Global Bureau, Office of Agriculture and Food Security

USAID
U.S. Agency for International Development

POLICY SYNTHESIS

for USAID - Africa Bureau
Office of Sustainable Development

Number 40 February 1999

Office of Sustainable Development

EFFECTS OF CASH CROP PRODUCTIONON FOOD CROP PRODUCTIVITY IN ZIMBABWE: SYNERGIES OR TRADE-OFFS?

By

Jones Govereh and T.S. Jayne

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

BACKGROUND: The experiments with African state-led models of input intensification on food crops (featuring subsidized state credit disbursement, input delivery, and purchase of output) generally have proven themselves to be financially unsustainable. But in many parts of Eastern and Southern Africa, the subsequent withdrawal of state-subsidized credit, input delivery and food crop price fixing has resulted in a decline of cash inputs on food crops. A sustained renewal of African agriculture growth will require some form of transformation out of the semi-subsistence, low-input, low-productivity farming systems that currently characterizes much of rural Africa.

High-valued cash crops represent one potential avenue of crop intensification. But the case for cash cropping has generally been based on the direct contribution that *these crops* have on farm incomes. A relatively neglected avenue of research concerns the effects that cash cropping can have on the productivity of other household activities, including food crop cultivation. This paper examines two potential pathways by which cash cropping may affect the productivity of other crops: (1) *household-level synergies* (which occur when the household's participation in a commercialized crop scheme enables it to acquire resources not otherwise available for use on other enterprises in the crop mix); and (2) *regional spillover effects* (which occur when a commercialization scheme may attract certain kinds of investments to a region which create spillover benefits to farmers engaged in other crops). Examples of these *household-level* and *regional-level spillover effects* include:

1. Under credit and input market failures, commercialization schemes may be one of the few feasible ways to acquire credit and inputs. In some cases, through interlinked transactions for inputs, credit, management, and sale of product, the institutional mechanisms between farmers and marketing firms can relieve some of the market failure problems that constrain input intensification on grain crops. The success and sustainability of this pathway may depend on the firm's ability to recover its credit and associated costs of supporting smallholder production.

2. Input-intensive cash crops, by promoting market demand for inputs, may induce private sector investment that improves the availability (and reduces per unit costs) of key inputs that can be used on a wide range of crops.

3. The promotion of high-value, high-return enterprises may improve households' ability to invest in lumpy assets such as animal traction.

4. Commercialization may support private investment in infrastructure and human capital that has broader benefits for other economic activities such as food crop production.

These potential synergies between cash crops and food crops have been generally neglected in food crop research and extension programs, although they may have important implications for programs designed to promote smallholder food crop productivity growth. More comprehensive information on the interactions between food and cash crop production may help in understanding the indirect payoffs to cash crop research programs and in refining extension strategies designed to promote food crop as well as cash crop productivity.

OBJECTIVES AND METHODS: This paper studies the dynamics between cash crop and food crop productivity in Gokwe North District in Zimbabwe, a major cotton producing area. The main research issues were: (1) to identify the determinants of commercialized crop production at the household level; and (2) to determine the effect of increasing crop commercialization on household food productivity.

The paper derives a *household crop commercialization index,* defined as the ratio of crop sales to total crop production. The bivariate statistics in Table 1 show sample household characteristics according to a cotton commercialization index, and indicate that the relationship between cash and food crop production is neither entirely competitive nor complementary.

We also develop econometric models for identifying the determinants of household-level commercialization and for measuring its effects on food crop productivity.

Results are based on cross-sectional household survey data collected in 1996, implemented under the project on Integrated Assessment of Trypanosomosis Control Strategies and their Impacts. This project is a joint collaboration between International Livestock Research Institute (ILRI), University of Zimbabwe (UZ), Regional Tsetse and Trypanosomosis Control Program (RTTCP) and the Department of Veterinary Services Tsetse Control Branch of Zimbabwe.

FINDINGS: The principal findings of the paper are:

1. This area of Zimbabwe is highly commercialized in cotton production. Maize accounts for 47.4% of cropped area, while cotton accounted for 45.2%. However, there are clear differences in the purposes for growing these crops: 100% of the cotton production was marketed, while 93.8% of maize production was grown for home consumption. Cotton sales contributed 83.6% of the value of marketed crop income. **In this area of Zimbabwe, agricultural commercialization is virtually synonymous with expanding cotton cultivation.**

2. Especially under conditions of credit and input rental market failures, cash cropping schemes may enable households to increase both input use and productivity of food crops. **Cotton commercialization at the household level significantly and positively affected food crop productivity, *ceteris paribus*. The expected value of food grain output for households at the mean level of cotton commercialization was 38.1% higher per hectare of food crops than households growing no cotton.** Also gross crop income per hectare and per family member were positively related to the share of cotton in cropped cultivation.

