U.S. Agency for International Development

Mali Mission

Initiative to End Hunger in Africa

Revised Action Plan
(FY 03 – FY 08)

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Executive Summary

This Action Plan sets forth USAID/Mali's strategy and plan for the first six-year period (FY03 to FY08) of the Initiative to End Hunger in Africa (IEHA). The preparation of this Action Plan represents the first step in implementing IEHA in Mali, and serves as the basis for selection of the first IEHA initiatives to be funded in FY03, as well as maps a strategy for IEHA during the first six years.

The Action Plan focuses on the six core themes of IEHA:

- Advancing scientific and technological applications and support services that harness the power of new technology (e.g., information technology and biotechnology) and global markets to raise agricultural productivity, create agriculture-based enterprises and support sustainable land use management.

- Improving the efficiency of, and participation in, agricultural trade and market systems for major African products in local, sub-regional and international markets and the integration of African countries into global markets for agricultural goods and services.

- Promoting and strengthening community-based producer organizations to help link business and farmers to create new opportunities that add value, raise incomes, deliver services and increase the participation of the rural majority in decision-making processes.

- Building the human and institutional capacity to shape and lead the policy and research, as well as provide agricultural education.

- Integrating vulnerable groups and countries in transition into sustainable development processes.

- Strengthening environmental management to: a) conserve and foster the production of environmental goods and services that contribute to economic growth; and b) make agricultural production and water management environmentally sustainable.

The first two core areas just described will receive the most emphasis for several reasons: first because of their intrinsic importance as drivers of agricultural growth, secondly because they have been designated as key areas under the President's Initiative to End Hunger in Africa, and thirdly because some of the initial funding for IEHA comes from earmarked or otherwise restricted sources that relate to those two areas.

This Action plans first presents the major features of Mali's macro and agricultural economy, USAID Mali's vision of agricultural growth to end hunger, the mission's strategic objective of accelerating agriculture-led economic growth, current investments in agricultural growth and the priority investments planned. It discusses the activities being implemented by the government and other donors to combat hunger as well as the coordination between the bilateral mission and the West Africa Regional Program. The Mali Action Plan concludes with an implementation plan that covers funding, staffing and procurement issues.

Mali's Macro and Agricultural Economy

Mali is one of the poorest countries in West Africa, with more than 70 percent of its roughly 11 million people living under the poverty line of less than one dollar per day. It is home to a largely rural population, dependent on agriculture for both food and income. Poverty is largely a rural phenomenon, with the overall rural poverty rate of 76 percent much higher than the urban rate of 30 percent. However, Mali has experienced moderate population growth with economic growth at about the same level for several decades, leading to long-term economic stagnation (per capita GDP under $275 USD). Agriculture is Mali's largest industry and offers the greatest potential for growth that will cut hunger and increase rural incomes. Major agricultural commodities produced include cotton lint, cattle, sheep, rice, millet, sorghum, maize and groundnuts. Most of these commodities are produced under rainfed agricultural conditions, making Mali a high-risk, low productivity agricultural country. The value of agricultural exports has remained fairly stable over the last decade at around $250 million, peaking at $300 million in 1996 (after the CFA Franc devaluation in January 1994). In accordance with IEHA themes, increasing access to improved science and technology to boost agricultural productivity, combined with strengthened agricultural markets and support for an increase in the volume of trade will result in a large positive impact on the well-being of Mali's vulnerable rural population, and on the economic health of the country as a whole.

USAID Mali's Vision of agricultural growth to end hunger

Cutting hunger requires that poverty decrease. Without increased incomes, the poor cannot sustainably increase their food intake and improve their nutrition. In Mali, with such a high proportion of the population living in rural areas, the increased economic growth that would support higher incomes cannot take place without growth in agricultural output per capita. Increased output per person leads to higher incomes in the agricultural sector: farming households find themselves better off.

These households mostly spend their extra income locally, thus creating an important indirect or "multiplier" effect. As they become less poor, family members do less work and children go to school, so they hire farm laborers and maids who would otherwise be unemployed or underemployed. They also support a range of off-farm enterprises selling goods and services, such as well construction, agricultural tools, clothes and market trade. Households benefiting from this indirect effect are not necessarily a minority: Mellor estimates that if Mali's agricultural sector were to grow at 5.6 percent, approximately half Mali's employment growth would take place in the rural off-farm sector.[1]

Agricultural growth generates more and cheaper food for the domestic population and for export, and also provides inputs for agribusiness, which may take place in urban areas. Exports of some raw and processed agricultural commodities (and import substitution of others) free up foreign exchange for the import of strategic industrial and capital goods. In this way, not only does agricultural growth benefit only the rural sector: studies show that it also brings about poverty

[1] J. Mellor 2002 "Agricultural strategy and poverty reduction in Mali" *Mali agricultural sector assessment, volume #2: in-depth analyses and supporting materials* Abt Associates Inc. for USAID/Mali, contract number PCE-I-0099-00033-00, task order 802, 18-24

reduction in urban areas (whereas urban growth does not alleviate poverty in rural areas).[2] Thus, not only is agricultural growth imperative to achieve overall economic growth and poverty reduction, it has an economy-wide pro-poor bias, allowing some of those living under the poverty line to rise above it.

As limited space exists for extensive growth of Malian agriculture, accelerating economic growth requires growth in agricultural productivity. This requires a mix of demand-driven agricultural research to generate more efficient technologies, extension mechanisms that "sell" improved technologies to the farmer, credit to finance the inputs to improved agriculture, and efficient and well-capitalized marketing services. It also requires policies that enable the link between research gains, yield increases, economic growth, and the consequent poverty reduction and nutrition improvement. Analysis across countries shows a strong statistical relation between increasing agricultural productivity, decreasing poverty and ending hunger.

If agricultural growth will contribute most to ending hunger in Mali, which agricultural sectors will generate most of this growth? Mellor (2002) notes growth in the value of the output of tradeable agricultural commodities will probably exceed that in the growth of non-tradeables. Mali's comparative advantage in non-tradeables is limited at best to just beyond its own borders, whereas its comparative advantage in tradeables extends to significant parts of other countries and, in some cases, outside West Africa. Thus the demand for non-tradeables is limited by domestic demand but the demand for tradeables is, in theory, limited only by the rate at which Mali can increase production while still maintaining its comparative advantage.

The Country Strategy and agricultural investments and gaps

In May 2002, USAID/Mali published its *Country strategic plan FY 2003-2012*, with five strategic objectives (SOs):

SO6: High-impact health services
SO7: Improved quality of basic education
SO8: Shared governance through decentralization
SO9: Accelerated economic growth (AEG)
SO10: Communications for development

Strategic objective 9, *to increase productivity and incomes in selected agricultural subsectors*, is directly relevant to IEHA. It has funding of $5.2 million in FY 2003 and $11.0 million for FY 2004 – 2007. It focuses on three intermediate results (IRs):

IR1: sustainable production of selected agricultural products in targeted areas increased
IR2: trade of selected agricultural products increased
IR3: access to finance increased

SO9 of USAID/Mali's CSP is largely consistent with IEHA. Its IRs 1 & 2 correspond closely to pillars 1 & 2 of IEHA in their basic thrust, and are operationalized in a way that largely corresponds to IEHA's other pillars. Substantial parts of IR3 supports pillars 2 & 4 of IEHA.

[2] For a summary of the literature, see C. Thirtle et a. 2002. *Relationship between changes in agricultural productivity and the incidence of poverty in developing countries* DFID report no. 7946

The AEG team chose these three foci in the light of a comprehensive *Agricultural sector assessment* completed in March 2002. This assessment recommended major interventions in:

1. irrigation
2. improved multiplication, dissemination and demonstration of seed
3. cost-sharing and/or equity funds to promote investment in the agricultural sector
4. animal feeding
5. policy analysis to achieve Malian and USAID objectives.

More tentatively, it recommended interventions in:

1. rice and cotton
2. horticultural crops
3. oilseeds

In general, the assessment emphasized the need for both increased agricultural productivity and risk reduction in agricultural development.

The *Agricultural sector assessment* provided a framework for SO9 that is IEHA-compliant, in that its primary thrusts include science and technology (improvements in irrigation technology, seed technology and animal nutrition) and markets and trade (continuation of the Agribusiness Center and of the market information system for agricultural commodities, both currently funded by USAID, and promotion of microfinance activities) . In addition, the assessment reinforces the need for smallholder-focused programs to reduce poverty and cut hunger, strongly supports human capacity-building, a central role for women in agriculture, and environmental sustainability. In effect, the assessment played the role of a pre-IEHA study for AEG. Most of its recommendations for investment could be funded by either CSP or IEHA.

In structuring its CSP portfolio in May 2002, USAID/Mali did not feel able to undertake all the assessment's proposed activities within its foreseen budget. Thus the CSP does not deal with developments in the seed sector or construction of infrastructure for agricultural marketing both of which meet IEHA criteria and could therefore benefit from IEHA funding.

Though the assessment considers agricultural research "very important" for the future gains in agricultural productivity that it considers essential for poverty reduction, it remains largely mute on the specific subject of biotechnology and its relationship to the seed sector. In principle, this will be covered, like other agricultural research, by the World-Bank-funded PASAOP project. However, on the one hand, the Malian agricultural research institute (IER) has already approached USAID for funding to develop a biotechnology capacity and, on the other, USAID is aware the US has a strong comparative advantage in biotechnology. It therefore seems that, in this case, it would be appropriate for the AEG team to go beyond its IR1 commitments in meeting IEHA's science & technology goals through supporting biotechnology to support the seed sector initially.

Though the assessment emphasizes the importance of the development of irrigation technology, rather than making specific recommendations for irrigation activities, it suggests a separate irrigation study, which took place in October 2002. One of the main findings of the irrigation study was the socio-economic situation, particularly with respect to land tenure, in the capital-intensive *Office du Niger* (ON) irrigation schemes responsible for most of the impressive growth in Mali's rice production since 1994. The study's authors recommend proceeding with caution,

and in tandem with an ON donor group, in ON investments until these issues are resolved. Outside ON, various less capital-intensive investments appear attractive in terms of return to capital. They also appear to have fewer land-tenure problems, and women would probably benefit proportionally more from these investments than in ON. As the scope for irrigated agricultural production is vast, and as even the less capital-intensive schemes can absorb USAID's entire budget many times over, it would be appropriate if the AEG team added to its irrigation investment through some allocation of IEHA funds to less capital-intensive irrigation.

Table 1 summarizes the AEG portfolio under the CSP and food-aid-funded programs relative to IEHA Pillars.

Table 1. USAID SO9 activities by IEHA pillars

	USAID SO9 activities under the May 2000 *Country strategic plan*	**Primary area of impact**					
		Science & tech-nology	**Agri-cultural trade & market systems**	**Strengthening producer organizations**	**Human capacity & infra-structure**	**Vulne-rable groups**	**Sustainable environ-mental management**
1	IR1 – agricultural production						
2	IR2a – increased access to export markets for Malian products						
3	IR2b – enhanced competitiveness of the Malian private sector						
3	IR3a – strengthened financial services for SMEs						
4	IR3b – developed investment promotion skills						
5	IR3c – microfinance training						
6	Food-aid-funded programs						

Codes Blank = No Grey = Yes

Notes:

1) Although the AEG team's program does not target vulnerable groups as such, it has responsibility for the former special program for northern Mali, a particularly poor area, and it mainstreams women in all its activities.
2) Greater specificity for IR1 will become available when the Mission releases the RFP for IR1; the detail at the "performance requirement" level for IR2 and IR3 is taken from the corresponding RFPs.

Given that the Mission just completed its CSP design exercise but not yet identified specific sites that it will fund under the CSP, the Action Plan recommends applying IEHA funds to augment the number of activities that target smallholders. The list of investments presented below as candidates for IEHA funding exclude some that would otherwise have been included but which the Mission has decided to fund under the CSP. This limits the number presented for consideration.

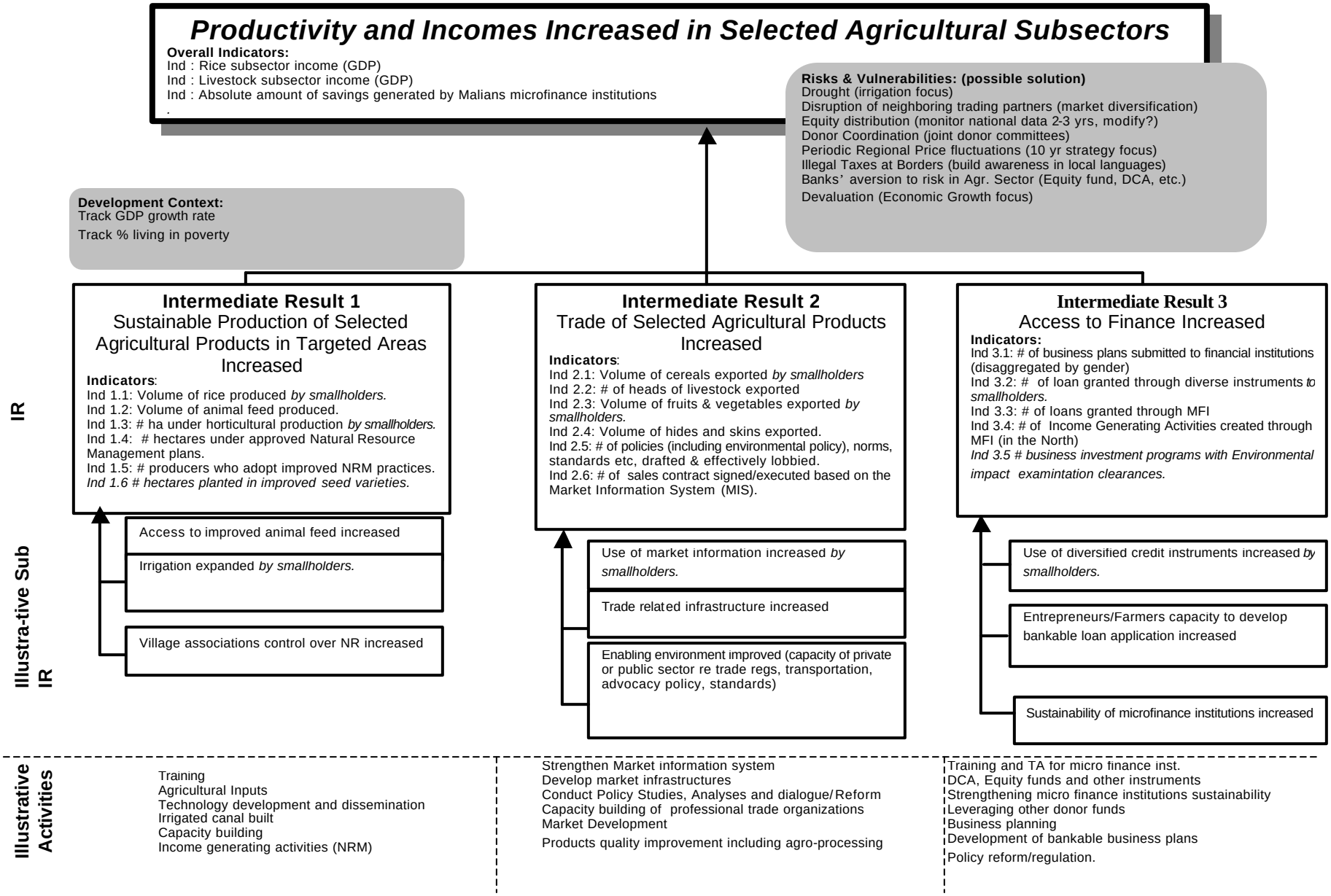
Proposed Modifications to Current Strategy to Enhance the Achievement of IEHA Pillars

In the course of preparing this IEHA Action Plan, the AEG (SO9) team reviewed the current Strategic Objective to determine whether it needed to be modified in order to achieve the objectives of IEHA. The team realized that in order to achieve the IEHA vision there would need to be sustained economic growth resulting in increased incomes for smallholder producers in Mali. In order to enhance the current strategy's ability to achieve the IEHA vision the current strategy would need to place more deliberate focus on the needs of the smallholder. The seed sector was identified as an area in need of strengthening. This increased emphasis on the smallholder was determined to be necessary within each of the current Intermediate Results of the SO9. It was determined that more specific emphasis would be placed on the identification and enhancement of technological innovations which would target the integration of the smallholder in both irrigated agricultural production, regional trade promotion as well as access to financial services. Thus, in the initial years, at least, the strategy will achieve IEHA objectives by adjustment rather than radical re-design of activities. Implementation partners in the new strategy will be encouraged to adjust their focus and expand the scope of their activities to meet the goals of IEHA.

Figure 2 shows the results framework for SO9, providing details of its IRs and sub-IRs, the indicators proposed, and some illustrative activities. The major SO9 targets are significant increases in rice subsector income, in livestock subsector income, and in absolute microfinance savings. *(note: additions to the original strategic framework proposed to enhance the achievement of the objectives of IEHA are indicated in italics.)*

AEG staff will liaise with the Mission's SO6 – High-impact health services – on HIV/AIDS, which is an important cross-cutting issue for IEHA. The AEG team will also liaise with the West African Regional Program (WARP), and initial meetings on IEHA have taken place, notably at WARP's IEHA workshop in December 2002.

Figure 2: USAID/Mali SO9 results framework



Priority investments proposed under IEHA

Given that the Mission just finished its CSP design exercise but not yet fine tuned the activities that it will fund under CSP and given the similarity of the CSP and IEHA foci, the Mission has flexibility in choosing funding for given activities. The list of investments presented below as candidates for IEHA funding have been chosen because they expand the activities planned under the CSP both geographically and in terms of the number of people that will be reached.

Examination of the needs for action by pillar reveals the following:

Small-scale irrigation expansion

Mali has a huge undeveloped irrigation potential. Less than 8 percent of the irrigation potential is exploited. As a consequence, Mali's agriculture is mainly rainfed, low productivity and very risky. Food deficits and malnutrition are experienced each year in many places within the country, specifically in areas far away from river basins. The construction of infrastructures in small inland valley basins using IEHA funds will increase the area under irrigation, and the development of smallholder and women-led farming enterprises. Complementing investments in small-scale irrigation are efforts to (a) ensure secure land tenure for those farming irrigated land, (b) avoid delays due to inadequate environmental impact analyses, and (c) promote post-harvest activities.

Harnessing agricultural technologies for small farmers

The Mali CSP Strategy is primarily focused on increased irrigated agricultural production for those commodities for which Mali has a regional comparative advantage i.e. rice, horticulture, etc. With supplementary IEHA funding the Mission will place strategic emphasis on making available technologies which will enhance the Production and Trade of those commodities with particular focus on small farmers and small farmer producer groups including women. This emphasis will focus on the identification and adaptation of existing (on the shelf) technologies in order to increase the accessibility of these improved technologies to the smaller producer. Emphasis will be placed on production, irrigation, processing, and marketing of those commodities produced by small farmers to increase impact. In addition, technological advances and applications in communication, as it applies to the effective market integration of the small producer, will be of particular focus. The accessibility and awareness of the smaller producers and producer groups of technological advances in plant varieties, post harvest handling, milling, storage, shipping, packaging, etc, will enhance the market integration of these groups.

In order to specifically improve accessibility and awareness of the smaller producer to new improved plant varieties coming about through biotechnological applications, a biotechnology initiative under this action plan will be centered around the following: a) biotechnology policy development and enforcement; b) biotechnology capacity-building; c) use of varieties and techniques for pest management; d) biotechnology research infrastructure development. Efforts in the area of biotechnology legislation will allow Malian producers to take advantage of biotechnological advances achieved in plant varieties. The initial phase of the biotechnology program under this action plan will focus more on the creation of a sound policy environment

relative to plant biosafety regulations allowing the field testing and demonstration of improved varieties for small producers. The Mission has $0.5 million allocated for biotechnology support but this will not suffice for a full program that would initially involve support for biosafety and Intellectual Property Rights legislation preparation, including public discussion of the options. In collaboration with EGAT (AID/Washington), a biotechnology assessment in Mali was conducted in March 2003 and longer term future Mali biotechnology strategic options will be identified to enhance production of both the small and large producer groups.

