

MSSD DISCUSSION PAPER NO. 20

**RURAL ECONOMY AND FARM INCOME DIVERSIFICATION
IN DEVELOPING COUNTRIES**

by

Christopher L. Delgado (International Food Policy Research Institute)

**Ammar Siamwalla (Thailand Development Research Institute
Foundation)**

Markets and Structural Studies Division

**International Food Policy Research Institute
1200 17th St., N.W.
Washington, D.C. 20036 USA**

**Contact: Carolyn Roper
Phone: 202/862-5600 or Fax: 202/467-4439**

October 1997

Paper presented at a Plenary Session of the XXIII International Conference of Agricultural Economists, Sacramento, CA, U.S.A., August 10-16, 1997.

MSSD Discussion Papers contain preliminary material and research results, and are circulated prior to a full peer review in order to stimulate discussion and critical comment. It is expected that most Discussion Papers will eventually be published in some other form, and that their content may also be revised.

Abstract

Farm-level diversification, the adoption of alternative income-generating activities by farm households, is rarely deemed an explicit objective by economists. Where agricultural transformation has occurred, markets function well and agriculture is a waning portion of overall national product, such as the rice growing regions of Southeast Asia, farm diversification might be a desirable outcome of pursuing a market liberalization objective, but is probably not an end in itself. In Sub-Saharan Africa, where these conditions often do not hold, development depends on pro-actively commercializing rural areas. African farmers tend to diversify their production activities widely to mitigate risk, but to only produce one or two exportable commodities. High transaction costs are common barriers to diversification into new export opportunities, especially for the poor and less well-informed, who tend to fall behind during times of rapid structural change. Identifying appropriate rural institutions to incorporate rural people into new export opportunities is a major priority for relevant policy research; contract farming and participatory cooperatives offer promise and merit further study.

Introduction

Farm-level diversification involves adding income-generating activities at the farm-household level, including livestock, local non-farm, and off-farm pursuits undertaken by farm people. The objective of the paper is to consider questions arising from the apparent inconsistency between the fact that policymakers seem to consider farm diversification a major "economic" issue, thus as an *objective*, and the fact that economists typically neglect this area, seeing farm diversification as an *outcome* from pursuing some other objective. This lack of consensus is further reflected by disagreement over the extent to which national policies should pro-actively seek to promote diversification of farm-level output mixes in specific directions.

The Ambiguous Meaning of "Farm Diversification" for Economists

Governments in developing countries have an intense interest in promoting increased output diversification at both the farm and national levels (Petit and Barghouti, 1992; Siamwalla *et al.* 1992). Cited benefits of farm diversification are: high and more stable farm incomes and employment, greater long-term prospects for farm income growth, and more environmentally sustainable farming systems. Economists, on the other hand, often change the subject at the first mention of the topic.¹

The simplest interpretation of farm diversification as an objective is that farmers seek to generate a portfolio of income from activities with different degrees of risk, expected returns, liquidity and seasonality, and adjust their output mix accordingly. Thus farm diversification would be the allocation of household productive assets among different income generating activities. Farm diversification may be distinguished from village-level diversification, where households become more specialized over time, but village economies offer a wider array of goods and services for sale, the typical path of rural economic development under commercialization (Timmer, 1988; von Braun and Kennedy, 1994). Similarly, farm diversification as an objective involves a different set of issues than export diversification out of a few agricultural commodities, as a means to stabilize foreign exchange receipts (Bautista, 1992).

¹The definitive literature review in agricultural development economics, *Agriculture in Economic Development: 1940's to 1990's, volume 4* in the massive *Survey of Agricultural Economics Literature* edited by Lee Martin (1992), contains over 1,037 pages. Yet none of the 440 subtitles of this work, and only a very small handful of the nearly 5,000 titles of professional references surveyed, mention "diversification," much less "farm diversification."

Most economists in the Western tradition tend to see farm diversification as the endogenous outcome of economy-wide policies or secular trends affecting relative incentives. These policies can be primarily on the output or factor price side (e.g. Schiff and Valdés, 1992) or on the input price or non-price sides, such as "free" water supplies to farmers that encourage an over-production of rice, or public investment choices for agricultural research priorities, or the creation of infrastructure that favors one product over another (World Bank, 1990; Hayami, 1991). Thus farm diversification is perceived as a process of adjustment to major changes in relative costs, benefits, risks and uncertainties of different household income generation strategies.

Without disagreeing, we argue that in some cases--but only in some cases--it makes sense for both economists and governments to approach farm diversification as a specific objective, even to the point of concentrating analysis and interventions on favored sub-sectors or outputs. The key lies in the degree of market development, the degree of prior agricultural transformation and the relative importance of agriculture in the case concerned. Cases where agricultural input, factor and output markets work reasonably well--typically where agriculture has evolved to a point where it has become a commercial sector just like any other--are very different from those where the commercialization of family agriculture is still at a very early stage and many markets are missing.

Where markets work well, by definition relative price changes are transmitted throughout the economy (in the absence of distortions) and all actors face a common set of prices (adjusted for distance, etc.). If agriculture is a relatively well-developed sector, most farmers will be able to respond to those signals. Since agriculture is only a small share of economic activity, cases that deviate from the ideal are more an issue for equity than for growth, and can be dealt with through other approaches besides output mix diversification.

Where markets do not work well, other events will need to occur before adjustment to relative price changes in the macro economy can be transmitted to the farm level. If agriculture accounts for a large share of employment and exports as well, such adjustment in output mixes is crucial to growth as well as equity. If agriculture is also pre-commercial, shifting into a new set of commercial activities will require a host of major rural changes besides changes in output mixes. Under these circumstances, it will be argued, a commodity-specific approach may be needed to commercialize agriculture, to speed up the transmission of incentives to the farm level and to promote adjustment of output mixes in ways favorable for both growth and equity.

