



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



POLICY SYNTHESIS

*for Cooperating USAID Offices and
Country Missions*

(<http://www.aec.msu.edu/agecon/fs2/psynindx.htm>)



Office of
Sustainable
Development

Number 74

February 2005

INCOME AND NUTRITIONAL OUTCOMES IN RWANDA'S RURAL AREAS, 1990 AND 2000*

By

Andrew McKay and Scott Loveridge

Food Security III Cooperative Agreement between U.S. Agency for International Development, Global Bureau,
Economic Growth and Agricultural Development Center, Office of Agriculture and Food Security
and Department of Agricultural Economics, Michigan State University

KEY FINDINGS: This Policy Synthesis examines the evidence on changes in household income and consumption to understand the apparent paradox of improving child nutrition indicators during a period of extreme and increasing poverty and vulnerability among the poorest households. While households in the three poorest categories demonstrated lower total incomes compared to the poorest categories in 1990, the poorest households also shifted their agricultural production out of cash crops and dedicated more land to cropping food staples. More of those staples were then consumed at home, rather than marketed, leading to nutritional improvements.

The long term trend, however, indicates that ever-declining land area per person will limit how far households can go with this strategy, such that growth in off-farm income potential is critical for these households to find a path to growth and long term improvements in income and welfare. Yet for off-farm income potential for these households to grow, there needs to be increasing demands for the goods and services they could produce. Measures to increase incomes in rural areas as a whole, are likely to play a key role in creating this demand.

BACKGROUND: Rwanda is the most densely populated country in Sub-Saharan Africa, with very small land areas available per person. Rural households make up 90% of the population and they rely heavily on agriculture. In the ten years between 1990 and 2000, Rwandan rural households have faced production deficits due to drought, pests and diseases in various crops, and the devastating effects of the 1994 genocide.

Rural household incomes at the beginning of the 1990s were low by international standards and child nutritional indicators demonstrated the effect of poverty. Thirty-two percent of children under the age of five were underweight in 1991/92, according to a nationwide survey, and the rates for stunting and wasting among children was also high (Wise 2004). By 2000, prevalence of underweight children was down to 24%, and stunting and wasting declined, in spite of the difficulties faced and the lack of growth in most rural households' incomes.

We compare patterns in household strategies using two surveys, the Revenue and Expenditure Survey (RES) conducted in 1990 with 1208 rural households, and the integrated Household Living Conditions Survey (HLCS) conducted in 2000 with 5271 rural households. Despite methodological differences between the two

surveys, aggregate results of the HLCS compared well with results of agricultural production surveys conducted at about the same time (Ministry of Finance and Economic Planning, 2002)¹.

RESULTS: Average rural household income per adult equivalent in 2000 is around 15% above its 1990 level, when measured on a comparable basis and after adjusting for inflation. This is consistent with agricultural surveys that show calorie availability in 2002 was 20% above its 1990 levels (Mpyisi et al., n.d.). Loveridge (1992) computed household revenue per adult equivalent² based on the 1990 survey and established four income categories based on natural breaks in the data. We maintain these same categories, adjusted for inflation,³ for the latter data set. Table 1 presents the proportion of rural households in each category for the two years. Both the poorest and least poor household categories increased in proportion at the expense of households in the middle two categories. Female headed households – the number of which increased dramatically following the genocide – continue to be over represented among the poorest group and under represented in the richest group.

Table 1. Percentage of Households in Each Income Group, 1990 and 2000⁴

Income Group	1990	2000	Change
Poorest	25	29	4
2nd	20	14	-6
3rd	29	26	-3
Least Poor	25	31	6
All	100	100	

In addition, households in the three poorest categories in 2000 were even poorer on average than were their 1990 counterparts, while those in the richest category are somewhat better off (Figure 1). However, malnutrition rates have fallen for all groups, but by more among the poorer groups. This result appears counterintuitive given the evidence on changes in income levels. All income categories experienced substantial losses in available land area by similar absolute extents. With less land, agricultural income is expected to fall (as observed in Figure 2), increasing the need for off farm income sources. Over the period off-farm labor increased on average as a source of revenue (Figure 2).

