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Agricultural Diversification for the Poor

Guidelines for Practitioners



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1. Introduction

This study treats diversification as a differentiated form of agricultural development and recognizes its role to spur sustainable growth in the rural sector. The principle purpose of this study is to outline practical ways for implementing diversification activities. After briefly outlining the changes in the external environment that influence the process of diversification and reviewing background literature on the rationale and process of diversification, a six-point structure for describing key operational guidelines for practitioners is established: 1) feasibility, 2) policy, 3) infrastructure and markets, 4) research, extension, and training 5) private sector and supply chains, and 6) natural resources. Drawing from past diversification initiatives especially in the Bank, lessons and functional guidance for future initiatives are described. These typically relate to a multicomponent approach involving specific investment areas (for example, irrigation, infrastructure, and research systems) that are discussed within the six-point structure. Throughout the paper, emphasis is particularly on how the diversification process can be made pro-poor with minimum risk involved. The paper closes with a list of key investment areas to assist diversification.

Poverty continues to persist in many countries throughout the world despite improvements in the global trade regime and significant enhancement in agricultural productivity through the green revolution technologies. Approximately 1.2 billion people (20 percent of the global population) live in extreme absolute poverty (earning less than US\$1 per day). The incidence of poverty is greatest in rural areas and is typically severe among small and marginal farmers.¹ To achieve the millennium goal of halving poverty by 2015, these people should be provided with alternative production opportunities that can generate new employment and enhance incomes. Data from several countries reviewed in this study confirm that agricultural diversification can contribute to this.

The emphasis on cereal production over the past three decades in most developing countries has resulted in low output prices and profitability for cereals and dampened agricultural growth (the growth in the sector has fallen from 2.3 percent per year during the 1965-1980 period, to 1.9 percent per year over 1996-2000—this mainly because of reduced growth in cereal production, i.e. 2.9 percent to -0.5 percent over the corresponding period. FAOSTAT, 2003). Also, investment in the sector has fallen. As a proportion of total World Bank lending, investment in agriculture declined from about 31 percent from 1979 to 1981 to below 10 percent in 2001 (World Bank 2000a). To reverse this trend, one of the opportunities identified in the agricultural strategies of donor agencies is agricultural diversification (World Bank, 2002a; DFID, 2002; Rosegrant and Hazell, 2000).

Diversification defined. In its simplest form, diversification reflects a change in business activities based on the flexible and differentiated response to changing opportunities created by new production technology or markets signals. More specifically, we draw from Pingali and Rosegrant, (1995) to define diversification as “change in product (or enterprise) choice and input use decisions based on market forces and the principles of profit maximization.” At the farm level, diversification will represent a change in the underlying characteristics of the farm system such that farm practices and products are more

¹ That is, farmers who have limited access, in terms of quantity or quality, to the resources required for profitable agricultural systems. This may include farmers in arid regions with no access to irrigation, those on steep topography, infertile soils, etc. It also encompasses farmers in remote areas with limited access to input and output markets because of excessive transaction costs arising from inadequate communication and transportation systems.

aligned with the social, environmental, and economic contexts, as well as the constraints and opportunities that exist. At the community level, diversification implies establishing a dynamic optimal mixture of farm production alternatives capitalizing on between-farm heterogeneity in terms of resource availability and qualities.

The advantage of engaging in different production systems at the farm level depends upon the level of within-farm heterogeneity in soil and land resources, as well as biological and economic factors, such as the possibility of interruption in insect and diseases cycles, the extent of the sustainability effects, and the gains in fuller utilization of resources in the diversified compared to the monocrop production system. Such diversification may be constrained by the skill requirement to manage diverse entrepreneurs. Situations in which rational decisionmaking under an unbiased public policy scenario for different crops and enterprises, taking into account various constraints and opportunities, leads to specialization in certain crops or processing activities at the farm level (for example, asparagus production in Southern Thailand) fall within our conceptual definition of diversification; however, diversification at the community level is likely to result in the diversity of enterprise due to within-community heterogeneity regarding resource distribution and synergies from complementary coexistence of multiple agricultural enterprises, including crop, livestock, fisheries, farm forestry, and horticulture.

Farm-level specialization that happens because of biased public policies toward certain crops based on noneconomic considerations, such as food self-sufficiency is not categorized as diversification in the context of market-based decisionmaking. In this case, the advantages from the distorted incentives may exceed those created by within-farm or even within-community heterogeneity in the environment. As a result, specialization in the cropping system will occur both at the farm and the regional levels.² A typical example of this is the promotion of cereal-cereal cropping systems through price and nonprice incentives during 1970s and 1980s. Similarly, the distorted use of certain inputs, such as fertilizer and water, during the green revolution period is also not considered diversification in the market context.

Diversification increases systems' flexibility, previously neglected in development measures, such as per capita income and poverty. In some cases, the components of a typical development plan, such as infrastructure, social capital, technology and research, and the policy environment, might be similar to that of a diversification plan. Diversification strategies have to go a step further to generate flexible abilities among producers to quickly adjust to the opportunities created by the market and rational policies. Such strategies enable farmers to produce different crops (horizontal diversification) or engage in different value added activities (vertical diversification), or even leave agriculture as a full time occupation because of newly acquired flexible management and market skills to grab working opportunities out there.

Diversification can also invigorate sustainable growth independent of development parameters. For example, adjusting crops to microenvironments of soil and land, spreading the demand for labor, machinery, and other inputs, improving cash flows, and reducing production and marketing all can spur sustainable growth in agriculture. Learning to adjust to emerging opportunities has significant spillover in terms of technological and managerial skill. In addition, when diversified production promotes dietary diversity or new food processing product, it can enhance the nutritional balance of the diet, which improves earning capacity of labor (Ali and Farooq 2003). All these attributes of diversification induce

² Regional specialization in the cropping system, such as in Northern America and Australia, may also occur under the free policy environment when the cost of infrastructure for diversification is higher than the benefits due to within community heterogeneity in the environment. Such specialization can be considered as part of diversification in the market context.

sustainable productivity growth in agriculture, without being exclusively related to the parameters of development. For example, Ali (2003) has shown that diversification in the cropping system brings productivity growth after detangling the simultaneity between the two. Malik (2003) has shown that the incidence of poverty is significant less in those areas of Pakistan Punjab where agricultural activities are more diversified but have less development infrastructure compared to those where agriculture is less diversified but have higher development infrastructure.

Although agricultural diversification is a natural response to the changing economic and political environments inside and outside the sector, which will be discussed in a later section, we would like to refer here to the “process of promoting diversification.” Such a process involves an unbiased economic analysis to identify the diversification opportunities at the community level. Information, extension, farmers training, and the attention of the private sector are then directed toward those opportunities; selection of appropriate enterprise(s) is left to farmers. Resources and training are provided to make appropriate selection of enterprises—especially to smallholder farmers cultivating in less favorable areas and landless poor people. Initially, the diversification process can be started at a larger community level because of high costs; however, when additional resources become available, the diversification process can be narrowed down to smaller communities by identifying more specific opportunities. This improves the overall competitiveness of agriculture both in the domestic and in international markets. It is this type of process that this paper aims to promote by providing guidelines to practitioners. A crosscutting issue through out this paper is how to make this process pro-poor.

Motivation and Purpose

The motivation for our investigation is the conspicuous lack of knowledge relating to *how* to design and implement operationally feasible programs that speed up the diversification process and remove constraints and improve the livelihoods of poor people significantly. We will analyze and, hopefully, contribute to the current understanding of the specific poverty impacts of diversification, while emphasizing those principles that carry the most direct, practical application in informing the design and implementation of diversification programs. Relevant global trends and forces instigating and constraining diversification options will be reviewed, and seminal theoretical works will be used to develop a logical and practical approach to addressing the key issues relevant to diversification. Implementation guidelines will be developed for practitioners in a formal and structured manner by pooling lessons learned from the experience of past initiatives.

Key questions of interest include:

- What are the changes in the global context that are enabling or, indeed, necessitating agricultural diversification?
- What are the context-specific variables that affect the potential poverty impact of diversification and influence the nature of program design and implementation?
- What can we learn (in terms of practical applications) from a theoretical understanding and from past successes and failures for using diversification options to relieve poverty-related pressures?
- What are the key constraints and prospect that need to be addressed by practitioners for exploitation of diversification opportunities?

This study is not about elaborating on the now well-understood theoretical rationale of diversification; rather, we develop not only an improved understanding of the ways in which agricultural diversification

contributes to poverty but a comprehensive and functional approach for implementing appropriate diversification programs that can benefit poor people.

2. The Evolving Global Context of Agriculture and Diversification

The global environment is changing, and new forces, such as integrated food chains, are shaping the way in which food is produced, distributed, and consumed throughout the world. While these changes are providing diversification opportunities, new challenges are emerging. Producers have to orient toward meeting the changing demands, rather than selling the output that they have traditionally produced. There is a need to transform existing production systems to new systems that are more aligned with this dynamic environmental context. Public concern should shift from simply raising the ability of small farmers to produce whatever they are able to produce, to increasing their ability to produce what they can sell at a price that can improve their incomes. For agricultural diversification to benefit poor people, these critical questions must be addressed:

- How are small producers connected to changing markets?
- How can small producers get information about market demand?
- How quickly can they adapt to these demands?

The implication for diversification programs is that diversification means more than adjusting to the *existing* environmental context; It also means establishing the flexibility and capacity to *continually* adapt products and the process of production to continuously evolving circumstances. We briefly describe the key diversification issues related to these changes below, particularly how these changes affect the poor in rural areas.

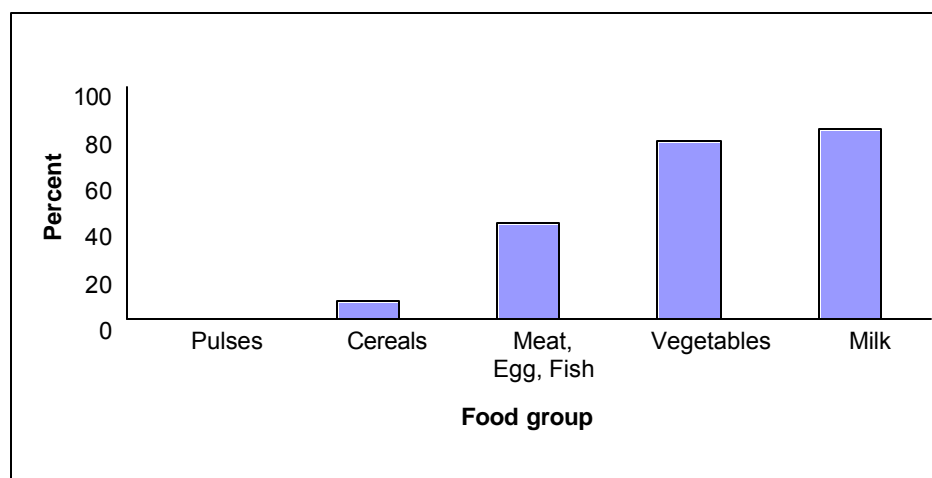
Changing Consumer Demands

As a consequence of urbanization, international migration, how the new definition of food security is emphasizing the balanced diet, increasing reach and effectiveness of global media and marketing systems, and increasingly adventurous consumption habits, the structure of consumers demand for food is changing. For example, due to growing concerns with dietary health, the market for nontraditional fruits and vegetables has expanded rapidly over recent years, which will contribute to the improvement of the nutritionally balanced diet. These shifts in consumption patterns occur not only in industrialized countries but also in both urban and rural areas of developing countries (see figure 1). Structural changes in demand—associated with a wider choice of foods available, exposure to a variety of dietary patterns of foreign cultures, a premium for foods requiring some preparation, more sedentary occupations, and separation of food consumption from production—are also related to increasing demand for nonfood agricultural products (for example, cut flowers, plant- and animal-derived textiles, and new sources of natural energy such as ethanol).

The increased awareness of the impact of food on health through research, mass media, and strong cross-culture influences has resulted in greater emphasis not only on food quality reflected in improved nutrient balance of the diet but also on the attributes related to food safety. In the light of recent disease outbreaks, such as mad cow disease (also known as BSE) and foot-and-mouth disease, governments are increasingly

wary of potential biosecurity risks.³ These relate to threats to consumers health, domestic agricultural systems, and stock of biodiversity in the natural environment (for example, from the invasion of invasive species arriving through the importation of foreign agricultural products or from mishandled domestically produced food products.⁴ Ethical values are increasingly important in trade, such as production with prisoners and child labor. In response, the governments are changing food regulations related to production and marketing systems to protect their consumers from biosecurity risks. Producers need to adjust production, marketing, and certification systems to accommodate new safety and quality regulations relating to the trade of agricultural (particularly food) products, thus creating opportunities for the vertical value added diversification of agricultural commodities.

Figure 1. Per capita consumption increase by food group, India, 1977-99



Source: Joshi et al. 2002

Meeting these new demands requires additional capital and sophisticated skills to produce, store, preserve, pack and distribute. Unless institutional innovations enable smallholder farmers to provide these skills, large resource-rich farmers may seize the diversification opportunities created by the demand shift at the expense of poorer farmers. Inducing pro-poor diversification requires an improvement in the access of small producers to information, markets, and institutions providing inputs and skills.

Increased volatility of supply and demand

Although the increase in average incomes worldwide has been associated with an increase in demand for a diverse range of novel and high-value products, the income elasticity of these products is also typically high. That is, small changes in income will result in a more than proportional change in demand for any one product.

Nevertheless, the producers supplying markets for these nontraditional high-value products are faced with high levels of price variability—not only because of variability in demand but also because of uncoordinated supply from geographically disbursed large number of farmers and relatively short shelf

³ This is the abbreviation of the scientific name of the disease Bovine Spongiform Encephalopathy.

⁴ The recent refusal of Zambia to accept genetically modified maize as food aid is an illustration of the importance of these issues—even in the face of a starving population desperate for food.