Seed multiplication and dissemination

The purpose of this activity is to enhance the availability of existing improved seeds from the shelf to producers in order to increase farm productivity and production. The focus of this activity will be on both the profit-making seed multiplication sector and the non-commercial seed testing and diffusion. Support from the African Development Bank (ADB) to the National Seed Service (SSN) creates several opportunities for complementary activities. ADB will finance SSN's facilitation of seed production in Mali but will not finance the extra burden of production of foundation seed that has been transferred to the agricultural research institute (IER), will not stimulate demand for improved seed, will not build existing businesses into successful seed businesses, will not ensure that the National Agricultural Directorate (DNAMR) will have the resources to identify and nurture producers' associations most likely to succeed in production of commercial seed, and will not include fodder-crop seeds. IEHA funds will serve to fund such activities.

Support to agribusiness

Agribusiness needs in Mali are numerous and broad in scope. IEHA funds will enable Mali to strengthen and broaden the activities already planned under the 2003-2012 Country Strategy to specifically focus on smallholder integration. The agribusiness support program will cover a range of activities which include: widening the range of products covered by the market information system; diffusion of regional trade information, e.g. OHADA details, provision of news of business opportunities; business support services related to seed production; policy analysis and outreach on linkages between export-led agriculture growth and poverty alleviation; technical degree training for the next generation of agro-entrepreneurs at the University of Mali's Agricultural School, and other support services. This support would go not only to individual business persons and classic companies but also to cooperative business organizations.

Support for Analytical Studies and Assessments

Comparative Analyses of Investment Options. Study to look more closely at what investments in other subsectors might have the most pronounced impact on rural incomes (smallholders) and agricultural growth; i.e. investments in improving the trade capacity and market infrastructure or investments in raising farm productivity. Not an either or set of investments but rather what is the best balance to get the largest impact, this type of analysis is critical.

1. Examine the possibilities for development of Malian horticultural crops. Mali produces a wide range of horticultural crops, and there is potential to expand some of them both for

domestic and export markets, particularly in the West Africa region. Much of the horticultural crop production is done by women, so there is considerable potential for expanding this source of women's income. Expanding water availability will be needed to achieve significant productivity gains in this area. (Ag sector assessment, v.2, ix)

2. Determine the potential to expand oilseed production. Groundnuts have potential but only if aflatoxin problems can be solved. Shea butter could be expanded both for domestic, regional and international markets. Assistance will be needed in adapting improved varieties, improving processing technology, and ensuring standards and quality. Both peanuts and shea offer significant income potential for women. (Ag sector assessment, v.2, ix)
3. Study the structure of linkages from agricultural growth in Mali to other sectors of the economy (backward, forward, consumption, fiscal, employment). Understanding the nature of these linkages is critical for an understanding of how growth in the agricultural sector (e.g. through export promotion) affect employment and income in other sectors – particularly the generation of jobs for the poor. (Ag sector assessment, v.2, x)
4. Analyze public finance issues at the commune and cercle level – How to effectively tap resources from increased agricultural productivity for investment in health and education infrastructure? If increased agricultural productivity is to lead to better health, nutrition, education and the like at the local level, some of that growth must be tapped and reinvested in programs aimed at promoting those goals. In the context of decentralization, there is a great need to examine ways that local governments can develop sustainable financing mechanisms for these programs, fuelled by the increased local incomes coming from higher agricultural productivity. (Ag sector assessment, v.2, x)

Environmental Impact Assessment and Environmental Audit Capacity

Considerable potential public/private investment opportunities (Schaffer Sugar Factory, Tannery Factory, irrigation infrastructure expansion, etc) have already been delayed and/or stopped because of the GRM's inability to carry and/or audit assessments to support its 1999 environmental protection laws. Complementing investments already made by other donors (GTZ, etc) will greatly enhance and speed up the desperately needed capability to assess potential investments against the environmental protection laws and allow such investments to go forward in an environmentally sustainable manner. Other projects that will have positive impacts on the environment that will be complementary to USAID/Mali's activities will be considered.

Stakeholder consultation and Donor coordination

The design of this action plan involved numerous consultations with government entities, private sector actors and donors. The "Mali National Committee of the U.S.-Africa Partnership to Cut Hunger in Africa" was a key partner in defining strategic options to cut hunger in Mali. This committee included representatives from the government's ministries in charge of agricultural development, industry and commerce, the NGO community, the private sector consulting firms. Drawing on the extensive work and documentation produced by this committee and other consultant reports of USAID Mali, Abt. Associates Inc. conducted , under the AICHA task order,

an overview of this material, held discussions with other donors and recommended investment options to USAID Mali. These investment options are covered in more detail in the core text of this action plan.

In Mali, vulnerable groups include women and children. Many farming and agro-processing activities are the responsibility of women who are also responsible for the health, nutrition and general care of children. Horticultural production, peanut and sesame production, and many value-added activities are the near-exclusive domain of women. As mentioned above, in Mali, IEHA will mainstream women in its activities, though it may also choose to go further and fund activities in which women traditionally dominate.

Coordination with WARP, Regional Trade Hub, and the Region

The collaboration and coordination between USAID Mali and the West Africa Regional Program (WARP) will evolve primarily around two areas. First, in the area of West African economic integration, the Trade Hub will collaborate with bilateral missions on issues related to increased trade opportunities offered by the AGOA, WTO and the regional trade agreements (WAEMU and ECOWAS). This will involve activities such as trade barrier reduction, development of sanitary and phytosanitary standards and practices, customs reform and harmonization, banking and accounting procedures and trade capacity building. Secondly, USAID Mali and WARP collaboration will evolve around the issues of food security and environmental protection. Community participation in program development and implementation regarding famine prevention and environmental management will be emphasized under the Accelerated Economic Growth strategic objective, but more specifically under the IEHA program. In this respect, the activities of CILSS will be closely monitored by the WARP and the AEG teams. These activities include the famine early warning system, production and dissemination of agricultural information and statistics, environmental and economic policies.

It is critical that the activities implemented under the activities of the West African Trade Hub (WATH) and the Mali IEHA Action Plan be well coordinated. Since markets and trade play a vital role in IEHA and agriculture products for which Mali has regional comparative advantage are a primary focus of the Mali IEHA Action Plan, the two initiatives overlap. Many of the activities of the planned Hub will impact on programs of the Mali IEHA Action Plan and CSP as well as other Missions throughout the region. For instance, under WATH technical assistance will be provided to strategically assess export markets. Clearly this will include agricultural products for which Mali has a regional comparative advantage either processed or semi-processed i.e. rice, horticulture, etc. Support to regional and national organizations will further IEHA's goals if business, traders, and/or producer organizations in Mali receive assistance under the Hub activities. Regional inter-governmental organizations like ECOWAS, WAEMU and CILSS will also play a critical role in each of the initiatives. Perhaps the most immediate impact and agriculture/trade overlap between the Hub's IEHA activities and Mali IEHA's activities in this regard will be in regionally coordinated training and forums for trade information exchange and coordination. As is already envisioned under the Hub initiatives, critical emphasis will be place on regional work planning among not only the Hub and USAID Mali but all other critical national players in the region.

USAID Mali has strategically supported the market information system (MIS) in Mali for many years. Early on the Mission realized that support for the MIS would only go as far as the borders and began funding the PASIDMA project. The purpose of the PASIDMA project is specifically to collect and distribute market information to neighboring West African countries. Primary focus and coordination in the reinforcement of existing national MISs and supporting the setting up of national MISs in countries where they do not exist will be critical strengthening effort of the Hub program to the Mali MIS system.

Implementation Plan

IEHA Action Plan will represent a significant increase in the size of USAID/Mali's Accelerated Economic Growth Program. Under the new CSP currently, the Office can be envisioned to be composed of three to five units. These include: Production Unit, consisting of two FSNs; Trade Unit, consisting of one FSN; Finance Unit, consisting of one FSN, Environmental Unit; consisting of one FSN, North Program Unit; consisting of one FSN, and two Administrative Assistants.

In addition, the office is managed by a USDH Agriculture Officer and one USPSC.

Once the outstanding DA-funded procurements are awarded, this staff will be charged with implementing a DA portfolio consisting of 8 projects and totaling up to $15 million per year.

The administrative workload entailed by the IEHA program will depend upon: (1) the actual level of funding ultimately received; and (2) whether existing procurement mechanisms can be amended to absorb the additional funding. Obviously, the need to establish additional stand-alone projects will be more administratively burdensome than expanding the scale of existing contracts and agreements. USAID/Mali will be taking advantage of the availability of personnel support from the central IEHA Program. Specifically, the Mali Mission will receive funding for a PASA agricultural specialist for the entire period of IEHA. The USAID Mission will recruit this individual.

If the Mission's IEHA program is funded at the envisioned level, additional FSN and/or locally-hired US PSC staff would be required. The number of additional personnel would depend upon the ultimate scope and nature of the program, as well as whether the implementation of the IEHA program requires separate stand-alone contracts and cooperative agreements.

Procurement Mechanisms

Tentatively, various mechanisms will be used to implement the Mali IEHA Action Plan. A first possibility will be to include in the current requests for proposals for the implementation of the new country strategy of accelerating economic growth, some activities planned under the IEHA program that have direct impact on selected components of the strategy. In this respect, activities related to seed multiplication, biotechnology and small inland valley irrigation have been included in the request for proposal to implement the "Production" component of the accelerated economic growth strategy. This should permit rapid start-up of IEHA activities. Secondly, some IEHA activities could be implemented through buy-in to a centrally-funded cooperative agreement like the Food Security III cooperative agreement under EGAT. A third

possibility would be to implement activities through contracts directly managed by USAID Mali or a government ministry. Capacity development and participant training would be supported through centrally-managed projects or under USAID/Mali instruments. USAID/Mali envisions using a combination of these approaches to implement this action plan.

Geographic Focus

The 2003-2012 USAID/Mali Country Strategic Plan has made a strong commitment to increase linkages and synergies throughout the full range of four strategic objectives and one special objective. This will be achieved through geographic focus, and by establishing substantive programmatic relationships – between the five strategic objectives and between the activities pursued under each.

In the context of geographic focus, IEHA will support the activities pursued under USAID/Mali's strategy. The Mission has particular interest in launching IEHA activities in Mopti because it has been a food deficit region for each of the past ten years – the only region of Mali (including the North) to have this record.

Synergies

The IEHA activities will be implemented in close coordination with all of the other USAID/Mali strategic objectives. These include Education, Health, Democratic Governance, and Communications for Development in order to increase impact. For example, the Communications for Development team will be able to provide technical expertise in required radio communications so that information pertaining to new technology will reach the maximum number of farmers.

Gender

Gender considerations and their integration is a major crosscutting issue for the 2003-2012 USAID/Mali strategy. Because of the critical role of women in off-season gardening, small ruminant animal husbandry, *bas-fonds*, irrigation activities, and food processing as well as their traditional role in family nutrition, all efforts will be made to increase and improve their involvement and participation in activities undertaken under IEHA.

Introduction

This Action Plan sets forth USAID/Mali's strategy and plan for the first six years of the Initiative to End Hunger in Africa (IEHA).

IEHA originated in the global recognition that hunger in Africa is one of the most significant development challenges facing the world today. The primary goal of IEHA is to rapidly and sustainably increase agricultural growth and rural incomes in sub-Saharan Africa. The agricultural sector is especially important because agriculture is the primary source of employment for an estimated 70 percent of the African population and low per capita incomes are closely correlated with both poverty and hunger.

The commitment of the U.S. Agency for International Development (USAID) to implementing the initiative stems from the recognition that clear political and technical options for reversing the trends of hunger and poverty in Africa now exist. The initiative recognizes that success requires sustained investments in agricultural-based policies, strategies, and programs, in conjunction with improvements in health, education, infrastructure, environment and public policy.

The initiative calls for a partnership with African leaders and governments to work and invest in a smallholder-oriented agricultural growth strategy. Since significant domestic and foreign investment from the private sector is also necessary, the conditions to attract and support private investment need to be established and maintained. IEHA was announced as a Presidential initiative, and is managed by the Africa Bureau of USAID/Washington in collaboration with its Economic Growth, Agriculture and Trade (EGAT) Bureau.

The USAID funding requested to support the Initiative to End Hunger in Africa is $200 million per year to 2015. This will complement and be in addition to the core funding allocated to the Africa Bureau's agricultural portfolio. At the current time, the initiative is only partially funded and will provide start-up funding for one bilateral mission per region as well as for the three regional missions.

Implementation at full funding levels will be focused on three priority countries in each sub-region (Eastern Africa, Southern Africa, West Africa). Mali, Mozambique and Uganda have been selected for initial FYO3 funding. Ghana and Nigeria are likely to be the other two priority countries within West Africa, but in those cases IEHA activities are not slated to begin until FY04 funding becomes available. IEHA work at the sub-regional level will be coordinated and largely carried out by the three USAID regional missions in Africa (the West African Regional Program in Mali/Ghana, the Regional Economic Development and Services Office for East and Southern Africa based in Nairobi, and the Regional Center for Southern Africa in Botswana), but they will act in close coordination with bilateral missions and an array of development partners at the regional and national level.

All Action Plans are expected to:

- Create a coordinated sub-regional (multi-country) momentum and dynamic to induce and encourage agricultural growth.
- Support the efforts of and partner with countries and leaders committed to agricultural growth as a critical development pathway.
- Identify and target development options and opportunities to accelerate rural smallholder-based agricultural growth, leading to more efficient use of resources.
- Build effective linkages with other sectors and initiatives, including education, health (HIV/AIDS, diarrhea, and malaria prevention), macroeconomic reform, and infrastructure to achieve economic and social development objectives common to everyone.
- Build alliances and a broad-based political and financial commitment among development partners, public and private, in Africa and internationally, to cut hunger in half—and stay the course to achieve this by 2015.

Background

Major Features of Mali's Macro and Agricultural Economy[3]

With 43 percent of children under the age of five malnourished, Mali has the highest rate of childhood malnutrition in West Africa, with the majority of its West African neighbors posting rates between 18 and 30 percent. However, data for the last decade reveal that more than 20 percent of Mali's adult population is undernourished; a figure that is lower than many other West African countries and has dropped nearly six percent since 1980. Mali still has a relatively low prevalence of population living with HIV/AIDS. At 2 percent of the adult population, the epidemic is far from the rate of 10 percent for sub-Saharan Africa as a whole. Recent research however indicates that Mali is at risk of rapid acceleration and incidence rates if immediate action is not taken. Agriculture workers have specifically been identified as a group requiring focused attention.

Mali's population continues to grow, at an annual rate of roughly 2.5 percent. Roughly 70 percent of Mali's population is located in rural areas, with 30 percent of the population in urban areas. The urban share of Mali's population has experienced growth at a fairly stable rate averaging 2.55 percent since 1961. However, it remains a largely agrarian economy with agriculture accounting for nearly 46 percent of total GDP in 2000; total GDP was roughly $3.1 billion in 2000, and agricultural GDP was approximately $1.4 billion.[4] Agricultural GDP grew 4.8 percent per year between 1991 and 2000.

Mali is landlocked and can be divided into three natural zones: the southern, cultivated Sudanese; the central, semiarid Sahelian; and the northern, arid Saharan. Of Mali's total 1.24 million square kilometer territory, four percent is considered arable land.[5] Extensive production systems dominate: land productivity is one of the lowest in West Africa, with agricultural output per hectare totaling $39 in 2000, far lower than the average for West Africa of $109.

[3] All data referred this section, unless otherwise noted, is available in the tables found in the Annex.
[4] Amount in constant 1995 USD.
[5] CIA World Fact Book, 2002. Available: http://www.cia.gov/cia/publications/factbook/geos/ml.html.

In 2000, the share of agricultural labor in total labor was 81 percent. Labor productivity is also one of the lowest in West Africa, at $286 of agricultural output per agricultural worker in 2000, compared to the West Africa average of $612. The value of agricultural production has grown at a rate of 2.85 percent annually over the last four decades; the value of crop production has grown at a rate of 3.45 percent, while the value of livestock production has grown at a rate of 2.12 percent over the same period. Remember that, over this period, population growth has equaled 2.5 percent annually.

Major commodities produced include cotton lint, cattle, rice, millet, groundnuts, sorghum and sheep, in decreasing order of production. The value of agricultural exports has remained fairly stable over the last decade at around $250 million, peaking at $300 million in 1996. The European Union is far and away the largest importer of Malian food exports and accounts for roughly 75 percent of Malian fruit and vegetable exports, with the remaining 25 percent exported primarily to other African countries. Asia accounts for nearly half of all Malian exports of "cash commodities", followed by the European Union which accounts for roughly another 30 percent. Mali's export growth per year follows fluctuation patterns for global and developing country growth in exports, falling from roughly ten percent in 1990 to zero percent in 2000.

In summary, Mali is one of the poorest countries in West Africa, and has experienced population growth with economic growth at about the same level for several decades, leading to long-term economic stagnation. It is home to a largely rural population, dependent on agriculture for both food and income. Agriculture is Mali's largest industry and offers the greatest potential for growth that will cut hunger and increase rural incomes. In accordance with IEHA themes, increasing access to improved science and technology to boost agricultural productivity, combined with strengthened agricultural markets and support for an increase in the volume of trade will result in a large positive impact on the well-being of Mali's vulnerable rural population, and on the economic health of the country as a whole.

The following sections will provide USAID/Mali's vision for increased agricultural growth to end hunger, address the current landscape in Mali with respect to the six primary IEHA themes, and provide the analysis for the identification of potential interventions to be funded by IEHA, and their ultimate selection for inclusion in this Action Plan.

USAID/Mali's vision of increased agricultural growth to end hunger

Table 1 displays the value of groupings of Mali's top ten crops and top ten livestock products into those that are considered tradeable and those considered non-tradeable. Together they account for 95 percent of the value of national agricultural output. The groupings into commodity type are crude because they force crops into one category whereas each might have two distinct components, one tradeable and the other non-tradeable. However, table 2 gives a broad idea of the distribution of the different types of commodity.

Table 2
Groupings of Mali's top ten crops and top ten livestock commodities by value

Commodity type	Commodity	Share (%)		Growth rate (% per annum)
tradeable crops	Cotton lint	17	**26**[1]	**7**
	Rice, paddy	10		
non-tradeable crops	Millet	9	**31**	**4**
	Sorghum	5		
	Maize	4		
	Other[2]	13		
tradeable livestock	Beef and veal	15	**24**	**6**
	Goat meat	5		
	Mutton and lamb	4		
non-tradeable livestock[3]		15	**15**	**6**
Total[4]		**95**	**95**	**5**

Sources: FAOSTAT 2002 for shares, Mellor (2002) for estimated growth rates

Notes:

1. Shares of commodity types may not equal the sum of the shares of the corresponding commodities, due to rounding.
2. "Other" non-tradeable crops include, in order of decreasing importance: groundnut, fresh vegetables, cow peas, cotton-seed cake, sheanuts
3. "Non-tradeable livestock" includes, in order of decreasing importance: goat milk, cow milk, chicken meat, sheep milk, game meat, camel meat, hen eggs
4. Mellor also gives a growth rate for forest products (2 percent), ignored here though they constitutes 4 percent of agricultural GDP.

The right-hand column of Table 2 gives Mellor's estimate of growth rates for each commodity type. These are conjectural but the orders of magnitude are probably correct and this column serves to emphasise where high growth is likely to occur.

To maximize economic growth that will reduce poverty and hunger, USAID/Mali should concentrate its efforts in the area of tradeable commodities. Among tradeable crops, cotton dominates, with almost a fifth of the value of national agricultural production. Other donors, particularly France and the World Bank, have historically provided technical and financial support to CMDT, the monopsonistic cotton parastatal. In the context of ongoing pressure for the Malian government to sell its ownership stake, and following a recent scandal that revealed poor management, there is pressure for significant restructuring. As long as other donors and lenders continue to provide satisfactory levels of support to the cotton sector, there seems little point in USAID moving into a technical area in which it has scant expertise. In addition, though USAID may have appropriate skills and experience to offer in institutional restructuring and full privatization, such activity would probably not meet IEHA criteria as well as some other activities.

