example, crop failures could reduce agricultural income and thus diminish its impact on equalizing income. However, FAO reports show that crop failures were not wide-spread, i.e., did not occur over the entire country, during the time under investigation (FAO, 2003, 2004, 2005). Thus, apparent declines in the inequality-dampening influence of agricultural income may also result from underlying structural causes. Studies of rural China find that local-level responses to globalization can lead farmers to increase their production for commodity markets, and that this can lead to more income inequality due to differential market access (Webber, 2008, 2012). Similar responses among Mozambican farmers could also contribute to the decreasing ability of agricultural income to mitigate inequality, a possibility which will be explored in more detail later in the paper.

The second point is that, as shown in the final column of each table, the magnitude of inequality effects decreased for five of the six income sources over the study period. In 2002, only income from agricultural production had a dampening effect on inequality. In 2005, natural resource sales and agricultural wage employment also had negative inequality effects, although the magnitude of these effects was extremely small. Remittances and pensions, self-employment, and non-agricultural wage employment had an inequality-enhancing effect in 2002 and 2005, but the magnitude of these effects decreased in all cases. Non-agricultural wage employment remains the biggest driver of inequality in 2005 but, as previously stated, the income from this source appears to have become more equitably distributed over the time period of the study.

The weakening of inequality-enhancing effects of the majority of income sources between 2002 and 2005 suggest a trend towards lower income inequality. However, as stated earlier, overall inequality increased over the period. This can be partly explained by examining changes in the distribution of agricultural production income. Although agricultural production remained the most equitably distributed income source in both years, it became less evenly distributed between 2002 and 2005. This finding comports with that of Benjamin et al. (2005) who find a sharp decrease in the equalizing effects of farm income in rural China after the implementation of policies promoting market liberalization. Since agricultural income is the largest source of income overall in rural Mozambique, it exerts a strong influence on inequality as it becomes more unevenly distributed across the population. Thus, changes in the distribution of agricultural income appear to drive rising income inequality.

5.3 Drivers of inequality in the Limpopo River Basin

A common theme emerging from the interview data was the increasing commodification of rural life and the subsequent need for cash income. Respondents in both case-study villages reported that formal employment opportunities in the region are scarce, and that low levels of educational attainment made jobs particularly difficult for local residents to obtain. Indeed, several respondents said that members of wealthier households have more chances of getting higher-paying employment since they often had higher levels of education and better social connections. Interview data from Limpopo River Basin case-study respondents suggest that people in Massavasse and Matidze cycle in and out of the agricultural labor market and self-employment depending on the food security of their household. Drought was described as a particularly strong driver of household participation in off-own-farm agricultural labor, and follow-up interviews suggest that drought conditions worsened over the study period.

Interview respondents said they participate in some off-own-farm activities to supplement their income and report increasing time spent on off-own-farm activities as farming conditions worsened. Drought increases both the supply of agricultural laborers and, in some cases, the demand for such workers, but respondents said wages typically fall during dry periods. Better-off farmers, i.e., those with more capital or access to irrigation, typically hire laborers to help plant crops at the beginning of the agricultural season. But insufficient rain can cause these crops to fail. If this happens, farmers may hire laborers to plant again if it rains later in the season, though they typically pay less for a second planting since their resources are diminished via prior crop failures. Meanwhile the supply of agricultural labor increases since drought causes the food stocks of some farming households to fall below subsistence levels. Interview respondents in both case study sites said that wages for farm laborers are low even in good agricultural years. Still the number of people seeking work, coupled with poor harvests for many medium- and large-scale farmers who employ farm laborers, leads to very low wages during periods of drought.

People face considerable pressures to earn income, but in the absence of employment opportunities, most smallholders say they must sell crops get cash. Respondents expressed a strong preference for producing vegetable crops that can be easily sold in regional markets. This is, in part, because farmers do not need loans to buy seeds or use fertilizers, unlike the case with many cash crops (Silva, 2007, 2008). “People who can sell [food] crops have an easier life,” was how one female respondent described the relationship between agricultural production and inequality, referring to sales of surplus subsistence crops, such as cereals and vegetables, for local or regional domestic markets. In terms of cash crop sales, many respondents voiced a strong disinclination to participate in these types of commodity markets. Interviews revealed that past experiences with the market economy made people suspicious of farming cash crops. “You can never win with those people because they cheat you,” said one male respondent, referring to the representatives of agro-industrial firms that control contract farming arrangements.

Still, producing for domestic markets has associated risks and can influence village-level inequality. For example, vegetables require more rainfall than do many other subsistence crops, and they grow best in alluvial soils. Thus cash cropping of vegetables raises two clear risks: excessive rainfall causes the best crop land to flood thereby causing crop failure, and low rainfall causes crop failure by disabling crop growth. Moreover, when harvests are good, households with better market access or ability to transport crops are likely to receive more economic benefits, thereby increasing inequality across households.