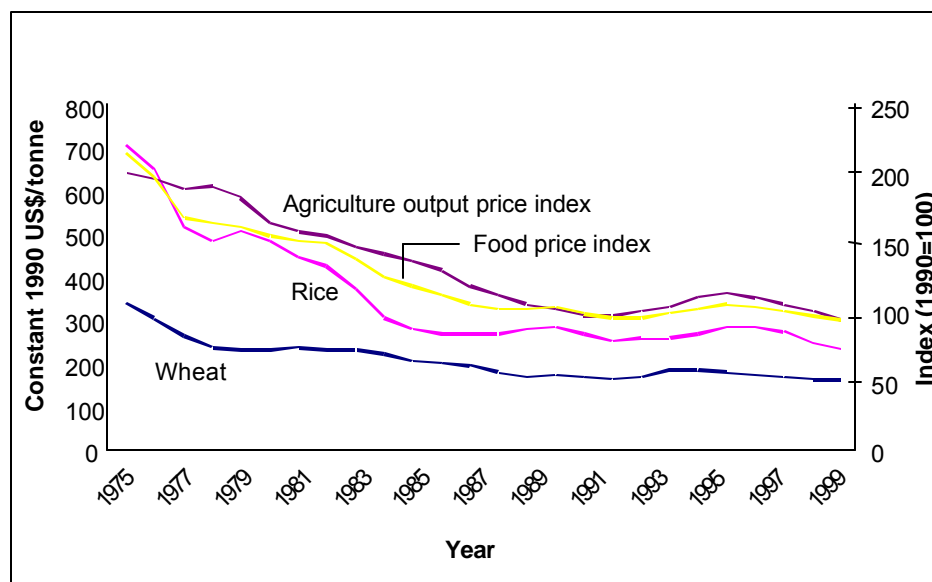
life. This, in turn, demands that farmers understand the volatile nature of high-value crops, maintain the flexibility to adapt to fluctuating relative prices, and adopt ways and means to manage risks.

Technological advances in production and marketing

While the previously noted internationalization of consumer demands represents the demand-side impetus for growth, the development of new production technologies have enabled supply-side growth and diversification to alternative products and production systems. New production technologies and management techniques, such as improved agricultural machinery, biotechnology, new pest and disease control products, improved methods of seedling production, drip and controlled irrigation, and integrated pest management, have enabled better use of the sources of competitive advantage of developing countries (for example, unique microclimates and soil types, low labor costs, specialized labor skills, and in many instances the ability for off-season production to supply lucrative markets in developed countries). The technological advances in communication (television), logistical (cold storage trucking), and marketing systems (superstore marketing), as well as storage facilities (refrigeration and controlled-atmosphere storage) have further induced the supply-side growth. In addition, progress in food technology—for example, soybean milk, soybean meat and variety of juices—has enabled the manufacture of a much greater variety of consumer products and the ability to add more functional and intangible value (vertical diversification) to agricultural materials.

Relative commodity prices and profitability

Associated with changing demand patterns and slow growth in demand for the commodities traditionally produced in developing countries are their declining prices (see figure 2). Technological advances in traditional agricultural products, especially cereals, combined with continued protectionist and support policies in developed countries (which send distortionary signals leading to overproduction) further contributes to this trend of declining prices. Low commodity prices, dependence on the export earnings of a narrow range of traditional commodities, uncertainties involved with natural resource based production systems (for example, degradation, drought and disease), and selling in volatile international markets, have brought producers in many developing countries to a crisis situation. In such a situation, farmers are desperately looking for options that can provide reasonable return on their resources invested in agriculture.

Figure 2 World market prices for agricultural commodities: five year moving averages (1962-2000)

Source: IMF International Financial Statistics

Of course, not all agricultural prices have been declining, or at least not declining as quickly as many traditional commodities. For example, during the 1990s, inflation-adjusted real prices were found increasing for overall vegetables at the retail level in Southeast Asia and for tomato at the export level globally (Ali, Farooq and Shih 2002).

This differential impact of changes in output prices, improvement in postharvest handling, and differential trade opportunities in international markets—high-value crops are often political less sensitive to import, thus face less restrictions—have changed the relative profitability in different agricultural commodities. For many farmers, the profitability of traditional crops has fallen, while the profitability of nontraditional crops has remained more favorable, especially when farm production is accompanied by value-added activities. This change in relative profitability, especially during the 1990s is the strongest economic factor for crop diversification. The introduction of new technologies in high-value crops is also changing the relative attractiveness of these commodities.⁵

Changing relative input prices

With positive economic growth and increasing off-farm opportunities, the opportunity cost of family labor and wage rates for hired labor are increasing, while improvement in production and transport

⁵ It is far too early to fear an over supply of high-value crops. The high growth in fruits and vegetable production during the 1990s without any price crash has negated this fear. Although potential for international trade for especially traditional high-value crops may soon diminish, a lot of potential to increase the supply of high-value crops in developing countries exist. This is because per capita consumption of fruits and vegetables in these countries is far below the minimum required level and far below the level achieved in developed countries. Moreover, the share of area under fruits and vegetables in most developing countries ranges 2-3 percent, compared to 50 percent in the developed regions of East Asia (Ali and Abedullah 2002).

technologies has decreased the relative prices of capital inputs (fertilizer, crop protection products, seed etc). This leads to substitution of nontraded inputs, such as animals and farm manure with traded input like mechanical power, fertilizer, and pesticides. Power intensive farm operation, such as land preparation, transportation, milling, and threshing are directly affected by increased wage rate, while chemical technologies are used to replace labor for the likes of fertility maintenance, winnowing, weeding, etc. (Pingali and Rosegrant 1995). These changes in input markets have completely revitalized the input market structure in rural areas. Input supply shops, seed and seedling production, rural financial system, and machinery workshops have created off-farm job opportunities for millions of farm family workers. The off-farm incomes supply necessary cash to implement diversification on the farm and provide the necessary risk cushion, as well.

Supply chain integration

At a broader level, technological progress has reduced the transaction costs associated with interbusiness activity. Novel information and communication systems, new forms of contractual arrangements, just in time delivery, and credit card payment systems are enabling stronger linkages throughout the agricultural supply chain. These innovations in production process along with improvements in transport infrastructure have enabled farmers to deliver agricultural products according to exact specifications and have helped building the trust among different players in the food chain. Increased integration into this supply chain through improved linkages with up- and downstream sectors is increasing the ability for agriculture to have a positive effect on national economic growth and provides producers with attractive options for investment in quality improvement and value-added activities beyond the production of raw material.

Small farmers have certain advantages to integrate with the new supply chain as they can supply better quality output with intensive management attention to each output unit; however, they lack the size to benefit from scale economies. The net effect of integrated markets on small farmers depends upon the nature of a commodity and its market, as well as the ability of small farmers to coordinate marketing activities (Jaffee 2003).

The changing architecture of international trade

New multilateral trade negotiations were launched at the Fourth World Trade Organization (WTO) Ministerial Conference, held in Doha in 2001. The WTO members agreed to undertake “comprehensive negotiations aimed at: substantial improvements in market access; reductions of, with a view of phasing out, all forms of export subsidies; and substantial reductions in trade-distorting domestic support” (see box 1). If these negotiations are successful, it will put up the agriculture of both developed and developing countries in a new paradigm of diversification for international competitiveness.

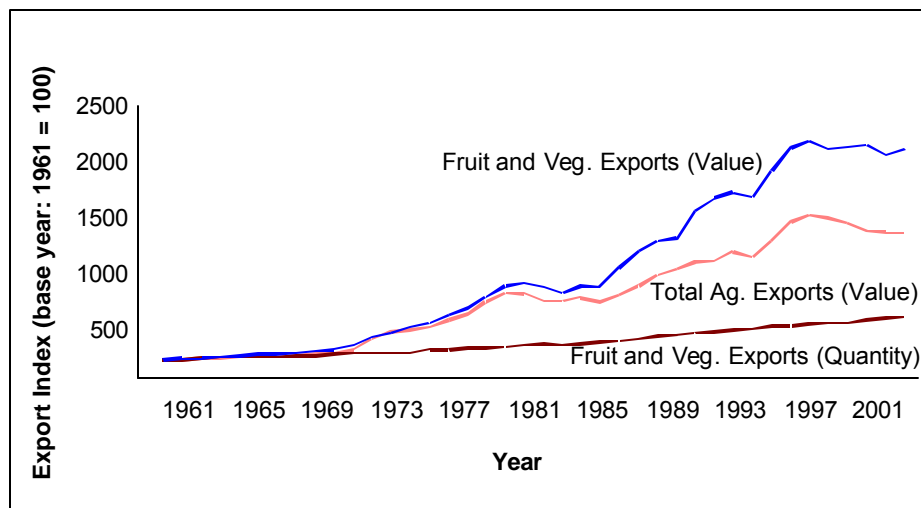
Box 1 The Doha Round and Recent Agricultural Related Negotiations

Discussions on market access have dealt primarily with tariff reductions and the administration of tariff-rate quotas. On *tariff-cutting*, two basic approaches supported thus far include; a minimum cut per tariff line along with an overall average cut for all tariffs, and a “cocktail” approach that combines a flat-rate percentage cut for all tariffs with additional cuts on higher tariffs. In the area of market access, measures for *special and differential treatment* are being considered, while in the area of domestic support to agriculture, little progress has been made to date despite a wide range of topics having been debated. Export subsidies are the subject of considerable debate as net food-importing developing countries fear higher food prices if subsidies are eliminated while net-exporters argue that their domestic producers are placed at a disadvantage by competition from subsidized products in their home and export markets. The agriculture negotiations are addressing a number of other issues, including state trading, food security, food safety, rural development, intellectual property rights, geographical denominations, safeguards, the environment, trade preferences and food aid. However, the report of the WTO Committee on Subsidies and Countervailing Measures shows that the presence of high subsidies and barriers to market access in agriculture were still there, and may even have increased. After Doha, the EU common agricultural policy (CAP) remains at \$43 billion a year and rising. And the level of US agricultural subsidies went up by 80 percent with farmer scheduled to receive \$190 billion over the next ten years.

Source: Agriculture and the WTO 2004

Trade liberalization

Combined with internationalization of consumer habits and improved logistical technologies, trade liberalization to date has induced a major increase in foreign direct investment. For example, in the Africa, Asia, and Latin America and Caribbean regions, FDI has increased from approximately US\$1 billion in 1970 to US\$17 billion, US\$94 billion, and US\$85 billion dollars respectively in 2001. Such investment is typically accompanied by the flow of new knowledge, skills, and technologies, themselves which are essential ingredients for the process of diversification. Associated with this has been the growth of the international trade of agricultural products, especially fruits and vegetables (see figure 3). The volume of total merchandise trade has increased 16-fold since 1950 (compared to a 6-fold increase in production), and the value of agricultural exports from low-income countries increased at an average rate of 6 percent per year over the past 30 years. Despite stringent restrictions, food and agriculture products represented an average of approximately 24 percent of total merchandise export value from the developing countries during this period. If trade negotiations in agriculture are successful, the increase in the agricultural exports will be exponential, with substantially higher contribution of high-value crops and livestock products in the farming system. More important will be the increase in the value-added activities, thus inducing both horizontal and vertical diversification in agriculture.

Figure 3 Global agricultural exports (indexed); 1961-2001

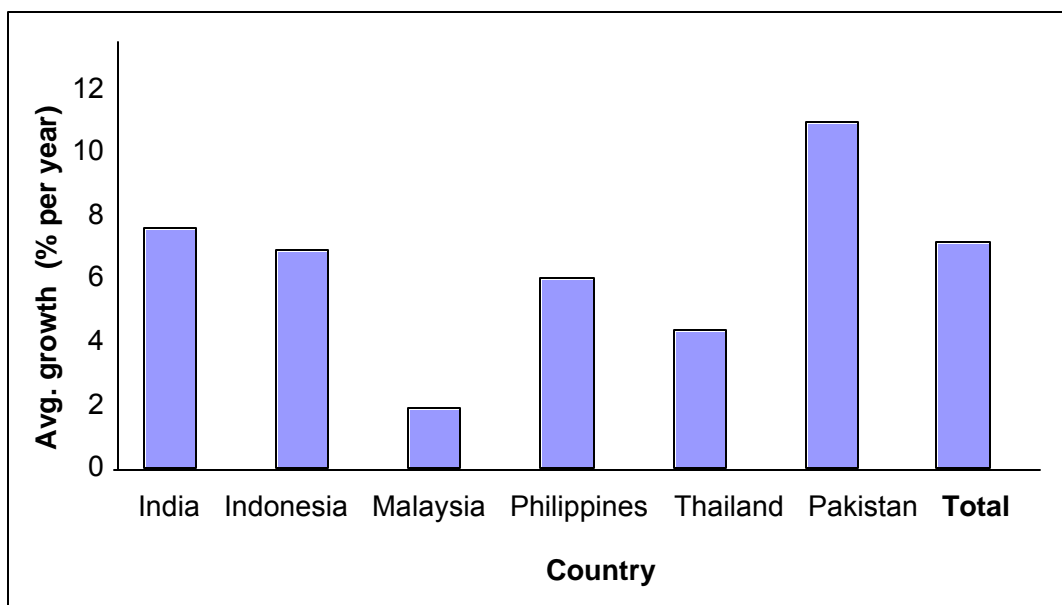
Source: FAO STAT 2003

Changing role of government

Changes in economic and political factors are forcing the public sector to redefine its role from one of an active player in markets and allocation of resources, to an overseer and regulator among private sector entities, and provider of the public goods. Public sector parastatals are being privatized, subsidies on inputs are being removed, tax structures are being reformed, and control on output prices where it exists is being relinquished. Resources saved from the withdrawal of the public sector from business activities have spared funds which can be redirected to increase investment on developing effective research, education, and extension systems in agriculture, providing farmers training, and promoting competition for the development of physical infrastructure and financial services, all necessary for diversification. Such a competitive environment put small farmers on a more even footing with large farmers to diversify their production system, arrange inputs for these systems, and get information to deliver their products for the market.

Expanding role of the private sector

Deregulation of markets by the public sector is providing space for the private sector to operate profitably. The technological advances, such as in communication and information sectors, along with the development of the private sector participation methodologies by various agencies like the World Bank have further improved the capacity of the private sector to participate in many traditionally public domains—for example, operation of irrigation systems and monitoring and controlling of a range of externalities in the agriculture sector. This is reflected by the increasing growth of, and investments by, the private sector, including rural producer organizations and community groups in agriculture research and technology (see figure 4).

Figure 4 Annual growth rate of private sector research investment in Asia (1985-1995)

Source: Pray and Fuglie 2000

This increase clearly indicates that the private sector considers agriculture a profitable industry, one with growth potential and profits suitably appropriable to various participants in the supply chain. It is also appropriate to note that this growing role of the private sector is demanding new functions of government. For example, protection of the rights to intellectual property and the establishment of appropriate contract law are increasingly essential for securing private investment to promote diversification; however, the gap resulting from disestablishment of parastatals and public sector withdrawal has, in many instances, not been adequately filled by the private sector, negatively affecting the diversification process in the short term.