Malian rice production has undergone significant growth over the 1990s to reach a tenth of the value of agricultural output. Thanks to this growth, over a third of Mali's cereal production no longer depends on risky rainfed production of coarse cereals. Indeed, Mali now exports rice to neighboring countries. Most of this production comes from the large-scale capital-intensive

irrigation perimeters of the *Office du Niger* (ON) which account for much of the big production increases over the last decade. Despite the undisputed contribution ON has made to large, low-risk increases in rice production, it has a range of technical, social, economic and environmental problems that have recently made donors wary of supporting it without fundamental change in the way in which it operates. In addition, at least until some of these problems have been solved, the comparative advantage of rice produced under such capital-intensive conditions is suspect if the cost of the infrastructure is included. (Barry et al. 1998) A donor group works with the government to resolve these problems. USAID will be part of this group, given the importance of ON to increasing food security in otherwise risky rainfed agriculture. With current doubt about the resolution of these problems and the enormity of capital-intensive irrigation investments, a prudent strategy for USAID would be to participate actively in ON restructuring and re-evaluate carefully the comparative advantage of this system of price production.

Rice production also takes place under less capital-intensive conditions, with more reliance on natural irrigation and less on water control. Recent study (Gaddis et al 2002) suggests that such production systems are more profitable than ON-style irrigation, with profitability varying inversely with capital intensity. In addition, these low-control rice-production systems tend to often lack ON's other disadvantages, with a wider distribution of the profits among the farmers, who are more likely to be women than in ON. Successful development of these many and widely dispersed alternatives to ON would require complementary inputs, notably seed, and extension.

Irrigation systems need not produce rice. In practice, some farmers use irrigation for other crops, notably vegetables, either in addition to rice during the off season or instead of rice. Table 2 classifies vegetables as non-tradeable but some vegetable production may rightly be called tradeable. The two principal crops found in this category are shallots and potatoes. Farmers who grow them in preference to rice do so because they find them more profitable. There is scope for growth, particularly with improved seeds. Other horticultural crops are technically possible in this context, but problems with storage, transformation and marketing may limit their profitability. USAID/Mali will therefore consider using IEHA funds for support of less intensive irrigated agriculture of rice or alternatives, such as horticulture crops like onions, tomatoes, etc, with provision for extension and improved provision of seed and other inputs. Horticulture production is particularly lucrative for many women's groups in the South. This will be a primary focus in the USAID Mali Action Plan early on, FY03, for quick impact results on small-holder incomes.

Table 2 refers to various types of meat but, for most of the marketing chain, the commodity marketed is livestock on the hoof. Almost all exports are of live animals. Sahelian ruminant numbers typically grow year-on-year between drought years, when they plummet. This is characteristic of a mature extensive ruminant production system on the open range in which few individual herdowners have an incentive to cull their herds, particularly traditional herdowners who store their wealth in the form of livestock. Over the long run, livestock production in such a system stagnates, though it may rise for several years before drought intervenes.

One way out of this stagnation is to encourage the use of supplementary animal feed in some combination of agricultural byproducts or fodder crops. Since having met the long-term carrying

capacity of its range in the 1960s, Malian animal husbandry has gradually evolved towards this solution, but much more so since the devaluation of the CFA franc in 1994 as peri-urban dairy production has taken hold and fattening for urban markets and export has become the norm in the agricultural zone. In this way, animal production can increase and profits in this potentially lucrative sector can continue to grow (though drought still hits hard).

Domestic demand for red meat continues to grow and, without any measures to curtail it, may completely absorb national production, thus reducing the benefits from exports. Poultry production has expanded to compete with red meat on the domestic market, thus freeing up red meat for export. More intensive peri-urban poultry production and other non-traditional production systems also use feeds.

An efficient market for feed requires knowledge by producers and consumers of optimal feed mixes for different animal types, labeling and marketing. Fodder crops are not common and their promotion requires a good source of seed. This combination of technology and marketing, combined with the relatively widespread ownership of livestock, particularly small ruminants among women, makes this a target for IEHA financing. However, USAID will fund this under its CSP.

As IEHA will support seed production and dissemination for other crops, it will be worthwhile extending this to the coarse cereals: maize, sorghum and millet. These do not constitute a high-growth area but they constitute the staples for most Malians. Increased yields from only modestly higher-yielding varieties would therefore make a considerable difference to national cereal production, especially in good-rainfall years.

Among the "other" non-tradeable crops in Table 2, oilseeds appear to have some potential for profitable growth. However, the scale to which this might take place is not clear. Further study would be required.

Among the inputs to crop agriculture, improved seed requires the most work. For each species, breeder and multiplication seed has to be produced and certified and, though negotiation and trial and error, the public and private sector must take responsibility for different stages in the seed supply chain for each crop. Therefore, as suggested above, USAID will allocate IEHA funds to multiplication and dissemination of improved seed.

Mali lags in biotechnology which, in its several forms, holds promise as a tool to help breeders accelerate the development of new, more productive varieties (and for other goals). Malian agricultural researchers should have the opportunity to use this technology to accelerate improvement of yields and resistance to drought and disease of the crops most important to the country's farmers, including its small farmers. IEHA funds may profitably be allocated to this use. Such research is only as useful as the agricultural extension system's ability to promote adoption by farmers of the improved technologies, so Mali needs the efficient extension system that ongoing World Bank support should provide.

Inefficient agriculture that provides the small farmer with low returns incites poor environmental husbandry. Poverty leads to excessive exploitation of soils and thus to erosion and nutrient

depletion. It also provokes unsustainable use of forest resources. Among farmers with higher incomes, irrigated agriculture can result in salination or acidification of the soil and the uninformed use of pesticides can have negative effects on human and animal health. It is essential to monitor and take corrective action in these cases and IEHA activities will, at a minimum, ensure that its own activities to promote agricultural production do not also result in environmental degradation.

Increased production of crops or livestock will play a limited role in cutting hunger if the commodities do not reach the consumer in a more satisfactory condition. Current techniques of post-harvest storage allow wastage of up to half a given crop. Malian processing techniques are generally artisanal or take place on a small scale with limited access to electricity, and without sufficient attention to the quality of the product from the consumer's perspective, particularly the more discerning consumer in the regional market. Grading and standards, and the development of brands, are in their infancy. Losses in transport are high, due to a combination of poor packing, old trucks with poor shock absorption, poorly maintained roads (particularly secondary roads) and, for perishable commodities, long delays at road blocks, particularly at borders. Cold chains from farm gate to urban markets or to the airport either do not exist or are rudimentary and risky. Packaging for the consumer is not generally a consideration. USAID's Country Strategic Plan (CSP) for 2003-2012 indicates that it intends to provide support in at least some of this range of related issues. However, the whole will take many years and collaborative work among the private and public sectors and donors to resolve. Therefore IEHA will play a role in alleviating some key bottlenecks in this dysfunctional system. Quick, high impact interventions might include: loading ramps; warehousing; and secondary farm to market roads.

In addition to these problems of physically handling the crop once it leaves the field, traders have problems knowing how to find the consumers who will pay most for the commodity. The importance of this lack of knowledge varies by crop and in time, sometimes quite unpredictably. Thus the importance of market information systems (MISs) which, at a minimum, provide traders with up-to-date price information that they can use to target profitable markets, including export markets in the region. User-driven MISs vary the information they provide and the diffusion medium and methodology according to traders' needs. Farmers may also benefit from this system. USAID is the lead support agency to Mali's successful MIS and will continue to support this activity in some form.

Many farmers and traders, as individuals or in associations/co-operatives, would like to invest to solve some of the constraints to agricultural production or post-harvest management but find they cannot easily obtain credit for investment in the sector. Banks largely limit their loans to the formal sector but most farmers and traders of agropastoral commodities work in the informal sector; the credit they offer to traders goes almost exclusively to finance imports; and they generally do not want to work with small-scale operators. There is thus a need to give training and other incentives for farmers and traders to begin working in the formal sector, to work with banks to ensure that they have the expertise to interpret proposals for credit for agriculture, and to reinforce and develop the activities of successful microcredit schemes that target small economic operators, often in associations. The USAID CSP for 2003-2012 will contribute to this process.

Investment of resources to improve the operation of the agricultural sector will be more effective if government ensures a supportive policy environment. Malians are lucky that over the last decade or more, government has enacted a series of reforms to try to create this environment in the context of regional co-operation to generate a single market for goods and services among the UEMOA countries. However, the regulatory framework still has significant room for improvement, for instance, by providing a more attractive environment for foreign investment in agribusiness. In addition, knowledge on the part of government officials and of economic operators of national and UEMOA regulations remains limited. Again, USAID/Mali, through the CSP, will work to solve some of these problems, in collaboration with USAID/WARP.

In orchestrating its efforts through IEHA, USAID/Mali will take into account the creating of clusters of excellence. Research[6] shows that economic clusters increase productivity by providing efficient access to specialized inputs, employees, information, institutions and "public goods" such as training programs and training institutions; by facilitating co-ordination across firms and between individual entrepreneurs; through rapid diffusion of best practices; and by ongoing, visible performance comparisons and strong incentives to improve with respect to local rivals.

HIV/AIDS threatens to undermine development as a whole and agriculture in particular. Though Mali's mean seropositivity rate of about two percent is relatively low, this figure seems set to rise, especially in certain areas such as along trucking routes. Higher HIV/AIDS rates threaten the productivity of IEHA activities in two ways. Firstly, they risk debilitating and killing off adults in the prime of their working life, removing the key workers needed for the success of agricultural production and marketing. Secondly, they threaten to decimate the support structures in extension, research and policy development, which represent concentrated bundles of human capital in which Mali will have made significant investments. For these reasons, USAID's AEG team, in collaboration with USAID's Health program, will adopt strategies and incorporate appropriate anti-HIV/AIDS measures can be incorporated into its IEHA activities.

Finally, in pushing for greater productivity in Malian agriculture to increase employment and incomes in order to cut hunger, USAID will proactively promote the interests of women by mainstreaming them in all activities. No longer will women's interests be represented by some token activities in which women are traditionally involved and which cement their lesser position in the economy. Instead, USAID will ensure that each IEHA activity can give women the opportunity to participate fully.

Context for IEHA

Science and Technology

The current state of Mali's research and extension services largely determines the level and quality of science and technology available to, and adopted by, the country's rural producers. A favorable science and technology policy environment that allows for the generation and transfer of agricultural technologies is a vital link in increasing efficiency in agricultural production, storage, transformation and marketing. While the country's research and extension capacity is

[6] M. Porter 2002. *Microeconomics of development* PowerPoint presentation for USAID/Washington, 18th September

central to its ability to achieve agricultural growth, three specific areas within the context of science and technology were identified as important to meeting IEHA goals — biotechnology development, seed multiplication and dissemination, and irrigation technology.

Research and Extension

With support from the World Bank and other partners, including USAID, Mali's National Agricultural Research System (NARS) and the National Agricultural Extension System (NAES) were greatly improved during the 1990s. The lead Malian NARS agency is the public *Institut d'Economie Rurale* (IER). IER has its headquarters in Bamako, with six field stations at: Kayes, Sotuba, Sikasso, Niono, Mopti and Gao. It performs research on a range of agricultural, livestock, forestry and fisheries topics, as well as in natural resources management. It also runs laboratories for soil and water, food technology and animal nutrition; maintains an economics unit focusing on commodity value chains; and has a genetic resources program. In 2001, IER had 151 researchers across these different activities.

From 1994 to 2001, the *Projet national de la recherche agricole*, PNRA, financed a substantial part of IER's work. Development partners for PNRA included the World Bank and various bilateral aid agencies, including USAID. In January 2002, the *Programme d'appui aux services agricoles et aux organisations paysannes* began, marking a new phase of support to the institute.

Over the last few years, IER has improved its internal management and become more responsive to the needs of its users, representatives of whom now account for four of 12 of its board. No women sit on the board, though one of eight members of the *Commission Nationale des Utilisateurs* is female.

IER envisions a biotechnology unit with a laboratory that may allow for some of the following activities: in-vitro tissue culture; artificial insemination, cloning and embryo transfer; the use of molecular markers for genetic analysis, for defining vegetal or animal selection criteria, or diagnostically; and genetic engineering and gene transfer. With the notable exceptions of genetic engineering and gene transfer, several of these technologies already exist in Mali. An improved biotechnology capacity would provide the possibility of accelerated development of improved genetic material for Malian agriculture.

However, such work requires a legal framework, which is not yet in place. An IER-led committee is currently drafting a law and has the responsibility for ensuring a full public debate on the issues involved prior to the passage of the law, expected in 2003. IER has submitted a proposal to USAID for funding of the drafting of the law and the corresponding public consultation, as well as the laboratory that should follow. In June 2002, a national workshop formally recommended the creation of a biotechnology center, with MAEP's *Service de Contrôle et de Réglementation* overseeing it, a biosecurity protocol, an intellectual-property policy, and publicity for public debate.[7] IER submitted a request to USAID for support in this work.

[7] Source: Ministère du Développement Rural et de l'Environnement, Ministère de l'Education, and Institut d'Economie Rurale, 2002.

As part of a reorganization of the seed sector, the National Seed Service has relinquished production of foundation seed to IER, which has the technical capacity and the land to undertake this role, but has not received an increased budget for this task.

Agricultural research also takes place under the auspices of the Ministry of Education at IPR/IFPRA (Rural Polytechnic Institute and Institute of Applied Research) that houses the Biotechnology Laboratory at Katibougou and LBMA (Applied Molecular Biology Laboratory) of FAST (Faculty of Science and Technology) of the University of Mali.

Mali also benefits from an ICRISAT research station near Bamako and from CILSS' *Institut du Sahel* (INSAH) performing regional socio-economic research in the agricultural sector. Mali is also a member of CORAF, the regional agricultural research network, which links researchers in particular disciplines to their peers in other West African countries. Although CORAF is not currently very active in promoting regional exchanges and co-operation between agricultural researchers, ICRISAT and INSAH allow some Malian researchers to work with international scientists and promote the availability of international research to others. ICRISAT also works actively with NGOs to make available improved seed of coarse cereals and groundnuts to farmers, and on an innovative small-scale drip irrigation system.

Improved technology can only lead to increased agricultural output through the efforts of an extension system that is well organised and well equipped. Mali's National Agricultural Extension System (NAES) resides largely in MAEP's *Direction Nationale d'Appui au Monde Rural* (DNAMR), though NGOs also play a role. In the context of the World Bank-financed Agricultural Services and Producer Organizations Project (PASAOP), the government aims to increase effective extension services. Despite NAES strengthening over the course of the 1990s, it requires further reinforcement in order to become more efficient and responsive to the diversity of agro-socio-economic conditions of the producers and also financially sustainable in the long run. DNAMR has recently received the mandate to identify for the National Seed Service agricultural producers' associations best-suited to multiplying seed. However, it currently seems underqualified and underfunded to carry out this important function.

Seed Technology and Dissemination

The challenge of developing the seed sector appears to be twofold. Firstly, where the private sector can make a profit from multiplying and diffusing new seed, the policy environment should favour this and firms should be encouraged – even subsidized, for a limited period – to do so. Secondly, where profit is not possible, farmers should receive incentives to try new seeds. Various ways of doing this exist. In the meantime, IER must continue to produce new foundation improved seed. (WARDA may contribute to improved rice seed.) IEHA funding can play an important role in getting existing varieties out for agricultural productivity, improved markets and the development of producer associations. Enhancing availability of existing improved varieties already "on the shelf" would be a quick, high impact, initial area of focus in the IEHA Action Plan.

There is only limited improved seed available. Due to this reason and a lack of knowledge, most Malian farmers retain their own seed or buy from nearby farmers. Only a small number of

farmers use improved, high-yielding seed. This is particularly true of those growing traditional crops, above all the coarse grains: maize, sorghum and millet. The low fraction using improved seed leads to significantly lower agricultural production, and thus lower farm incomes, than would otherwise be possible.

Mali has a good history of varietal development of millet, sorghum, maize, rice and cowpeas. The Institut d'Economie Rurale provides new varieties for a range of crops and now sells pre-basic seed to the National Seed Service (NSS). In turn, NSS produces basic seed of improved varieties and uses trained farmers to further multiply it. NSS oversees the operation and buys the resulting seed. The independent National Seed Laboratory certifies the seed before it is sold on. However, the volume of improved seed made available to farmers through this mechanism falls far short of the total seed demand. A new seed-sector project financed by the African Development Bank began in 2002 and promises to reinforce NSS as the institution linking production of breeder foundation seed at IER with large-scale multiplication of seed by farmers.

The private sector has some incentive to participate in the production and marketing of seed under certain circumstances, not all of which are met for all Malian crops. However, in these cases – vegetables, rice and maize and, to a lesser extent, groundnuts and cowpeas – lack of credit may in practice limit private-sector interest. In others, notably millet and sorghum, the private sector has no profit motive for stepping in to replace the role of NSS.

The supply chain for improved seed will need an orchestrated combination of efforts by farmers' groups, IER, ICRISAT, NGOs and the private sector to ensure that farmers continue to receive improved seed. In some cases, farmers' groups may eventually find seed distribution a profit-making operation. The World Bank-financed Agricultural Services and Producer Organization Program may find a way to attract the private sector to varietal research and seed multiplication but, as yet, the effective demand for improved seeds of certain crops seems to present a barrier.

During preparation of the IEHA Action Plan, USAID/Mali undertook an in-depth study of the country's seed sector in order to obtain rigorous analysis that would support the design of interventions in this sector. The study noted that the African Development Bank had just begun a project to reinvigorate the National Seed Service. This project provided it with much needed support but also left largely untouched a range of essential complementary activities. In essence, NSS now co-ordinates the supply of seed from IER and to farmers' associations, which then multiply it. It does not do its own multiplication. Neither does it have the means to identify and work with the associations doing the multiplication: that is now the responsibility of DNAMR. IEHA will strongly consider support and complementary investments where there are weaknesses.

Adoption of Irrigation Technology

Mali suffers from significant inter-annual variations in the magnitude and distribution of its annual rains. Consequently, production of rainfed crops varies considerably. Several times a decade, in an unpredictable fashion, production falls below consumption needs. When this happens for two or more years in a row, famine may ensue, at least locally. Over the past 30 years, the country has experienced declining and erratic rainfall, with severe droughts in the

1970s (1970-74) and the 1980s (particularly 1983-84 and 1987-88), causing widespread famine and disrupting almost all development activities. Climatic risk is a major factor in sustained production and productivity increase. Recent droughts have had negative impact on productive assets and on the behavior of producers who utilize and employ low-risk, low-productivity production systems.

Mali benefits from larger irrigation potential than its Sahelian neighbours. It is evolving towards converting that potential into irrigated agriculture, and production that does not vary with rainfall. The primary irrigated crop being developed in Mali is rice. Through these efforts, Mali is lessening its susceptibility to drought. A 1996 World Bank survey on irrigation reached the following conclusions that underscore the need for investment in irrigation:[8]

- Many farmers are willing to invest in small-scale irrigation and are prepared to pay for services that increase the investment's profitability;
- Adequate solutions to the technical and managerial problems are diverse and location-specific, and require high expertise and experience in small-scale irrigation management;
- Government support services prioritize other agricultural sub-sectors, and the support capabilities for specialized irrigation production activities are weak;
- Because of the specificity and the diversity of private irrigation, its promotion must be led jointly by the public sector (extension and research services) and the private sector (technical and management specialists, legal consultants, and financial institutions); and,
- The government should play a catalytic role and maintain its present policy to support the private sector.

The Malian government has developed an irrigation policy[9], promulgated in December 1999. Major components of the policy are to:

1) Increase irrigation development financing by leveraging its limited resources to offer those investing in irrigation full ownership rights in exchange for 20 to 40 percent of investment costs plus full operation and management costs by:
    - Ensuring that beneficiaries take full responsibility for all operation and management costs;
    - Transferring responsibility for financing tertiary infrastructure and parcel-level development (for small-scale, community-development schemes);
    - Requiring beneficiaries of other types of scheme to make partial payment for both secondary and tertiary infrastructure through lease-purchase arrangements;
    - Using funds generated exclusively to fund further irrigation development; and,
    - Providing increased incentives to private investors to acquire land titles, develop investment plans, prepare loan applications for possible funding by banks.