Interviews suggest that, in response to the rising need for income, rural households in the Limpopo River Basin are shifting towards a particular form of commercial production. Subsistence farmers describe moving towards commercial production of traditionally subsistence crops, despite the absence of irrigation, agricultural inputs, and technical help. Respondents said they undertake the shift primarily by abandoning two traditional agricultural strategies—intercropping and farming multiple, spatially dispersed plots—that help them cope with negative events such as bad weather or disease outbreaks. People said they had traditionally farmed a variety of crops in both the *altos* (highland areas) and *baixos* (low land areas), so that they could harvest from the *altos* in years with heavy rains and from the *baixos* in times of drought. This system also offers some protection against pests or disease outbreaks that might impact only one location or crop type. But mixed cropping in multiple areas commonly leads to both high labor inputs and high losses. For example, in any given year farmers said harvests tend to fail in one of

the two areas, depending on the seasonal rains. Respondents repeatedly stressed how they could not generate surplus production for sale if they lost half their crops every year. While geographically dispersing cropped areas mitigates risk, people said it was incompatible with generating much needed cash income. The majority (80 percent) of respondents said they lacked the labor and capital to expand agricultural production. So respondents reported altering their farming strategies by only using land in either the *alto* or *baixo* and growing fewer crop varieties. Although this increased their risk of losing an entire crop in bad years and falling into deeper poverty, in good years they can generate a tradable surplus. Farmers often described this gamble as their only chance to produce surplus yields.

People linked changes in farming strategies to rising inequality primarily in terms of increasing uncertainty.⁵ The move away from familiar agricultural practices to more commercially oriented ones decreases farmers' ability to mitigate environmental risks. In the words of one male respondent, "it is easier now for the poor to fail [at farming] because rains are often bad and the government no longer helps us." Respondents reported that as negative events become more common they cause a farmer's household to fall further behind that of less-affected farmers. That is, in any given year extreme weather or other shocks affect some farmers more than others. In situations of wide-spread shocks, unaffected farmers can also get higher prices for their crops. Since farmers may reinvest profits in agricultural technology to improve future yields, varying exposure to shocks can exacerbate inequality in the long run. Thus, changing farm practices are a channel through which income inequality can increase in rural areas.

5.4 Linking global pressures to altered farming strategies

The general picture emerging from interviews is one of people who feel pressured to engage more intensely with agricultural commodity markets in order to earn cash income, despite higher associated environmental risks. While some farmers began growing commercial crops to supplement their former activities, most expanded production of traditional food crops to sell locally or regionally. Three factors were repeatedly mentioned as driving this change. First, people spoke of a desire for material goods. Prior to Mozambique opening its economy, few retail goods were available in rural markets. But goods—including radios, cell phones, clothing, and a variety of plastic products—are rapidly becoming more available. People speak of wanting these goods but need cash order to buy them. Evidence suggests the desire for material goods weakens social support networks for the poor. "Now people with money want more [consumer goods], so rich relatives don't help you when you need seeds or money to plow," said one female respondent.

Second, it is becoming increasingly difficult for people to remain outside the cash economy. The Mozambican government eliminated subsidies for farm inputs and other social services as part of their structural adjustment program so people must now purchase what they need. And many respondents described a trend away from bartering and towards cash payments for goods and services. For example, one respondent reported she used to be able to trade a chicken at the regional health clinic in exchange for treatment, but now the clinic required cash payment. So those who continue as subsistence farmers find such an existence increasingly

⁵ The new risks faced by farmers in Mozambique's Limpopo River Basin are discussed in more detail in Silva (2005, 2008) and Silva, Eriksen, and Ombe (2010).

difficult, if not impossible, to sustain due to the rising number of services (e.g., schools fees, clinic fees) that no longer accept barter goods. Several other respondents said that community members used to help one another during seasonal harvests in exchange for food or home-brewed beer, but this practice was dying out, because people now want to receive cash payment for providing assistance.

A third factor that some people mentioned was the advice of agricultural extension agents who urged them to farm commercially and consolidate plots in order to benefit from economies of scale. This was only mentioned in the village with greater access to regional markets, Massavasse, where people regularly encountered agricultural extension agents. When interviewed, extension agents said that their advice to farmers was based on Mozambican government policies.

6. CONCLUDING REMARKS

The findings of the decomposition analysis indicate that inequality is already high and increasing rapidly in rural Mozambique. With the exception of agricultural production income, the magnitude of inequality-enhancing effects of all income sources decreased over the time period of the study. Although non-agricultural wage income makes the largest relative contribution to rural income inequality in both years, the magnitude of its contribution falls over time, from 11 percent in 2002 to 7 percent in 2005. However, the proportion of rural households participating in off-own-farm employment has increased much more than the proportion of income that household earn from these sources. Despite the decline in inequality-enhancing effects of all off-own-farm income sources, rural income inequality, as measured by the Gini coefficient, still increased over 3 percent between 2002 and 2005. Decomposition findings suggest that this increase is driven by increasingly unequal distribution of agricultural production income across rural households. The relative contribution to overall income inequality made by agricultural production is less than its income share in both years (16 percent in 2002 and 8 percent in 2005), signifying that this income source still has an inequality-mitigating effect but that this effect has decreased considerably.