Management of natural resources

Increasing pressures on the physical environment (along with the tightening of the legal framework that sometimes results) are necessitating that agricultural producers tune their production systems such that they are making the most efficient use of the resources available not only in economic terms, but also with regards to social and environmental resource use. This means taking account of positive and negative externalities associated with resource consumption and, in many cases, relates to the transition from depletive monocultural production systems to diversified or rotational systems with high resource use efficiencies and significantly less pollution. .

Increasing world population (projected to reach 8 billion by the end of this century) will require significant additional agricultural intensification on shrinking farmland with less available water to meet future food needs. While agriculture has traditionally been the biggest consumer of water resources, growing demands from urban communities are threatening the security of water availability for agricultural production. This is forcing the upgradation of the existing irrigation infrastructure, creation of flexibility in water market so that water can be shifted in its most productive use, selection of new cultivars and cropping patterns responsive to growing water scarcity and increasing costs of irrigation,

and the adoption of new and improved water application systems (Rosegrant and Ringler 1999; Gleick 2003). One challenge facing research communities is to help farmers shift to more water-efficient crops and production systems.

In summary, agriculture is in a state of transition throughout the world, and, at the global level, agricultural patterns have been changing with remarkable intensity and diversity. We see that this evolution is being driven by multiple complex and interacting forces related to production, consumption, trade, and political regimes. These changes have a considerable effect on relative input and output prices and put certain producers in a precarious position while treating those more suited to demand patterns favorably. The public and private sectors have each adopted different roles over time in response to technical opportunities and societal demands, though in many parts of the developing world both remain ill-defined and far from socially optimal.

The somewhat compounding and competing forces in the changing environment are presenting opportunities for agricultural producers in developing countries (for example, growth in demand for nontraditional products) and enabling them to capitalize on these opportunities through improved production, packaging, transportation, and processing technologies. For policymakers, the main challenge relates to the empowerment of rural producers to make a transition away from traditional means of farming toward production systems more aligned with the social, economic, and physical opportunities and constraints (the “environment”). This is the topic of discussion in the following sections.

3. Diversification: Rationale and Impact on the Poor

Employment effects

Aside from income generation, diversification will, in most instances, increase employment for the rural poor. For example, von Braun (1995) quantifies that as a result of diversification to export vegetable production in Guatemala, employment increased by 45 percent on participants’ farms. It is expected that the benefits of increased employment opportunities are not only substantial but are distributed across a broad spectrum of the economy and thus are to a large extent “pro-poor.” Ali and Abedullah (2002) demonstrated the potential for rural employment generation arising from diversification out of cereals to high-value commodities, such as vegetables, by comparing the labor intensity in both systems (see table 1). Substantial employment opportunities are generated in seed and seedling production, precision land preparation, and the irrigation, harvesting, cleaning, grading, and packaging of high-value crops. It was estimated that a one-hectare shift of cereal to vegetables in one season generates more than one year-round full-time employment (that is, the difference between cereals and vegetables was more than 220 working days per hectare). The off-farm employment effect of similar magnitude was predicted through the expansion in the agricultural business activities. Joshi et al. (2002) also reported similar results. To promote the pro-poor diversification with high-value crops, investment should be directed to reduce yield fluctuation by developing stress-tolerant technologies and resistant cultivars of these crops and to improve farm to market linkages. Moreover, policy innovations should stimulate market mechanisms to develop small farmers’ organization for the purpose of overcoming the economies of scale problem and improving their access to markets and information. Training on small-scale agricultural business development can also enable smallholder farmers and landless poor people to adjust. With appropriate policies, some of these investments may come from the private sector, while investment related to the establishment of

producers' organization to improve their ability in analyzing diversification opportunities and meeting the research needs related to these opportunities should come from the public-private sector collaboration.

Table 1 Average labor use in vegetables and cereals (person days/ha) in Indochina countries

<i>Crop group</i>	<i>Cambodia</i>	<i>Laos</i>	<i>North Vietnam</i>	<i>South Vietnam</i>	<i>Overall</i>
Cereals	81	101	216	111	127
Overall vegetables	437	227	468	297	357
Tubers	79		294	303	225
Allium (onions, garlic etc)	542	191	454	317	376
Cucurbits (cucumbers etc)	373	309	533	264	370
Leafy vegetables	502	207	517	253	370

Source: Ali and Abedullah 2002

The initial demand generated for labor in the nonfarm agricultural industry (agribusiness or agro-based industry) is for relatively unskilled employees. The growth of these agro-industry employment opportunities represents an opportunity for farmers to diversify income sources through part-time work off-farm, contributing to a reduction of farm-related income risks. Also, this expanded labor demand provides an avenue for poor farmers on marginal lands whose only viable long-term solution may be to exit farming. Because the agriculture industry makes up such a large share of the total industry in developing countries, farm-level diversification will generate substantial employment effects from the industrial expansion and value-adding opportunities opened through greater availability of marketable row agricultural products (see table 2).

Table 2 Size and structure of agro-industry in India: 1994-95

	<i>No. of Units</i>		<i>Value Added</i>		<i>No. of Workers</i>	
	<i>Rural</i>	<i>Urban</i>	<i>Rural</i>	<i>Urban</i>	<i>Rural</i>	<i>Urban</i>
Share of agro-based industry within total manufacturing (%)	71	48	43	31	50	63

Source: Chadha and Gulati 2002

Multiplier effects of agricultural diversification

As a result of growing consumer demand for highly packaged and processed agricultural products, diversification typically involves the movement away from traditional commodities (requiring minimal secondary processing) toward higher value commodities (requiring significant processing and handling). Additionally, the new production systems are often more intensive and generate demand for a greater quantity and variety of farm inputs. Because high-value crops, compared to cereals, are more strongly interlinked with other sectors of the economy in terms of providing their outputs and receiving inputs from these sectors, there is a stronger multiplier effect of the initial increase in income. For example, it was estimated that a unit increase in initial income in cereals has a multiplier effect of two, while similar increase in vegetables will generate a multiplier effect of three (Ali and Abedullah 2002).

Income effects and food security

With the transition away from subsistence crops to more profitable cash crops like vegetables, returns to land, labor, fertilizer, and water are significantly higher (see table 3). The degree of improvement in farm

income in the long and medium term will depend on the nature of relative changes in income and expenditure, as well as the extent of home consumption. Rural households earning the bulk of their income from the production of exportable goods will experience a net welfare gain regardless of their consumption basket, while the impact for those households that are net consumers may be ambiguous, depending on the effect on local food prices. In any case, diversification will result in greater food security at the household level (von Bruan, 1995). Findings of the impact of diversification on food security, employment, and exports by a recent study of agricultural diversification in Kenya are presented in box 2.

Table 3 Resource use efficiency in vegetables versus rice cultivation in selected countries

<i>Crop/input</i>	<i>South Vietnam</i>	<i>Laos</i>	<i>Cambodia</i>	<i>Bangladesh</i>
Land (US\$/ha)				
Vegetables	1151	696	452	553
Cereals	120	80	48	30
Labor (US\$/labor day)				
Vegetables	7.7	5.9	3.8	4.4
Cereals	4.1	1.6	2.0	1.4
Water (% return on irrigation cost)				
Vegetables	21	11	8	65
Cereals	15	42	21	40
Net revenue/total costs ratio (%)				
Vegetables	106	170	96	81
Cereals	43	54	53	13

Source: Ali and Abedullah 2002

Risk and vulnerability

Successful diversification will often result in a more varied mix of activities—at the regional level of farm enterprises and the vertical level of economic sectors, including new input markets and emerging processing industries. This will reduce community dependency on a narrow range of outputs and, as a result, will reduce vulnerability to shocks from climatic variability and volatility of commodity prices. One of the most common rationales for diversification of (national/farm) output mix is to reduce environmental (climate shocks), ecological (pest and diseases) and economic risk associated with uncertainty and variations of net (aggregate/farm) income. The extent to which this is achieved depends largely on the correlation between output and input prices, as well as the relative effects of climatic variability of production levels.

Strong negative correlations are, of course, most desirable for risk reduction. However three important considerations warrant discussion: 1) addition of new products to the product mix is not cost free; 2) over time, inter-output correlations have increased as a result of more flexible consumption patterns and the introduction of improved production technologies; and 3) commodity prices have common reaction patterns to regional and macroeconomic shocks (Quiroz and Valdés 1995).

The convergence of price correlations, and (perhaps to a lesser extent) convergence of production correlations, are making expansion of the output mix solely for the purpose of risk reduction, a less viable option.⁶ Diversification initiatives (in the broader sense of changing input and output mixes based on market forces) should now be driven more by income and employment enhancement motives rather than risk management.⁷ And to do this, there must be effective mechanisms for risk management be they provided by the private sector (for example, crop insurance) or the public sector (safety nets, etc).

Box 2 Advantages of Diversification with Horticulture in Kenya

Poverty in Kenya is widespread and deep with approximately 13.4 million Kenyans (over half the population) living below the total poverty line in 1997. Using data from an income survey of 263 households (representing 1010 people), a recent study (IDS, 2002) examines the relationship between income and a variety of explanatory factors. Diversification into horticulture ventures is found to have a significant positive impact on the poor. Results also clearly indicate that access to assets such as land and (in particular) irrigation water, are critical for the successful diversification into horticulture ventures in terms of reducing poverty. Ownership of land is found to be positively correlated with income to the extent that land owning households have incomes 38 percent higher than those that do not. Also, income is strongly and statistically significantly correlated the proportion of land; households whose land is all irrigated have incomes 50 percent higher than those without. Other findings include:

- Horticulture benefits the rural poor through increasing income opportunities for pack-house workers, and increasing farm profitability of horticultural smallholders.
- Relatively low-income households and unmarried women are likely to benefit most from the substantial employment opportunities created by horticulture.
- Younger farmers are more willing to adopt new horticultural crops; their ability to do so is assisted by access to family labor. This is a reflection of the high labor intensity of horticulture ventures.
- Exporter provided credit and extension services to smallholders encourage participation.
- Poverty eradication policies should not have preference toward any particular form of engagement with any sector. Policy should focus on reducing the barriers to the participation of the poor in the sector.

Source: IDS 2002

While diversification may reduce risk by spreading production activities to various enterprises, additional risks are involved in the adoption of new skills and technologies to produce unfamiliar products for foreign markets. The greater part of this risk comes from having no experience or knowledge on which to base a judgment as to its riskiness. Suitability of natural resources and adequacy of infrastructure for the production and processing of the new product, crop yields and product quality, market prices and competitiveness are all much more uncertain than those relating to the production and marketing of traditional products. These uncertainties are translated into livelihood risks for the producers within or near the poverty threshold.

⁶ For example, new crop protection procedures reduce the impact of disease outbreak, and thus minimizing the divergence of the yield of the effected crop from the unaffected crop. Also, irrigation and improved seeds that reduce production variability also reduce the wide yield fluctuations within the set of crops produced.

⁷ In part, this relates to the tensions and trade-offs associated with adopting generalist (more flexible but less efficient) or specialist (less flexible but more efficient) approaches.

Impact on smallholder farmers cultivating in less favorable area

It has been argued that commercialization and diversification mainly have negative effects on the welfare of the poor, including small and marginal farmers (for the review of literature on this argument, see von Braun and Kennedy, 1986; and Longhurst, 1988). It has also been suggested that productivity gaps between lagging and growing regions may amplify because of the increasing productivity of the more prosperous regions, reducing prices for people in the less productive regions (and nations). Product and factor markets are not always well-functioning (especially throughout Africa), and considerable intersectoral and interregional market rigidities exist. This reduces the liquidity of resource movement and can lead to the development and growth of inequitable interregional disparities; however, new technologies present new ways in which smallholder farmers can be targeted. For example, appropriately organized, managed, and supported producers' organization and incorporation of small farmers representatives in managing the research and extension systems can help to make respond to the needs of poor small and remote farmers and improve their access to information and technologies. Also, infrastructure investments can improve poor farmers access to markets and thus their ability to participate in diversification activities. Nevertheless, even broad-based growth (such as technological innovation in irrigated areas) that may appear to benefit large and perhaps more affluent farmers, has been shown to have significant poverty impacts through the secondary and tertiary effects (such as adjustments through factor prices, labor migration, and land sales), despite market imperfections in the flow of resources (David and Otsuka 1994). It is important to recognize that in an extreme case when farmers cannot compete independently, diversification will not be a viable option, and publicly supported strategies for exit from the agriculture sector must be developed.

Knowledge and spillover effects

There are considerable potential gains from diversification in terms of knowledge and technology spillovers—which will promote both industry growth for national prosperity and the skills required for flexible adaptation to future changes at the producer level—and improved terms of trade from increased competitiveness of the products in which it exports (Ali and Abedullah 2002). Producer efforts to diversify will require investment in knowledge acquisition, relationship building, and technological proficiency. For diversification to be pro-poor, such investment in developing countries should be cofinanced by the public sector and farmers, at least in the beginning, and can be channeled through the private sector. Although the costs associated with these activities are not insignificant, the assets, such as knowledge and relationships, are durable to the extent that they will enable the farmer to more effectively adapt to changing environmental circumstances. That is, these assets (typically intangible) are not highly specific and their flexibility reduces the s associated with asset devaluation should conditions for the selected product/market deteriorate. The knowledge, skills, partnerships etc. can be used to adopt alternative enterprises that yield higher returns. Indeed this is the type of flexible skill and managerial capacity that is required for an industrial development to take off. Therefore, while the immediate effect of these skills will be enhanced earning potential of rural people, the long-term effect will be an ability to make a successful transition to other sectors that typically have a greater induced demand for skilled labor relative to the agriculture sector, and contribute in the industrial and overall economic development. This will further contribute to closing the gap between agricultural and nonagricultural wages.

Implications for natural resources

Agricultural diversification can result in improved management of natural resources. It typically facilitates the diversification of traditional monocultural systems—the over production of traditional crops induced by distortionary policies will be avoided—to capitalize on potential synergies of crop rotations, associations and the improved integration of crop-livestock-tree components (see box 3). As a result of this, land degradation can be reduced, input-use efficiency can be improved, and biodiversity can be preserved.