2) Reduce the cost of irrigation development by:

[8] "Project Information Document: Mali – Pilot Private Irrigation Promotion," World Bank, Report No. PIC1939, 3 May 1996. Available: http://www4.worldbank.org/sprojects/Project.asp?pid=P001738

[9] "Project appraisal document: The national rural infrastructure project" World Bank Report no. 20500 MLI, 2 June 2000

- Substituting local contractors for expensive foreign companies; and,
- Using cheaper alternative methods and equipment.

3) Improve maintenance by:
    - Limiting irrigation perimeters to sizes manageable by local communities;
    - Ensuring greater ownership through a demand-driven approach and increased beneficiary participation in infrastructure planning, financing and management;
    - Providing beneficiary training programs in maintenance programming and execution, input purchase and output marketing;
    - Updating and applying technical norms;
    - Promoting locally adapted equipment; and,
    - Promoting greater involvement of local institutions (NGOs, private sector, etc.) in providing support-sector services.

4) Increase access to agricultural services and adequate planning and monitoring of the irrigation sector by training local-government staff and starting an investment program.

5) Prepare a program (PASAOP, with EC and French Cooperation funding) to:
    - Rationalize and decentralize MAEP core services;
    - Reinforce capacity through training and provision of basic equipment;
    - Improve the efficiency and relevance of the national extension and research systems
    - Strengthen and empower producer associations in the design and execution of agricultural support services.

The Ministry of the Environment implements environmental impact assessments on larger irrigation construction as part of Mali's National Environmental Protection Policy. In addition, greater attention is now paid to environmental problems created by irrigated agriculture once the infrastructure is operational. USAID has contributed to the development of improved natural resource management practices to ensure the sustainability of more productive agriculture.

IEHA funding may support interventions designed to increase the area of irrigated agriculture in Mali, which would lessen the country's exposure to climate-related risks. Low-cost complementary activities necessary for the success of the perimeters should be carefully designed to support their operation. Current factors constraining the construction of irrigated perimeters in Mali include issues of technical capacity and delays are often the result of lack of capacity to administer necessary environmental impact statements that precede construction.

Agricultural Markets and Trade

Gains in agricultural marketing and trade have a high potential to increase rural incomes in Mali. The World Bank predicts that several products offer potential for increased trade and/or import substitution. Domestically and regionally, high levels of urban growth and growth in urban incomes create demand for fresh fruits and vegetables such as potatoes and onions, dairy products, and processed foods, as well as for other agroindustrial products such as animal feed, soap and shoes. European markets may offer potential for increasing exports of mangoes and

green beans and other non-traditional exports. However, there are several constraints to growth in commerce that need to be alleviated if Mali is to achieve hoped for gains in agricultural trade.

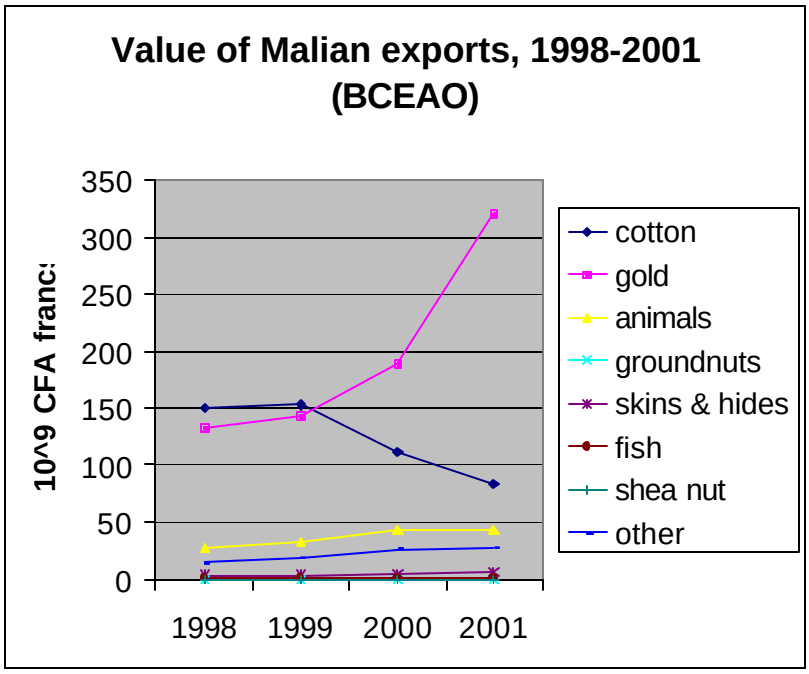
Trade in Commodities

The Malian government has instituted a number of sectoral policy reforms to liberalize prices and markets for agricultural commodities. Coarse grains, cereal, cotton and livestock exports, as well as input distribution were totally liberalized in the late 1980s.

As a member of West Africa's two most important economic groupings, UEMOA and ECOWAS, Mali is committed to West African economic integration and a proponent of increased regional trade. The Government of Mali wants to see exports to the region grow. Transport links to neighboring countries are improving, thanks to donor-financed construction of various roads and to the restructuring of the company running the Bamako-Dakar railway. However, the two regional organizations have not yet harmonized all aspects of regional policy and there remain protectionist and corrupt elements preventing the full implementation of free regional trade. Additionally, Mali entered the WTO in May of 1995 signaling its potential for trade outside of Africa.

Mali now has in place a legislative framework that largely permits efficient markets to operate and allows for effective trade in agricultural commodities. The major exception is cotton, Mali's biggest agricultural export, which is still sold through CMDT, the state cotton company which is a monopoly and has suffered severe price shocks in recent years. However, the legislative framework has not been fully institutionalized. Those implementing it do not have all the details or do not completely apply them; and those to whom they are applied are often ignorant of their rights.

Malian exports have risen from 331 to 485 billion CFA francs from 1998 to 2001, according to BCEAO statistics. However, cotton exports (45 percent of exports by value in 1998) have fallen significantly (to 17 percent in 2001). At the same time, gold exports have risen dramatically (from 40 to 66 percent of value). There has been an upward trend over this period for livestock and for skins and hides and a stable one for fish, groundnuts and sheanut. Rice exports do not figure in the BCEAO statistics, presumably because they take place in the informal sector. See graph 1.



Graph 1

Constraints to Agricultural Commerce

A variety of elements limit the growth of commerce in agricultural and livestock products, inputs, and agricultural processed products, including weak business support services, poor access to finance, shortcomings in infrastructure, and trucking inefficiencies.

Mali's agricultural sector greatly lacks the agribusiness support services that are necessary to enable producers to network, plan for growth, and meet market demands. Producers need assistance in building and reinforcing professional associations and making professional contacts. They require support for obtaining legal advice. Perhaps most importantly, producers need improved access to training and information. Training and information needs include: information on prices and availability of commodities; training for managing seasonality constraints and surpluses for grain and horticultural products; training in post-harvest and agroprocessing technologies and techniques; and training and information on how to meet quality control, grading and standards for agricultural products. Both farmers and traders need better access to information on market opportunities, fiscal and investment incentives, and export/import and transport regulations.

Sanitary and phytosanitary restrictions on trade will become more important as countries in West Africa, as well as in Europe, become more conscious of product quality and of the possibility of transnational human, animal and plant contagion through imports. It becomes more important for a country trying to win market share for its agricultural products in foreign markets to have respected brands and a system of certification based on well-equipped and regulated testing laboratories.

Finally, infrastructural shortcomings limit the rate of growth of commerce. Despite improvements in the main road network, and improvements in communications infrastructure that have come with use of FM radio and mobile phones, Mali's agricultural markets lack mobility of goods and services. Markets often lack warehousing and loading ramps for trucks, and an old trucking fleet, in the context of the poor application of restricted regional trucking law leads to inefficient, expensive and slow movement of agricultural commodities to regional export markets and, to a lesser extent, within Mali. Roadside extortion by the uniformed services further slows movement and limits the rate of growth of commerce.

USAID has led the way among donors in providing support to private-sector development, notably in institutional support and the provision of market information, and is in a strong position to contribute significantly to the development of Mali's markets and of its internal and external trade in agro-pastoral products. In addition to IEHA initiatives, as part of its ten-year Country Strategy Plan, USAID/Mali will continue its efforts in this area by allocating significant resources to various dimensions in this area, such as strengthening and expanding the market information system, expanding marketing infrastructure, pursuing policy reforms, strengthening the capacity of professional trade organizations, and expanding agricultural markets. Through these efforts, USAID/Mali aims to alleviate many of the barriers to increased trade and agricultural commerce listed above.

Initial IEHA funding should help support USAID/Mali priorities and initiatives in agricultural trade and commerce by building on activities with complementary activities and an integrated approach to meeting objectives to grow the country's agricultural markets. IEHA funded actions under this area fall under the Support to Agribusiness Development of the Action Plan. The program will strengthen trading enterprises and trade development agencies. Strengthening business skills of private sector trading enterprises to acquire the capacity to identify and exploit potential existing and new markets and diversify exports. In addition, subsector analyses under the Agriculture Sector Assessment revealed various constraints relative to basic infrastructure: unreliable infrastructure, loading ramps, warehousing and support services, dysfunction of the legal and regulatory system, the shortage of good labor force, lack of adequate quality control services for exports. (USAID/Mali programming and priorities in this area are discussed in further detail later in this chapter).

Community-Based Producer Organizations

Producer organizations exist from the local to the national level. However, by and large they remain less effective than they could be. Their weaknesses stem from organizational and managerial difficulties, including poorly-trained human resources and lack of capacity. Many of these organizations were government- or donor-induced, and therefore their leaders' legitimacy is often in doubt. The capacity of most of these organizations to communicate with their members and to keep information flowing in both directions is weak; and they generally lack financial leverage.

Some local-level producer organizations benefiting from project or NGO support have attained a certain level of sustainability. By organizing around the use of a particular technology, some organizations are bringing increased welfare to their members and the community. However, it

is rare that such organizations evolve to go on finding new sources of technological change that allows them to continually grow and evolve, and to accept continual change as the road to long-term economic growth and wealth.

To try to overcome this drag on local development, CLUSA, a USAID-funded international NGO, has begun a strategy of organizing groups of producer organizations with a common interest into "second-order organizations" that have a purely commercial orientation. Each member organization receives a share in the business at the start but is free to sell its share or buy others. Each business receives ongoing support and advice in order that it may have a chance to grow into a viable economic unit. The economies of scale and the discipline of the market lead to a new basis for growth for those that succeed, though some businesses may fail and some producer organizations may sell out. Even where the resulting businesses do not grow rapidly, they generally offer the benefits of vertical integration and economies of scale to their member organizations. Where they do succeed, they provide a formula for ongoing growth in their members' standard of living.

The World Bank's *Agricultural Services and Producer Organizations Project* gives producer organizations and associations the chance to take increased responsibility at village/commune level. Producer organizations on various scales (national, regional and local) receive support to improve their members' access to agricultural services, inputs, product marketing, credit and information through the project.

Human and Institutional Capacity and Infrastructure

Human capital, capacity and infrastructure are in many ways the essential building blocks of a developing country's economic growth. It is necessary to have an understanding of Mali's broader development needs as they impact rural growth, and provide a context for the overall investment environment for IEHA programs.

Human Capital

Mali has a range of public and private institutions providing education in agriculture and related fields at several levels. At a basic level, the government ensures education in functional literacy at training centers in rural areas.

A group of secondary schools in Bamako run by the *Ministère de l'Agriculture, de l'Elevage et de la Pêche*, each with its own specialization, covers vocational training in agriculture, animal husbandry, forestry or extension. Similar MAEP-run secondary schools teaching only either the agriculture curriculum or the extension curriculum are scattered around the country. In addition, lower-level MAEP-run *Education pour le développement* schools providing technical training for the young are to be found throughout the country. There also exist privately-run schools performing the same function.

The Faculty of Agriculture of the University of Mali offers four-year courses to a Bachelor of Science level in agriculture, animal husbandry, hydrology and forestry, and agricultural engineering. Although this faculty does not offer a course in agricultural economics, other

economics courses are available elsewhere in the university. The Faculty of Civil Engineering graduates engineers who may turn their skills to public works in the agricultural sector. In addition, the private Boukari University offers Bachelor of Science level courses in sociology, anthropology and rural economics. The *Institut Supérieur de Formation en Recherche Appliquée* offers the equivalent of a Masters of Science degree in "Environment and Ecology" but not in any other agriculture-related subjects. Beyond this level, if not before, continuing students leave Mali to pursue their studies.

General criticism of agriculture-related Bachelor of Science level training at Malian universities is that education offered in these fields is too theoretical and lacks field experience. Students tend to see these as courses that will provide them with jobs as extension officers or on projects, but not as precursors to starting their own farming businesses.

For those who want business training, several private institutes offer undergraduate and masters level education in business studies. However, none of these institutes offers an agribusiness curriculum. These private institutes compete with each other and with consulting companies for contracts for specific short-term needs of government, NGOs or projects. Private institutes tend to be affiliated with a reputable university abroad, which ensures quite high standards. For the last few years, standards in public institutions have been maintained by regional testing.

The Malian government notes that political reform, structural change and decentralization have left a gap in the provision of several categories of training for farmers, professional organizations, local government, and reoriented public institutions. In addition to training in agricultural production and extension skills, it identifies several new areas for curriculum development: crop protection, post-harvest handling, and processing of agricultural commodities (for farming communities); and organization and management, leadership, building partnerships, and conflict resolution (for managers of professional organizations). It suggests targeted training for local-government staff and for civil servants who have to adapt to new institutional settings and that, in parallel, secondary and tertiary curricula should adapt similarly.[10] All planned changes should take into account the training needs of women. In May 2002, MDR held a national conference to launch of a process to develop a new agricultural-sector education program supported by the World Bank, with a draft strategy composed of seven themes and 36 modules.[11]

Institutional Capacity

Limited institutional capacity hampers MAEP, the Malian Ministry responsible for agriculture. The Ministry is highly centralized, and its staff are poorly trained and offered little incentive for growth. The Ministry is overwhelmed by its various mandates and does not adequately plan or monitor investments in the rural sector, or coordinate donor initiatives to ensure their social, environmental, and economic soundness. Largely due to a World-Bank-funded project during the 1990s, its extension staff in DNAMR have some experience in accomplishing their mission,

[10] Source: République du Mali, Ministère du Développement Rural, Cellule de Planification et de Statistique 2001: 81-83

[11] PowerPoint presentation entitled: *Communication du volet formation agricole du PASAOP à l'occasion de l'atelier de lancement du PASAOP du 20/05/02 au 23/05/02*

however, now that the project has closed, find themselves without the means to fully meet their objectives. The Ministry is also charged with regulating quality control for agricultural inputs and food products, and the management of animal and plant diseases. Unless Ministry staff charged with this regulatory control are given training and the incentive to perform, current problems related to poor quality and standards that are limiting product development and market differentiation will not be improved. The Agricultural Services and Producer Organizations Project, financed by the World Bank, has responsibility for bolstering MAEP.

The *Ministère de l'Industrie et du Commerce* suffers from similar problems. Lack of training and motivation hampers its staff and limits vigorous dissemination of new legislation and support to the business community. Its fledgling MALIPLEX will need support if it is to be a functional and effective institution. USAID/Mali will provide this support under CSP funding.

The *Institut d'Economie Rurale*, IER has set up a users' council to provide feedback that is intended to shape the research it carries out. Some of its researchers now have experience with competitive grants for research. These two institutional changes begin to provide a structure that will enable IER, as an institution, to be more responsive to real Malian needs. However, this change has only recently begun. Additional institutional drawbacks include a lack of incentives for its researchers to work closely with extension staff, limiting its efforts to contribute to Malian agricultural growth. If, as noted above, the DNAMR extension service remains unable to fulfil its functions, funds allocated to IER will have limited effects on agricultural growth.

The *Service Semencier National* has recently been restructured, following the advent of a credit from the African Development Bank that guarantees its future. It has ceded the production of foundation seed to IER and now principally has the responsibility of facilitating the production and marketing chain for seed of different crops, principally via overseeing multiplication of seed by producers' associations. The new funding has engendered a new sense of mission, but the AfDB funding covers only part of a package that would enable it to revitalize the seed sector. A variety of important tasks omitted from the AfDB package would strengthen this sub-sector if funded through IEHA. These include support to DNAMR, to identify the best producer associations to multiply seed, financing efforts to incite farmers to buy improved seed, and promoting an increased role for the private sector for seed where a profitable market exists.

Infrastructure

Mali has several infrastructural weaknesses that hamper its agricultural growth and economic development, in particular transportation, power and electricity, and water deficiencies hinder rural development.

Transportation

Donors, particularly the EC, are currently funding the construction of several tarred roads of regional importance that, when finished, will greatly improve Mali's connectedness to the rest of West Africa. The set of roads either under construction or due for tarring includes: Bamako-Kankan (Guinea), Sikasso-Bobo Dioulasso (Burkina Faso), Ségou – Ayoun El-Atrous (Mauritania) and Bamako – Tambacounda (Senegal).

Mali has a very poor system of rural secondary roads. Many rural areas do not have ready access to markets and are thus hindered from the possibility of getting their products to local and regional urban markets, or tapping into export opportunities. There is a strong need to lower transport costs for Malian agricultural commodities. Better feeder roads would lead to markedly improved competitiveness of these commodities, as would a reduction in transport taxes, and the significant curtailment of roadblocks between Malian and coastal markets.

Mali benefits from a railroad line from Bamako to Dakar (Senegal) via Kayes. For many years, this line received negligible maintenance and became slow and unsafe. However, restructuring and privatized management have brought about track replacement and other upgrading.

Power and Electricity

Another constraint to enhancing agricultural production and reducing poverty has been the lack of electrical power in both rural areas and secondary cities. Because of the limited electrification in Mali in these locations, storage activities are not developed, leading to elevated levels of spoilage of agricultural commodities. Processing activities generally need electricity to be competitive. Therefore employment opportunities are limited outside of the large urban center of Bamako. An unreliable electricity supply also limits development of small industries producing local consumer and producer goods.

Diesel-powered and hydroelectric generators produce Mali's electricity. The diesel-generated electricity is expensive and the continuity of the supply of hydroelectricity suffers from seasonal falls in reservoir levels. Mali hopes to benefit from membership of the West African Power Pool, which will pipe Nigerian natural gas to Ghana where a power station will convert it into electricity to serve various countries, including Mali. Participation in this grid should allow Mali to lower the price, and stabilize the supply, of the electricity it offers to residents and businesses.

Water Supply

Expansion of irrigation is a means of increasing agricultural productivity and reducing risk in Malian agriculture. According to the World Bank Mali has the greatest irrigation potential in the Sahel, but high permeability of old primary and secondary canals combined with a lack of technical and managerial assistance to private irrigators has resulted in high water losses from leaky irrigation canals and to inefficient design and management of equipment.[12] Without significant reduction in water losses, the substantial growth in irrigation foreseen for the next two decades will begin to significantly reduce the water available for aquatic ecosystems, fish production and navigation; and may cause problems with downstream neighbors.

Two points emerge from this discussion. First, as for other USAID funding mechanisms, transportation and power investments lie outside USAID's manageable interest. Nonetheless, it is important to take them into account, particularly transportation options for marketing. Second, while IEHA funding in the early stages of Action Plan implementation are not focused on broad improvements in the areas of human capital, institutional capacity or infrastructure due to the

[12] "Project Information Document: Mali – Pilot Private Irrigation Promotion," World Bank, Report No. PIC1939, 3 May 1996. Available: http://www4.worldbank.org/sprojects/Project.asp?pid=P001738

large size and scope of investments in these areas, these issues are addressed in the IEHA Action Plan as they relate to and may impact the outcome of longer term proposed interventions.

Vulnerable Groups and Transitional Economies

The Malian government's Poverty Reduction Strategy Program (République du Mali 2002: 11-17) indicates that poverty in the country remains mostly a rural phenomenon, with 80 percent of the poor living in the four big regions of Mopti, Sikasso, Ségou and Koulikoro. Table 3 shows the incidence and extent of poverty by region in 1998.