Key Issues in the Economic Analysis of Farm Diversification for Different Types of Economies

Farm diversification in countries with developed markets

In well-functioning market economies of the world, which in addition to the traditional OECD countries probably includes much of Southeast Asia and Latin America, the need for policies to specifically promote change in farm level output mixes arises primarily because of the existence of prior distortions, such as differential protection to specific crops. These policies have led to over-specialization in these crops, and the subsidization of certain crop-specific inputs, such as water, in the case of rice. The barrier to adjustment to new relative prices--in effect, what prevents response to lasting changes in relative prices--is typically a policy distortion that drives a wedge between social prices and prices experienced by farmers. The likely policy recommendation is to do away with the distortion.

Relevant research is not really a separate category of research from that dealing with market liberalization generally. In fact, farm diversification would be an endogenous outcome of pursuing a liberalization objective, not a target in itself. Indeed, most economists addressing diversification issues today in the context of functioning markets for inputs, outputs, and factors go out of their way to insist that they are *not trying to pick the winners*.

In sum, in economies with strong markets, where agricultural transformation has largely occurred, and agriculture is a relatively small part of the overall economy, farm diversification as an objective is probably not a very important economic issue in its own right, even though the outcome of other policies for farm diversification is important. The relevant economic issues concern how to overcome distortions--usually policy-mediated--that drive a wedge between socially and privately optimal production and sales strategies. Solutions are likely to be found in policy changes addressing the source of the problem (such as free irrigation water) and farm diversification (or specialization) will be an endogenous result of those changes.

Farm diversification in the presence of missing major markets at early stages of agricultural transformation

In many parts of the world, while some markets for factors, inputs and outputs may work well, some key markets for agriculture (such as land and credit, for example) may not exist. Markets may be missing for a variety of reasons, and we shall solely be concerned here with the case of market failure from incomplete transformation and commercialization of subsistence agriculture.

In countries at early stages of agricultural transformation, small and large farm households in rural areas typically do not have access to the same technology, information, asset base, input supplies and market outlets. The same is true for farm households in different locations. Under these conditions, different farm households are likely to be subject to significantly different levels of *transactions costs* for producing and selling the same output mix (Akerlof, 1970; Lopez, 1984; de Janvry *et al.*, 1991). Broadly defined, transactions costs are the full costs of carrying out exchange, presumably including marketing costs (Coase, 1960).² They include intangibles such as search, monitoring and enforcement, and vary by product, type of agent in the marketing chain, and individual agent within a category of agents.

Most high value-added products in agriculture are characterized by a high ratio of transactions costs to final value, because of the high degree of processing embodied in such items (Binswanger and Rosenzweig, 1986; Jaffee and Morton, 1995). Examples would be animal proteins and horticulture, which are prime candidates for farm diversification. Production of these items tends to increase returns to family resources. They also tend to be products with high income elasticities, which offer prospects for long-term growth. Rural households with different asset bases are likely to face different levels of transactions costs. Poorer households may have more difficulty diversifying into new activities than more wealthy ones.

Lowering and reducing disparities of transaction costs across rural households is therefore central in economies at early stages of agricultural transformation to promoting farm-level adjustment of agricultural output mixes to major changes in relative prices. Moving the shadow decision prices individual farmers face (market prices plus transactions costs) closer to a common new social optimum is central to growth; making sure that poorer farmers also adjust is central to equity and poverty alleviation. The key issue is the extent to which addressing high transactions cost barriers separating households from markets requires a commodity-specific, or at least a commodity group-specific approach.

Policies for growth and poverty alleviation will probably involve increasing access of farm households--and especially the poor--to information and assets

²A non-exhaustive list of relevant transactions costs affecting the exchange of agricultural and livestock products in developing countries is: a) spoilage, b) quality differences depending on processing, c) lumpiness of initial investments, d) lags in production, e) seasonal variability, f) search costs, g) screening trade partners, h) bargaining, i) monitoring and j) contract enforcement (Hoff *et al.*, 1993; Jaffee and Morton, 1995). In addition, locational issues such as k) transport, l) handling, m) packaging, and temporal costs such as n) storage, should be included.

for adjustment, primarily through infrastructure provision and institutional development for collective action. Sectoral policies of governments play a key role here, and they typically have important commodity-specific attributes, particularly when dealing with high-value added commodities that typically have high transactions costs associated with processing, such as milk and meat in the tropics.

Present Patterns and Driving Forces of Farm Income Diversification

A snapshot of the process of diversification of the world's agriculture out of cereals over the last decade can be gleaned from Table 1, which shows relative growth rates for major farm outputs, excluding non-farm and off-farm income. For the world as a whole, aggregate production of fruits, vegetables and tree nuts grew faster from the mid-1970's to the mid 1990's than did cereals or other crops. Livestock output grew faster than crop output. In developing regions cereals output grew at slower rates than other crops or livestock, with the notable exception of Africa. In Africa, cereals production grew at a high rate than other crops over the period, which included some major droughts.³ However, Africa is the only region of the world where a large share (up to half) of starchy staples come from roots and tubers (Alexandratos, 1995). It seems likely that cereals are gradually replacing these crops, given the typically greater labor intensity of the latter.

Table 1 also illustrates the rapid rise in livestock production in Asia over the last two decades, where it is the key diversification activity (with fisheries, not shown) at the farm and national levels. Generally the relatively strong showing for output growth of livestock and horticultural products over the last decade illustrates a broader pattern throughout the world of substitution of horticultural products and animal products for starchy staples in human diets over time, due to preferences for these items as incomes go up. Although Table 1 does not contain figures for non-farm income, it seems reasonable to suppose that agricultural income continued to shrink around

³These are rates of absolute increase. Africa's very high population growth rate makes per capita growth seem paltry or negative.