Box 3 Integration of mungbean in the wheat based system

The incorporation of mungbean in the single wheat crop rotation in Pakistan, made possible through technological innovation in mungbean cultivation that increased its yield and reduced crop duration, had a positive spill over effect on the following wheat crop. The mungbean-wheat system uses 28 percent less fertilizer, while wheat yield was 5.7 percent higher compared to in the wheat-fallow rotation. As farmers recognized that incorporation of mungbean in the rotation improved soil quality (in subjective terms), land preparation cost was also less for wheat in the wheat-mungbean rotation. Farmers income from wheat production alone was only 87 percent of that generated by the mungbean rotation, and the benefit-cost ratio of the mungbean was 33 percent higher than the former rotation.

Source: Ali et. al 1997

On the other hand, specialization through biased and distorting policies may present serious environmental costs (see box 4).

Box 4 Effect of intensification on resource degradation in Pakistan

The Pakistan Punjab illustrates the problems of resource degradation arising from inappropriate agricultural intensification. While average growth in total factor productivity (TFP) since the green revolution has been moderate at 1.26 percent, rice-wheat system depicted the negative growth in the TFP. There was wide spread resource degradation in all the regions of Pakistan's irrigated Punjab measured by six indicators of soil and water quality. The resource degradation has offset much of the gain from investments in technology, infrastructure, and education. Policy distortions, water pricing and lack of research and extension on more suitable cropping systems set the stage for this resource degradation.

Source: Ali and Byerlee 2002

With appropriate input prices, certain technologies may surface to conserve natural resources. Conservation tillage, one such technology emerged in recent decades, represents a diversification of production activities (if not output) and has considerable environmental impacts (see box 5).

Box 5 Environmental benefits of no-till in the Indo-Gangetic Plains

Aside from increased yields and substantial cost savings, the diversification to conservation tillage systems in the Indo-Gangetic Plains has generated significant environmental benefits. Lower irrigation and water requirements, reduced diesel requirements, and less plowing has contributed to less erosion, improved soil fertility, improved water use efficiency, and conservation of water resource quality.

No-till has proven very effective in controlling weeds in wheat because germination of most weeds is triggered by light or by lower temperatures. Since the soil is disturbed less with no-till, less weed seed is exposed and germinates. Recent data suggest that no-till reduces weed infestations over time, and eventually no herbicides are required in some seasons.

Thanks to the availability of custom machinery services, small-scale farmers have been able to use no-till. By adopting no-till, small-scale farmers obtain two additional benefits: their operating capital requirements fall because they need to contract fewer tractor hours, and they no longer need to maintain bullocks all year on the farm.

In a trial with wheat, five irrigations, each at a depth of 8-10 cm, were applied under conventional tillage, whereas only four were needed under no-till. Savings per hectare with no-till reach up to one million liters of irrigation water and about 60 liters of diesel. No-till has the potential to save 6-10 plowing operations (reducing costs from Rs 825 with conventional tillage to Rs 125).

Often farmers replace bullocks with water buffaloes to obtain additional income from selling their milk. In Haryana in 2001, 70 percent of farmers that adopted no-till did not own a tractor and used custom services; also, 40 percent of the adopters were small landholders with farms smaller than 2 ha.

Source: Ekboir 2002

4. A Structured Approach to Assessing the Issues of Diversification

The *process* of diversification out of traditional commodities is generally triggered by factors such as rapid technological change in agriculture production in a wide variety of commodities including cereals, pulses and high-value crops, improved rural infrastructure, policy changes, and diversification in food-demand patterns. For example, diversification in Peru has resulted from a variety of factors, one of the most important being the decline in the profitability of traditional commodities (especially cotton) (Escobal et al. 2000). This decline has resulted primarily from appreciation of the real exchange rate, competition from liberalized imports, and increased input costs due to cuts in government subsidies for inputs and credit. Such a decline creates financial and social stress that, in turn, can provide the motivation to search for alternative, more profitable, production systems. While this has *necessitated* a change in the structure of national agriculture production systems, other factors *stimulated* diversification and structural adjustment in Peru included: efficient transportation infrastructure systems, ideal climate and natural resource base, locality to markets, low labor costs, experienced farmers, and quality input markets. It is evident that this example relates to one case only and, in general, many requirements and preconditions for successful diversification strategies exist. In 1990, the World Bank published a study on diversification policies and issues. It structured an outline of these key elements of diversification under the subheadings of agronomic/technical, economic, and government policy factors (see table 4).

Table 4 Agronomic, economic, and policy factors for diversification

<i>Agronomic/Technical</i>	<i>Economic</i>	<i>Government Policy</i>
<ul style="list-style-type: none"> ▪ - Climate and soil type (irrigation, topography, fertility, drainage, etc) ▪ - Availability of required inputs (fertilizer, chemical, credit, tractors, feed grain) ▪ - Plant/seed and animal stock of high genetic quality ▪ - Management techniques and quality managers ▪ - Appropriate scale and organizational form (inc. no monopolies) ▪ - Abundance of labor, or appropriate mechanical technologies 	<ul style="list-style-type: none"> ▪ - Means for risk management ▪ - Flow of market signals and communication and information systems ▪ - Means for vertical diversification ▪ - Venture capital and entrepreneurship ▪ - Transparency of input and output prices ▪ - Information on export standards, market demand and relative profitability ▪ - Efficient marketing systems 	<ul style="list-style-type: none"> ▪ - Nondistortionary policy that discriminate among crops ▪ - Broad based demand driven efficient research and extension programs, without any bias for major crops or against high-value crops. ▪ - Contract farming opportunities ▪ - Available market strategies to reduce production and marketing risk and costs. ▪ - Rural credit, and markets for other inputs ▪ - Off-farm employment opportunities ▪ - Marketing systems (including satisfying quality standards) ▪ - Involvement of the private sector

Source: World Bank 1990

These issues remain relevant today. The changing nature of the policy, institutional, economic, and physical environments has, to some extent, forced a sharpened focus on specific themes for successful agricultural diversification. For instance, increased market liberalization and consumer affluence, coupled with an evolving structure of consumer demand, have increased the importance of business-to-business (small-scale farmers included) relationships and information systems to more accurately and promptly meet consumer requirements. Climate change and the mounting demands on natural resources outlined in section two are necessitating a movement from traditional monocultural (and often exploitive) agricultural production systems. Recent works (Saleth, 1999; Pingali and Rosegrant, 1995; and Delgado and Siamwalla, 1997) illustrate the sharpened focus of these activity areas when considering the process of diversification (see box 6). The activity areas in box 6 are largely activity- and context-specific, and the availability and adequacy of these environmental attributes is typically limited, especially in developing economies.

At a somewhat more macro level, Delgado (1995) recognized that there are three requirements for policy-level encouragement of diversification.⁸ First, diversification strategies need to target staple food production and marketing issues such that policies providing for greater food security are designed and implemented. Increases in high-value production are not likely to occur unless food security risks are considerably lowered, particularly in areas currently devoting a high share of resources to subsistence food production. Second, the transaction costs associated with the flow of resources and products between

⁸ In addition to these requirements, Saleth (1999) recognizes the importance of various social factors.

regions and between countries need to be reduced.⁹ This is so that gains from the production of tradables can flow to areas producing non-tradables, which in turn are required to support the production of tradables. Third, there is a need to promote nontraditional exports as a source of foreign exchange to overseas markets. This can be achieved by investing in research, extension, and information systems of high-value crops, livestock and fishery products, and by developing quality infrastructure. It requires sustained efforts to overcome institutional and infrastructural constraints. A further important role of the government is ensuring that agricultural producers have the capacity to capitalize on the technological and market opportunities present in the external environment. This form of producer empowerment requires sound education and extension systems at all levels, as well as intervention when necessary to overcome any barriers to the flow of market and technical information and knowledge.

Box 6 Activity areas important to the process of agricultural diversification

- A suitable endowment of natural resources,
- Research and extension to generate and disseminate the required technologies in wide array of commodities,
- Economic liberalization,
- Development and liberalization of financial and capital markets,
- Establishment of secure rights to scarce resources and markets for those rights,
- Investment in rural infrastructure and markets,
- Continuous investment on upgrading the sanitary and phytosanitary laboratories,
- Development of support services (including health and nutrition programs).
- Farm-level investment (though often with some lag before payback),
- Availability of specialized inputs, and investment in the processing level,
- A conducive regulatory environment for commercial taking,
- Knowledge of export markets, and
- Having an established reputation (trust) in export markets.

Source: Paul Siegel 2003

Emerging from these studies are common threads linking various issues and themes of diversification activities relevant today. We consider that a set of six focal points of generic activity areas can effectively structure the key issues and questions relevant to outlining practical guidelines for diversification initiatives (see table 5). These six generic activity areas are associated with more specific, content-specific elements and more appropriately addressed on an individual basis. There are inevitably considerable interdependencies and interconnectivities between these various activity areas and elements of diversification strategies and transitions. It becomes clear that diversification is “cross-cutting” in that it relates to multiple themes and indeed requires a multidimensional approach to successful implementation.

⁹ Similar reduction in transaction cost associated with the flow of resources among production enterprises is required to reduce production and market risk. This can be achieved through farmers training on market forecast and resource management, providing market information, and improvement in financial and input markets and farm to market links.

5. Drawing Lessons From Past Experience: Process and Elements for Successful Implementation

Given our objective of developing a comprehensive set of guidelines for diversification programs, we now use the six themes above as subheadings under which we present operationally useful guidance to assist practitioners in the implementation of diversification initiatives. Under each subheading we discuss how the theme of interest relates specifically to diversification programs. Where possible, we provide detailed examples of what has been implemented in various contexts and to what effect this has contributed to poverty reduction. In doing so, we inevitably sacrifice some degree of analytical depth to maintain breadth of different areas in which investment and policy activity is required. Relevant references are provided such that readers can access further details as required. Detailed information on eight selected World Bank projects (in 7 countries) that focused on one or several aspects of agricultural diversification is presented in the Annex.

Table 5 A structure for planning and implementing diversification programs

<i>Generic activity areas</i>	<i>Specific elements</i>
Diversification feasibility	SWOT (strengths, weaknesses, opportunities, threats) analysis, including evaluation of consumer demand, and analysis of available agronomic resources and off-farm employment opportunities.
Policy environment	Land and water policies, food security, price support and input subsidy policies, policy environment that is crop-neutral, equality of access to assets, vulnerability management, economic and market liberalization, and decentralization.
Input markets, infrastructure systems, and market access	Systems for meeting quality and safety requirements, investment in processing and value adding, investment on transporting and food preserving technologies, options for contract farming, venture capital, credit markets, fertilizer, seed, and technology supply, irrigation and drainage.
Private sector participation and supply chain coordination	Cooperation with NGOs, investment by and participation of the private sector, rural producer organizations and community groups, risk management tools, communication and logistical systems.
Research and extension systems	Integrated management systems (for example, ICM, IPM) and conservation tillage, demand driven site-specific research on wide ranging agricultural products, increasing productivity, crop/livestock integration, natural resource management, resource use efficiency, intensification, and systems for market, technology, and grading-system information flow.
Natural resources	Sustainable land and water management systems, protection of biodiversity, biosecurity, government regulation, taxes and incentive systems to internalize externalities, appropriate technologies to conserve the environment.

Source: Sorby and Siegle 2003

Feasibility analysis and provision of information

How should the tasks of feasibility studies be allocated among interest groups? On what criteria (for example, welfare, income volatility, income distribution, food security, etc.) should alternatives be analyzed and compared? To what degree should farmers be guided toward certain production systems? To what extent should information systems be promoted to ensure freedom of choice?

One of the critical steps in the diversification process is that of feasibility analysis. This entails a comprehensive stocktaking of all relevant exogenous and endogenous factors including potential poverty impact, risks, resources available, market characteristics, asset ownership patterns, etc. (see box 7). In developed countries there is little role for the public sector in the promotion of diversification or the assessment of alternative production systems. This is largely because a supportive policy and institutional environment for investment exists in which producers firstly have access to the required assets (including information) for making welfare maximizing decisions, and secondly have the capacity (skills, education, experience, etc.) to plan and implement activities based on these choices. In developing countries, such investment environment does not necessarily exist, and farmers do not always have the capacity to make the best possible decisions. There is a role for the public sector, including development agencies such as the World Bank, to facilitate the process of investigating alternative production systems based on experience and grounded reasoning with the objective of identifying the approach that will yield the maximum poverty impact, be it directly or indirectly. It is critical, however, that the roles of analysis are appropriately distributed among all stakeholders, including the farmers so that the competencies of each are used effectively (for example, farmers are relatively more competent at analyzing the production feasibility, and outside entities may be more skilled at assessing alternative market opportunities). “Solutions” should not be imposed in a top-down fashion. Diversification programs will only be successful if they can gain buy-in and ownership from farmers from the outset. In other words, to be effective, decisions made must be largely demand-driven. Avoiding the imposition of pick-the-winner stances is a key condition for success.

Box 7 Factors to consider when assessing alternative diversification options

- Government policy (biases, incentives, regulations) and the impact of this policy.
- Risks (income, food security, natural resource, production, price, financial, loss of market, etc.).
- Infrastructure and organization of existing distribution channels.
- Access to resources and security of access (water, financial services etc).
- Impact on the environment
- Quantitative data on consumption levels, prices, and the trends in these.
- The currencies of both the country of the consumer market and the local economy.
- Exchange rate trends and s associated with exchange rate volatility.
- Effect on food security at each of the household and national levels.
- Potential entry strategies and alliance opportunities (including contracting and vertical integration).
- Possibility of acquiring required technologies in production, storage and processing.
- Trade tariffs, quotas and taxes.
- Main importers and participants in the supply chain.
- Storage requirements given potential perishability.
- Resistance and competition from producers in countries of potential export markets.
- Ability to certify food safety requirements and product grades and standards.
- Existing research and extension systems.
- Next best alternative market and production system.

Source: Sorby and Siegle *2003

Programs are needed to provide the farmers with continuous market information, market connections, and relevant technologies, to facilitate their decisionmaking process, both in the feasibility as well as in the implementation stage. The Agricultural Services Innovation and Reform project in Bangladesh (see Annex for more information) focuses on targeting the extension needs of women-, small- and marginalized farmers through cooperation with local NGOs. The establishment and strengthening of farmer associations can provide farmers with a platform for receiving information and sharing knowledge

regarding a range of potentially feasible production alternatives. The El Triunfo Sustainable Coffee project in Mexico (see Annex for more information) works through local producer cooperatives to empower local farmers and communities and enable them to assess and access markets on their own accord. This empowers the farmers to control their production and their output sources, which reduces the risk of having to rely on only one buyer.