Table 3
Incidence and degree of poverty in 1998

Region or location	Incidence of poverty (%)			Degree of poverty (%)
	Very poor	Poor	Total	
Mali	21	43	64	42
- urban	2	28	30	22
- rural	28	48	76	46
Kayes	25	38	62	44
Koulikoro	18	41	60	42
Sikasso	14	52	66	37
Ségou	26	42	68	45
Mopti	38	38	76	53
Tomboctou	26	50	77	47
Gao	11	68	79	37
Kidal	4	89	93	33
District de Bamako	0	28	29	15

Source : République du Mali 2002

The World Bank identifies two main causes of poverty in Mali: [13]

1) Low level of agricultural productivity in a country where 80 percent of the population lives in rural areas, due to the following:
    - Narrow resource endowment (limited rainfall and mostly poor and fragile soils);
    - Poor access to markets and market information;
    - Inadequate agricultural services (limited access to credit resulting in limited use of farm inputs and cultural practices, and inadequate technical support); and,
    - Sometimes non-supportive policy and institutional environment with ill-adapted administrative organizational structures (overly centralized and bureaucratic government services and weak producer organizations).

[13] "Project Appraisal Document: Mali - Agricultural Services and Producer Organizations," World Bank, Report No. 21527-MLI, 13 November 2001, p.7.

2) Poor access to social services and infrastructure (health, education, rural roads, drinking-water supply and sanitation).

USAID/Mali is active in the application of improved technologies to increase agricultural productivity through SO9 of its CSP covering: irrigation, trade and microfinance. USAID/Mali also has strategic objectives in health and in education, where continuous contact and possibilities for synergy are actively sought. The IEHA principles stress the importance of both intra-USAID co-ordination and co-ordination between donors involved in areas related to these poverty-inducing factors in order to reduce poverty in a harmonized way.

North Program

Northern Mali is particularly poor. This region contains large areas of desert, some livestock rearing and very little crop agriculture. Over the course of the 1990s, civil unrest in this area disrupted what had, before the unrest, been a poverty-stricken area. Until recently, USAID has had a special Strategic Objective that deals exclusively with development in this region. Responsibility for activities there now lies with AEG.

The Governement of the Republic of Mali (GRM) and the United States Agency for International Development (USAID) signed on June 11, 1998 an agreement to provide funding for a development "Special program" targeting the three northern regions of Mali (Timbuktu, Gao and Kidal) which cover 70% of the nation's land mass and 10% of the total population (estimated population: 1 million). The Special Objective for the North is a $15 Million program for 5 years (June 1998 – September 2003) intended to contribute in the consolidation of peace and stability in the North through the strengthening of civil society, expansion of economic opportunities, and provision of basic social services. These activities are implemented by 5 competitively selected PVOs: CARE, AFRICARE, and MCDI in the region of Tombouctou ; World Vision and Action Against Hunger in the regions of Gao and Kidal.

The program is making steady progress towards meeting its long-term strategic goal and short-term intermediate results.

As the key indicator of peace and stability, the absence of any form of armed rebellion was reported. USAID/Mali, such as many other bilateral and multilateral partners, is engaged in a policy dialogue with the Government to encourage them to take preventive, as well as corrective, measures to address the problem. Mali has long and porous borders with neighboring countries (Algeria, Mauritania, Niger), so close collaboration among the security forces of those countries is key in combating banditry and curbing the availability of small arms that nurtures banditry in the North.

Environmental Sustainability

Mali, like its West African neighbors is experiencing increased degradation of its natural resources, due largely to the dual pressures of climate and population growth. The Guinean zone has suffered severe soil erosion caused by wind and water that can reach 6.5 tons per hectare

annually covering up to 60 percent of arable land.[14] In other parts of the country, the ground-water table has dropped as much as 6 to 12 meters in the last 10 years.[15] Excessive use of wood for fuel in peri-urban areas has furthered rapid devastation of forests, while overgrazing degrades rangeland. The loss of biodiversity is apparent in all statistics for natural resources; for example, the World Bank cites a decline in fish catches in the Niger River from 120,000 tons to only 50,000 tons in recent years.

However, when considering the impact of environmental degradation on rural incomes, hunger, and food security, the issue is first and foremost one of soil fertility. Dramatic declines in soil fertility are resulting in stagnant or declining agricultural productivity in Mali, directly impacting rural income and food security. According to the World Bank, average fertilizer use in Mali is 0.8 kg per hectare versus a sub-Saharan Africa average of 5.3 kg/ha, and 58.5 kg/ha for the rest of the developing world. A combination of population pressures and lack of money and information results in farmers resorting to unsustainable farming techniques and constant overuse without fallow periods or crop rotation. The end result is a loss of productivity and potential, and further risk of poverty and hunger.

As noted above, USAID/Mali will be active under CSP funding in ensuring that its work in irrigation takes place with due attention to environmental problems. Advances in irrigation require additional attention to potential environmental implications. Though it does not propose activities directly mitigating environmental problems, via either CSP or IEHA funding, its work to raise agricultural productivity and, more importantly, rural incomes, will reduce the need of rural populations to overexploit their resource bases.

Government Oversight of Environmental Protection

In addition to the issues of environmental degradation, Mali suffers because of the deficiency of government oversight of environmental protection. The government understandably wants to introduce a system of environmental impact statements on major construction works. However, its inability to create a system that produces high-quality environmental impact analyses (EIAs) creates significant delays in the construction of major development projects, such as irrigation perimeters. Thus a positive step has had major unintended negative side-effects.

The recently created Ministry of the Environment has responsibility for environmental protection. Until November 2002, it was part of the Ministry of Rural Development and Environment (MDRE). Its *Direction Nationale de l'Assainissement et Contrôle de Pollution des Nuisances* (DNACPN) oversees EIAs of major projects, with the support of the *Direction Nationale de la Conservation de la Nature* (DNCN) when natural resource management issues arise.

[14] "Project Appraisal Document: Mali – Agricultural Services and Producer Organizations," World Bank, Report No. 21527-MLI, 13 November 2001, p. 8. Available: http://www4.worldbank.org/sprojects/Project.asp?pid=P035630

[15] "Project Appraisal Document: Mali – Agricultural Services and Producer Organizations," World Bank, Report No. 21527-MLI, 13 November 2001, p. 8. Available: http://www4.worldbank.org/sprojects/Project.asp?pid=P035630

The Ministry in general, and DNACPN in particular, has few staff members with a formal training appropriate to their posts. When the government formed environmental departments within MDRE, it staffed them with personnel that came from other rural-development backgrounds. Thus the majority of staff within the Ministry of Environment hold degrees in veterinary science or animal production, agriculture or agronomy, and forestry or water management. DNACPN has approximately 30 staff at its Bamako headquarters with at least a university degree, of whom eight have doctorates (or equivalent), but only three have degrees in environmental topics. The situation among the approximately 50 staff in DNACPN's regional offices is similar.

Under the 1999 decree that created DNACPN, it has responsibility for EIAs for all new construction over a certain size. It receives applications for environmental approval from those proposing construction and indicates the approvals necessary for the type of construction proposed. The agency or entrepreneur wanting to build then finds a private-sector company approved by DNACPN that can perform the analysis required and then submits a report with results of the analysis to DNACPN for approval. DNACPN staff appraise the report and, if necessary, verify certain parts before giving, or refusing, approval. The job of most staff is thus both bureaucratic and technical, but technical only to the extent that they must evaluate the reports submitted relative to technical standards, rather than perform the evaluation themselves. Even if doubts arise, the Ministry has little real in-house expertise and uses outside sources if it needs a second opinion in areas such as soils analysis. In addition, the decree gives to DNACPN the responsibility of carrying out an environmental audit (EA) of each major construction predating its promulgation. This procedure is similar to, but considerably lighter than, an EIA.

A series of approved consulting companies and individual consultants that perform EIAs complements DNACPN. They must have, or be able to hire, technical competence in a range of disciplines that EIA requires. For the Malian EIA system to generate useful results, both DNCPN and the combination of environmental consulting companies and individual consultants must play their roles well. However, from outside the Ministry and within, observers admit that the different players are still learning how to meet the needs of the 1999 decree.

A lack of technical competence causes delays in construction projects. This finding holds not only for Malian-owned projects but also for donors who must satisfy international IEA norms at higher levels than the 1999 Malian law requires. USAID/Mali has experienced significant delays to project implementation because it was unable to obtain an environmental impact statement that met US standards. Such delays may again surface when USAID/Mali begins its investments in irrigation infrastructure over the next ten years. The cost of all such delays to the Malian economy – in terms of capital tied up awaiting construction approval and the additional waits for the benefit streams to come on line – is significant.

Cross-Cutting Development Issues

There are several development issues that have a broad impact across the IEHA themes and within the IEHA context. These issues include gender, HIV/AIDS, water and conflict. Mali's IEHA Action Plan attempts to integrate, or "mainstream" these important development issues into the planning process and address them through its proposed portfolio of interventions. This

approach is based on the recognition that these issues play an important role in meeting IEHA objectives.

Gender

Mali's Poverty Reduction Strategy Program (République du Mali 2002: 58-59) emphasizes the need to reinforce women's economic capacity and, particularly, to reinforce women's income-generating activities and access to credit, as well as to support businesswomen.

The IEHA Action Plan seeks to mainstream gender into its approach, and will require that a set of rules is developed applicable to each activity that will ensure that women have a chance to participate in, and benefit from, IEHA activities on the same basis as men. As conventional wisdom holds that women's low participation rates in many potentially income-raising activities stems from structural factors that limit their access to these activities, these rules will address the extent to which creating a level playing field requires affirmative action that will facilitate female involvement.

The subtext of "gender sensitivity" is generally that women lack access relative to men. Though this perception appears to hold for most major income-increasing activities in Mali, the rules should also address situations where men, more than women, lack access to these opportunities.

HIV/AIDS

Although HIV/AIDS poses a development crisis across much of Africa, preliminary results from the 2001 DHS survey show that Mali has one of the lowest overall prevalence rates on the continent (less than 2 percent). Older statistics from UNAIDS (1999) estimate 97,000 Malians have HIV/AIDS. Such national figures mask important trends. HIV/AIDS is rapidly increasing to alarming levels in nearby Cote d'Ivoire, Nigeria and Burkina Faso, common destinations for migrating Malians. The government's 2002 Poverty Reduction Strategy Plan (République du Mali 2002: 53) takes HIV/AIDS seriously. It notes that Mali's populations susceptible to HIV/AIDS, including migrants and truckers, must be educated about its impact. The president's office oversees the political aspects of government HIV/AIDS policy, while the Ministry of Health co-ordinates the technical aspects.

HIV/AIDS can decimate families reducing household labor supply, draining savings and eroding human capital. In the agricultural sector, reduced labor results in less area under production, lower crop output, substitution away from labor-intensive cash crops, and a curtailment of natural resource management techniques. As rural savings fall, so do capital investments, purchases of high-cost inputs such as fertilizer, and livestock holdings. As human capital is lost, so too are the important agricultural skills that promote productivity. Moreover, the disease affects the capability of government agencies to support troubled communities and maintain staff (especially extension agents are at especially high-risk for contracting HIV as they traverse rural areas). Therefore, agricultural sector interventions for addressing HIV/AIDS should focus on building rural incomes, food security and resilience to shocks, gathering and disseminating information, and building HIV/AIDS advocacy.

Where HIV/AIDS is rampant, three steps should be taken to mainstream HIV/AIDS concerns into IEHA activities:

1) Ensure that IEHA interventions contribute to a reduction in, or containment of, the spread of HIV/AIDS. For example, incorporate anti-HIV/AIDS messages into training and information dissemination, or provide condoms at key transmission nodes, such as agricultural markets of regional importance.

2) Mitigate the marginalization of sero-positive populations. For example, adopt principles that do not allow sero-positive individuals to be excluded from participation in producer associations or other programs.

3) Plan for losses of key productive adults in both the public and private sectors. For example, require institutions in both the public and private sector funded by IEHA to plan to train personnel to replace those rendered unable to work and to consider how to fund care for this disabled population, as such measures would focus beneficiary attention on disease prevention.

Mali's current mean sero-positivity rate of less than two percent suggests that HIV/AIDS does not yet threaten to compromise the income growth promoted by IEHA interventions, except in a few select pockets of the population. Therefore, during the early phases of IEHA planning, the second and third types of measures listed above may not be necessary. However, if sero-positivity rises beyond its current low rate then additional measures will certainly become necessary. Populations fleeing the threat of violence in Côte d'Ivoire during the last quarter of 2002 threaten to spread that country's significantly higher level of sero-positivity to Mali. The current "pockets" of infection may expand, causing the mean rate of infection to grow sharply. The IEHA Action Plan must be designed to respond to potential changes in scale and distribution of the problem, which may evolve from a problem contained to well-defined pockets of vulnerable populations to a major cross-cutting issue.

Conflict

The North of Mali was the scene of an armed rebellion from 1990 to 1995. The two most important challenges faced by all development partners in the North are insecurity and the relative pervasiveness of the "assistance mentality". The former deters new partners from initiating development interventions in the North and the latter impedes the efforts of donors to shift from relief to sustainable local development. Hence, the ultimate goal that a development program should envisage is to help minimize the prospects of a new rebellion and a "failed state" in Mali. An armed rebellion in the North would be detrimental to the stability of the country and will undermine the overall security in a sub-region plagued with social and political turmoil.

Compared with some of its neighbors, Mali has enjoyed a relatively peaceful period since independence. It has had a border skirmish with Burkina Faso and a violent coup in 1991, neither of which resulted in great trauma or long-term economic disruption. In contrast, civil strife that took place in the north of the country during the 1990s has left that region, already economically marginalized before the conflict, with high levels of poverty . The government's 2002 Poverty Reduction Strategy Plan (République du Mali 2002: 12) classifies 93 percent of the

population of this region as "poor" or "very poor", compared with 64 percent for Mali as a whole. The IEHA Action Plan will ensure that IEHA activities in Mali reinforce the economic development of this region.

While, IEHA objectives include the mitigation of conflict, over a ten-year planning horizon, accurately predicting where conflict will break out is difficult. Therefore, the IEHA Action Plan will not try to tailor activities to reduce the probability of conflict, nor will it look to pursue activities in conflict-ridden areas. However, the Mission will remain vigilant to any need to alter IEHA activities to rebuild the economy of strife-stricken populations and reintegrate them into the national and regional economies during conflict and when it ends.

Investment Climate and Gaps

Mali has many poor and, as table 3 showed, they mostly live in rural areas, particularly in the north. In order to do something about this poverty, agricultural yields must rise and social services must become more accessible. Many of the solutions to the former of these two needs lie in operationalising some of the recommendations made below in this section.

The *Institut d'Economie Rurale*, Mali's principal agricultural research organisation lacks facilities for biotechnology. Yet biotechnology would allow IER to accelerate its development of high-yielding varieties of cultivars resistant to disease, drought and pests. It seems essential that the institute move purposively in this direction. This will require not only trained scientists and equipped laboratories but, fundamentally, national protocols for biotechnology and biosafety as well as a prioritization of the tasks to which this powerful new set of tools and techniques should be put.

For crop agriculture, seed is one of the most important determinants of yield. Low-income Malian farmers can raise their yields and incomes significantly by using improved seeds. In a high-risk environment they understandably seek the low-risk solution of retaining their own seed for staple crops year after year, or borrowing or buying it locally, but these are also low-gain solutions. Seed with much the same resistance profile but higher average yields, or that taste better, are available. Ways of familiarizing farmers with the advantages of such seed must be developed.

More commercially-oriented farmers are prepared to buy good seed for crops such as vegetables or rice. (And with biotechnology, more and better improved seeds should become available.) However, here the limiting factor is often the absence of someone from whom to buy good seed. The Malian private sector has not yet sufficiently embraced seed as a profitable commodity, partially because the more commercially-oriented farmers are so few. Mali needs seed companies that are prepared to take a vigorous entrepreneurial approach to marketing good seed, to make a profit, and to thus guarantee a sustainable and ever-improving set of commercial seed options to the country's farmers.

Mali, like its Sahelian neighbors, suffers from droughts. However, unlike these neighbors, Mali is favored with potential irrigation sites where production largely continues undisturbed by climatic factors. To reduce the risk to agriculture, it seems essential to move towards increasing

the ratio of Mali's agriculture that takes place under irrigation. Government policy favors this transformation. On closer inspection, there are several different irrigation technologies, largely distinguished by their capital intensity and the level of control they give over water flow. Where farmers adopt irrigation and find less variation in their harvests, they become less risk-averse and are easily persuaded to buy improved seed and other inputs that raise mean yields. Mali needs more irrigation.

Over the last two decades, the Malian government has taken steps to liberalize trade in most agricultural commodities. So have other West African governments. The UEMOA governments have created a free-trade area protected by a common external tariff that privileges trade between member states, including Mali. However, liberalization does not mean that trade immediately flourishes. Indeed as graph 1 showed, Malian agricultural exports have actually fallen between 1998 and 2001. There are two problems. Firstly, reforms on paper, whether national or regional, do not always translate into action. More action is necessary to really liberalize markets in Mali and its neighboring countries.

Secondly, several other factors have to co-exist in order for trade to take off. Firstly, traders need agribusiness support services, such as help in building professional associations, market information on prices, regulations and transaction costs, as well as training in post-harvest crop handling; grading, standards and certification, including sanitary and phytosanitary controls; and writing loan applications to financial institutions. Secondly, they need access to functional infrastructure that allows them to work efficiently: trucking, loading ramps, warehousing, railroads, rural roads, cold chains, milling and other processing services, packaging and packing. Thirdly, they need practical access to credit and insurance. Fourthly, they need diminished delays and demands for bribes along the roads to their destination markets. With help such as this, traders could efficiently move many of Mali's agricultural commodities onto the regional market.

In theory, producer organisations provide for the farmer a means of doing more through co-operation than she can do on her own. Mali has no lack of producer organisations, but a paucity of effective ones. With systematic organizational support, training and access to finance, producer organisations can raise productivity and diversify agriculture, allow communities to move into processing and marketing, and facilitate access to finance. All activities with smallholders should work through such organisations.

Mali has a range of agricultural education institutions covering most needs of the farmer, herder or forester. However, particularly in the context of the importance of developing a merchant middle class, it is notable that those who attend university do not have the option of obtaining an agribusiness degree at the BS level. Such a course should be developed at the University of Mali.

Most government institutions of importance to the development of the agricultural economy have weaknesses that the public purse cannot afford to remedy. The foregoing text cites the shortcomings at MAEP, MIC, IER and SSN. In each, there is a strong case for reinforcing these institutions and allowing them to fully play their roles in reducing hunger.

Although significant investment is taking place to improve Mali's highway and railway networks, the secondary road network is in a bad state. This problem is made worse by the high price of transport fuel in this landlocked country, resulting in difficulties in reacting to opportunities made plain when good information suggests lucrative markets. In addition, electrical power is expensive and subject to cuts. Transformation of agricultural commodities will not take off until cheap reliable power is available.

The primary and secondary canals in Mali's decrepit old irrigation systems leak large volumes of water. More irrigation as inefficient as this on a grand scale will significantly reduce the flow of rivers such as the Niger and the Bani, with implications for biodiversity and relations with Niger and Nigeria. More efficient use of water in some of the other smaller watersheds around the country which, in many cases, seem to offer lower capital intensity, would contribute to easing this situation.

Soil erosion and depletion are Mali's biggest environmental problem, one that has direct implications for agricultural productivity. Conversely, greater productivity in agriculture relieves the pressure on the land because the more intensive the agricultural system, the less land that is needed and the more can be left unused. Hugely increased use of improved seed and chemical fertilizers would largely solve this problem.

Mali's lack of capacity to enforce its relatively new environmental protection codes is critical to attracting and maintaining critical investments in the agriculture sector. Capability in both the private sector as well as the public sector to carry out the required environmental impact assessments and environmental audits now required in a timely and competent manner for new construction and investment is a critical constraint to attracting new investment.

It is not just important in principle to mainstream gender in agricultural development; it is practically important to marshal all available resources as a matter of course. Proactively planning for HIV/AIDS is better than waiting for its effects to hit agricultural productivity. For humanitarian reasons and to stave off further conflict, it is important to fully include citizens of the north of the country into the national economy.