Table 1--Compound annual growth in production of major agricultural items by major regions and selected countries, 1973-1996 (percent per annum)

Region	All crops	Cereals	Vegetables and fruits/treenuts	Livestock
Africa	1.84	2.64	2.14	2.65
Burkina Faso	4.38	4.65	3.14	4.85
Uganda	0.94	1.32	<i>0.64</i>	2.40
Zambia	2.07	<i>-0.20</i>	2.44	1.77
Asia	2.88	2.74	4.41	6.36
Bangladesh	1.68	2.30	1.03	2.01
Indonesia	4.02	4.15	3.62	7.00
Thailand	3.89	1.84	1.45	3.67
South America	2.21	1.86	3.19	3.23
Chile	3.81	3.45	4.14	4.62
Europe	<i>-0.05</i>	1.01	<i>0.22</i>	1.20
1984-96	<i>-1.86</i>	<i>-0.69</i>	<i>-0.52</i>	0.25
U.S.A.	0.60	1.03	1.21	1.95
World	1.42	1.76	2.67	2.87

Source: Annual production data from FAO, 1997.

Notes: Compound annual growth rate of annual output in metric tons.
 Italicized values not significantly different from zero at 10 percent.

the world as a share of total farm household income and employment, as found for a selection of developing countries from 1965 to 1988 by Petit and Barghouti (1992).

In looking at specific country cases, we limit our analysis to the virtually polar opposites of Asian rice economies and African food/export crop economies. The former represents cases where markets work relatively well, agriculture has largely gone through a prior transformation into a commercialized sector, and it is a shrinking part of the overall economy. The latter tends to represent cases where some markets do not work well, agriculture is largely uncommercialized, and it still accounts for the largest share of economic activity.

Economies with functioning markets, where agricultural transformation has occurred, and agriculture accounts for a shrinking share of employment: Examples from Asian rice areas

Agricultural diversification has mostly been a hot policy issue in Asian rice growing countries. Indonesia, for example, went from being the world's largest importer of rice to being self-sufficient in the decade ending in the mid-1980's (Hayami and Otsuka, 1994). This pattern was not unusual in the region during the Green Revolution period, and typically involved substantial policy support for cereals production, through research and infrastructure investment, and even outright protection (Pingali and Rosegrant, 1995). Pressure to diversify resulted from the abrupt fall in world rice prices during the mid-1980's (World Bank, 1990).

Besides short-run price movements, the long-run outlook for many rice producers in Asia suggests a need for diversification. Under post-Green Revolution conditions, further growth of cereals production would lead to sharply falling producer incomes as cereals--being more costly to produce than world prices and having low price and income elasticities--encountered a domestic demand constraint.⁴ Thus there are many pressures to diversify farm resources into high-income elasticity of demand items, preferably having broad export markets for outlets (Hayami and Ruttan, 1985).

The quickest form of market adjustment might be to let abrupt price declines push small farmers and landless laborers off the land into cities. While sharp declines in rice prices would presumably provide an impetus to diversify, few governments would be able to ignore the welfare implications for millions of small producers, even if the short run consequences for poor net consumers of rice were favorable (Timmer, 1988; Taylor, 1994).

⁴Viet Nam and Thailand may be exceptions, but it is hard to see Bangladesh, Indonesia, and China as major rice exporters in the future.

Given that subsidized provision of irrigation water is one of the main incentive factors of the Green Revolution, diversification out of rice may be hard to achieve in the absence of tradable property rights in water that match social and private costs in water use (Rosegrant *et al.*, 1995). Now that irrigation infrastructure has been put in, passing on its maintenance cost will require substantial institutional change (Siamwalla *et al.*, 1992). We therefore need to be careful about assuming that markets alone will ensure a smooth adjustment out of over-reliance on cereals.

Equity issues in farm diversification are hinted at by Table 2, which shows the share of farm household income across the household income distribution coming from various sectors, for selected cases. The first two, from Pakistan and the Philippines, arguably represent cases where local markets work fairly well. The latter two, from Guangdong, China in 1989 and Viet Nam more recently, represent the case of substantially transformed agricultures in the early stages of privatization. In the first two, the share of crop profits increases with income, whereas in the latter, it declines. Private ownership of land is critical to wealth in the first two, whereas access to non-farm opportunities is more important for income in the latter two.

The detailed data by income class available for Pakistan and the Philippines shows that prime farm diversification activities, especially livestock but also fruits and vegetables, account for a large share of the income of the poorest households, and the share of these activities declines with increasing income. Hossein (1988) also shows that livestock, backyard crops, and fisheries play a special role in the income of the poor in Bangladesh, in both Green Revolution areas and areas that have not undergone this transformation. David and Otsuka (1994), in a comprehensive study of the impact of high yielding rice varieties on income distribution in eight Asian countries, raise the possibility of an adverse impact of the rice Green Revolution in high potential areas on incomes in lower potential areas. They show that this was largely mitigated by out-migration and diversification of low potential areas into non-rice activities.

Choices involved in fostering technological progress and providing rural infrastructure are likely to remain critical for providing the incentives for successful diversification of farmers faced with a structural need to adjust their output patterns away from exclusive reliance on cereals. Efforts in Southeast Asia to promote diversification while maintaining cereals production incentives have only had success where technological advances

Table 2--Asian farm household income sources by income quintile (percent of household income, quintile 1 is the poorest)

Country	Quintile	Crop profits	Livestock profits	Agricultural wages	Non-farm activities	Rents	Transfers
Pakistan ^a 1986/87-1988/89, 3 province rural survey	1	6	25	1	50	5	14
	2	9	24	0	48	5	13
	3	12	18	2	44	9	15
	4	20	16	1	43	8	13
	5	37	9	0	17	21	17
Philippines ^b 1984/85, Mindanao	1	29	23	31	17	(Included in "non-farm activities")	
	2	25	18	39	19		
	3	35	18	28	20		
	4	36	18	20	27		
	5	54	10	2	35		
Viet Nam ^c 1992/93, National	1	59	(Included with crops and forestry profits)	23	15	-	3
	2	57		20	20	-	4
	3	48		19	28	-	4
	4	40		22	35	-	3
	5	18		23	52	-	3
China ^d 1989, Guangdong	1	74	(Included with crops and forestry profits)	(Included with non-farm activities)	22	-	4
	2	64			32		4
	3	60			34	-	7
	4	48			47	-	4

Sources: ^aIFPRI Rural Survey of Pakistan (Alderman and Garcia, 1993; Adams and He, 1995).