There are considerable differences in how markets are evolving within different countries. For example, Colombia has been in the cut flower business for a relatively long period of time, expanding from US\$20,000 in 1970 to US\$560 million in 2000 (Asocolflores 2002). The industry in Ecuador emerged when Colombian producers discovered the favorable production conditions and lower labor and investment costs across the border. This illustrates that in assessing various alternatives, it is necessary to do so while taking account of advantages *relative* to those in other countries, particularly neighboring countries. It is also appropriate to note that it was not until 1990-1997, following the implementation of the Andean Trade Preferences Act, together with encouragement from the government in the form of favorable investment conditions, that Ecuador featured in global markets (Holt, 2000 in Dolan and Sorby, 2002). This brings attention to the need for careful consideration of government policy in feasibility assessments. In Uganda, (where commercial floriculture emerged as an export industry in 1993) the economic policy reforms under the Museveni government had a central platform in the diversification into nontraditional exports with the cut flower industry representing one of the most successful aspects of these diversification efforts (Asea and Kaija 2000). Analysis must be made in an uncertain environment, and recommendations and decisions should be based on comparative given relative costs, returns, and sustainability, not only in an economic sense, but also accounting for social and environmental implications.

The policy environment

How should various reforms be sequenced to ensure equitable distribution of the costs and benefits of policy adjustment? How should internal interest for transition away from the traditional roles of the public sector toward the functions demanded by the modern economic and societal environment be generated? How should public sector investments in areas such as land and water reform, and infrastructure provision be guided?

Emerging from recent work is the recognition that the establishment of a clear definition of the role of government and a sound policy framework critical for diversification and broader rural development. This relates to a wide range of policy issues and is closely associated with other generic activity areas, such as research and extension and encouraging private sector investment. Food security, price support, and input subsidy schemes, taxation policy, and land and water policies are all important elements of this theme.

A liberalized production policy with crop neutral agriculture support policies, such as direct income support, that are only used where necessary to help the transition process will promote demand-driven diversification (World Bank 1990a). Even in such a neutral policy environment, there is a need to conduct feasibility analysis to provide producers with sound economically viable options and improve the analytical capacity of producers to select appropriate option(s). For example, Turkey, with the support of the World Bank, has implemented such neutral policies by phasing out existing input and output subsidies, and introducing a system of de-coupled subsidies to partially cushion the blow to farmers (see Annex for more information). Existing subsidies have led the country to a surplus of hazelnut and tobacco output, in particular, and on this basis the project is aiming at giving financial and advisory support to the farmers for switching their production to alternative crops. This support takes many forms, including

uprooting costs, and technical and business advice on alternative production systems. The importance of giving the farmers a selection of options for their production is recognized within the program.

Defining an appropriate role of government and the private sector is the next important step in diversification strategies. This is the attempt made by the Senegal government in issuing an agricultural strategy in 1995. The main objectives of the strategy were to sustain agricultural productivity, improve food security, and increase rural employment (see Annex for more information). To achieve these goals, the government has undertaken to *deregulate* prices and trade of agricultural products and inputs, *decentralize* governmental activities, and *focus on public service functions*, such as policy formulation, regulatory functions, and monitoring and evaluation.

Securing land title not only enables farmers to use land as collateral, it also ensures returns on the investments which matures in long term, such as land improvements and skill development for horticultural crops. Several other World Bank projects are working with land registration issues; one example is the Agricultural Diversification Project in Vietnam. The project allocates secure long-term land use rights certificates to promote stable land use, reduce land disputes, and encourage investment to increase production. Within the Agricultural Reform Project in Turkey, land registration and strengthening of national land administration is a major focus because it is necessary to establish clear definitions and criteria for *payment* within the direct income support programs. Additionally, the *improved data resource* will provide a foundation for comparing the cost, speed, and transparency of alternative production methods, as well as facilitate monitoring of new production systems introduced in each region.

Other policies less directly related to agriculture are also important to programs with a diversification focus. National food security policies need to address both the country-wide production and the local availability of foods in areas with low productivity and/or areas more suited for the production of tradable goods, for example. The introduction of The Malawi Central Region Livelihood Security Program of CARE USA strengthens the country's focus on raising agricultural productivity through crop diversification and improved farming systems (CARE USA 2002). Support to nonagricultural income generating activities is also considered important in reinforcing the project objective of food security. Health and sanitation must be promoted to fully exploit the welfare effects of commercialization and diversification, and policy should focus on training and labor mobility programs because "after all, the least diversifiable endowment is probably uneducated labor" (Quiroz and Valdés 1995, p. 254). Appropriate trade policy is critical, especially given that opportunities are increasingly tied to the exploitation of emerging markets in foreign countries. Inward-oriented trade policies must be avoided as they will generally result in a reduction in the volume of trade and a narrowing of the export base such that the economy as a whole may be more vulnerable to price risk.

Input markets, infrastructure systems, and market access

What important input and output markets are missing? What are the priorities for their establishment? How should infrastructure inadequacies be addressed? How should funding responsibilities of these activities be allocated?

Input markets and infrastructure systems are still inadequate in many economies of the developing world. In many cases, the unavailability of specialized inputs, capital markets, communication and transporting systems, support services, and irrigation and drainage systems can all place limitations on diversification. These structural constraints relating to the efficient functioning of the supply chain are in part due to the failure of the private sector to fill the void left by government withdrawal and the dismantling of

parastatals. Throughout Africa, in particular, many infrastructure bottlenecks exist, and this significantly increases transport and marketing costs for agricultural products. From the outset it is important to recognize that many of these investments are potentially commodity-specific to a certain degree and that the degree to which infrastructural investments influence production decisions should be carefully considered (with least-biased investments that are ideally favored). The key structural areas for investment include: transportation systems, processing and packaging facilities, quality control and certification processes, information and communication systems, financial markets, and management mechanisms.

Transportation systems. Improved transport systems are key to enhancing market access and to minimize postharvest losses and costs, timely supply of outputs and inputs, and spare the time of producers spent on transportation for other more productive activities. All these ultimately improve the competitiveness of producers in domestic and international markets. Improved transportation and communication systems can also reduce the isolation that is typical of marginal farmers and can reduce the transaction costs associated with market participation. For example, increased land transportation budget in Thailand from 512 million baht in 1983 to 3,286 million baht in 1997 significantly reduced the transportation cost for export commodities. This significantly contributed to the increased competitiveness of Thai agriculture in the world (Titapiwatanakun 2001). The net farm income in the country increased from 24,000 baht per hectare in 1980/81 to 80,000 baht per ha in 1995/96. In Peru, approximately 3 million people benefited from rehabilitation and expansion of 13,000 kilometers of rural roads and highways under the Peru Rural Roads Program (World Bank 2002b). The road between Corca and Cuzco reduced traveling time to one-tenth of that prior to the initiative. This opened many opportunities for the poor inhabitants of the mountain village of Corca for trade and part-time employment in the buoyant tourist center of Cuzco.

Input markets and processing and packaging facilities. Improvement of the quality of infrastructure related to aspects of the supply chain, particularly supply channels for new inputs and storage and processing facilities, is critical to improving market access and the ability for farmers in developing countries to compete with those in developed countries in markets for nontraditional or high-value agricultural products, especially perishable products. New enterprises require new inputs—for example, specialized machinery, fertilizers, and packaging materials—and it is important that farmers can access these at competitive prices and in the form and volume and at the time that is suitable to their needs. For example, in Ghana, small packages of powder glyphosate were supplied to farmers trailing conservation tillage (CT) systems. Farmers preferred these packages as each contained the exact amount they needed for one backpack sprayer. This enabled them to trial CT without investing in large quantities of herbicide.

The development of this product resulted from a joint effort between Monsanto and Ghana's Crops Research Institute. On the downstream side, appropriate processing and logistical systems are needed to transform and transport the primary products to wholesale and retail customers toward the end of the supply chain. One aspect of this is the establishment of facilities and equipment for the testing of products for compliance with trade and market standards (see box 8). The Agricultural Export Promotion and Diversification Project in Côte d'Ivoire and the Agricultural Export Promotion project in Senegal both include components to increase the efficiency of quality control and packaging facilities (see Annex for more information). This included rehabilitation of the existing fruit wharf in the Port of Abidjan in Côte d'Ivoire and the upgrading of facilities for cold storage and storage capacity at the airport of Dakar. The construction of an export terminal at the Dakar airport has significantly increased the efficiency and functionality of preparation processes. A facility for collective handling of fruits and vegetables is also being implemented in Senegal through an innovative approach based on four independent units, private management, and a progressive lease structure based on sales.

Information and communication. The dissemination of relevant information to stakeholders, particularly small growers, is critical to identify profitable markets and opportunities, as well as improve the efficiency and competitiveness of supply chain. Economical and effective communication channels are essential to convey consumer demands backward to processors and ultimately primary producers so that the products are produced competitively and satisfy the demands of end users. APROFA, a governmental agency in Mali, uses *agrobusiness centers* and *reference centers* to disseminate new technologies and products to producers. The agency also relies on local radio programs and “audio-technical books” to distribute new technologies that enable producers to participate in new supply chain initiatives. GSM technology is one technology, in particular, that will become increasingly useful for price communications and production pooling systems. One emerging challenge is the design and application of effective information systems for the tracing of product origin and movement to satisfy calls for the maintenance of product identity from “pasture to plate.” Traceability database management systems will be an integral element of these systems. Farmer marketing organizations, as well as collaboration between these organizations and wholesalers, are critical for the development of efficient traceability mechanisms.

Financial markets. The availability of credit significantly improves farmers’ ability to venture into new lines of business and enable them to make the necessary investments for the additional infrastructure required for these ventures. Several microfinance programs have been designed to focus on providing credit to small farmers and enterprises to start diversification initiatives. The Pilot Community Development Project in Paraguay (Paraguay PAD 2002) and the Agricultural Diversification project in Vietnam both include credit lines in their programs to increase the availability of funds to farmers (see Annex for more information). The experience from the Rural Finance project in Vietnam illustrates the positive effects of providing farmers with small loans—an average loan of US\$360 (Vietnam PAD 2002). According to a study by the Microfinance Resource Center of the National Economic University in Hanoi, 99 percent of the borrowers increased their income significantly after borrowing (World Bank 2002b). One-third of the borrowers within the program were women, and the repayment rate was recorded to be 98 percent. Linking microfinance and technology dissemination programs can further improve the viability and effectiveness of these programs.

Risk management. Along with diversification comes the need for techniques to manage nontraditional risks. This is especially critical for smallholders that have in the past relied on subsistence food

Box 8 Agricultural Services Innovation in Bangladesh

The Agricultural Services Innovation and Reform project is operating simultaneously as the Export Diversification project in Bangladesh and works to strengthen the country’s new agricultural extension policy in which promotion of diversification into High-value Agricultural Exports (HVAEs) is high on the agenda. One focus of this project is the establishment and support of a horticultural export foundation, HORTEX, to encourage pioneer horticultural production and create market opportunities for increased exports. When HORTEX started out, its main function was that of an exporter, but during implementation of the previous project (the Agricultural Support Services project), the focus of the foundation was shifted toward a more successful approach emphasizing the provision of services to private initiatives. The foundation made a good progress in the latter years and succeeded in exporting a first horticultural shipment to high quality segments of the European market. The future focus of the foundation is projected to be within quality monitoring by providing information on quality standards in different international markets, and certification for quality of export products.

Source: Bangladesh PADs 1999a and 1999b

production to maintain household security and manage vulnerability to fluctuations in the international and local prices of nonfood crops. Liberalized and integrated capital markets reduce the costs of increased price variability through risk sharing on an economy-wide basis. This also allows saving and the strengthening of the asset base and improvement of human resources. Efficient and reliable input marketing systems that assure the timely supply of necessary inputs (especially fertilizer, chemicals, seed, and water) reduce the risks associated with the adoption of new production systems. Technologies, such as protected cultivation and resistant varieties; infrastructural investments, such as early warning; and demand-driven irrigation systems can also reduce production risks. Supporting irrigation projects (for example, development of markets for water) and investments in financial markets can reduce production and financial risks respectively. Improvement in information, communication, and extension systems can enhance the accessibility and reliability of technical and market information for farmers and, thus, reduce the uncertainties associated with the strategic planning of diversification. Integration of producer organizations and marketing associations can help sharing the production and marketing risks. In addition, the investment in flexible skills and technologies (rather than those that are highly specific) and the production of products that have multiple uses and markets reduce the risk of asset devaluation associated with deterioration of the product or market selected. Policy stability will reduce political instability that reduces the incentives to invest, especially for foreigners.

Diversification may imply the adoption of specialized production systems in which assets are highly specific and sales are dependent on specific markets and require long-term investments in inflexible systems with long production cycles. In general, an important tradeoff needs consideration: that between specialization (efficient, profitable, highly risky, and less sustainable) or generalization (flexible, adaptable, less risky, more sustainable yet potentially less profitable).

Private sector participation and supply chain integration/coordination

How should the role of the private sector be defined in different countries at differing stages of development? How should participation be encouraged? How can cooperative partnerships be forged between the private sector and farmers, producer organizations and the public sector?

While the previous subsection outlined how the *structural* issues of supply chain management can be addressed, it is important to simultaneously invest in the *organizational* changes required to fully realize the benefits made from infrastructural investment. Private sector participation and organized group action through community and producer associations are two particular themes critical to diversification success. It has been the trend toward more liberal markets and a renewed (and somewhat reduced) role of government that has generated a call for developing means to encourage private-sector participation. Processing and handling of high-value crops is complex and typically requires more streamlined marketing systems than traditional commodity crops (principally due to their perishable nature). The structural investments need to be complimented with investments in new organizational forms and intra-organizational relationships.