These factors identified above, indicate major weaknesses and ultimately potential areas for IEHA intervention. However, it is important to consider what initiatives are already underway to address these issues to determine first, whether or not a particular issue is already being adequately addressed, and second, whether or not IEHA activities might be tailored to support on-going or planned interventions by other parties, to build complementarities and linkages, and boost the overall effectiveness of government and donor efforts within the IEHA context.

U.S. Government Food Aid

The U.S. Government provides food aid to developing countries under three different programs or mandates – Public Law 480, which includes Title I and Title II programs, Section 416(b), and Food for Progress. Mali receives food aid only under Title II, administered by USAID. In 2001, Mali received 2,600 MT of wheat flour worth $564,200 and USAID provided the World Food Programme (WFP) with 1,770 MT of cornmeal for Mali worth $433,650, for a total value of

$997,850 in food aid. The value of food aid provided to Mali in 2002 dropped by roughly one third, with food aid provided by USAID entirely through the WFP consisting of 2,100 MT of cornmeal worth $441,000 and 600 MT of peas worth $225,000, for a total value of $666,000 in food aid.[16]

A portion of this food aid is monetized to pay for development programs (in 2001, 74% of all food aid to West Africa was intended for monetization). Monetized food aid for Mali is distributed through the Chad monetization program administered by Africare, to support agricultural extension programs that teach farmers how to use improved seeds and other technologies that increase productivity, and nutrition programs that provide direct food assistance to encourage mothers' and children's attendance in health centers, as well as nutrition/health education, consultations and training.[17]

Government, Donor and Private Sector Programs in Mali

Major Government Initiatives in Mali

The Malian government's *Cadre stratégique de lutte contre la pauvreté* (CSLP, or Poverty Reduction Strategy Program PRSP) was finalized in August 2002.[18] One of its three major thrusts is the development of infrastructure and productive sectors. The CSLP/PRSP underscores the importance of a range of activities in areas of interest within the context of IEHA goals and objectives. The CSLP/PRSP may be seen as a summary of the government's initiatives and priorities for agricultural growth and rural development towards the reduction of poverty.

The CSLP/PRSP addresses government concerns in the following areas relevant to the IEHA themes:

- Agricultural research
- Rural water management
- Promotion of marketing and processing
- Support for producer organizations
- Support for private sector development
- Vulnerable populations

Agricultural Research

The CSLP/PRSP discusses the importance of agricultural research, without a great amount of detail regarding proposed interventions or improvements. However, the latest annual report (2001) produced by the national agricultural research organisation, Institut d'Economie Rurale

[16] Source: USDA statistics.
[17] "West Africa Commodity Monitoring (WACOM) Project: Fiscal Year 2001 Report," USAID West Africa Regional Office of Food for Peace, Bamako, Mali, June, 2002.

[18] CSLP (République du Mali 2002: 66) refers to Ministère du Développement Rural, Cellule de Planification et de Statistique (2001a) for more detail of its rural-development strategy.

offers more detailed information on government-sponsored research currently underway. As previously discussed, IER conducts research in the areas of agriculture, livestock, forestry and fisheries, natural resources management; laboratory studies on soil and water, food technology and animal nutrition; economic study of commodity value chains; and operates a genetic resources program. IER's recognition of the importance of biotechnology appears to have arisen too recently for inclusion in either CSLP or the IER annual report but is well documented in the proceedings of a national workshop on the subject (*Ministère du Développement Rural et de l'Environnement*, *Ministère de l'Education*, and *Institut d'Economie Rurale* 2002).

Rural Water Management

The importance of rural water management in general, and irrigation in particular, is stressed by the CSLP/PRSP, which identifies the following key activities: increasing the inventory of irrigable sites; continuing the national irrigation program and implementing its planning framework; developing the capacity for environmental impact statements; setting up a sustainable financing mechanism for irrigation infrastructure and equipment; capacity building for producer associations so that they can manage and upkeep the perimeters; and, construction of better roads to irrigated perimeters. Additionally, the CSLP/PRSP focuses heavily on the importance of overcoming land-tenure problems and including local populations in the construction of irrigation works.

Promotion of Marketing and Processing

The CLSP discusses the promotion of marketing and processing of crops, and notes the importance of adding value to agricultural and livestock output and, where possible, increasing exports. It identifies cereals (especially rice) and ruminants as priority commodities; and poultry, horticulture and fisheries as other important sectors. Among other prerequisites to increased export marketing highlighted by the CSLP/PRSP were a better knowledge of market dynamics, specialisation for the regional market, improved transport, and training programs to make the business community aware of the new rules of international trade. The CSLP/PRSP also recognizes the demand for better infrastructure: market infrastructure, livestock vaccination corridors, wholesale markets and warehouses. The government proposes to set up a *Centre national de promotion des exportations* (CNPE) to develop these and other export-promoting factors.

Support for Producer Organizations

The CSLP/PRSP also stresses the role that both producer organizations and the business community have to play in developing market-oriented, and sometimes export-oriented, agriculture. The government calls for support to producers organizations in the form of services supplied, such as extension based on adaptive research, training, communication, agricultural finance and credit. Overall, the government's objective in this area is to better develop these organisations via education, skill transfer and the promotion of rural credit.

Support for Private Sector Development

The CLSP/PRSP also stresses the need for private-sector development as the engine of economic growth and poverty reduction. For this to happen, government recognises that it needs to remove the principal constraints to commerce, and to put in place conditions that will foster a positive business environment and allow the sector to take off. The CSLP highlights the need for a business climate and infrastructure that encourages entrepreneurship, institutions to guarantee property rights, and a solid, efficient and accessible financial system to promote investor confidence. The government also acknowledges that developing business capacity requires reinforcing the capacity of private-sector organisations and professional training in technical skills and organisational ability, reinforced support structures, the promotion of professional associations, and improvement of commercial negotiation skills.

Vulnerable Populations

As a poverty reduction strategy, the CSLP/PRSP is intrinsically focused on vulnerable populations, however, the government does highlight the need to promote the inclusion of vulnerable populations, such as women and youth, as part of agricultural development efforts.

Major Donor Initiatives in Mali

World Bank

The World Bank asserts that "in much of rural Africa improved performance of agriculture will lead to poverty reduction," and that "agricultural productivity can increase only where rural institutions are strengthened, growth is widely shared, natural resources are well-managed, and rural risks are reduced or shared." The World Bank's strategy for rural development in Africa, therefore rests on four pillars:[19]

- Making governments and institutions work better for the rural poor.
- Promoting widely-shared growth.
- Enhancing management of natural resources.
- Reducing risk and vulnerability.

The primary thrusts in supporting these pillars are programs that emphasize community participation, strengthening of voluntary producer organizations, private sector participation in production and trade, a stronger role for markets, enhanced activity of local governments and private firms in provision of public services, and transparency and accountability in the use of public funds.

[19] The World Bank's strategy is outlined in "From Action to Impact: The Africa Region's Rural Strategy," International Bank for Reconstruction and Development, Rural Development Department, July 2002. Available: http://lnweb18.worldbank.org/ESSD/essdext.nsf/11ByDocName/StrategyRegionalStrategies

Thus, in many ways, the World Bank strategy and focus for rural development in Africa is in harmony with the six primary IEHA themes. Current World Bank programs in Mali include the following:

Agricultural Trading and Processing Promotion Pilot Project: A five-year project, ending in 2002 designed to address key sectoral constraints to private investment in agricultural processing and marketing in the Sikasso, Segou and Mopti regions of Mali. The project is focused on capacity building and the transfer of know-how to the private sector through information networks, training, specialized technical assistance and study tours. The project is targeted on promoting vertical integration of the fruit/vegetable, hide/skins, and oilseeds/shea nut subsectors. Total funding for this project is expected to reach $6.9 million USD.

Pilot Private Irrigation Promotion Project: A six-year pilot effort, ending in 2003, that focuses on the link between irrigation and food security. The project is designed to improve and induce an investment in expansion in small-scale irrigation that will contribute to increased on-farm diversification of investments, productivity and food security. The project provides training and capacity-building for technical and managerial service delivery, in addition to financial institution experience in appraising investment projects in irrigation. Total funding for this project is expected to reach $5.5 million USD.

Grassroots Initiative to Fight Hunger and Poverty Project: This "prototype" for future World Bank activities in fighting hunger and poverty in Africa began in 1998 and will end in 2004. The project aims to improve the living conditions of disadvantaged targeted rural communities through community development exercises designed to build the capacity of communities to identify, rank and respond to their priority needs. Total funding for this project is expected to reach $23 million USD.

National Rural Infrastructure Project: This large-scale project is a five-year effort began in 2000 that marks the first phase of a long-term initiative to develop rural infrastructure in Mali. This first phase aims to reduce poverty and improve the livelihood of the rural population by accelerating the provision, and enhancing the sustainability, of basic rural infrastructure in irrigation and transport; output markets and social services; and water supply and sanitation. Total funding for this project is expected to reach $139.3 million USD.

Agricultural Services and Producer Organizations Project: This new project, began in 2001, is the first phase of a long-term program that aims to transfer non-basic public service functions to autonomous private entities. The first phase is designed to establish an institutional framework to improve the delivery of agricultural services to producers by supporting the decentralization of core functions in the Ministry of Rural Development, promoting private sector participation, and empowering producer organizations. This project is the inheritor of the World Bank's previously separate programs; the National Agricultural Research Project and the Agricultural Services Project. Total funding for this project (first phase only) is expected to reach $43.5 million USD.

African Development Bank

The African Development Bank's strategy for African agriculture focuses on a "shift from highly diversified, subsistence-oriented farming activity towards a more commercially-oriented agriculture with improved access to markets and agro-industry." In order to meet this overarching objective, AfDB will concentrate its lending in six key areas:

- Provision of rural infrastructure
- Expansion of private sector agribusiness
- Development and capitalization of more effective private sector financial networks
- Improved natural resource management
- Capacity building
- Increased regional integration

The principles guiding lending for the agricultural sector include: conducive policy and environment for private sector development; appropriate macro-economic policy; participation at the grassroots level of beneficiary groups with officially-recognized status in fiscal and commercial aspects of the activity; and, cross-sectoral holistic approaches to rural development.

AfDB's policy paper recognizes the contributions of other donors and asserts that it will offer its support to other donor initiatives, but will not take the lead where other donors and agencies are already providing effective leadership. AfDB, therefore, has identified several areas that it considers primarily the domain of other donors, including: policy-based structural reform programs at the macro-economic level and agricultural sector investment programs; agricultural research with special interest in developing technologies; and, agricultural extension with special emphasis on more effectively serving the needs of all end users, especially women.

Based on a primary assumption that "development aid to Africa has often been heavily biased towards the pre-harvest input delivery services with much less emphasis on the post-harvest aspects of the food chain," AfDB's strategy for the next decade will be to put more emphasis on post-harvest needs and focus on improving farmer's access to markets and providing support to member countries in identifying critical points for intervention throughout the production process.

In the area of post-harvest needs, AfDB intends to focus on the following areas of high potential that it deems under-funded or neglected by other donors: labor-intensive technologies; greater integration of crop, livestock and agro-forestry enterprises within farming systems; post-harvest technologies to minimize losses; and high-value but less well-researched export commodities.

While in the area of improving farmer's access to markets, AfDB intends to focus on helping member countries to develop financial sector development, private infrastructure and micro-credit and savings services, and to streamline regulatory and legal environments to nurture private investment in the sector. Likewise, it will focus on removing trade barriers and identifies key areas as the liberalization of domestic trade, the promotion of intra-regional trade and the diversification of export opportunities through the harmonization of policies related to agriculture, lower tariffs and the removal of other barriers to free trade.

Despite the stated policy for rural development in Africa, the majority of AfDB's recent loans to Mali do not match stated strategy goals, instead many focus on increased agricultural production, primarily through improved irrigation. In Mali, AfDB has approved the following projects related to rural development during calendar years 2000-2002:

Financing for the 2001-2003 Structural Adjustment Programme: The SAP III program has been strengthening the reforms implemented by the Malian Government since 1991. This particular loan provided by the African Development Fund (ADF) will be used to finance reforms that will strengthen economic growth by supporting agricultural production; primarily the restructuring of Mali's cotton sector. Total size of loan is an estimated $29 million USD.

North-East Mali Livestock Development Project: This project is the second phase of the first such agro-sylvo-pastoral development project that ran from 1989 to 2000 with joint support from the ADF and the European Development Fund. The project will provide training to farmers associations on new herd production and management methods, artificially inseminate herds and develop pastures and watering places, and implement an environmental management plan. In addition, the project will develop a revolving livestock fund to benefit very poor families and incorporate information on AIDS, STDs and malaria into training programs. Total amount of funding for this project is expected to reach $22.7 million USD.

Feasibility Study of the Phedie and Sabalibougou Irrigation Development Project: This study will analyze the present irrigation situation and produce detailed analyses that will guide the design and future development of these two irrigation projects. The long-term goal of implementing irrigation projects is to increase rice and market garden products through intensified cropping of the land in the Phedie and Sabalibougou areas. Total amount of funding for the feasibility study is roughly $0.8 million USD.

Mopti Region Rural Development Support Project: This project is a follow-up project to the rural development project for Mopti carried out between 1986 and 1998. The goal of the project is to enhance food security and reduce poverty in Mopti by diversifying and increasing agricultural production and promoting income-generating activities. In particular, it aims to increase output of rice, onion, millet and sorghum in the Mopti area largely through improving irrigation, in addition to improving basic human capacity and social infrastructure in the region. Total funding for this project is expected to reach $23.2 million USD.

Technical Assistance for the Douentza Province Agricultural Development Study: This grant provided funding for a feasibility study of irrigation development project on Ouallo plain and the preparation of bidding documents, specifications, an environmental impact assessment and other project preparation. Total funding for the study estimated at $0.9 million USD.

Project to Support the Seed Sub-Sector in Mali: This project aims to increase the production and use of certified seeds in Mali, by ultimately producing and disseminating 7,150 tonnes of certified seed to sow 255,000 hectares, and 5,700 tonnes of certified rice seeds to sow 48,000 hectares in the year 2009. The project also entails the rehabilitation and equipping of the laboratory in Sotuba, as well as the establishment of four departmental laboratories in Sikasso,

Ségou, Mopti and Kayes for the certification of seeds. Total amount of funding for this project is estimated at $8.2 million USD.

Rural Development Project of the Daye, Hamadja and Korioume Plains in Mali: This project seeks to increase agricultural production through irrigation and ensure sustainability of the introduced activities through the strengthening of management capacity of cooperatives in the Day, Hamadja and Korioume plains. Additionally, the project will support specific actions to support women's socio-economic activities and a credit system for village banks, plus basic social infrastructure in these areas. Total funding for this project is expected to reach $11.9 million USD.

Maninkoura Irrigated Scheme Development: This project seeks to increase agricultural output and develop rural economic activities, notably those of women in the Maninkoura area. The project involves the funding of over one thousand hectares of irrigated schemes, plus fish ponds and feeder roads. It will also provide training and support to farmers associations, establish a credit system to sustain local initiatives, an develop basic infrastructure. Total funding for this project is expected to reach $19.9 million USD.

Agence française de développement

The French development agency does not have a stated policy or strategy for agricultural or rural development in Africa, but is active in Mali with numerous programs covering a wide range of development issues. Agence française de développement currently has two projects focused on agricultural development in Mali – a program to improve cotton production, and a program to intensify agricultural production and provide assistance to producer organizations in Office du Niger – both are described in further detail below. Average total commitments to Mali (1997-2000) equal roughly $23 million USD per annum.

Financement partiel du programme d'amélioration des systèmes d'exploitation en zone cottonière: The first project aims to make Mali's cotton sector more competitive through the development of an information system for producers, new experiments in technology transfer to improve production, and a new form of management board that is able to take as its purview a broad range of production issues without being limited to purely technical aspects of cultivation. Total funding for this project is expected to reach $5.7 million USD.

Programme d'apui à l'intensification de la production agricole et à la professionnalisation des organizations de producteurs de l'Office du Niger: This is the second phase of a project to create four new centers to deliver integrated extension services, including research and development, and change observation services. The objective of these centers will be to improve the mechanism for delivery and the quality of technical assistance provided to producers, thus improving overall agricultural productivity and environmental management. These new centers are expected to service 80 percent of village associations in Office du Niger. Total funding for this project is expected to reach $2.6 million USD.

Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)

GTZ is active in Mali where it focuses primarily on three sectors: (i) agriculture/resource management; (ii) decentralization; and, (iii) drinking water supply. Technical assistance is targeted at supporting government reform in these sectors and implementing national strategies and programs. Projects are concentrated in the northern parts of Mali and are loosely tied to Mali's Poverty Reduction Strategy. In the area of agriculture/resource management, GTZ is currently undertaking the project described below. Total GTZ project funding for Mali in 2001 was roughly $9.4 million USD.

Management of Natural Resources – PRGN: In response to progressive desertification and decreases in soil fertility, GTZ is providing technical assistance to the Malian Ministry of the Environment for the conceptualization, coordination and implementation of a national environmental action plan. Within the scope of this project, GTZ is introducing sustainable agricultural management methods for rain-fed farming, as well as assisting to develop and implement village and communal land-use plans.

Other bilateral donors also provide aid and development assistance to Mali, but in limited ways or by supporting government and World Bank initiatives. Participation of these donors, including the British, Dutch, Swiss, Japanese, Canadian and other development agencies provide assistance throughout West Africa.

Major Private Sector Initiatives in Mali

More and more public/private sector partnerships are evolving in the agriculture sector in response to the encouraging investment climate in the agricultural sector in Mali. Notably among these is in the sugar and hides/tanning industries. U.S. private investment is being proposed in joint partnership with the Malian government for the development of sugar production and processing capacity and marketing. In addition, private U.S. interest has prompted the proposed construction of livestock hide tanning factory in the country. The sugar facility is in the initial planning and investment identification stages while the tannery has begun construction implementation and has a confident market identified for the forthcoming production.

Table 4: Existing Investments by Source of Funds and Primary Area of Impact

Project	Period	Funding (millions USD)	Primary Area of Impact					
			Science & Technology	Agricultural Markets & Trade	Strengthening Producer Organizations	Human & Institutional Capacity & Infrastructure	Vulnerable Groups and Countries in Transition	Sustainable Environmental Management
USAID								
IR1 – Agricultural Production	2003 – 2005	$7.1						
IR2 – Agricultural Trade	2003 – 2005	$4.8						
IR3 – Agricultural Finance	2003 – 2005	$5.8						
World Bank								
Agricultural Trading and Processing Promotion	1997 - 2002	$6.9						
Private Irrigation Promotion	1997 - 2003	$5.5						
Grassroots Initiative to Fight Hunger and Poverty	1998 - 2004	$23.0						
National Rural Infrastructure	2000 - 2005	$139.3						
Agricultural Services and Producer Organizations	2001 - 2006	$43.5						
African Development Bank								
Structural Adjustment Program (Cotton Sector)	2001 - 2003	$29.0						
North-East Mali Livestock Development	2003 - 2008	$22.7						
Phedie and Sabalibougou Irrigation Development	Issued in 2002	$0.8						
Mopti Region Rural Development Support	2002 - 2007	$23.2						

Douentza Province Agr. Dev. (Irrigation Feasibility)	Issued in 2001	$0.9						
Support for Seed Sub-Sector	2002 - 2006	$8.2						
Rural Dev. Daye, Hamadja and Korioume Plains	2001 - 2005	$11.9						
Maninkoura Irrigation Scheme	2001 - 2005	$19.9						
Other Donors								
Improving Productivity in the Cotton Sector (AFD)	N/A	$5.7						
Productivity/Producer Orgs in Office du Niger (AFD)	N/A	$2.6						
Management of Natural Resources (GTZ)	N/A	N/A						
Government								
Agricultural Research Services	N/A	N/A						
Rural Water Management and Irrigation	N/A	N/A						
Promotion of Marketing and Processing	N/A	N/A						
Support for Producer Organizations	N/A	N/A						
Support for Private Sector Development	N/A	N/A						
Private Sector, NGOs, Associations								
Sugar Factory								
Hide Tannery								

Shading Code:	Blank=Negligible	Light Grey= minor	Dark Grey= Major

Table 4 shows that Mali's major donors and lenders support a lot of science and technology projects. It is noteworthy, however, that with few exceptions work in biotechnology and seed remains unfunded. In addition, irrigation potential is so large and expensive that while there are numerous smaller projects and feasibility studies underway, the need for funding is so great, that further funding of irrigation development is needed in many areas.