^bIFPRI/Institute for Mindanao Culture Survey (Bouis, 1991). Livestock includes fruits and vegetables.

^cViet Nam, State Planning Committee, 1992/93 Viet Nam Living Standards Survey (1994). "Agricultural wages" includes non-farm wages.

^d1990 Qingyuan County Farm Household Survey (Hare, 1994). Data is for quartiles. Agricultural wages includes non-farm wages.

have increased the profitability of alternatives (Hayami and Otsuka, 1994; Siamwalla *et al.*, 1992).

Where technology is available, the constraints become infrastructure and institutions. Detailed work in Indonesia by Hayami and Kawagoe (1993) shows that in countries with good infrastructure and a trader class, private marketing initiatives can do much to promote the shift of producer resources into diversification activities. Similar results have been reported for Thailand by Siamwalla *et al.* (1992).

Yet much of the agricultural infrastructure built in the 1970s and 1980s in Asia was built around the objective of cereals production, and in some cases is fairly specific to that objective by virtue of location or function. Furthermore, not all areas have the institutional capacity afforded by traditional Chinese traders in Indonesia. Nineteenth century experience in Denmark (butter) and Japan (sericulture) suggests that the combination of technological innovation in the diversification activity (the cream separator and cold storage of cocoons, respectively) and non-monopolistic institutions of collective action, such as creamery cooperatives, were critical to historical diversification trends out of cereals (Hayami and Ruttan, 1985; Hayami, 1991). The need for institutional innovation for farm diversification will be greatest in economies that have not gone through agricultural transformation and where agricultural markets do not work well.

Economies at the early stages of agricultural transformation: Farm income diversification in Sub-Saharan Africa

By definition, agricultural transformation has not occurred in these cases and agriculture tends to remain the predominant sector for employment. Many markets are missing or severely restricted, especially for credit and land. Not all African economies fit this definition, and not all economies that fit the definition are in Africa.⁵ Smallholders in Africa generate significant income from activities other than growing crops and tending livestock.

The results from 28 household case studies of farm household income generation across Sub-Saharan Africa are summarized in Table 3. Farm income includes both income in kind and from net sales of crops and livestock. Local non-farm income includes income earned by farm people working for wages (including on someone else's farm) and local sales of

⁵For convenience, "Africa" will be used as shorthand for the part of the continent south of the Sahara and north of the Limpopo River.

Table 3--Income sources for 28 samples of farming households across Sub-Saharan Africa, various years (in percent of total household income)

Share of farm Income	Farm income ¹	Local non-farm income ²	External non-farm income ³
Maximum ⁴	86	8	4
Mean ⁵	63	28	8
Median ⁶	63	20	16
Minimum ⁷	37	51	11

Source: Compiled from data and independent studies listed in Table 1 of Delgado (1997). The survey data were mostly collected for a single harvest year, within the 1985/86 to 1988/89 period.

Notes: ¹ Income from net sales of raw crops and livestock plus subsistence consumption.

² Income from local wages (even on other farms) and local sales of non-farm goods and services, including processed foods.

³ Income from migration, remittances, and transfers.

⁴ Gambia, uplands areas, 1985/86 (Puetz and von Braun, 1991).

⁵ Means for each income source separately, across the sample.

⁶ Zimbabwe, natural region IV, 1988/89 (Mudimu *et al.*, 1993, cited in Reardon *et al.*, 1994).

⁷ Senegal, Sahelian zone, 1988/90 (Reardon *et al.*, 1994).

goods and services. External farm income consists of remittances and transfers and does not depend upon buyers in local markets. These three types of income have different risk profiles for smallholders, who tend to diversify their income portfolios across different combinations of these three sources, depending on local circumstances. Non-farm income in the farm surveys in Table 3 ranges from 12 to 62 percent of total household income, with a median value of 36 percent.

The relationship between local and external non-farm income is highly variable across cases studied. The *raison d'être* for the two are in fact distinct. Local non-farm income is largely a result of the development of the local farm economy for other reasons, such as cash crop development. Spending by households of cash crop income on non-tradable rural products creates employment for any under-employed local resources (Bell and Hazell, 1980). External non-farm income is largely the result of a deliberate effort by households to diversify into income sources that are not highly co-variate with local cropping outcomes (Reardon *et al.*, 1988; von Braun and Pandya-Lorch, 1991). Not surprisingly, the correlation coefficient between the two forms of non-farm income across the 28 cases was low (0.17) and insignificant.

There are significant regional differences in farm income sources within Africa. Anecdotal evidence suggests that smallholder agriculture in Southern Africa tends to involve a much smaller number of secondary crops than in inland West Africa. In the Sahel, 20 to 25 crops per small farm, often inter-cropped in several different combinations, is the norm rather than the exception, whereas in the highlands of Eastern and Southern Africa, a dozen crops might be grown with a much lower incidence of inter-cropping (Ruthenberg, 1976). Farm income as a whole tends to account for a significantly higher share of total farm household income in Southern Africa than in West Africa, with the exception of the countries within the old South African Customs Union, which are heavily influenced by migration (Delgado, 1997).

In semi-arid and savanna West Africa, the relationship between income distribution and diversification out of agriculture appears to be monotonically increasing (Reardon *et al.*, 1994). At very low income levels, people are almost entirely occupied with subsistence agriculture. As commercialization increases, people diversify into non-farm income sources that provide some liquidity outside the harvest period and insurance against risky agricultural incomes. This appears to be the joint result of stagnant agriculture, risky returns in agriculture, urban bias that boosted returns to capital in nonagricultural pursuits such as commerce, and the fact that people principally involved in non-farm activities in rural areas of the Sahel often still reside on farms, not in market towns.