Table 1. Household Characteristics according to Cotton Commercialization Index in Gokwe North District, Zimbabwe, 1995/96

Characteristics	---------- Cotton commercialization index [a] ----------				
	Non-Cotton Growers (0)	1st Tercile (1% - 66%)	2nd Tercile (67% - 82%)	3rd Tercile (>82%)	Total
Sample	75	122	126	107	430
Grain Yield (kg/hectare)	1165	1443	1037	1007	1167
Grain Output (kg/capita)	481	495	331	263	385
Total crop income (Z$/total hectares cropped)	1690	2271	2340	3001	2396
Total crop income (Z$/capita)	639	1492	1525	2822	1732
Grain self-sufficient (%)	59	81	50	41	57
Grain selling households (%)	20	42	25	21	27
Household cotton sales ($)	0	3633	5409	10597	5387
Land size (ha)	4.39	5.62	5.66	7.87	6.04
Fallow area (ha)	1.29	.78	.71	.78	.85
Family size (No.)	5.9	6.4	6.8	6.6	6.5
Farm capital investment (Z$)[b]	2254	4353	5120	6806	4855
Animal draft teams (number)	0.36	1.09	1.20	1.65	1.14
Used animal draft power (%)	42	74	75	79	70
Family head years in school	4.5	5.9	6.0	6.8	5.9
Master Farmer Certified (%)	2	6	12	11	8.4
Female headed (%)	21	11	11	11	13.0
Distance to market (km)	27.5	25.2	23.5	22.6	24.5
Tsetse controlled early (%)	41	27	35	29	33
Mid tsetse controlled (%)	13	27	35	56	34
Tsetse controlled recently (%)	46	46	30	15	33

notes: [a] cotton commercialization defined as value of cotton sales divided by value of total crop production. [b] Farm capital investment includes value of draft equipment, pesticide equipment, etc.
Source: Socioeconomic Impact Assessment of Tsetse and Trypanosomosis Control Surveys, Gokwe North District, Zimbabwe, 1996/97.

3. **Traction equipment and draft power were found to be key determinants of households' ability to diversify into cotton production.** Under the relatively land-abundant conditions of the study area, animal traction allows households to put more land under cultivation, and therefore is a major source of increased farm production per capita.

4. **Cotton commercialization was significantly and positively affected by farm size, other factors held constant, but farm size was significantly and inversely related to food crop productivity.**

5. **The level of education, maturity of the household head and the household's investment in animal traction significantly and positively affected food crop productivity.**

6. The degree of **cotton commercialization varied significantly across locations at various stages of settlement development.** The development stage for the settlements were driven by the relative timing of tsetse control.

POLICY IMPLICATIONS: Overall, the findings show that farm dynamics between cash cropping, capital investment, and food crop productivity are important to consider in discussions of agricultural commercialization among smallholder farmers.

Most local and internationally-based agricultural research programs designed to promote food crop productivity growth in Africa are based on the allocation of scarce resources to primary food crops. To a large extent, agricultural and nutrition policies in Zimbabwe have historically formulated rural development strategies on this conventional wisdom and have implicitly or sometimes explicitly regarded diversification into non-food cash crops as detrimental to household food security objectives. While productivity growth of staple food crops is indeed essential to overall rural productivity growth given the large proportion of cropped area under food crops, the potential of higher-valued cash crops to promote food crop productivity has often been neglected.

The challenge for government policy is to identify and facilitate strategic pathways to create positive interactions between food and cash crops, and between the public and private sector. The various pathways by which crop commercialization can affect food security and incomes under conditions of pervasive market failures needs to be more clearly understood to develop more informed policies in support of smallholder welfare.

This study clearly suggests that, despite frequent criticisms stressing the trade-offs between agricultural commercialization and food crop production, it is important to also consider the potential synergies.

*Special support for this study was provided by the Food Security and Productivity Unit of the Productive Sectors Growth and Environment Division, Office of Sustainable Development, Africa Bureau, USAID (AFR/SD/PSGE/FSP). The research was conducted under the Food Security II Cooperative Agreement between AID/Global Bureau, Office of Agriculture and Food Security, and the Department of Agricultural Economics at Michigan State University. The views expressed in this document are excluusively those of the authors.

Govereh is visiting research scholar, and Jayne is a visiting associate professor at Michigan State University.

This paper is a summary of a report entitled *Effects of Cash Crop Production on Food Crop Productivity: Synergies or Trade-offs?* MSU International Development Working Paper No. 74. It can be obtained by writing to:

MSU Bulletin Office
10-B Agriculture Hall
Michigan State University
East Lansing, MI 48824-1039