USAID is a major donor in the area of markets and trade, and is well-placed among other donors, along with World Bank, with the capacity to undertake effective interventions in this area. Trade capacity building and support to agribusiness development and trade infrastructure is critical.

The World-Bank-funded PASAOP funds research, extension and support for producers organizations, at a total expected commitment of $43.5 million, thereby likely covering most needs in these areas for the foreseeable future. In addition, several NGOs offer support for producer organizations but are not represented in Table 2.

Development support for human and institutional capacity is generally lacking, while the World-Bank-funded National Rural Infrastructure Project addresses several infrastructural issues, including irrigation and rural roads, as well as market infrastructure.

Table 4 suggests that donors and lenders are not covering vulnerable groups or the environment well. However, these themes, may well be mainstreamed into projects with other principal foci.

Development Gaps

Taking into account the needs that Malian agriculture evidently has and, the ongoing activities by USAID, Government of Mali and other donors that address those needs, there remain investment "gaps" in IEHA-related areas. There also remain information gaps, in the sense that it is difficult to make some investment diagnoses without more data and/or more analysis.

Program gaps (Investment opportunities)

Under the rubric of "science and technology", the need for investment in biotechnology, irrigation and seed-sector development to boost agricultural incomes through increased productivity and reduced hunger seems clear. These three are linked as one of biotechnology's main functions is to accelerate the production of improved seed, and the production systems where farmers are keenest on improved seeds are irrigated.

Biotechnology investment logically begins with support for the development of a national protocol and for training, both technically and in policy analysis. Construction of laboratory facilities will follow. Work on seed improvement will complete this investment.

Seed-sector investment will take several forms, mostly articulated around the activities of NSS. NSS, IER, DNAMR and other stakeholders will hold meetings to prioritize the crops, target populations and techniques to be used to popularize seed for coarse grains. To develop private-sector participation in the sector, USAID will organize a preparatory process to decide on the level of support and firms that will benefit from it in seed-sector marketing.

While USAID will continue to invest in a variety of types of irrigation with its CSP funding, it will use IEHA funding to invest only in the type that appears to given the best return to investment and the best distribution of returns to smallholders, particularly women.

In "trade and marketing", there is a need to both provide a variety of different types of support to Mali's traders and, in the context of the UEMOA free-trade zone, to promote opportunities for Malian commodities in regional markets. AEG is already undertaking actions in both, as part of SO9 of the USAID/Mali CSP. However, trade and marketing also constitute an important part of IEHA and therefore the Mission will fund strategic interventions identified in proposed follow-on assessments of the critical needs in the area of trade capacity building and support to agribusiness development and trade infrastructure. The development of an agribusiness curriculum at the University of Mali with part of its IEHA funds, and the upgrading of Mali's Environmental Quality Laboratory at the Central Veterinary Laboratory to the level where it can become a member of the network of certifying labs in Africa and provide certification for Mali's exports for accessing foreign markets demanding quality produce, among others.

Data and analytic gaps

In the course of preparing this Action Plan, with the assistance of IEHA-funded contractors (Abt Associates), an extensive review was done of all of the most recent analyses and studies (completed over the past year) used in defining the current USAID Mali CSP SO9 Accelerated Economic Growth Strategic Objective Program. These included Mali Agricultural Sector Assessment Volumes 1 & 2, An Analysis of the Benefits and Costs of Alternative Irrigation Investments in Mali, a Mali Equity Fund Feasibility Study (basically a review of the entire financial sector re: constraints to agricultural credit) and a Mali Trade Development Program Study. Each of these studies and assessments incorporated results from key USAID/W policy papers and reports (especially from AFR/SD and EGAT), documents done by or for the Mission over the last five years (ATRIP, EAGER, etc. reports), selected documents prepared by the GRM, work done by institutional contractors, as well as publications from the World Bank, IMF, WTO, UN Agencies, CGIAR affiliates, universities and other bilateral donors.

No major information gaps were found with respect to the six core areas of IEHA. Yet as might be expected, much more information was available on some of them than on others, and there was also some unevenness within any single core area. For example, more information was found on science and technology than on vulnerable groups, and on conventional plant breeding in Mali as opposed to actual applications of agricultural biotechnology.

Data and analysis for some areas of Mali was more abundant than for others. Recent and accurate information on the North was lacking.

Reasonably current economic, social, and demographic information was readily available for Mali, but sector-specific information was somewhat more elusive or dated. For instance, within the time available to prepare this first Action Plan, agricultural sector GDP could not be easily disaggregated by subsector, categories and commodity, which makes it difficult to weigh the relative importance of interventions that might be undertaken. Commodity-specific national and

district-level trends in area planted, area harvested, cropping intensity, yields, and farmgate value are reportedly available, but could not be effectively used for Action Plan development until the design of the specific activities under the AEG portfolio actually begins in 2003. The same applies for different types of livestock activities. Costs and returns for many specific agro-economic enterprises could not be located, although again it may be available with more time to seek it out. Stand-alone situation and outlook analyses for commercial crops could not be found for most commercial crop or livestock activities, but were occasionally noted as part of sporadic industry appraisals, often done with donor support. For food security crops, however, reasonably good analyses and projections are available from FEWSNET. Agricultural trade statistics tend to be at least two years old, and are generally not available in disaggregated form except for the most important commodities. The main destination markets for specific crops were difficult to identify, as was the seasonality of trade flows. Improved agricultural statistics—especially intra-regional trade for West Africa, as well as historical data on volumes and prices within each country--is a goal that IEHA clearly should support on a regional basis such as through regional WARP targeted program interventions .

Adaptive agricultural research done by IER and its various research institutes and the IARCs (most notably ICRISAT, WARDA, IITA, etc.) does suggest which crops and livestock activities offer opportunities for productivity improvements through technological innovation. Trade and market analyses completed under the ATRIP, EAGER, and WARP Regional Programs and taken into account by the agriculture sector assessments completed this past year does suggest which commodities and regions in which Mali can show clear competitive advantage in terms of trade. These resources notwithstanding, additional analytical work by IFPRI and the contractor teams that will be responsible for implementation of the new CSP will be needed to definitively say at the national, district and sub-district level (or by ecological zone, coupled with market access data) which specific agro-based activities offer the best potential for contributing to agricultural growth, rural incomes and hunger, whether to concentrate on production versus post-harvest versus processing versus marketing issues, and which end-markets to aim for.

In addition, the Agriculture Sector Assessment recommended further ongoing analysis of the structure of linkages from agricultural growth in Mali to other sectors of the economy (backward, forward, consumption, fiscal, employment) in the first year of CSP implementation in order to support and fine tune selected investments under the current CSP.

Specific activities under the new CSP have not yet been identified. USAID/Mali has recently released a series of RFPs for solicitation. Aside from these activities, USAID/Mali is proposing in this plan some significant additional activities to be funded solely or mostly through the IEHA initiative. Certain analyses are needed before those new activities can be designed, and then the designs themselves must be completed. These analyses are discussed in the Section below.

Criteria for Selection of Investments and Evaluation of Portfolio

As the Mission planned for a significant increase in funding for agriculture, a key question that arose was how best to apply the resources, given the development context described above. It was evident that priorities would have to be set in order to reduce alternatives to a more manageable number.

First, four **threshold criteria** were applied to make sure that all areas of intervention under consideration were even feasible to address:

- Is the proposed area of activity amenable to USAID intervention, given Agency policy worldwide and legal restrictions on the use of U.S. Government foreign aid funds?
- Are likely interventions in that area consistent with the Mission's mandate and Integrated Strategic Plan?
- Is it possible to visualize one or more development interventions in the area of interest that might help raise smallholder incomes, and could therefore be important?
- Can interventions be designed that would complement the activities of the private sector, host country government and other donors?

A priori, none of the areas of potential intervention identified as development gaps by the Mali AEG (SO9) Team seemed to violate these criteria, although it was recognized that because of the Bumpers' Amendment and other U.S. legislation, some caution would have to be exercised before devoting resources to the cotton/textile/apparel industry, and a PD71 policy determination might be required.

Consistent with the objectives and design of IEHA, the Mission also defined certain selection criteria with which potential investments could be evaluated. Since the objective of IEHA is to rapidly and sustainably increase agricultural growth and rural incomes, and growth is what leads to income, it follows that all investments should contribute as directly as possible to agricultural growth, which is usually measured in terms of change in real economic value-added.

Next, taking all of the above into consideration, each prospective investment was evaluated in terms of ten **individual selection criteria**

- **Cost,** in terms of development assistance resources required;
- **Return,** not just in terms of absolute level but also in terms of the time to realize results, and the annual variability (because of droughts, for example) of returns;
- **Impact** on different populations, i.e. farmers, women, people living in rural areas, or consumers;
- **Risk of failure**, whether due to the physical, technical and policy environment, or simply a dubious design or difficulties in implementation;
- **Fit** with other IEHA-supported activities and the rest of the Mission's portfolio;
- **Scalability/Replicability,** if successful;
- **Burden** on Mission staff and management;
- **Spill-over effects, especially on fragile lands, vulnerable groups, and other industries**;
- **Leveraging potential**, in terms of attracting support from other donors, the government or the private sector;

- **Susceptibility to measurement**, for monitoring and evaluation purposes.

Finally, the revised Mission set of activities that would result was checked against ten **portfolio evaluation criteria** to make sure that there were no overall defects in the selected mix:

- **Level of resources required** in terms of development assistance;
- **Return,** in terms of key indicators for IEHA activities alone, as well as expected contribution to the SO7 Intermediate Results;
- **Distribution and equity of impact** on different populations of interest;
- **Risk of failure** in IEHA-supported activities alone, as well as the overall portfolio;
- **Fit** with IEHA's objectives, approach, and six core areas;
- **Burden** on Mission staff and management;
- **Balance within the agricultural sector**, in terms of subsectors assisted, domestic vs. export orientation, fresh versus processed products, high- versus low-value;
- **Complementarity** with WARP and bilateral mission activities;
- **Leveraging potential**, in terms of attracting support from other donors, the government or the private sector; and
- **Coverage of cross-cutting concerns**, including gender mainstreaming, environmental impact, child labor, HIV/AIDS, food safety and others.

The Mali Mission believes that the combination of on-going activities, planned activities, and selected new activities that emerged from this three-step evaluation process will result in a very strong development program, one capable of achieving major impacts in terms of agricultural growth, smallholder and rural income increases, and reduced hunger. The resulting portfolio is entirely consistent with the GRM's long-range vision and its poverty reduction and agricultural/trade competitiveness strategies.

In the discussion that follows, we describe the investments selected, distinguishing between those that are funded from current and prior year funding, and those that would require future IEHA funding.

Program Design and Analysis.

For the proposed Biotechnology Capacity-Building Program, even before a design is commissioned, the USAID Mission will have to figure out: (1) the scope of possible activities in biotechnology; (2) the extent of on-going involvement by both public and private sector; (3) the depth and breadth of interest and demand on the part of potential customers; (4) to what extent other donors or the GRM are already planning on working in this area; (5) which segments of biotechnology spectrum of interventions offer the most immediate impacts and promise. These and similar questions will require some IEHA-funded groundwork, probably conducted by external consultants possible from the RAISE IQC and/or in conjunction with the EGAT ABSP II Program support institutions.

For the proposed Support for Irrigation Emphasis/Development in Small Valley-basins and Large Plains (*bas fonds*), design of this activity will need to be carried out in close coordination with the to be selected technical assistance team or teams identified for implementation of the larger irrigation/production development efforts currently being solicited for under the CSP.

For the proposed Support for Seed Multiplication and Dissemination, before a design is commissioned, the USAID Mission will have to determine: (1) the scope of possible activities in the seed sector; (2) the extent of on-going involvement by both public and private sector; (3) the depth and breadth of interest and demand on the part of potential customers; (4) to what extent other donors or the GRM are already planning on working in this area; (5) which segments of the seed sector potential interventions offer the most immediate impacts and promise. These and similar questions will require some IEHA-funded groundwork, probably conducted by external consultants possible through the RAISE IQC and/or in conjunction with the IARCs such as ICRISAT and those NGOs most knowledgeable and experienced in the seed sector in Mali.

Under the proposed activity aimed at Supporting Agribusiness Development, particularly the Strengthening Human and Institutional Capital and Education and Training of the next generation of Malian agro-entrepreneurs, the foundation has already been laid by the AID/W project assessing training needs assessment conducted in mid-2002. However, prior to the design of a specific long-term activity in this crucial area, further analytical work will be needed to make sure that the apparent need to replenish high-level Malian professional expertise in agriculture and allied fields is sufficiently addressed, that mid-career refreshment training is provided, that both degree and non-degree training is fully covered, and that the specific needs of USAID/Mali and GRM flagship projects are taken into account. This means that a follow-up assessment, including a focus on critical trade enhancing infrastructure needs, should be carried out in the latter half of 2003, by which time the contractor teams under the new CSP will have begun implementation. Given the incremental nature of this activity, as well as its intrinsic importance, this is viewed as a good candidate for IEHA funding, not only in the assessment and design stage, but for implementation.

Under the proposed Environmental Impact Assessment and Environmental Audit Capacity building activity, the Ministry of the Environment has asked GTZ to finance various training sessions in EIA and EA similar to previous training done on a very small scale to date, in the first quarter of 2003, as well as the production of a procedure manual for EIA. GTZ appears to be unable to fund these requests. Therefore, the Ministry has turned to USAID/Mali, which has agreed under the current CSP (although unplanned in the current CSP) to pay a limited portion of the cost of the training sessions, leaving the Ministry to find additional resources elsewhere. It is not clear to what extent the inefficiencies in the EIA process stem from a generalized lack of familiarity of the public or private sectors with the basics of environmental science and environmental policy and, on the other hand, to what extent are there gaps in specialized knowledge and facilities, such as laboratories. An initial assessment of the critical gaps and needs will further reveal critical actions in this area to be addressed with IEHA funding.

Investment Options for IEHA funding

1. Support for the construction of irrigation infrastructure in small valley-basins and large plains.

In the first year of IEHA funding (FY03) USAID Mali intends to focus IEHA funds under on expansion of efforts which are already having quick measurable impacts for small-holder incomes in order to show results within the first 18 months of IEHA funding. In this regard initial FY03 IEHA funds will be focused on expansion of small holder irrigation perimeters where success stories are already emerging. For example this past year USAID Mali funded the development of improved irrigation systems in various areas of southern Mali, e.g., the Djenne area. Today, this simple action has substantially changed the lives of many women, men and children in the Djenne village. After only three months of production and marketing of the horticultural products from this improved system, these women's income has changed from virtually zero to CFA 675,000 (approximately $ 1,054). In one year of operation, they expect to generate more than CFA 2,500,000 (approximately $ 3,906).

This proposed IEHA investment represents an increased/expanded emphasis of investments intended under IR1 Sustainable Production of Selected Agricultural Products in Targeted Areas Increased in the USAID Mali CSP investments under the SO9.

Proposed Activities

The description of the IEHA pillars as they apply to Mali compared different types of irrigation systems. Whereas the Mali mission intends to move ahead with a focus on both capital-intensive irrigation infrastructure systems (such as fully-controlled and partially-controlled flood irrigation) as well as the less capital-intensive *bas fonds* systems under CSP funding, it welcomes the opportunity to expand and accelerate development of less capital-intensive systems (*bas fonds*) through IEHA funding.

Bas fonds are small inland valley basins fed by diverted streams and found in the OHVN zone, the CMDT zone of Mali-Sud, Kayes and the Dogon plateau. Although yields are normally considerably lower and risk higher within these systems, in contrast to more capital-intensive irrigation systems, valley-bottom irrigation holds several unique characteristics. Firstly, it costs relatively little per unit area to develop. Secondly, costs of operation are low because this system exploits local natural topography and drainage characteristics. Thirdly, it builds on existing land-use systems, some of which are well-defined and uncontroversial. Fourthly, it focuses more directly and extensively on relatively more resource poor smallholder producers, of which women make up a larger participating group and are more traditionally integrated into the production system.

Implementation Characteristics

The exact approach and modalities of accelerating the development of these small-holder *bas fonds* irrigation production systems within the larger SO9 irrigation production development

program will be further outlined and designed when the contractor for the overall program has been selected and is on site in Mali.

In general site selection will depend on:

1. favourable local topography and hydrology resulting in relatively low construction costs per unit area;
2. proximity to a road in sufficiently good repair to allow the evacuation of agricultural surpluses to the national market;
3. pre-existing harmonious land-use relations between smallholders who work the land to be irrigated;
4. local acceptance of gender-neutral rights to benefit from the improvements;
5. willingness of beneficiaries to pay 20 percent of the cost of construction (or to contribute the equivalent in sweat equity);
6. willingness of beneficiaries to adopt improved agricultural technologies;
7. an existing producers' association to which beneficiaries belong (or a willingness to form one);
8. proximity to other similar sites (in order to build centers of excellence in *bas fonds* irrigation).

Partnership meetings will precede all other activity and will continue regularly throughout the life of the investment. Design will take place with full consultation with local beneficiaries, local authorities, representatives of government ministries concerned, and any other relevant organization. Construction will favor labor-intensive techniques to the degree practicable. In addition to the labor contributed in the form of beneficiaries' sweat-equity, local non-beneficiaries will have first option to paid employment on the construction site.

After construction, the farmers affected will receive training in water management and the producers' association will be required to appoint a water-management committee. For five years, farmers will have ongoing access to extension services, micro-credit for inputs and marketing, and market information. They will be oriented towards high-yielding varieties of rice and horticultural crops, particularly those resulting from USAID/Mali's seed-sector development initiative proposed for IEHA funding. If necessary, local traders will receive credit to stock agricultural inputs, including improved seed.

Once a year during the five years after completion of construction, representatives of the producers' association for each site will attend a national workshop to exchange experiences. Representatives of donors involved in irrigation, relevant government officials and NGO representatives will also be invited to attend. In addition, where appropriate, producers' association representatives will take part in study tours that will allow them to visit similar sites where new technology and water-management systems have been successful.

Ongoing monitoring and evaluation will provide feedback that USAID/Mali will apply to this construction program. Before, during and after construction, USAID/Mali will consult other donors promoting this type of agriculture: EC, Dutch Cooperation, the World Bank and the African Development Bank.

GTZ has been funding work in small irrigated perimeters in Mali for several years now. Many of these irrigated perimeters, particularly in the Atara area, have been producing rice on one half acre with good success but far too small of a scale for ever achieving incomes above the poverty level. USAID would like to explore, on a pilot basis, the enlargement of some of these areas with successful participants who have water, the training, and the desire to be bigger rice producers. This could pilot a demonstration program of what can be done with the needed expertise but on larger perimeters by the same small scale producers.

Evaluation of Selection Criteria

Gaddis et al (2002: appendix C) estimate the internal rates of return (IRRs) for *bas fonds* systems at between 18 and 32 percent, with the higher figure for smaller basins of this type. These returns should be compared to the same authors' estimates of IRRs of 9 percent for capital-intensive, ON-types of system, primarily due to the up-front investment costs. Moreover, they judge the variability in these returns to be "low" for small *bas fonds* schemes to "medium-to-low" for larger schemes.

The area cultivated under irrigation would vary between sites. In Mali-Sud the typical size varies between 15 and 30 hectares. Elsewhere, sizes up to 600 hectares exist. The average cost per hectare for 33 *bas fonds* completed in 2002 under funding from the African Development Bank cost is about $1,000, compared to 5 – 10 times as much for an ON-type system. Thus USAID could expect for, say one million dollars, to construct 1,000 hectares of *bas fonds*, with a yield of about 2 T of rice per hectare, resulting in production of 2,000 T. If paddy sells for 100,000 FCFA per T, this translates into an estimated gross annual value of production of 200 million FCFA (approximately $363,636 @550 FCFA/$1). Some farmers would substitute more profitable crops for rice and this would raise the gross value. It seems that, in most cases, water storage would only allow a single crop annually.