Producer organizations. Recent success stories of producer organizations cooperating to compete by more efficiently using their resources and skills have generated renewed interest in utilizing these groups for empowerment and for improving access to markets (World Bank 2002c). Producer groups can either play a role in establishing a platform for trade through providing advice, inputs, and output services, or act as a strong trading entity on behalf of its members, or some combination of both. United they can effectively partner with other organizations and participate in innovative business-to-business (B2B) relationships. Several of the Bank's projects, including the Export and Promotion and Diversification

Projects in Senegal and Côte d'Ivoire, support the creation of farmers associations (see Annex for more information). Of course, a policy environment conducive to private investment is necessary for producer organizations to be forceful. This has been illustrated in Turkey where the original centralized structure and the governmental control over the farmers' cooperative at the time diminished the efficiency of the organization and weakened the producers' trust in it (see Annex for more information). The Agricultural Reform project in Turkey is currently supporting the implementation of a new law on agricultural cooperatives to decentralize the cooperative organizations and improve their efficiency. The restructuring is managed through a participatory process involving member mobilization, business planning, and implementation.

Noncommercial/nongovernmental agents. NGOs, donors, and other nongovernmental and noncommercial entities may effectively act as brokers between producers and other commercial parties in the supply chain. The sustainable coffee project in Mexico works with community development—for example, within infrastructure, health, education, access to markets etc., using the surplus received by the producer organizations in order to gain community support and enhance regional development (see Annex for more information on the roles of different stakeholders). The project clearly shows that producer organizations need to have strong bonds with its members and their communities. Strong links and an active working relationship with Conservation International (an international NGO) helped establish market linkages and provided assistance to the Mexican coffee producers involved with selling their certified Organic and Fair Trade produce to a specifically targeted customer (World Bank 2002d). Similarly, in Mali a management model in which key supply chain participants were linked together through effective partnership arrangements facilitated by The Agence pour la Promotion des Filières Agricoles (APROFA) fostered successful horticultural diversification (see box 9). There are a number of projects that promote linkages with exporters and international markets through NGOs or public sector organizations. The Agricultural Export Promotion and Diversification Project in Côte d'Ivoire and the Agricultural Export Promotion project in Senegal are both working to diversify export possibilities through developing partnerships between local entrepreneurs and foreign businesses, as well as by helping local businesses to conform to international quality standards.

Private-public sector collaboration. Private sector can play a pivotal role in providing training to farmers to analyze diversification opportunities and develop small scale agricultural businesses, as well as supply inputs, especially fertilizer, chemicals, and seed and seedlings. The collaboration between private and public sectors can be pivotal in developing methodologies and organizing and managing facilities for quality control (see box 10). For example, the project in Senegal promotes a procedure of quality control and introduces the principles of Hazard Analysis Critical Control Points (HACCP) to local producers, demonstrating the practical implications of the process of the HACCP system, as well as the potential benefits from achieving certification status.¹⁰ These quality procedures have the possibility to be used as a foundation for the establishment of a privately managed "Origine Senegal" quality label that, in time and with good management and participation, can yield international recognition of the high standard of Senegalese produce. This recognition in the marketplace can in itself lead to improved access to high-value markets. The organizational structure must be closely linked to the physical resources and infrastructure available.

¹⁰ The HACCP principles include identification of critical limits and appropriate monitoring procedures, and the establishment of preventive measures such as safe use and disposal of pesticides at all stages of the supply chain. As such, they require investment in new plant and machinery, vertical coordination, and the learning of new management systems for local producers both at the primary production stage and up and down stream stages in the supply chain.

Box 9 Actors and management model for Mali mango exports

APROFA The Agence pour la Promotion des Filières Agricoles (APROFA) was established by the Government of Mali to restructure supply-chains for diversification, develop commercialization channels, and promote the application of research and technology.

Village-Level Organizations, including producers' associations, work to pool production, negotiate contracts, and also assist with training and technical assistance activities, (for example, organizing production, conducting field level experiments, and supplying quick alert crop performance information).

Intermediaries, such as field-men, middle-men, and collectors enable realization of the financial connection between commercial agents and growers. Though often disliked because of their sometimes usurious practices, they can facilitate technical transfer to growers as a means to adapt to market needs. They can also offer arrangements to share production and marketing risks with farmers.

Public services. The State through its public services in the agricultural sector, Research and Extension, is an important relay between the production and the commercialization processes. The national extension agents provide training activities.

The private sector. The role of private operators is includes raising private finance for investment, managing pack-houses, and organizing the exportation. Private operators have brought capital, experience and competence in the export sector, including quality requirements and have been active in the task of securing crop financing and technological transfer to enhance quality—traceability, supply base management, integration, as well as streamlining logistics and monitoring markets.

The management model. APROFA identified an Ivorian exporter willing to set up a joint-venture and thus split the risks along the Malian-Ivorian border. APROFA would guarantee a fixed price to the Ivorian importer who would then bear the logistic and commercial risks associated with exporting the product. The Ivorian partner is liable for financing the fruit purchase from growers, the packaging material at the pack-house, securing forwarding and in-land logistics. Fixed prices included a profit margin if each party managed to respect the cost objectives. If average selling prices exceeded a fixed amount, the differential would equally be split between APROFA and the Ivorian company. Further, it assigned two experienced pack-house managers (administrative and packing) to implement proper packing, accounting, and shipping procedures. Following this agreement, APROFA obtained the re-opening of the foreclosed Sikasso pack-house from the local bank, which enabled access to an efficient pre-cooling capability essential to container shipments. APROFA acts as an intermediary between the producers' associations and their trading partners. The agency has been providing a number of extension services to the growers and pack-house employees to increase productivity, reduce costs, and improve quality.

Source: World Bank 2003

Policy environment for private sector investment. The Export Diversification project in Bangladesh illustrates that a policy environment favorable to national and foreign private investment must be supported to accelerate integration into the global economy (see box 8). The project strives to improve the national business environment for commerce through supporting advisory services and providing trade and policy analysis to private enterprises for international and regional trade. Within the country's customs reform, which is supported by the project, issues such as corruption and inefficiency in revenue collection are attacked because they have constituted a major impediment to private sector investment and the emergence of intrabusiness cooperation. The Export Diversification project in Bangladesh gives incentives for investment in product and market development through a matching grant facility directed to exporters and market service providers. The Agricultural Export Promotion projects in Senegal and Côte d'Ivoire have both assisted in identifying foreign market development opportunities and facilitated partnerships between local producers and foreign investors. These have been central themes in the work plan that enables successful entry into international markets. The projects strive to reach agricultural producers and exporters through their professional organizations and also give special support to smaller growers of exportable crops. Stability in political and macroeconomic environment, correction in over-valued exchange rate, reduction in public sector budget deficit to bring down the interest rates, price liberalization both at the farm gate and processing levels, reduction in government sensitivity to increases in agricultural prices for the purpose of protecting urban consumers, and complete withdrawal of the public sector involvement in the business activities are other important policy factors for the induced private sector investment on diversification of the agriculture sector.

Vertical integration and contractual arrangements. Contract farming arrangements are commonly implemented as a strategy for supply chain integration, securing the supply of raw material, and providing income security to primary producers. The contractors often provide technological support and supervision to receive reliable and high-quality produce, and, as such, there is typically a flow of information to local farmers. In Thailand, baby corn canning factories and frozen vegetables industries use systems of contractual arrangements to accomplish and maintain a certain quality standard of the products required for export (Titapiwatanakun, 2001). For example, with regards to the frozen products venture, a strict implementation of IPM systems is necessary to meet the sanitary and phytosanitary (SPS) requirements of importing countries. Under the framework of contract farming, small farmers in poor areas can be more effectively targeted, and tailor-made contractual arrangements can be established with the support of both governmental and private sectors. Contracts are also used in vanilla production in Uganda and in snow pea production in Guatemala. Both production systems are very labor intensive. This

Box 10 Diversification within Traditional Commodity Groups; Coffee Production in Mexico

The current coffee crisis with declining coffee prices during the past few years has forced many farmers to diversify their production into other areas. However, production diversification does not exclude the possibility of diversifying *within* the traditional commodity. Certifying production according to an international certification system may add significant value from a consumer perspective, and thus raise considerably the price received by the farmer for the traditional commodity. Two of the most common certification systems are for organic production and Fair Trade.

For more information on the specific movements see <http://www.ifoam.org/> for information on organic farming and <http://www.fairtradefederation.com/> for information on Fair Trade.

Source: World Bank 2002d

gives small-scale farmers an advantage over large-scale producers, as they are more able to effectively utilize sources of low-cost family labor.

Contract farming can present individual farmers with an opportunity to gain cash income and empower their situation through specializing their production systems (Dolan and Sorby, 2002). Bank experience illustrates that a number of potentially negative implications may be associated with contractual arrangements. For example, women are not always allowed to participate in binding contracts due to either legal or traditional reasons. In Guatemala only 3 percent of the snow pea contracts are women even though they contribute to more than one-third of total field labor and virtually all labor used in processing (Warnken 1989). Violations in the agreement regarding fluctuations in output supply and quality and insufficient legal mechanisms to enforce the agreements are common problems in the contractual arrangement. Exploitation of farmers or downstream producers is another concern as a contracting company usually has better negotiation powers than producers. To avoid these problems, effectively organized producers' organizations equipped with information and necessary capital and supported by legal protections can better negotiate, implement, and monitor the contracts.

Overall, when complimented with the required structural investments and accompanied by a supportive policy environment, effective research and extension systems, and environmental management practices, private sector participation and coordination of the supply chain will provide a solid platform for diversification. As is increasingly recognized in Bank work, activities must be market driven with an explicit focus on consumer demand both in the domestic and foreign markets (see Cote d'Ivoire PAD 1995). To optimize poverty impact, it is imperative that poor producers (typically small- and marginal-farmers) are empowered with the capacity to participate and claim their share of profit residuals. Improving the integration of agricultural value chains will improve the transfer of information, risks, resources, and funds, and also increase efficiency. At the same time investments and supply chain integration can maintain the flexibility to adapt to changing consumer demands and emerging market opportunities. A well-structured organization model can facilitate appropriate risk management and enable its transfer to those most able to manage it. As a result, the incentives for participation by poor people has improved, and their vulnerability to production and market vagrancies have been reduced.

Research, extension, and training

How should research and extension systems be funded? How can they be designed to meet the need of diversification of small farmer? How will the system allow for effective flow of information between scientists and farmers?

Agricultural diversification requires research efforts to develop innovative solutions to new problems associated with alternative and unknown production enterprises. While priorities should largely be demand-driven, investments in research and extension systems typically have long-time horizons and may be either *crop specific* (for example, yield increases, shorter duration cultivars, improved quality characteristics, and greater tolerance to pest stresses), or more general *system-level research* (for example, land management and tillage systems that allow for shifts of cropping patterns in response to changing incentives and farm-level water management systems that can accommodate a variety of crops within a season).

While the emphasis of the public sector is shifting toward providing systems for quality and safety control, sustainable management of natural resources, and the protection of the global environment, the private sector is adopting a greater role in research and extension. By providing their contract farmers with inputs and enhanced production techniques and know-how, private companies are able to increase

the security of their procurement. The private sector also plays a larger role in research through the development of improved seed and other input. Usually the concern is that the private sector research mainly focuses on large commercial farmers as the technologies that they produce are considered expensive and out of the reach of the small farmers, especially in a case when financial institutions are weak. The research system must respond to this concern, and technologies released by the system must reflect the constraints of particularly small/marginal farmers. Collaboration between the private and public sectors, producers' organization, client groups, and NGOs can address these concerns by making the research system relevant to small farmers needs. For example, public sector research organization can initially finance testing of smallholder farmers' technologies/production alternatives on their field alongside their existing system. But the need of such testing should be identified through the producers' organization and can be implemented by NGOs or private sector under the supervision of the farmers or producers organization. On-farm testing will reduce the risks that smallholder farmers face from a complete transition of farming activity. Providing demonstration plots and field days can reduce some of the learning costs associated with transition to new production systems.

Key to successful diversification is rapid adjustment of the producers to changing national and international market opportunities; therefore, successful diversification requires efficient information flows, quick identification of opportunities, development of appropriate technologies, and fast adoption of these technologies on the producers' fields and factories. This requires efficient back-and-forth flows of information from researchers to extension agent to farmers. Decentralized research and participatory extension systems, well-harmonized and democratically organized farmer organizations, and an efficient private sector are important ingredients (see box 11). The agriculture information and knowledge system should necessarily contain data on prices, cost, grading system, sanitary and phytosanitary requirements, alternative sources of supply and their cost structure, and available technologies for production, transport, and processing. From this data, opportunities and constraints should be identified and discussed with the producers, marketing agents, and processors involving researchers, extension agents, private sector, and donors. Changing input-output prices and appropriate risk function should be incorporated into this analysis. Practical ways to resolve the constraints should be worked out in consultation with all stakeholders. Financing sources to resolve these

Box 11 Technical Support for Diversification in Vietnam

Technical support for intensifying crop and livestock production is one of the activities within the Agricultural Diversification project in Vietnam. The project focuses mainly on participatory research and extension, for example, regarding pilot fruit tree development and establishment of nurseries. The inclusion of farmers in the research process is regarded as essential to target the outcomes to the specific farmer needs. A smallholder crop and technical package is introduced through the project, promoting a mixture of farmed activities such as investment in rubber, livestock, and food crops. Markets for rubber are relatively well established in the country. It has the comparative advantages with lower production costs compared to neighboring countries and can offer small producers profitable opportunities. Some small producers have already started to venture into planting rubber trees because this activity is strongly promoted by the project. The tree-crop is considered environmentally suitable for the degraded, deforested highlands, and focus is put on introducing sustainable management practices (for example, production on sloping and degraded lands). Sustainable natural resource management is nationally supported through the preparation of the National Environmental Action Plan and the strengthening of regulations for land and water use.

Source: Vietnam PAD 1998

constraints should be identified, and institutional arrangements for production, processing, and supply should be visualized. A continuous flow of information between farmers and researchers will allow for any adjustment in technologies and institutional arrangement necessary to fully benefit from the identified or changed opportunity.

Wide-ranging research agenda focusing on various crops and commodities, production system, and processing technologies in various environments according to the site-specific needs of the farmers is a basic requirement for diversification. Such an agenda can be targeted through the regional and international networking. For example, South Asia Vegetable Research Network (SAVERNET) disseminated successful technologies and varieties of different vegetable crops from one country to another. It also helps to allocate the limited research resources available in the public sector of a country in more priority areas and learn from the experience of other countries in other areas, more important for them. Such networks can also help setting up the information networks on various crops, as well as facilitate the flow of information, research methodologies, and literature.