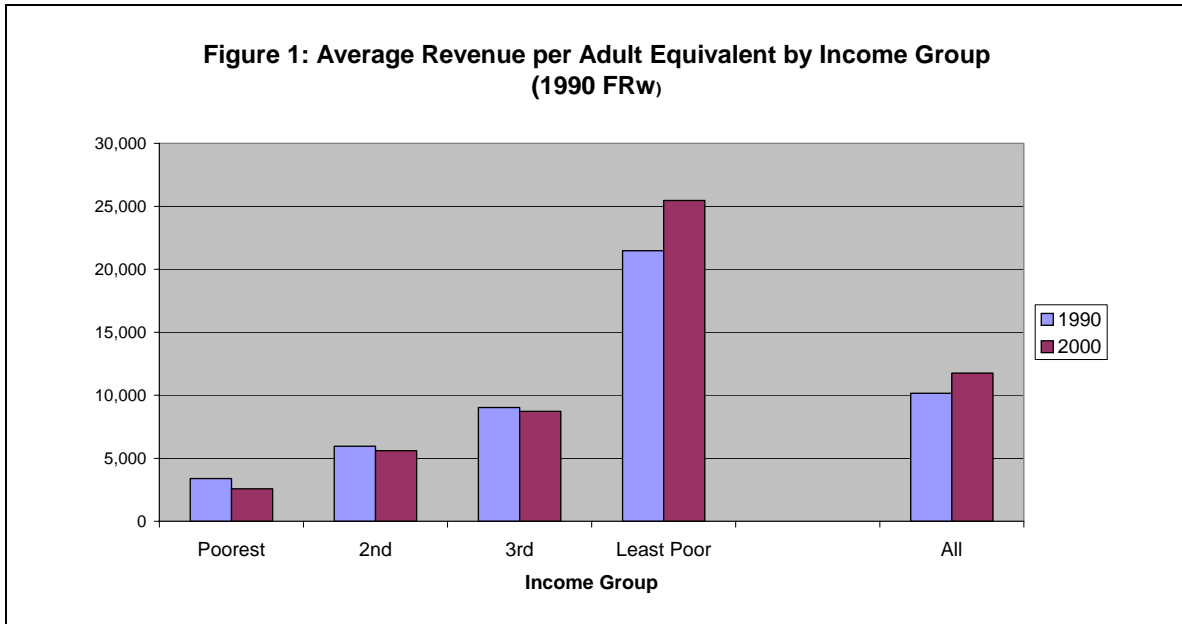
Another important change is in market participation, in that in 2000, households are consuming a higher proportion of their agricultural output on-farm, and selling a lower proportion. But the aggregate figures hide important differences by income group (Table 2). In both 1990 and 2000 there is a substantial difference between the least poor group and the three poorer groups. This difference is particularly striking in regard to non-agricultural

¹ The 2000 agricultural production survey used essentially the same method as used by the basic agricultural production surveys during the pre-war period—see Mpyisi et al., nd. for details.

² Adult-equivalent is conceptually similar to “per person” except that it takes into account age and gender differences. The conversion from people to adult-equivalents is based on rates reported in Ministère du Plan (1988).

³ Rwanda Consumer Price Index was from the Ministry of Economic Planning and Finance (personal communication). 1990=106.7 2000=348.44. The index likely has an urban bias; in what follows, patterns evident in the data would probably be stronger if a rural CPI were available.

⁴ Note: the income groups are those defined by Loveridge (1992) in an earlier analysis of the RES survey. They are defined based on their income per adult equivalent in 1990 prices as follows: less than 5000FRw; 5000-7000; 7000-12000; and greater than 12000.

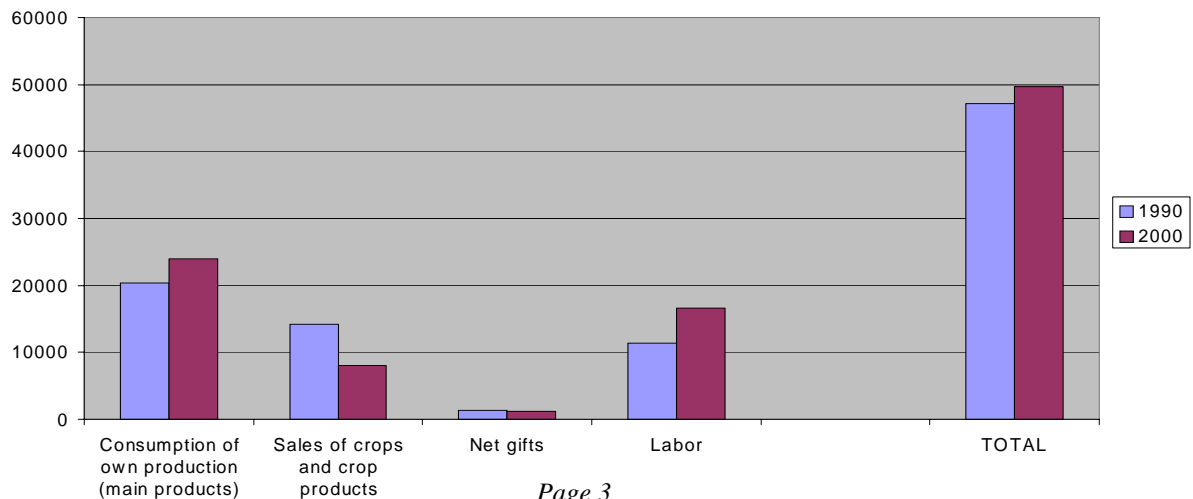


labor income, which is a major income source for the least poor group but a relatively small source for the others. Further, it has become more important for the least poor group, and less important for the three poorest groups. This is probably one reason why those in the least poor group have been able to increase their average income levels significantly between 1990 and 2000, while the average incomes for the other three groups have fallen. This is also consistent with the results from the Rwanda Participatory Poverty Assessment conducted in 2001 (Ministry