Diversification into non-farm activities in Africa occurs through different institutional forms than in Asia. In Africa, the same households tend to be

involved in both farm and non-farm activities; in South Asia, households tend to specialize, even though different households in the same village may have different economic functions (Reardon *et al.*, 1994). In the savanna and Sahelian parts of West Africa, the term "household" itself is misleading. In these zones, non-nuclear household compounds of more than 100 persons can be observed, although there is considerable variation among households in the number of nuclear units and persons.

The high degree of diversification of smallholder farmers in Africa, both within agriculture and outside of it, appears to be closely related to risk management strategies devised to cope with risky agricultural returns (Reardon *et al.* 1988; Eicher and Baker, 1992; von Braun 1989). Furthermore, for those involved in single-season agriculture susceptible to climatic risk, diversification into non-farm activities may be the most appropriate solution. Yet, it seems likely that such high diversification out of agriculture occurs at the cost of agricultural intensification strategies, which generally require concentration of farm investment and labor resources in farm production.

Farm diversification as a target seeks to promote a diversity of commercially marketed commodities, which is both different from a diversity of production activities and from actual experience in many African countries, where major cash earning activities on the farm may be limited to one or two crops out of the many grown. The solution often addressed for this is to promote farm-level diversification in "non-traditional exports," or at least into farm tradables that are different from the traditional agricultural commodity exports. Thus "farm diversification" as an objective in African smallholder agriculture should refer primarily to the part of farm household output undertaken specifically for cash generation, which may be significantly less than half the value of total output (Eicher and Baker, 1992).⁶

Experience with diversification into non-traditional commodities at the small farm-level in East Africa through contract farming and coops

The impetus for farm diversification in these cases stems from the need to adjust to fundamental changes in price relationships: sixty percent relative price declines for traditional export crops during the 1980s, and phasing out of many traditional agricultural subsidies at the farm level during the Structural Adjustment era, offset by substantial devaluation of real exchange rates (Hussain, 1994; Delgado, 1995).

⁶This is different from the selling of occasional surpluses of grains grown primarily for household use.

It is often thought that the sum of these forces on Africa's small, relatively open economies has tended to increase the relative incentive for smallholders to engage in production of non-traditional agricultural exports, such as fruits, vegetables and spices. However, the anecdotal evidence suggests that the main production response into non-traditional agricultural exportables, in those countries that have in fact gone forward with macroeconomic adjustment measures, probably concerns less than 15 percent of small farmers (Little and Watts, 1994; Jaffee and Morton, 1995).

This raises the question of why other farmers have been slow to adjust their production patterns and what can be done about it. Part of the explanation is undoubtedly that proximity to infrastructure or physical access to other non-price incentives is key for participation, and this is not possible for everyone at the early stages of agricultural transformation (Lele *et al.*, 1989). However, it is hard to rule out the intriguing hypothesis that wealthier segments of the rural population in terms of control of factors of production and access are the first respondents to new opportunities. The issues then are how soon the rest of the population will follow, and what can speed the process up.

Clearly rural production and marketing institutions are key in this environment (Lele *et al.*, 1989; Lele and Christiansen, 1989). Compare what is required for farmers to diversify into non-traditional tradable activities to what is available in economies at early stages of agricultural transformation. The eight requirements are: a) transfer, adaptation, and extension of technology for producing the item cost effectively; b) investment at farm level, often with some lag before pay back; c) availability of specialized inputs; d) heavy investment at the processing level, often in fairly activity-specific facilities; e) availability of infrastructure (cold storage, roads, airports, etc.) f) a conducive regulatory environment for commercial risk-taking; g) thorough knowledge of OECD export markets; h) having an established reputation (trust) in export markets.

These items by and large are not much in evidence in most African countries. Furthermore, they all tend to be somewhat activity-specific. Even in the case of roads where transport infrastructure is lacking, policymakers have to decide whether to build the road to a cotton area or to a tea area, for example, and the two are not good substitutes. Commodity specialization is required for accumulating the knowledge required for success in marketing many of these items, raising the transactions costs for diversifying into any one of them.

The institutions that have been brought to bear in East Africa for reducing these transactions costs are vertical integration of production and marketing, contract farming and various forms of producer cooperatives or village self-help groups. Vertical integration through plantation agriculture tends to work well for capital-intensive items where rural population density is low (easy access to land), and quality is fairly uniform, such as palm oil in West Africa. However, it is not a tool to diversify smallholder agriculture. Contract farming tends to offer

a more attractive option for processors--and a viable means of facilitating adjustment by smallholders to new structural incentives--where quality of the item in question is intrinsically heterogeneous and highly critical to success, where land is scarce and labor intensity is high, such as horticulture in Kenya and cotton in the Sahel (Minot, 1986; Watts *et al.*, 1988; Lele *et al.*, 1989; Jaffee, 1992; Little and Watts, 1994).

For smallholder producers, contract farming reduces risks and most importantly provides substantial access to specialized information and assets. For processing companies, it reduces costs and risks of labor supervision, matches incentives to quality control objectives, and provides access to land, and may provide some political cover against arbitrary government actions. The key point for present purposes is that contract farming under the above structural conditions tends to be successful where it succeeds in reducing farm-level transactions costs for adjustment to viable commercial opportunities at an aggregate level. It does this by focusing in an integrated fashion on commodity-specific sub-sectors.

Producer cooperatives under some conditions might provide an alternative to vertical integration of processors or contract farming. An example would be the relatively recent explosion of private small-scale smallholder dairy cooperatives in Kenya and Uganda (Jaffee and Morton, 1995; Staal *et al.*, 1997). Since 1990, devaluation of real exchange rates and an end to dumping of milk powder by the developed countries has radically increased the potential profitability of domestic dairy in Africa (Staal *et al.*, 1997). The issue is whether smallholders in zones that can support cattle will diversify their market-oriented activity out of formerly subsidized items (such as maize in Zambia or peanuts in Senegal) into the new dairy opportunity or not.