Contractual research and extension systems are another way to meet the wide array of research needs of diversification and make the research output relevant to the needs of small farmers. To make such system effective, the ability of farmers to identify the key diversification issues is critical. Democratically organized and responsible producers' organizations are better suited to identify contractual research demands and implement these contracts. A public sector identity, independent from the financial agency, can transfer these demands into contractual arrangements. Universities, national organizations, and private sector can compete for the task-specific contract on an equitable basis. Initially, the public funds can finance these contracts, but, as farmers see the utility of the output from contractual research, they increasingly become less willing to pay for such research.

The government of Bangladesh recently approved a New Agricultural Extension Policy that emphasizes a participatory extension system based on farmer needs and a decentralized design of extension programs (see Annex for more information). The policy encourages increased cooperation with other governmental agencies, especially within fisheries, livestock, and forestry, and NGOs, and focuses on targeting the extension needs of women, minority groups, and small, marginal, and landless farmers. In extension, cooperation between governmental agencies and locally established NGOs has been very useful in reaching marginal and small farmers with technical advice and/or to introduce new higher value crops.

The need for training farmers for diversification is also wide ranging. Farmers need to be trained not only in the new technologies of the traditional crops but also new methods of cultivation in new crops, commodity packaging, sorting, grading, processing, financial management system, and international trade. Seed and seedling production, crop protection technologies, IPM methods, and improved irrigation systems are all important. All these suggest importance of research and extension; however, public sector organizations cannot meet all these training needs alone, without involving the private sector, NGOs, producers' organization, client groups, and universities. The public sector organization should play the key role in the training of trainers in the private and public sectors, as well as key farmers, and society leaders. Such a broad-based training of farmers will reduce the risk involved in diversification as they adopt the processes and technologies of diversification more accurately.

Natural resource management

What are the potential environmental benefits and/or risks with agricultural diversification? How can the effects of negative externalities be mitigated? To what extent can government intervention

promote/ensure sustainable management of natural resources? How should incentives for poor, marginal farmers to venture into systems yielding environmental services be established?

Diversification is important for poverty reduction in the sense that it can contribute to improving the sustainable management of the natural resources upon which agricultural producers depend. Diversification to new production systems can present producers with a profitable alternative to the traditional cereal-based system, such as rice-rice or rice-wheat, while avoiding adverse effects on the natural resource base and thereby increasing sustainability of production. On the other hand, transition to new systems may impose new threats to the environment that must also be accommodated. Further, global climate change may threaten traditional cereal-based farming systems in many areas, while at the same time present opportunities for the transition to novel production enterprises.

A favorable policy environment is critical for sustainable management of natural resources. If rights to basic resources are poorly secured and enforced, then resources may remain locked into inefficient uses. Secure rights create the incentives not only for efficient and profitable long-term investment but also for the sustainable use of resources including conservation of the natural environment. In particular, secure and tradable water rights for irrigation will provide incentives for economizing on water use by inducing water users to consider the full opportunity cost of water. The Bank is supporting the creation of Water User Associations in a number of projects across the regions. The Irrigation Rehabilitation projects (I and II) in Albania have successfully used the system of water user organizations to build up the existing but degenerating irrigation system and, through local ownership, these projects have created incentives for sustainable maintenance (Albania PADs 1999 and 1994). The management vacuum at primary irrigation facilities has been a major issue for expansion of the program, but there are now plans for the Water User Associations to take over the responsibility of the secondary and even the primary irrigation canals with the view of improving water use efficiency and ultimately promoting more environmentally appropriate water use.

For the realization of the potential environmental benefits of diversification, programs must be accompanied by appropriate policies and regulations. Policies providing for secure tenure and use rights for productive assets (particularly land and water) create the incentives for sustainable management of environmental resources and the necessarily longer-term investments required for many diversification initiatives (for example, skill development for horticultural tree crops).¹¹ Upon the removal of inappropriate production incentives (for example, policy and infrastructure biases favoring traditional crops) and, given effective mechanisms for food security and management other than subsistence farming and appropriate mechanism for internalization of positive and negative externalities, producers are both more able and more willing to adopt the most profitable production alternative accounting for the long-term sustainability of production systems and resource use. This may involve a rotational or assorted production mix (frequently including livestock) to create synergies that will enhance environmental qualities such as soil organic matter, nutrient management, biodiversity, and carbon cycling. Public transfers for environmental services are an innovative way of recognizing the public good nature of many agricultural activities and providing livelihood maintenance for marginal farmers. In summary,

¹¹ Although land titling will likely improve the natural resource management, it may have consequences for equity. Under a land-titling scheme, the relatively well-off may capture land at the expense of the poor who are deprived of the nominal security offered by traditional arrangements, however inefficient they were. This is particularly true in Africa. When private sector activity fails to fill in the void left by the traditional system, such land titling may have adverse effect on the distribution of incomes. Therefore, equity effect should be considered and controlled before implementing such scheme for improved resource management.

appropriate public sector policies and institutional innovations to pay the supply and charge the consumption of the public goods are the necessary conditions for the successful diversification programs aim to improve resource sustainability.

Environmental certification of production systems can create important incentives for the introduction of environmentally and socially sustainable agricultural systems. For example, two Bank/Global Environmental Facility (GEF) projects that have worked with introducing certified coffee production are the El Triunfo Sustainable Coffee project in Mexico and the Promotion of Biodiversity Conservation Within Coffee Landscapes project in El Salvador (see Annex for more information). The projects incorporate natural resource management with high-value market advantages to raise rural income levels in marginalized areas through community-driven development and establishment of marketing partnerships. Within the project in El Salvador, 224 plantations are supported to certify the production according to the ECO/OK seal granted by the Rain Forest Alliance network (World Bank, 2002b). Through certification of their production, farmers can gain significantly from the higher price premiums. During the project in Mexico, not only did farmers' average net income increase by 25 percent, but deforestation simultaneously halted. These opportunities are emerging as a result of changing demands and increasing value being placed on the environmental sustainability of the production system used to produce the consumer product. Designing production systems to conform to these certification schemes will empower producers with an improved ability to access foreign markets with discerning consumers.

Technological advances have increased the ways in which agricultural activity can contribute to soil conservation and maintenance of biodiversity. Again, the policy environment can affect production incentives, and efforts must be made to restore crop neutral policies in circumstances in which inappropriate taxes and subsidies distort resource use. New technologies such as integrated pest management (IPM), and conservation tillage (CT) are enabling farmers to diversify production systems even while maintaining the same output (wheat or rice) and the same levels of output (see boxes 12 and 13). These technologies have been used to help farmers, particularly resource-poor farmers, to access profitable markets while at the same time securing a sustainable resource base. Modern plant breeding, including growing knowledge of and use of biotechnological products, may go some way toward reversing the trend of biodiversity loss by making it easier to maintain genetic material and by creating a wider gene pool of modern varieties.

Environmental service is one area that offers opportunities for agricultural producers, particularly those on marginal lands, to diversify. Capitalizing on the multifunctional character of agriculture, this area is of growing interest to conservation organizations, governments, donors, and community groups. One example of this is carbon sequestration, which the World Bank is promoting through the recently created Biocarbon Fund (World Bank 2002e). The fund will help poor farmers and rural communities explore new values in their

Box 12 IPM as a Key Tool for Sustainable Diversification

Sustainable production systems, including Integrated Pest Management (IPM) and Organic Farming, capitalize on diversification to achieve sustainable environments based on natural processes. Diversified production leads to more stable yields and less risk for the farmer in comparison to relying on one single crop. IPM is promoted in many World Bank projects (for example, within the previous Agricultural Rehabilitation Project in Vietnam and the current Agricultural Export Promotion project in Senegal) and inclusion is enforced by the safeguard policies guarding the operations (see Sorby, Fleischer and Pehu 2002). IPM is also a large research focus in the programs within the CGIAR system to which the Bank is the main sponsor (for more information see the Systemwide Program for IPM, <http://www.spipm.cgiar.org/>).

Source: Pehu 2003

agricultural lands and forests while enhancing the environment and reducing greenhouse gases in the atmosphere.

Box 13 No-Till Technologies in Ghana

In the 1990s, no-till with mulch was introduced to small-scale Ghanaian farmers. The rapid adoption was facilitated by low-input agricultural practices, and there was no need to develop no-till planters because planting is traditionally done with a stick or cutlass (machete). Difficulties in finding adequately trained contractors for planting or spraying, problems understanding the package, and economic constraints were cited as restricting factors for those that did not adopt the technology.

Recommendations from a recent report include:

- The introduction of machinery such as the knife roller for slashing, planters for manual, draft, and mechanized planting, and multi-line sprayers for herbicides.
- Crop rotations (including cover crops) can help improve soil cover at flowering, increase fertility, ease weed control, and reduce potential buildup of aggressive weeds and pests.
- Research on diseases and weed and pest populations will also help to identify potential threats and develop remedies before they become a limiting constraint.
- The development of a no-till package for crops that presently can only be planted with conventional till would also broaden the universe of potential adopters.
- Programs to help dealers improve business management and better infrastructure can also reduce transaction costs and help expand no-till practice.

Source : Ekboir, et.al. 2002

The scheme presents an innovative approach for creation of markets for public goods. The fund will work coherently with the two other recently launched Bank-managed carbon funds—the Prototype Carbon Fund (PCF) for energy-related projects and the Community Development Fund (CDF) that concentrates on small-scale energy and biocarbon projects in least developed countries. These initiatives are direct results from the Kyoto Protocol. The Biocarbon Fund will finance two types of activities: first, reforestation of deforested and/or degraded land through—for example, small-scale reforestation, community forest management, and agroforestry—and, second, activities other than reforestation, such as rehabilitation of grazing lands, improvement of soil carbon, and establishment of wider landscape management plans. These options represent an opportunity for farmers to diversify out of traditional systems that are possibly not sustainable on an ecological basis, into systems that use resources in such a way that valuable societal or environmental output or services are supplied. Despite these new initiatives, in some of the instances where producers cannot compete independently, governments also will not be able to justify sufficient transfer of expenditures on environmental services to provide for an adequate standard of living for those living in the area. In these situations, the only real alternative is exit of the agriculture sector and migration to other sectors.

6. Recommendation and Limitations

Agriculture is increasingly being recognized as critical to reducing poverty in developing countries mostly because agricultural activities are rural in nature and poverty incidence is highly concentrated in rural space. But policy concentration on few cereal crops has reduced profitability, detracted investment,

and dampened growth in the agricultural sector. Agricultural diversification can help to reverse these trends by making the sector more profitable as it becomes flexible in meeting the local and international demands and enables poor people to do something new and remunerative yet within their sphere of competencies and resources.

We consider diversification a flexible form of development yet recognize its role in inducing sustainable growth by encouraging sustainable production systems in line with the available resources of farmers and microenvironments of soil and land, capturing on the seasonal and regional availability of resources, and improving the nutritional balance of consumers. Although diversification is certainly not a new phenomenon, the nature of the dynamic and evolving global environment presents new challenges and opportunities to the agricultural sector. While these changes, in turn, induce a need to reexamine the role of diversification, diversification inevitably remains an integral part of the inescapable process of structural change in the global agriculture systems.

While the fast developments in the agricultural sector have created diversification opportunities, there are constraints that can hamper the ability of farmers, especially poor and marginal farmers, to take full advantage of these opportunities. Lack of adequate infrastructure, poor access to information, credit, and other assets (land, water, and technological know-how), can severely constrain the scope of diversification initiatives. These barriers, information gaps, and capacity limitations present not only an opportunity, but also a need for international donors, such as the World Bank, to provide support and assistance to build the capacity for pro-poor diversification activities.

Diversification initiatives require a multicomponent approach involving many specific investment areas. Policy and institutional environment, irrigation and drainage, science and technology, and rural infrastructure are just a few examples. All these investments will not come from the public sector. Government has to create the enabling environments for the private sector to provide inputs and services to farmers necessary for diversification; however, the government needs to invest to widen the scope of research institutes to cover emerging issues of diversification, improve the analytical capabilities of farmers to synthesize the diversification opportunity, and develop the efficient knowledge and information systems.

For the diversification process to be pro-poor, extension systems can be designed especially to reach smallholders, and research systems can be responsive to the needs of the small and marginal farmers by providing technologies that are adaptable to small scales. The establishment of rural producer organizations can be useful for promoting the interests of smallholders, who are typically underrepresented in political decisions, sourcing inputs by bulk and at competitive prices, exploring market opportunities, pooling output to improve bargaining power, and forming beneficial partnerships with commercial enterprises, governmental agencies, research and extension entities, and other community groups. To improve small farmers' participation in producer organization on equitable basis, free flow of information on markets, opportunities, and transparent rules and regulations of producers' organization, are very important.

In this study, we set out to identify the nature of specific operational practices in the implementation of initiatives that are important to ensure that the diversification process benefits the poor. We did so with the intention of providing useful guidance to practitioners involved in diversification initiatives. We define a set of six focal points as appropriate for describing implementation guidelines: 1) feasibility analysis, 2) policy environment, 3) input markets, infrastructure systems, and market access, 4) private sector participation and supply chain integration and coordination, 5) research, extension, and training systems, and 6) natural resource management. Because each project setting is made up of unique

constraints, resources, and opportunities, *situation specific guidance* to problem-solving is recognized as essential. The case studies presented are examples of different approaches to diversification activities. We use empirical evidence from the case studies to outline common problems and useful ways for overcoming these with the intention of sparking thoughtful and grounded creativity in the minds of task managers and others involved in decisionmaking processes relating to diversification. Below are key highlights from our analyses:

- The importance of strong governmental support is taken into account in most of the case studies, primarily through the development of policies that enable farmers to capitalize on the opportunities of diversification.
- Several of the projects studied are providing support for feasibility studies and enabling market access, both on local and national levels. This is becoming increasingly important as the technical skills required for effective market analysis are increasing.
- Market and transport infrastructure has long been a large focus within development aid. Despite this, in many instances infrastructure remains a major barrier for poor farmers to participate in and profit from agricultural diversification.
- The access to credit is frequently a major constraint for farmers wanting to venture into new lines of production. Micro-finance options and the provision of credit lines for rural inhabitants have been shown to be effective means of overcoming this problem.
- Reformation of existing extension systems toward more participatory methods has been found to be an effective means of strengthening the linkages between farmers and the research community.
- Close cooperation with local NGOs and producer group with regards to extension work has been shown to enable a more precise targeting of the needs of women-, small- and marginal farmers.
- Contractual research and regional and international networking are considered important to quickly resolve a wide variety of constraints in diversification that are site specific in nature.
- The training of farmers in new technologies and processes involved in diversification will improve their technical ability to engage in diversification, and reduce the involved.
- The public sector research systems need help from donors in widening their technical capabilities in new research and management areas evolving from the diversification process.
- There is a large focus on providing the private sector with support and incentives for investments within the projects. This can be achieved, for example, by facilitating the establishment of fruitful partnerships between local entrepreneurs and foreign businesses and by helping local businesses to conform to international quality requirements.
- The framework of contract farming can be used as a tool to transfer and to target small farmers in poor areas through tailor-made contractual arrangements achieved by successful public/private cooperation.
- Capacity building for certification of production systems according to an internationally accredited system has been shown to significantly raise the income of farmers and provide a possibility for diversification within the traditional crop. However farmers need assistance in acquiring the technical knowledge of these systems and support in accessing related markets.