of Finance and Economic Planning 2001) where respondents stressed that having wage work out of agriculture was the key route out of poverty. In table 2 the three poorest groups still obtain around 85% of their income from working on their own farms. With declining land areas the decline in their average incomes is to be expected.

All four groups sell a lower proportion of their output in 2000 compared to 1990, but this decline is particularly notable for the three poorest

Figure 2: Average Household Income from Different Sources, 1990 prices (FRw)





groups. Agricultural labor is the second most important source of income in the first two groups, but the contribution to household income remains small (as in 1990). The poorest derive less income from non-agricultural work in 2000 than in 1990, and this may be one driver of increasing inequality in rural areas.

Further analysis shows that among the two poorest groups, households are producing much more cassava and Irish potatoes (relatively unimportant crops in 1990), more beans and sorghum, and similar quantities of sweet potato. They are producing much smaller quantities of bananas, coffee and other smaller crops (including maize and soy beans). These poorest households have managed to increase their production of many staple food crops despite declining average land sizes. This reflects a number of factors including the change in production pattern mix itself and the introduction

of new varieties, such as climbing beans. Many of these staple crops, such as cassava, are low price crops, and this may partly account for the reduced value of agricultural production apparent in Table 2.

These production and marketing shifts also provide an explanation for the reduction of malnutrition in age five and under among the poorer groups despite declining incomes, in that production of many key sources of nutrients (beans, potatoes, and now cassava) have increased while production of crops for sale (coffee, beer bananas) has fallen sharply. Indeed, for the two poorest groups, revenue from sales of banana beer (by far the largest sales revenue source in 1990, and still in 2000) fell by three quarters between 1990 and 2000. Sales of most other agricultural crops fell sharply in these same groups, as well as for the third poorest group.

Table 2: Percentage Composition of Household Income, by Income Group 1990 and 2000

Composition of Household Income	Poorest	2nd	3rd	Least Poor	Total
1990					
Consumption of own production: main crops	52.2%	51.9%	48.7%	36.0%	43.1%
Sales of crops and crop products	26.0%	29.2%	34.4%	28.7%	30.2%
Net gifts	4.4%	2.9%	2.8%	2.3%	2.7%
Agricultural labor	9.3%	6.9%	3.8%	1.5%	3.6%
Non agricultural labor	8.1%	9.0%	10.3%	31.6%	20.5%
TOTAL	100.0%	99.9%	100.0%	100.1%	100.1%
2000					
Consumption of own production: main crops	76.5%	74.9%	71.5%	35.2%	48.3%
Sales of crops and crop products	7.4%	11.4%	12.5%	18.6%	16.1%
Net gifts	3.5%	1.7%	1.8%	2.4%	2.3%
Agricultural labor	7.9%	7.3%	6.0%	2.9%	4.2%
Non agricultural labor	4.7%	4.8%	8.2%	40.9%	29.1%
TOTAL	100.0%	100.1%	100.0%	100.0%	100.0%



The least poor group maintained a similar level of agricultural sales in 2000 compared to 1990.

While there may be systematic underestimation of income levels for some households, further calculations suggest the results here do not appear to be sensitive to this. This pattern of change provides an important explanation for the key paradox here: how child malnutrition rates have been able to fall despite extreme and probably increasing poverty and vulnerability, especially among the poorest households.

CONCLUSIONS AND IMPLICATIONS:

Overall, the average value of agricultural production has fallen slightly over this period, but more significantly households in 2000 are now consuming much higher proportions of their output themselves. Production patterns have also changed, with a sharp reduction in the value of output due to coffee and an increase in the shares of core consumption commodities such as sweet potatoes, Irish potatoes, beans and now cassava. The reduced agricultural production has been compensated for by an increase in non-agricultural wage income.

However, disaggregation by income level shows a highly differentiated pattern of change, with poorer groups becoming worse off in income terms while the richest group increased their income levels. Two major factors that seem to be driving this increased differentiation are non-agricultural wage employment and the extent of agricultural sales. Non-agricultural wage employment, regarded as a key route out of poverty, is predominantly undertaken by the richer households, more so in 2000 compared to 1990. Though the proportion of agricultural production sold has fallen dramatically overall, among the richest group the sales levels have actually risen in real terms.