Requiring specialized assets (semi-exotic breeds of dairy cows), the end product being highly perishable, and having a high share of retail value added coming from processing, dairy production for market is full of transactions cost barriers for smallholders. Vertically integrated companies might be an alternative near major consumption centers. While providing domestic milk in the short run, such schemes throw away one of the few viable opportunities for integrating smallholders into economic growth, made possible by rapid urbanization and macroeconomic reform.

Furthermore, East African experience suggests that vertically-integrated milk farmers/processors typically run afoul of the high labor intensity of dairy and the problem of feed costs; smallholders tend to do better on both through more intensive use of family resources at a lower reservation wage. However, allowing smallholders to benefit from the new commercial opportunity made available by economic reforms at home and abroad will require promotion of institutions of collective action. To date, small-scale producer cooperatives have

played this role in Kenya and Uganda, often with a lot of top down involvement by NGOs, government and foreign aid agencies. Over time, agricultural cooperatives in Africa will need a certain amount of state intervention to provide support for complex technological, financial and managerial functions. Yet they cannot work unless they are run with substantial participatory involvement of local people and good local government (Lele and Christiansen, 1989).

Summary and Conclusions

Whether farm diversification should be considered a distinct objective--rather than an associated outcome--of good economic policy depends primarily on the economic structure of the economy in question. In places such as the Southeast Asian rice areas, where agricultural transformation has largely occurred, markets for goods and factors generally work well, and the role of agriculture in supporting overall growth and equity is waning, farm diversification is an important issue. The analytical issues for economists, however, are more in the area of market liberalization or property rights than in promoting diversification *per se*.

In such areas, there is a concern to see farmers diversify into items less likely to be subject to abrupt price falls in the future than are food grains, given the low price and income elasticities of demand for the latter. The main concern for diversification policies however is probably equity, not growth, and governments probably do not need to be--indeed should not be--involved in commodity-specific institutional innovation or other direct interventions on the marketing or pricing side.

Farm diversification acquires a more strategic aspect as an economic issue in areas where agriculture is still a large share of the economy, farming is only partially commercialized, some major agricultural markets for goods or factors do not work well for structural reasons, and the level of technical progress is low. It is strategic because overall economic development depends on finding a viable way to commercialize agriculture, and a coordinated policy approach to sub-sector development will probably be necessary. In many countries of Sub-Saharan Africa, farm household income is already highly diversified, although the number and quantity of agricultural items produced explicitly for sale from any one farm tends to be low.

While smallholder-led agricultural growth is critical for such economies, intensification paths for such farms are less clear than in the historical case of the Asian Green Revolution in rice. Increasing farm value-added through high yield cereals cultivation will not be extended as easily as it was in Asia, because of the much greater diversity of the agricultural resource base. Promotion of a variety of high value agricultural tradables will be necessary to provide viable

incomes in rural areas and to provide the rural income base for non-agricultural spending.

These high value products tend to be subject to very high transactions costs for market entry by smallholder producers. These high transactions costs vary across rural households, as they are based on differential access to assets and information. To some extent this is true outside Africa as well, except that the institutional base for reducing these transactions costs is especially weak in economies at early stages of agricultural transformation. In this context, the poor and the less well informed in rural areas in Africa run a higher risk of being left behind in the adjustment of farming to a radically new set of relative incentives in the post-Structural Adjustment period. For these reasons, farm diversification in the sense of identifying promising candidates among tradable agricultural outputs seems a necessity for both growth and equity, through agricultural research, infrastructure investment, and through appropriate institutional development.

Contract farming is an institution that has worked well in some African situations, although the total number of farmers involved to date is still low compared to the number who are not participating. Producer cooperatives have also had some success in some sectors, such as dairy. However, there have also been many failures in government attempts to pick winners and become involved in their marketing in Africa. It is clear that monopolistic approaches to institutions of collective action are not desirable. Actions taken need to encourage the use of markets, not replace them. On the other hand, failing to consider the probable need for a commodity-specific focus in promoting smallholder agriculture under these conditions is not helpful either.

Farmers and traders have usually been more successful at identifying lucrative opportunities than economists or governments, and Africa is no exception in this regard. However, the role of government in acquiring and sharing information and making assets available to small farmers is still very large in Africa. Identifying the appropriate rural institutions to mobilize participation and to incorporate the asset- and information-poor in post-Structural Adjustment economic growth is clearly a major priority for relevant policy research in Africa today. The right institutional forms to promote diversification of marketed output in Africa undoubtedly will involve a mix of public and private, and will need to associate the skills of better-off farmers with problem-solving for the smaller farmers. Such research could begin by looking at existing forms of contract farming and cooperatives to assess their economic viability, overall impact, and extendability to large numbers of people. Research should attempt to quantify the barriers to participation in high-value markets by the poor, and their determinants. It should also develop quantified scenarios for different investment options to move forward, and the overall impact of these investments on regional economies. The latter would take into account spin-off

effects of commercialization through high-valued commodities on local regions where under-employed resources can be brought into economic activity through the spending of increased farm incomes.

The second set of policy research priorities concerns the links between the incentives driving farm diversification, on the one hand, and the incentives for sustainable intensification of farming systems. To the extent that intensification will probably require moving farming systems in Africa towards less diversity in total output (even if there is more diversity in commercial output), the present strong risk management incentives for diversification are likely to prevent such intensification, at least until market development can make food supplies on the market more reliable.

A third set of economic research priorities concerns ways and means of better using growth in dynamic areas--say rice-driven growth in the Mekong delta--to stimulate growth in remote areas without a comparative advantage in rice production, except perhaps for local consumption (say the central highlands of Viet Nam). Experience shows that farm diversification can be a critical component of strategies to promote national economic integration, and research is needed to identify the degree to which coordinated government intervention is necessary on the non-price front (targeted research, roads, extension, credit, etc.) to allow the non-Green Revolution areas to profit from growth elsewhere.