- The sustainable use of natural resources can, on marginal lands in particular, justify diversification into production of public goods, such as carbon sequestration. The Kyoto Protocol promotes capitalization from the delivery of public goods, and the Bank's recently created Biocarbon Fund will support activities that explore new values in agricultural lands and forests.

This investigation is, of course, limited in that, on one hand, it does not account for the entire set of different farming environments in which diversification activities are of significant importance to poverty reduction, and, on the other hand, analysis of the illustrative cases selected is not sufficiently thorough to provide a fully comprehensive outline of operational detail to task managers and other practitioners. Nevertheless, we consider that we have suitably balanced the depth and breadth of analysis to satisfy our objective and, in doing so, have provided useful guidance to those at the field level of project design, implementation, and monitoring. In this regard, however, one key area for further research would involve the identification of systems for the careful documentation of operational planning and implementation detail of future projects and diversification activities (this system will, of course, also require the incentives for practitioners to do so). This will provide a basis for further research, by both theoreticians and practitioners themselves, relating to the successful implementation of diversification activities.

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Appendix—Case Study Summaries

Mexico and El Salvador

Project/Program: El Triunfo Sustainable coffee project and Promotion of Biodiversity Conservation Within Coffee Landscapes project, El Salvador)

Main Issues: Natural resource management, sustainable production, organic, shade-grown, and fair trade certification

The “El Triunfo” project in Chiapas, Mexico, implemented with a medium-sized Global Environment Facility (GEF) grant, integrates the support for organic and shade-grown coffee production and marketing into a sustainable development agenda for the marginalized, rural area in southern Mexico. The project introduced a scheme to certify and market organic and fair trade coffee, mainly. A local NGO manages the project and the Conservation International (U.S.) brokered the marketing link. The El Triunfo project entails nearly 800 farms organized in seven cooperatives covering about 1,800 hectares. The focus lies in building local capacity to deliver a high quality and certified product in a timely manner. Through empowering communities to assess and access markets themselves, the of having to rely on only one source for handling the output is reduced. During the project, the average net income of farmers increased by about 25 percent, while deforestation in the area was halted. Included as a goal in the production cooperative is to use part of funds for community development activities, including infrastructure, health, schools, and markets.

The “Promotion of Biodiversity conservation within Coffee Landscapes” project in El Salvador is also supported through a GEF grant through national coffee agency, PROCAFE. Because 95 percent of the coffee plantations are still shade grown in the country, the project developed a biodiversity friendly certification scheme to help maintain or reestablish biodiversity-friendly shade coffee systems in the country. The project also provided training for extension workers and supported farmers in the certification process. Through these schemes, natural resources management (NRM) is incorporated with high-value market advantages to raise rural income levels. More than 1,000 hectares have been certified and another 7,600 hectares are in the process of certification according to the principles of the Rainforest Alliance certification networks ECO-O.K. label (for more information see <http://www.rainforestalliance.org/>). The first exports went at a price premium to Japan.

Turkey

Project/Program: Agricultural Reform Implementation Project

Main Issues: Agricultural policy reform, national and regional production diversification, land registration, and reorganizing farmers associations

The government of Turkey is reforming their agricultural policy from a system heavily dependent on subsidies to a more liberalized system linking the farmer’s prices to the world market. A dialogue to reform the existing policies was initiated with Bank assistance already in 1998. However, one lesson learned is that policy reforms can take time and groundwork can pay off even if recommendations are not accepted immediately. A clear and straightforward conditionality dialogue is needed together with strong

Government ownership to succeed in creating a productive reform policy. The project contains an adjustment portion for satisfactory introduction of macroeconomic and socioeconomic reforms.

To phase out existing input and output subsidies, a system of de-coupled subsidies was implemented to partially cushion the blow to farmers and severance payments were made to workers in quasi-public enterprises that needed to restructure or close down. The previous cropping area expansion of hazelnut & tobacco led to a significant surplus. Advice and financial assistance is given to farmers who switch to alternative crops in form of support for uprooting costs, input costs for new crops and other transition costs. The importance of giving farmers a wide range of options was recognized during the successful implementation of the previous Eastern Anatolia Watershed Rehabilitation project and the crop replacement options include maize, soybean, sunflower, vegetables, and medicinal plants.

The project also assists the Ministry of Agriculture and Rural Affairs in the establishment of the National Registry of Farmers and supports the Land Registration and Cadastre office in updating existing land registry records. An adequate, transparent and reliable registry of farmers is essential to have in place to enable direct income support programs. It is necessary to establish a clear definition of the criteria on which the payments will be based. International experience has shown that one functional way to do this is to base the payments on the area owned or farmed by the beneficiary. The land registry will also provide a base for evaluations in comparing of the cost, speed and transparency of different methods.

Cooperatives financed and controlled by the government have been shown to degenerate into inefficient organizations, and loosing member support. The project supports the implementation of the new Law on Agricultural Sales Cooperatives. Restructuring of national and regional farmers cooperatives is managed through a participatory process in member mobilization, business planning and implementation. Cooperative reform projects in other countries have shown the importance of a comprehensive range of support over a substantial period of time in order to achieve a successful transition.

Bangladesh

Project/Program: Export diversification project and Agricultural Services Innovation and Reform Project

Main Issues: Financial and agricultural policy development, institutional and entrepreneur capacity building, market analysis for international and regional trade, cooperation with NGOs, and pioneer horticultural production and export.

The Export Diversification project gives incentives for investment in product and market development through a matching grant facility directed to exporting firms, groups of exporters and market service providers. The project aims at strengthening the skill of these entrepreneurs to create a broader export base in the country and increase private diversification initiatives. Another incentive for increased export diversification is provided through reforming trade policies and the institutional environment for export support services, for example, within Customs administration. Within the Customs reform, issues such as corruption and inefficiency in revenue collection are attacked since they constitute a major business impediment.

The Export Diversification project works to provide a sustainable base for business and export in Bangladesh, which in many ways supports the goal of the Agricultural Services Innovation and Reform project (ASIRP). The goal of the latter project is to improve the dissemination of agricultural technology, increase local involvement through decentralization and promote diversification into higher value commodities through NGOs and the use of contract farming models. The country is rice self-sufficient,

and efforts to intensify rice production are considered necessary to free up land for diversification opportunities.

The ASIRP project builds on the development made under a previous project (Agricultural Support Services project, ASSP) where a Horticultural Export Development Foundation (HORTEX) was established. The aim of HORTEX is to provide support to pioneering horticultural production and export activities. The foundation made good progress in the latter years and succeeded in exporting a first horticultural export to high quality segments of the European market. The shift to emphasize a provision of services to private initiatives instead of a function as an exporter seems to be successful. The foundation assists in market analysis, quality insurance (partly through establishing a logo as a symbol of product quality), and exports logistics, and provides training in production, grading, packaging, and quality control. HORTEX has also started to facilitate contacts with overseas interests for potential joint investments. The future focus of the foundation lies within quality monitoring and insurance of Bangladeshi produce.

During the last project (ASSP), the government of Bangladesh approved a New Agricultural Extension Policy that emphasizes a participatory extension system based on the farmers' needs and a decentralized design of extension programs. The policy encourages increased cooperation with other governmental agencies (for example, within fisheries, livestock and forestry) and NGOs, and focuses on targeting the extension-needs of women, small, marginal and landless farmers. Implementation of this policy is supported through the Innovation and Reform project (ASIRP). In extension, cooperation between governmental agencies and NGOs have been found very useful in reaching marginal and small farmers with technical advice and/or to introduce new higher value crops. It has also been found to be successful to experiment on a small-scale with full farmer participation in defining needs and designing appropriate solutions within the financial capacity of the farmers. The project focuses on three areas of concern for food security and agricultural growth; on-farm water management, soil fertility management and the use of weather monitoring for crop yield forecasting and farmer advice.

Vietnam

Project/Program: Agricultural Diversification project

Main Issues: Income and employment generation, land certificates, participatory research, NRM, and credit availability.

The overall objective of the project is to promote broad-based, private led and environmentally sustainable development to reduce poverty in the poor central highlands and coastal provinces of Vietnam. Low availability of credit, extension and other rural services in these regions together with the market instability of the main commodities rice and coffee, makes crop diversification necessary for income stability.

A smallholder crop and technical package is introduced through the project, promoting a mixture of farmed activities such as investment in rubber, livestock and food crops. Markets for rubber are relatively well established in the country, and with the comparative advantages of lower production costs compared to neighboring countries and small producers have already started to venture into planting rubber trees. The tree-crop is considered environmentally suitable for the degraded, deforested highlands and focus is put on introducing sustainable management practices for production on sloping and degraded lands, for example. Sustainable natural resource management is nationally supported by the preparation of the National Environmental Action Plan and its strengthening of regulations for land and water use. Crop and

livestock development within the project focus on diverting production from traditional crops such as coffee and rice to horticultural crops and establishing livestock fattening programs using local feedstuff. One pilot studies the potential for fruit tree development in the country's northern region, a crop that is not currently being exploited.

Smallholders in Vietnam that are normally not considered creditworthy, have in earlier projects, such as the Rural Finance project, shown as high repayment rate as those with realizable assets. The government is reforming the financial sector, for example by increasing the emphasis on longer term loans instead of shorter term credit. A directed credit-line is supplied through the project to smallholders to start up rubber-plantations and for crop and livestock development.

Although informal allocation of agricultural land is common and accepted in Vietnam, it can create land disputes. The project allocates secure long-term land use rights certificates to promote stable long-term land use, reduce land disputes and encourage investment to increase production. The land use planning and land allocation is performed through District Allocation Teams using Participatory Rural Appraisal methods in the villages. The project also focuses on strengthening institutional capacities of ethnic minority communities.

Senegal and Côte d'Ivoire

Project/Program: Agricultural Export Promotion project and Agricultural Export Promotion and Diversification project

Main Issues: Diversification of private agricultural exports, market research support (customer identification, quality requirements, and pre-export financing), partnerships with foreign businesses, and the creation of farmers associations

The two West African projects have a very similar set up with governmental support in form of an export led growth strategy with a core objective to diversify and develop private agricultural exports. The agricultural sector has in both countries a great potential for growth in nontraditional crops within horticulture, aquaculture or livestock. The production of fruits and vegetables for export has a major effect on income generation and employment in the rural sector, especially for women. An interim impact study for the project in Senegal showed that in 2000, women's share in total salary income reached 30 percent and rural men's 31 percent, while 43 percent of employment generated by these activities went to rural women and 29 percent to rural men.

The government of Senegal issued in 1995 a strategy with the main objectives to sustain agricultural growth at 4 percent per year, improve food security and increase rural employment. To achieve these goals, the government has undertaken to deregulate prices and trade on agricultural products and inputs, decentralize governmental activities and focus on public service functions such as policy formulation, regulatory functions, monitoring and evaluation. A legal framework was adopted to promote land-tenure security and private investment. The government's goal to increase exports of fruits and vegetables from 6,000 to 10,000 tons was reached in the 2001/2002 season, ahead of schedule. The project in Côte d'Ivoire focused on continued implementation of macroeconomic reforms and policies. The maritime shipping costs from Côte d'Ivoire were extremely high in comparison to other African countries due to monopolistic situations. The government of Côte d'Ivoire planned to progressively liberalize sea and air freights to promote export.

The projects were expected to reach private agricultural producers and exporters through their professional organizations and also support smaller growers of exportable crops. The anticipated benefits

were improved links between production and markets and creation of jobs while raising institutional capacity through training. Both projects also include the possibility of diversifying within traditional food crops to satisfy the growing urban demands in the two countries. The project in Côte d'Ivoire supported the establishment of an Inter-professional Group of Producers' and Exporters' Associations to generate a stronger voice for producers and exporters of small nontraditional export crops. Foreign market development, identification of customer and product requirements and a presence of a catalytic mechanism to facilitate the establishment of partnerships between local agricultural producers and foreign investors were considered as central factors for successful entry into the international markets. In a number of earlier Bank projects, failure of developing stable high-value agricultural export sectors due to lack of identification of customer and product requirements have been noted. To circumvent this, additional support was planned for the Côte d'Ivoire project within market development to establish Ivorian brands, logos and labels for packaging to streamline the identity and improve the image of Ivorian product quality. Through the National Agricultural Promotion and Diversification Fund credit was made available to small private agricultural exporters in Côte d'Ivoire.

Both projects include components to increase the efficiency of quality control and packaging facilities, for example, by rehabilitating existing fruit wharf in the Port of Abidjan in Côte d'Ivoire or upgrading of facilities for cold storage and storage capacity at the airport of Dakar. The construction of export terminal at Dakar airport, completion of which is expected in the first quarter of 2003, is another step in this direction. A facility for collective handling of fruits and vegetables is also being implemented through an innovative approach based on four independent units, private management and a progressive lease structure based on sales. Additionally, the project in Senegal promotes a procedure of quality control introducing the principles of Hazard Analysis Critical Control Points (HACCP) to producers in the country through workshops and study tours overseas. The HACCP principles include preventive measures such as safe use and disposal of pesticides all along the supply chain. These quality procedures could be used as a foundation for the establishment of a privately managed "Origine Senegal" quality label.

Both projects also incorporated the importance of increasing the transfer of pricing and emerging market information through strengthening and/or supporting creation of producer organizations. Training and support to streamline these organizations was sought to empower them in effective lobbying within specific trade or land tenure issues. Producer and exporter organizations were also invited in the Senegal project to provide advice in project execution, monitoring, and evaluation through the establishment of thematic technical committees.