The aggregate picture is therefore very misleading as an indicator of the situation of

nearly 70% of the rural population for whom income levels have not recovered. This is especially so among the poorest 30% (even if some of these incomes are underestimated). Increased land size pressure is particularly critical for these groups, who have less land to start with and who have experienced larger proportionate reductions in land size. That they now market much smaller proportions of their output is therefore not surprising. Because they lack skills, these households have also had very limited opportunities for high wage off-farm work, and may even have difficulty obtaining poorly paid and insecure agricultural wage labor.

The three poorest groups here (representing around 70% of rural households) are unlikely to derive much, if any, direct benefit from agricultural commercialization given that they have withdrawn from the market and are mostly cultivating land areas that are too small to be able to produce a surplus. Indeed withdrawing from cash crops is precisely how these households have managed to achieve reduced child malnutrition, against the odds. Measures to increase the productivity – and sustainability – of Rwanda's small scale agriculture are critical but there is a clear risk that commercialization by itself could further increase rural inequality (a process that already seems to be happening).

It is also clear though that many of the poorest rural households will never be able to obtain adequate consumption levels based on agriculture alone – but at the moment the opportunities for off farm work for these households appear very limited. Efforts to develop off-farm labor opportunities may offer the best long-term direction to achieve poverty reduction among the poorest. Yet for off-farm income potential for these households to grow, there needs to be increasing demands for the goods and services they could produce. In a country as rural as Rwanda, that growing demand will have to come primarily from increasing incomes among



segments of the smallholder sector who do have viable farm sizes and improved technology. This puts a premium on increased agricultural productivity for most categories of smallholders, both to help them eat better from their own production and face lower food prices for what they purchase in the market, as well as to raise incomes for those farmers able to take advantage of commercial market opportunities.

REFERENCES

- Loveridge, S. 1992. *Sources of Agricultural Household Revenue, Exports, and Their Impact on Rural Food Availability, Rwanda, 1990*. Report No. P.24. Republic of Rwanda, Ministry of Agriculture and Livestock, Agricultural Statistics Division. Kigali: Government of Rwanda. Web accessible at: <http://www.aec.msu.edu/agecon/fs2/rwanda/pre1994/revenuedep.pdf>
- Ministry of Finance and Economic Planning. 2001. Report on Poverty Profile Survey in Rwanda. Kigali: Government of Rwanda.
- Ministry of Finance and Economic Planning. 2002. A Profile of Poverty in Rwanda: An Analysis of Based on the Results of the Household Living Conditions Survey, 1999-2001. Kigali: Government of Rwanda.
- Ministère du Plan. 1988. "Enquête Nationale sur le Budget et la Consommation des Menages (Milieu Rural)." Volume 4: Consommation Alimentaire en Milieu Rural. République Rwandaise.
- Mpyisi, E., J. Nyarwaya, and E. Shingiro, nd. *Statistiques Agricoles: Production Agricole, Elevage, Superficies et Utilisation des Terres. Annee Agricole 2000*. Food Security Research Project et Division des Statistiques Agricoles, Ministry of Agriculture, Livestock and Forests. Publication FSRP/DSA No. 4F. Web accessible at: <http://www.aec.msu.edu/agecon/fs2/rwanda/anneeagricole.pdf>
- Wise, V. 2004. *The Nutritional Situation of Young Children in Rwanda: An Analysis of Anthropometric Data Collected by the Household Living Conditions Survey, 1999-2001*. Rwanda Food Security Research Project. East Lansing: Michigan State University. Web accessible at: http://www.aec.msu.edu/agecon/fs2/rwanda/wpr_anthro_rwanda_english_wise.pdf .
- * This Policy Synthesis is a summary of a more detailed analysis by the same authors entitled *Exploring the Paradox of Rwandan Agricultural Household Income and Nutritional Outcomes in 1990 and 2000*, available as an MSU Agricultural Economics Staff Paper: http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=15910&ftype=.pdf .

The authors are grateful for assistance of Cynthia Donovan and Michael Weber in preparing this Policy Synthesis.

McKay is Professor in the Department of Economics and International Development, University of Bath, Bath BA2 7AY, UK, e-mail: a.mckay@bath.ac.uk. Loveridge is Professor in the Department of Agricultural Economics at Michigan State University e-mail loverid2@msu.edu The views expressed in this document are exclusively those of the authors.

Support for this research has been provided by the Food Security III Cooperative Agreement (CDG-A-00-00021-00) between Michigan State University and the United States Agency for International Development, through the Bureau for Economic Growth, Agriculture and Trade's Office of Agriculture and Food Security (EGAT/AGR) with supplemental funding from the Africa Bureau's Office of Sustainable Development and by the Universities of Nottingham and Bath, UK.