Finally, environmental concerns have become especially important in the motivation of governments to promote diversification in Asian rice zones away from repeated sole cropping of rice. While such concerns are a cost factor pushing for farm diversification, the economic externality concerns how to share social costs with private producers. This points to the urgent need for policy research on water pricing. While resolution of these issues is of undoubted relevance to farm diversification as an outcome, we have chosen not to attempt to deal with it as an objective, as this is best done within the general set of issues on property rights and the environment.

References

- Adams, Richard, and Jane He. 1995. *Sources of Income Inequality and Poverty in Rural Pakistan*. Washington, D.C.: International Food Policy Research Institute. Research Report 102.
- Akerlof, G.. 1970. The Market for Lemons: Qualitative Uncertainty and the Market Mechanism. *Quarterly Journal of Economics*. 84: 488-500.
- Alderman, Harold and Marito Garcia. 1993. *Poverty, Household Food Security, and Nutrition in Rural Pakistan*. Washington, D.C.: International Food Policy Research Institute. Research Report 96.
- Alexandratos, Nikos. 1995. *World Agriculture towards 2010: An FAO Study*. New York: John Wiley and Sons and the Food and Agriculture Organizations (FAO).
- Bautista, Romeo. 1992. Rural Diversification in the Philippines: Effects of Agricultural Growth and the Macroeconomic Environment. *Southeast Asian Journal of Agricultural Economics*. 1 (1): 25-44.
- Bell, Clive and Peter Hazell. 1980. "Measuring the Indirect Effects of an Agricultural Investment Project on its Surrounding Region", *American Journal of Agricultural Economics*, 62, 75-86.
- Binswanger, H.P. and M. R. Rosenzweig. 1986. Behavioral and Material Determinants of Production Relations in Agriculture. *Journal of Development Studies*. 22 (3): 503-539.
- Bouis, Howarth. 1991. The Relationship between Nutrition and Income Sources for the Rural Poor in a Southern Philippine Province. In Joachim von Braun and Rajul Pandya-Lorch, eds. 1991. *Income Source of Malnourished People in Rural Areas: Microlevel Information and Policy Implications*. Washington, D.C.: International Food Policy Research Institute. Working Papers on Commercialization of Agriculture and Nutrition No. 5.
- Coase, Ronald. 1960. The Problem of Social Cost. *Journal of Law and Economics*. 1 (1): 1-44.
- David, Cristina and Keijiro Otsuka. 1994. *Modern Rice Technology and Income Distribution in Asia*. London: Lynne Rienner Publishers and Manila: International Rice Research Institute.

- Delgado, Christopher. 1995. Agricultural Diversification and Export Promotion in Sub-Saharan Africa. In Mark Rosegrant and Prabhu Pingali, eds., 1995. *Special Issue: Agricultural Commercialization and Diversification. Food Policy*. Vol. 20, No. 3, June.
- Delgado, Christopher. 1997. The Role of Smallholder Income Generation from Agriculture in Sub-Saharan Africa. Final Report to the Land and Agricultural Policy Center, Johannesburg, South Africa, Track I of the IFPRI\LAPC Project on Promoting Employment Growth in Smallholder Farming Through Agricultural Diversification. IFPRI, March 26, 1997 (mimeo).
- Eicher, Carl K. and Doyle C. Baker. 1992. Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey. Part I in Lee Martin, ed., *Agriculture in Economic Development: 1940s to 1990s. Survey of Agricultural Economics Literature, Vol. 4*. Minneapolis: University of Minnesota Press.
- Food and Agricultural Organization of the United Nations (FAO). 1996. *Production Yearbook 1995*. Rome, FAO.
- Hare, Denise. 1994. Rural Nonagricultural Activities and Their Impact on the Distribution of Income: Evidence from Farm Households in Southern China. *China Economic Review*. 4 (1): 59-82.
- Hayami, Yujiro. 1991. Conditions of Agricultural Diversification: A Historical perspective. In *Agricultural Diversification: Report of a Study Meeting*. Tokyo: Asian Productivity Organization. October 17-27, 1989.
- Hayami, Yujiro and Keiji Otsuka. 1994. Beyond the Green Revolution: Agricultural Development Strategy into the New Century. In Jock Anderson, ed., *Agricultural Technology: Policy Issues for the International Community*. Wallingford, U.K.: CAB International with the World Bank. 15-42.
- Hayami, Yujiro and T. Kawagoe. 1993. *The Agrarian Origins of Commerce and Industry: A Study of Peasant Marketing in Indonesia*. London: Macmillan.
- Hayami, Yujiro and Vernon Ruttan. 1985. *Agricultural Development: An International Perspective*. Baltimore, MD: The Johns Hopkins University Press.
- Hoff, Karla, Avishay Braverman, and Joseph Stiglitz, eds. 1993. *The Economics of Rural Organizations: Theory, Practice and Policy*. Oxford: Oxford University Press for the World Bank.

