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# Rural income sources and diversification: getting the assumptions right

## The case of Southern Mali<sup>1</sup>

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### 1. Introduction

The assumption, which has dominated in developing countries over the last two decades, namely that rural producers depend exclusively on their agricultural production for their livelihood and food security, has been seriously questioned lately as rural households living in difficult areas, such as in the Sahelian zone, have been able to preserve their food security, despite several droughts. The acknowledged implication is that rural households have activities outside cropping and are integrated into markets.

Several studies have described their characteristics, while others have analysed the linkages between income sources. There are few studies considering empirically the determinants and effects of household income diversification outside cropping in Sub-Saharan Africa. The sparse literature suggests that there might be a positive relationship between income diversification and income level in Africa, which is opposite to the findings in Asia (Reardon, 1997).

The paper aims at presenting the results of a study analysing the process of income generation in uncertain conditions. It focuses on the driving forces of non-cropping income and the effect of the latter on total household income in rural Southern Mali.

This contribution first briefly describes the empirical model used to examine the income diversification process. Second, it describes the major results. It finally presents conclusions that can be made on current issues, such as the role of cash crop in income generation and food security for example, and suggests policy recommendations.

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<sup>1</sup> This contribution briefly presents some results of a larger empirical study made while the author was working in the "International Agriculture" research group led by Prof. P. Rieder.

## 2. The model

The empirical model investigates two issues. The first is the hypothesis that only wealthier households are able to diversify in the presence of food market imperfections and the second is the relationship between diversification and total income at the household level.

The model draws heavily on the work of Finkelshtain and Chalfant (1991) and Fafchamps (1992). The latter argues that because basic staples constitute a large share of total consumption and low income, farmers are determined to protect themselves against food price risk. Confronted with volatile prices that are also correlated with their own production, households want to protect themselves against food price risk by self-sufficiency. Hence, they often emphasize food self-sufficiency. Therefore, the larger the likelihood that a producer with a higher degree of risk aversion will shift production towards the risky crop. Wealthier farmers, who spend proportionately less on food, also prefer to allocate a correspondingly lower area of their land to food crops.

A framework of portfolio choice under multivariate risk is used. According to the framework above, the household's decision to allocate resources outside the risky income, food production, depends on its wealth, the existence or otherwise of a marketable food surplus, the share of food in total consumption and food market conditions. Other factors are also included, such as: household characteristics, the price ratio between crop and non-crop sectors etc.

The empirical model consists of two equations, namely:

Non-crop income =  $f$  (wealth, marketable surplus, food market conditions, share of food, household characteristics, distance to market, price, access to credit)

Total income =  $f$  (non-crop income share, wealth, marketable surplus, food market conditions, share of food, household characteristics, distance to market, price, access to credit)

A two-stage sample design was used, based on an existing framework. The sample size was 120 households in 15 villages. The model is estimated simultaneously with 2SLS in both linear and log forms. The Hausmann-Wu test was used to test for exogeneity.

### **3. Results**

Rural households in Southern Mali do indeed have diversified incomes. On average, 30 % of total household income is generated by activities outside cropping. The latter are mainly composed of livestock activities, representing 80 % of non-crop income. Non-farm income generates the remaining 20 % of non-crop income.

The hypothesis stating that only households with cereal surpluses will diversify outside cropping, and that cereal deficit households will reduce their non-crop activities in the next campaign in order to protect themselves against market risk, is rejected. The higher the marketable cereal surplus, the less diversified is the household income. It was also found that income levels are about identical for households with cereal surpluses and cereal deficits, implying different food strategies for both groups. The share of food in total expenditure positively affects income diversification. In short, the overall hypothesis, that only wealthier households are able and willing to diversify under uncertain conditions, when food markets are present but imperfect is rejected. There must be other more important factors underlying the process of diversification in Southern Mali.

Cotton and non-crop incomes contribute positively to the total income and are therefore complementary to the total income generation process. However, cotton production leads to a significant decrease in the share of non-crop income in total income. This suggests that non-crop cash income might be a substitute for cash crop income.

Income diversification outside cropping is found to be associated with an increase in total income.

### **4. Getting the assumptions right**

Based on the results of this study, comments can be made on the current issues related to income diversification and its level as well as food security in rural West Africa.

- Food deficit households do not have lower total income than food surplus households. This finding concurs with observations made in Burkina Faso (Reardon and Mercado, 1991) as well as in the same area in Southern Mali ten years before our survey (Dioné, 1989) and

now with our study. About 38 % of rural households in Southern Mali are net buyers (normal years). According to the results, the existence of a food deficit might not result from the lack of income, but from the choice of food and income-security strategies.

- Diversification is not associated with lower total net income, but with higher overall household income. Therefore, concerns about the adverse effects of higher diversification on income levels are not justified.
- Cotton, which is produced within a rotation, is not a threat to food security. Cotton producers are net cereal sellers. The study shows that there is a positive relationship between both sources of income.
- Cotton producers still allocate over 60 % of their land to food crops on average, despite the fact that cotton is much more profitable than cereal production. Hence, potential gains from crop specialisation is not fully exploited and, consequently, households are prepared to get less total income for more home food production in a risky environment.
- Diversification might be partially a response to liquidity shortcomings. The commercialisation rate of household economies is high: 61 % of net income. The bulk accrues to cotton, which accounts for 87 % of the cash income. This implies high seasonal monetary income fluctuations. Since the study found that rationed credit is an income constraint, diversification might partially alleviate liquidity constraints.

Agriculture in Southern Mali is a risky business. This study shows that risk matters as well as household income composition in terms of cash availability, food security, and total income.

Hence, economic policies aiming at improving and securing household wealth and livelihood should take into account income composition and income sources interactions. Furthermore, policy measures should aim at reducing food price variability, improve the financial system, including the issue of adapted collateral, and improve social and economic infrastructure in order to increase commercialisation opportunities, for cropping and non-cropping activities.

## 5. References

Crole-Rees A., 2002: Rural household strategies: determinants and contribution of income diversification to income level and distribution. The case of Southern Mali. Unpublished PhD thesis, ETH-Zurich, Switzerland. <http://e-collection.ethbib.ethz.ch/ecol-pool/diss/fulltext/eth14596.pdf>.

Dioné J., 1989: Informing food security policy in Mali: interactions between technology, institutions and market reforms. Projet Sécurité Alimentaire CESA-MSU, Bamako.

Fafchamps M., 1992: Cash crop production, food price volatility and rural market integration in the Third World. *American Journal of Agricultural Economics*. February 1992; pp. 90-99.

Finkelshtain I. and Chalfant J.A., 1991: Marketed surplus under risk: do peasants agree with Sandmo?. *American Journal of Agricultural Economics*. August 1991; pp. 557-567.

Reardon Th. and Mercado-Peters M., 1991: Self-financing of rural household cash expenditures in Burkina Faso: the case of net cereal buyers. In: Cuevas and Benoit-Cattin, 1991: Actes du XIIème séminaire d'économie rurale, 21-25 Octobre 1991, Ouagadougou, Burkina Faso.

Reardon Th., 1997: Using evidence of household income diversification to inform study of the rural nonfarm labour market in Africa. *World Development*.

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