Qualitative data from the Limpopo River Basin case studies provide some insight into the set of mechanisms driving changes in inequality as rural households gradually rely on cash income. First, respondents said they are increasingly supplementing agricultural production with off-own-farm income sources, particularly agricultural wage labor and self-employment activities. Higher rates of participation in these activities provide one explanation for why these income sources have a lower inequality-enhancing effect over time in rural Mozambique as these types of revenue become more evenly dispersed across the population. Still, the experiences of interview respondents from the Limpopo River Basin suggest downward pressure on wages in these sectors arises from oversupply of labor during periods of climate shocks, and the limited resources of wealthier agriculturalists who hire farm labor if they need to replant multiple times in a single growing season when rains fail. This provides one explanation for the national-level findings that, although the share of rural Mozambican households participating in agricultural wage labor and self-employment activities more than doubled between 2002 and 2005, income shares from these sources grew by less than a third. Findings from interview data also suggest that case-study households in the Limpopo River Basin, particularly poorer ones, face high barriers to accessing non-agricultural wage employment. This finding runs counter to that of the decomposition analysis, which indicates that this type of income became more evenly distributed

across rural Mozambican households over the study period. This suggests that the ability to acquire non-agricultural income has improved unevenly across the country. One possible reason is that some areas of rural Mozambique have experienced more formal sector growth since the early 2000s (e.g., coal mining in Tete Province) making them better positioned to get jobs than are residents of the Limpopo River Basin.

Second, interview data indicate that agricultural income is becoming more unevenly distributed within Mozambique because farmers are taking on more risk in an increasingly market-driven society. In the absence of sufficient employment opportunities, people opt to increase their agricultural production income. In Mozambique's Limpopo River Basin, people are abandoning traditional risk-mitigating production strategies in favor of those that have higher potential yields. These changes to traditional farming strategies arguably arise from government policies aimed at liberalizing agricultural markets, promoting agricultural exports, and limiting agricultural subsidies to small-scale farms. These policies drive people to participate in agricultural commodity markets, but production for sale (of both cash crops and surplus food crops) does not mitigate inequality nearly as well as subsistence agriculture does, both because farmers are taking on higher risk and because some of them have much better access to markets, either via roads or extension services.

The situation described in this paper has broad implications for understanding how globalization influences trends in inequality and their driving mechanisms. The mixed methods approach used in this study reveals some changing patterns of inequality in a rapidly globalizing environment, and also suggests some mechanisms by which export-based development strategies can affect inequality, even in remote, rural regions of low-income countries. The study's decomposition findings show that the income composition of households relates to changing levels of national-level inequality, as certain types of income become more or less inequality-enhancing over time. The case-study findings suggest that households alter their strategies for earning cash income in response to the commodification of rural life, but often do under non-optimal conditions. The scarcity of formal jobs and other stable, well-paying forms of employment and the high degree of risk faced by farmers who depend on rain-fed agriculture are not unique to Mozambique; they are found in many other low-income countries, particularly in Africa. Evidence from Mozambique, China, and other countries with large, rural populations indicates that rising income inequality accompanies export-based economic reforms. Thus, the trends and mechanisms identified in this study provide some helpful insights in understanding changes in income inequality in other places with large, subsistence-based economies as they experience economic restructuring and increased engagement with labor and commodity markets.

Ultimately, this analysis reveals the importance of agricultural production as a strong income equalizing force in rural regions as they integrate into the global economy. Even if economic restructuring increases opportunities for off-own-farm employment, resulting in more evenly distributed income from these sources across households and reducing the possible inequality-enhancing effects of these income sources, overall inequality can still rise through changes in agricultural conditions and practices. Taken together, the results of the decomposition analysis and the experiences of rural agriculturalists in the Limpopo River Basin suggest that the prime driver of increasing inequality in rural Mozambique is the changing distribution of agricultural income. Given the evidence that lower and more variable farm income increases income inequality, the factors that drive this income to become more unevenly distributed across

rural households should be better understood so that rapid rises in rural inequality can be prevented in Mozambique and in other LDCs with large populations of subsistence farmers.

This study agrees with the many others that find, in some sense, globalization exacerbates inequality. However, the finding is not simply that international trade causes inequality. Policies promoting agricultural trade can increase inequality even if (perhaps especially if) exports do not increase. International policy discussions of achieving economic development in the LDCs typically highlight the importance of international trade. Export-oriented trade policies, which tend to focus on enhancing cash crop production, may not be relevant to a large segment of the rural population. Yet subsistence farmers in rural areas find they increasingly want or need cash income. As reported in the Limpopo River Basin case study, local and regional trading in familiar crops is sometimes a very plausible first step towards earning money and thus regional economic development. However, changes in production strategies that focused on engaging in regional markets are not without effects on inequality. It forces households to move away from purely subsistence farming and older risk-mitigating techniques. Thus, rural development strategies relying on exports still should consider policies that enhance the viability of subsistence crops in order to preserve the inequality-mitigating effects of agricultural production income in order to alleviate trends of rising rural inequality.

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