- Hossain, Mahabub. 1988. *Nature and Impact of the Green Revolution in Bangladesh*. Washington, D.C.: International Food Policy Research Institute. Research Report 67.
- Hussain, I. 1994. *The Evolving Role of the World Bank: The Challenge of Africa*. Washington, D.C.: World Bank. Fiftieth Anniversary Paper Series.
- Jaffee, Steven. 1992. "Enhancing Agricultural Growth through Diversification in Sub-Saharan Africa. In Shawki Barghouti, Lisa Garbus, and Dina Umali, eds., *Trends in Agricultural Diversification: Regional Perspectives*. World Bank Technical Paper Number 180. Washington, D.C.: World Bank. pp. 61-91.
- Jaffee, Steven and J. Morton, eds. 1995. *Marketing Africa's High-Value Foods: Comparative Experiences of an Emergent Private Sector*. Dubuque, IA: Kendall/Hunt Publishing Company.
- Janvry, Alain de, Marcel Fafchamps and Elisabeth Sadoulet. 1991. "Peasant Household Behaviour: Some paradoxes explained". *The Economic Journal* 101 (November 1991), 1400-1417.
- Lele, Uma and Robert Christiansen. 1989. *Markets, Marketing Boards, and Cooperatives in Africa: Issues in Adjustment Policy*. World Bank: Managing Agricultural Development in Africa Project. MADIA Discussion Paper No. 11.
- Lele, Uma, Nicolas Van de Walle and Mathurin Gbetibouo. 1989. *Cotton in Africa: An Analysis of Differences in Performance*. World Bank: Managing Agricultural Development in Africa Project. MADIA Discussion Paper No. 7.
- Little, Peter and Michael Watts. 1994. *Living under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*. Madison, WI: University of Wisconsin Press.
- Lopez, Ramon. 1984. Estimating Labor Supply and Production Decisions of Self-employed Farm Producers. *European Economic Review* 24. 61-82.
- Martin, Lee, ed. 1992. Agriculture in Economic Development: 1940s to 1990s. *Survey of Agricultural Economics Literature*, Vol. 4. Minneapolis: University of Minnesota Press.
- Minot, Nicholas. 1986. Contract Farming and its Effect on Small Farmers in Less Developed Countries. East Lansing, MI: Michigan State University. MSU International Development Papers, Working Paper 31.

- Petit, Michel and Shawki Barghouti. 1992. Diversification: Challenges and Opportunities. In Shawki Barghouti, Lisa Garbus, and Dina Umali, eds., *Trends in Agricultural Diversification: Regional Perspectives*. World Bank Technical Paper Number 180. Washington, D.C.: World Bank. pp. 1-13.
- Pingali, Prabhu and Mark Rosegrant. 1995. Agricultural Commercialization and Diversification: Processes and Policies. In Mark Rosegrant and Prabhu Pingali, eds., *Special Issue: Agricultural Commercialization and Diversification*. *Food Policy*. Vol. 20, No. 3, June. 171-186.
- Reardon, Thomas, Amadou Abdoulaye Fall, Valerie Kelly, Christopher Delgado, Peter Matlon, Jane Hopkins and Ousmane Badiane, 1994. Is Income Diversification Agriculture-led in the West African Semi-Arid Tropics? The Nature, Causes, Effects, Distribution and Production of Off-Farm Activities, In Achi Atsain, Samuel Wangwe and Anne Gordon Drabek, eds., *Economic Policy Experience in Africa: What Have We Learned?* Nairobi: African Economic Research Consortium.
- Reardon, Thomas, Peter Matlon, and Christopher Delgado. 1988. Coping with Household-Level Food Insecurity in the Drought-Affected Areas of Burkina Faso. *World Development* 16 (9): 1065-1074.
- Rosegrant, Mark and Prabhu Pingali, eds., 1995. *Special Issue: Agricultural Commercialization and Diversification*. *Food Policy*. Vol. 20, No. 3, June.
- Rosegrant, Mark, Renato Schleyer, and Satya Yadav. 1995. Water Policy for Efficient Agricultural Diversification: Market-based approaches. In Mark Rosegrant and Prabhu Pingali, eds., *Special Issue: Agricultural Commercialization and Diversification*. *Food Policy*. Vol. 20, No. 3, June.
- Ruthenberg, Hans. 1976. *Farming Systems in the Tropics*. Second Edition. Oxford: Clarendon Press.
- Schiff, Maurice and Alberto Valdés. 1992. *A Synthesis of the Economics in Developing Countries*. Vol. 4 of *The Political Economy of Agricultural Pricing Policy*. Baltimore, MD: John Hopkins University Press for the World Bank.
- Siamwalla, Ammar, Direk Patamasiriwat, and Suthad Setboonsarng. 1992. Public Policies toward Agricultural Diversification in Thailand. In Shawki Barghouti, Lisa Garbus, and Dina Umali, eds., *Trends in Agricultural Diversification: Regional Perspectives*. World Bank Technical Paper Number 180. Washington, D.C.: World Bank. pp. 199-214.

- Staal, Steven, Christopher Delgado, and Charles Nicholson. 1997. Smallholder Dairying under Transaction Costs in East Africa. *World Development*. May.
- Taylor, Donald. 1994. Agricultural Diversification: An Overview and Challenges in ASEAN in the 1990s. *ASEAN Economic Bulletin*. March. 264-279.
- Timmer, C. Peter. 1988. "Crop Diversification in Rice-Based Agricultural Economies: Conceptual and Policy Issues", in R.A. Goldberg, ed., *Research in Domestic and International Agribusiness Management: A Research Annual*. Greenwich, CT: JAI Press Inc.
- Vietnam. 1994. *Vietnam Living Standards Survey 1992-1993*. Hanoi: State Planning Committee and General Statistical Office.
- von Braun, Joachim. 1989. *The Importance of Non-Agricultural Income Sources for the Rural Poor in Africa and Implications for Food and Nutrition Policy*. PEW/Cornell Lecture Series on Food and Nutrition Policy. Ithaca, NY: Cornell Food and Nutrition Policy Program.
- von Braun, Joachim and Eileen Kennedy, eds. 1994. *Agricultural Commercialization, Economic Development, and Nutrition*. Baltimore, MD: John Hopkins University Press for the International Food Policy Research Institute.
- von Braun, Joachim, and Rajul Pandya-Lorch, eds. 1991. Income Source of Malnourished People in Rural Areas: Microlevel Information and Policy Implications. Washington, D.C.: International Food Policy Research Institute. Working Papers on Commercialization of Agriculture and Nutrition No. 5.
- Watts Michael, Peter Little, Christopher Mock, Martin Billings, and Steven Jaffee. 1988. *Contract Farming in Africa*. Vol. 1, *Comparative Analysis*. Vol. 2, *Case Studies*. Binghamton, NY: Institute for Development Anthropology.
- World Bank. 1990. Agricultural Diversification Policies and Issues from East Asian Experience. Washington, D.C.: World Bank, Agriculture and Rural Development Department. Policy and Research Series Occasional Paper.