USAID/Mali does not envisage significant on-farm storage facilities to complement the irrigation infrastructure. Rather, it foresees direct sales to the market of most of the production of rice and vegetables. This is the reason for the importance placed on the irrigation taking place close to a serviceable road, which is particularly important for perishable vegetables for which losses can exceed half the harvested crop. Crops that suffer from high post-harvest losses (for whatever reason) will send feedback to farmers that will result in their growing less in the next season.

It is not clear whether the rice farmer will sell paddy or try to add value by threshing it before selling rice into the national market. (Threshing results in 70 percent rice and 30 percent rice bran.) In recent years, small-scale local rice threshing has become the cheapest way to convert paddy into rice. However, these mills produce rice of uneven quality with a high percentage of broken grains. This reduces the competitiveness of rice for example in the export markets produced under these systems thus the price of the final product.

While vegetable markets may experience seasonal gluts unless the crops are less perishable, can be transformed, or have an export market, rice survives storage and handling without significant losses. Malian traders are developing regional markets for rice, so extra production should be

exportable with relatively small local price drops of short duration. Indeed, over the last few years, regional demand for rice has grown at about 8 percent annually, suggesting few worries about excessive supply.

Women should be the big winners from such projects because they traditionally farm the *bas fonds*. Though they may not have the capital to make the 20 percent contribution to covering costs, the sweat equity option should not exclude them. They should also find the increased quantity of agricultural by-products and of rice bran useful feed for their ruminants.

However, there are risks. Gaddis et al. (2002) note that it is possible to develop *bas fonds* that would be better left undeveloped because they "perform very well from several points of view – output, women's income, and harmony with other production systems (rainfed agriculture, livestock and fisheries)". They also point out that, upon occasion, engineers have planned irrigation structures inappropriately because they did not consult locals, resulting in sub-optimal water flows. Some *bas fonds* systems work inefficiently because, for various reasons, the beneficiaries do not manage the water optimally. Construction of even very modest infrastructure may result in larger areas of standing water than previously existed or in agricultural practices that have farmers standing in water for longer periods of time, both of which can lead to more disease. Finally, unresolved land-tenure problems may split a community, result in threats of conflict, and result in only partial use of the irrigation infrastructure.

2. Harnessing Agricultural Technology for Malian Agriculture

The Mali CSP Strategy is primarily focused on increased irrigated agricultural production for those commodities for which Mali has a regional comparative advantage i.e. rice, horticulture, etc. With supplementary IEHA funding the Mission will place increased emphasis on technologies which will enhance the Production and Trade of these commodities with particular focus on small farmers. This emphasis will focus on both processing and marketing applications along the entire production/marketing chain for these commodities to increase impact. For rice, for example, increased emphasis will be placed on appropriate milling technologies for Malian rice to increase its competitiveness in the regional market. This could include improved and more cost effective rice cleaning and polishing technologies within the irrigated rice production areas of the country. In addition, the identification of new/technologically advanced rice varieties through initiatives with WARDA, which has recently relocated to Mali from Ivory Coast, will be investigated. Technologically advanced horticulture varieties will be investigated through recent work being done in ICRISAT Niger and its Arid Zone Production Systems IPALAC/DMP Program as well.

Primarily, in support of the enhanced availability of new seed varieties, a series of most appropriate efforts in the application and access of biotechnological advances will be investigated under IEHA funding. USAID Mali recently undertook a Biotechnology Assessment in Mali in order to identify the most appropriate, quick impact practical applications of biotechnological advances for Mali. The preliminary results of this assessment identified three categories of proposed actions/needs to enhance production capacity in Mali under both short and medium term scenarios;

Short Term:

Examples of short term biotechnology related actions which could have relatively quick impact and support the current CSP Production efforts might include training sessions for policy-makers, scientists and technicians in biotechnology. There is a clear need for information at all levels in Mali and this is a constraint for decision makers, for breeders, and young scientists. It is also a major problem for NGOs, associations of farmers and consumers. Biotechnology priority setting exercises with scientists in Mali are another priority for Mali and would assist fairly quickly in the areas of some major current production problems such as Bt control, striga control, virus control, transformation techniques. This is critical as it would define all other actions and priorities to be undertaken – human capacity building, facilities, research development, transgenic seed importation, and investments.

The development of virus-free certification systems for Mali could be undertaken together with the scaling up of the production of select horticulture seeds such as potatoes, etc. Seed certification is a very small operation in time and funding but it would boost the seed production business and permit a scaling up of the production to save money for local businesses particularly in potatoes as well as other horticultural commodities which are already exported regionally on a significant scale from Mali.

It is also felt that Malian Scientists and decision makers need to be aware of top biotech priorities in other countries as study cases, taking into account Chinese, Kenyan or South African systems, as these could enhance and speed up the preparation of the capability to field test bioengineered plants, including the technical and physical aspects, in Mali. A major focus will be the development of biosafety regulations to be put in place and be operational in Mali so that the critical legislation and information will be available to issue permits for field testing of improved varities. The awareness and familiarity with such relevant cases in other countries (China, Kenya, Southern Africa, etc) for Mali would speed up the system and help scientists to accumulate the right data. It will be useful to separate biosafety regulations for commercialization from biosafety for field testing that allow farmers to see what the products look like compared to their own crops. Initial emphases would be placed on the biosafety regulations required for field testing of improved varieties.

Medium Term:

The setting up of biosafety regulations in Mali would have major enhancement impact on the current USAID Mali CSP Production emphasis. Plant Biosafety Regulation (PBS) assistance to establish biosafety regulations could be accomplished in a relatively short period of time i.e., 18 months or less. This could allow Mali the critical access it needs for higher producing varieties already becoming available world wide. In addition, the development of a national biotechnology Plan of Action targeting the development of, not only human resources, but facilities, and expertise in program planning is critical for Mali's ability to continue to be plugged-in to the developments in biotech in the future. To avoid duplications in this process it is necessary for Mali to have this National Plan of Action for coordination and best use of resources in the different institutions involved both now and in the future.

3. Support for Seed Multiplication and Dissemination

Again, in direct support of improved irrigated *bas-fonds* horticulture production by small-holder farmers and women's groups in the south (described in 1 and 2 above), FY03 IEHA funds will be targeted towards issues related to the importation and/or availability of improved horticulture seed (including tomatoes, onions, etc.) issues and potential improvements of seed varieties available for southern Mali producers. This will directly support the quick impact (within first 16 months) results anticipated under IEHA interventions #1 and #2 described above for assuring the achievement of solid results on small-holder incomes within the initial stages of the implementation of the IEHA Initiative.

This proposed IEHA investment represents a new investment option not currently addressed in the USAID Mali CSP but directly supporting both IR1 Production of Selected Agricultural Products in Targeted Areas Increased and IR2 Trade of Selected Agricultural Products Increased.

The Malian government has reorganized the National Seed Service (NSS) as a seed-production coordinator with no in-house production capacity. The African Development Bank (AfDB) began to finance NSS activities beginning in late 2002, and will continue to do so until 2009. The AfDB support has a production focus; an opportunity exists to support complementary marketing activities. USAID/Mali and IEHA funding will provide valuable support to the development of a critical sub-sector that will add significant value to efforts now underway at NSS at relatively low cost.

In addition, USAID/Mali will use IEHA funds to develop biotechnological capacity in IER, the current provider of new varieties for a range of crops, and the University of Mali to support improvement of seed that will be fed into the multiplication and dissemination systems. This proposed investment is discussed separately.

Proposed Activities

A core challenge to the design of effective interventions into the seed sector in Mali is associated with the differences in the approaches that are appropriate for the cash economy and those that are appropriate for the subsistence economy. The corresponding opportunity is that effective use of improved seed has the opportunity to move the dividing line between the cash and subsistence economies, and improve the productivity and stability of both.

The proposed activities fall into three categories: seed-sector activities that seem potentially profitable to the private sector, those that do not, and a series of support functions. Activities that appear profitable are those linked to commercial farming, principally of rice, horticultural crops or hybrid cereals. Others crops will follow. In this case, the task is to launch firms that can compete with each other and with others in the region to create profitable businesses. In searching for a sustainable business model, the entrepreneurs involved will be providing a valuable service to those involved in irrigated and other more commercial forms of agriculture.

Multinationals cannot justify involvement in Mali because of low returns linked to the absence of plant variety protection and of varietal exclusivity. New local companies may be able to operate within cost structures that multi-national companies would find difficult. They would:

- subcontract most production activities to seed producer associations;
- focus on specific local markets;
- use contacts with public research to avoid high cost of varietal development and at the same time gather information on new varieties;
- develop reputations, mostly through branding;
- affiliate with other seed companies inside or outside Africa, which might include licenses from some of the major international companies.

The only current commercial seed activity in Mali is in vegetable seeds, but seeds for rice, maize, groundnuts and cowpeas will become profitable over time.

The fundamental driving force behind the development of a private seed industry is the development of new varieties. If the flow of new varieties from public research can be assured, information about them is available from on-farm trials, and NSS can modify their price policy, a private seed industry can develop based on the ability to deliver newer varieties faster than NSS, deliver higher quality, and find and sell to the markets that need the seed.

In contrast, commercial seed businesses for non-cash crops, including varietal sorghum and millet, as well as forage crops will not develop without subsidy. Risk-averse farmers who grow them have a tradition of not buying seed. Small samples, coupon programs and loans to village micro-finance associations exclusively for seed purchase can help distribute new varieties. More relaxed seed laws can help spread the varieties at the margin of the cash economy. NSS has the responsibility for optimizing this type of seed distribution.

Thirdly, there are some public good issues that concern IER, NSS and DNAMR, not undertaken by the AfDB, which USAID will address through IEHA. As a quid pro quo for USAID support, the institutions involved should agree to co-ordinate through an established forum, and NSS must align its pricing for its seed with the market.

Commercial seed

Training for technical and business staff is an important component of expansion of the commercial seed sector. For crops which offer profitable seed businesses, it will be necessary to provide conditions where these businesses can plan and profitably market the seed. Loans may be available through BNDA; other advice and logistics may be supplied as needed. The US can provide good long-term technical training (e.g. Iowa State) and MBA programs. There may be some value in sending managers to the American Seed Trade Association Management School short course organized annually at the Krannert School at Perdue or good lessons may be learned through visits to seed companies in East and Southern Africa. Language will play a role in the choice of training locations so potential school linkages will be investigated. Where female candidates for training are available, their candidatures would be welcomed.

NSS has a small unfunded project to promote vegetable-seed production in women's associations. This will compete, though only locally, with the private-sector firms that USAID

will support but it will be healthy to have this competition and instructive to see how the two commercial models fare.

Non-commercial seed

Under the recent restructuring of the seed sector, village seed-production associations will carry out the multiplication of seed for coarse cereals. The AfDB-financed project will operate on a scale that can meet Mali's seed-production needs. One weakness lies in its reliance on MAEP's *Direction Nationale de l'Appui au Monde Rural* (DNAMR) to identify producer associations suitable for seed multiplication. Another lies in its inadequate capacity in marketing, distribution and sales. Private-sector activity in those areas may develop if seed prices rise to 2-3 times those of grain at harvest. However, ineffectual marketing and weak demand are likely to hold down seed prices for subsistence crops. It may be necessary to provide incentives to at least two commercial companies willing to enter this part of the seed sector to kick-start a competitive private-seed sector. For instance, support for the distribution of new sorghum and millet varieties would include:

- Distribution of very small packets of new varieties in specific sorghum and millet growing areas to which they are adapted at the rate of one variety per year. Local stores will sell the packets.
- Sponsorship of a coupon system allowing targeted farmers, including women, to purchase subsidized coupons and redeem them for seed, encouraging commercial seed companies to expand into the area. This would take place at a rate of 2-3 years per zone. Duration and quantity of coupons will be announced in advance. Administration can be contracted to an NGO.
- Financing seed loans through local micro-finance organizations, including *caisse villageois* run by women. This is sustainable in the long-term.

Seed for improved varietal maize and for forage crops would eventually be popularized in the same way.

Developing a commercial system for the production and sale of improved vegetable seed and new fruit tree varieties will also be a major program focus. ICRISAT Niger has developed a range of open-pollinated, improved vegetable seeds and new fruit varieties that have potential to reduce farmer's seed costs, diversify the range of vegetable varieties farmers can grow, and extend the vegetable production season to currently unproductive periods of the year. ICRISAT Niger has developed varieties of lettuce, tomatoes, eggplants, and other vegetable crops that offer significant quality or production advantages over the varieties that are currently available. Certain lettuce and tomato varieties, for example, are designed for rainy season production, a time of year when imported seeds do not perform well and vegetables are scarce. ICRISAT has also developed some improved fruit varieties, such as the Pomme du Sahel (*Ziziphus spp.*), which may have significant potential in local and subregional markets.

One of the main production constraints in Mali that has been identified by USAID, GRM, and farmers themselves is the production of and ready availability of improved cereal seed. It is known that existing government seed agencies are not currently, and unlikely in the near future, able to provide readily available improved seed varieties to producers on a timely and efficient basis. It is a fact that currently well positioned international seed companies are unwilling to produce seed in

Mali until current laws are changed protecting variety property rights and even when these laws are in place are unlikely to be interested in the dissemination of local selected improved sorghum and millet varieties that protect the bio-diversity of Malian agriculture.

Implementation Characteristics

Investment in Mali's seed sector supports all six of the IEHA themes by applying improved technology – possibly the product of biotechnology – to Malian farming, particularly in irrigated perimeters that reduce risk; furthering private-sector participation in the seed sector; promoting the participation of seed-producers' associations; reliably reducing food prices (which is particularly important for vulnerable populations); providing training in management and other skills; and reducing the pressure on delicate environments by improving yields on currently farmed land. Spillovers could include exports of seed to neighboring countries

This portfolio of seed-sector investments will complement investments in irrigated agriculture by ensuring that improved seed is available. It will also dovetail with ADB support to the NSS. The investment to develop the animal feed sector, proposed in the SO9 section of USAID/Mali's CSP, suggests that a complementary investment in fodder-crop seeds would producer synergies, particularly if farmers could grow them in irrigated perimeters during the first quarter of the year.

This initiative links to the IEHA seed-sector initiative and to support to agricultural research, extension and producers' organizations financed by the World Bank. USAID/Mali will periodically update other USAID missions in West Africa, including WARP, on the progress of this initiative, so that they may benefit from lessons learned.

Evaluation of Selection Criteria

USAID's seed-sector support will contribute to increased yields in the most important food crops to the Malian economy, in both the cash and subsistence economies. Support will be provided to the development of private-sector involvement in multiplication and dissemination of seed for varieties with commercial potential, to the distribution by NSS of seed of less commercial varieties, to NSS pricing policy, to promotional efforts to raise effective demand for the less commercial varieties, to women's associations producing seed, to foundation-seed operations at IER, to an on-farm testing program at DNAMR or AOPP, to rice-seed technology at IER, and to working with WARDA to find productive new varieties which should increase agricultural yields in most of the important crops. This will significantly raise the productivity of Mali's crop agricultural sector. More efficient production of fodder crops will complement USAID's SO9 aim to improve the animal feed market in Mali.

Principal beneficiaries will be individual farmers, farmers' associations, and some private-sector companies. The timing of the benefits would depend on the timing of the individual investments in the portfolio but would be substantial within five years. Given that the AfDB project has already started, significant benefits should flow within five years. Men and women throughout the agricultural zone should both benefit from this investment, though special effort may be needed to ensure that women are among the principal beneficiaries. Similarly, both large and small farmers should benefit, but the efficiency with which producers' associations channel

improved seeds to their members will partially determine the degree to which the smaller farmers benefit, at least initially.

It is therefore consistent with a strategy of working to end hunger in Africa, and in Mali in particular, that increasing production of the country's most important rural consumption cereal crops will: 1) require work on dry land cereal and horticultural crop production (e.g. Peanuts) that people are familiar with and already know how to produce; 2) make not one or two but several improved varieties more widely available which allows farming system risk diversification; 3) encourage farmers to be profit-oriented within the zone where these varieties have been chosen and where rainfall patterns and cropping patterns are similar; 4) protect the national bio-diversity of cereal varieties.

4. Support for Agribusiness Development

This proposed IEHA investment represents an increased/expanded emphasis of investments intended under IR2 Trade of Selected Agricultural Products Increased (including horticulture crops) in the USAID Mali CSP investments under the SO9.

Linking export-led agricultural growth and poverty alleviation

The Government of Mali (GRM) is committed to the Millennium Development Goals and has the ambitious goal to accelerate economic growth and significantly reduce poverty by 2015. USAID Mali will be contributing to this goal through its Accelerated Economic Growth strategic objective (AEG SO9). For rapid growth to occur, the program focuses on three inter-related elements: increased agricultural production, increased trade in agricultural products and increased access to financing for investment in the agricultural sector. To achieve these results, USAID Mali will initiate activities designed to alleviate the constraints identified by several consultant reports it has commissioned over the past year.

Insofar as trade development is concerned, there is a need to tackle two sets of issues; the first one is the strength of the trading enterprises and trade development agencies. Neither has the technical and managerial capacity to analyze and lobby for policy change or to move their enterprises from the informal to the formal sector. Its is planned under the USAID/Mali strategy to strengthen the business skills of private sector trading enterprises, to develop value-adding processing in order to diversify exports and markets.

The second set of issues is related to the enabling environment for increased trade and investment. Even if exporting enterprises are strengthened, they will not survive if they cannot compete. The subsector analyses conducted revealed a number of constraints: unreliable and expensive physical infrastructure, dysfunction of the legal and regulatory system, inadequate government incentives, the shortage of a good labor force, obstacles to intra-regional movement of goods, lack of adequate quality control services.

While the CSP plans to tackle many of these constraints, its limited resources demanded that it exclude some interventions. It is well known, for example, that increased agricultural growth results in increased incomes for the rural people, which in turn results in increased demand for

non-farm products produced and sold in these areas, thus creating off-farm employment. USAID had not planned analyses to study the impact of the AEG program on employment, poverty reduction, and the improvement of basic social services like health and education. On the other hand, no activity had been planned to improve the skills of the labor force in the agricultural sector.

With additional funds under the IEHA program, USAID Mali, through the AEG, will undertake activities related, not only to strengthening the human and institutional capacity within both the government of Mali and the private sector, but also to policy analysis and outreach on trade and poverty alleviation linkages.

Strengthening Human and Institutional Capital

The agricultural and agribusiness sector in Mali is rapidly evolving and new challenges are emerging. In the course of the implementation of the current country strategy, USAID Mali identified several problems related to training skills in specific program areas, both within the government and the private sector. The knowledge gaps identified were related to fields such as biotechnology, food and feed processing/engineering, nutrition, international trade and marketing, finance and banking, irrigation engineering and management, natural resources and environment.

Since 1995, USAID Mali has not funded any new long-term degree training. Past participant training programs helped Mali afford a critical mass of well-trained scientists, economists and engineers who have had a major impact on the development of the country over the past twenty years. Many of them held high level positions within the government and the private sector and advocated policy changes conducive to an open economy, good governance and broad-based economic growth.

USAID Mali would benefit from IEHA funds to reinstate the participant training program to strengthen the technical and managerial capacity of Mali. All the three intermediate results under the Accelerated Economic Growth strategic objective will benefit from capacity building in the above technical areas. Biotechnology training will benefit USAID interventions in the production of rice, animal and horticultural products in terms of increased capacity to conduct research on varieties and design policies regarding biosafety. Irrigation investment is a major focus area under the 2003-2012 strategy. Current studies indicate major constraints related to the high cost of irrigation development in Mali due to poor designs of the infrastructures and high water losses. Another major constraint to agricultural growth in Mali is the lack of appropriate financing instruments for agriculture and bankers' lack of skills in appraising the risk related to agricultural projects.

Based on an initial assessment of the infrastructure requirements to provide the most critical and high impact interventions to support the Agribusiness Sector in Trade strategic interventions will be identified and initiated. Potential investments to develop infrastructure for agricultural marketing support might include: warehouses, loading ramps, components of a cold chain, grading and certification systems. Upgrading of the Environmental Quality Laboratory at CVL to the level where it can become a member of the network of certifying laboratories in Africa and

provide certification for Mali's exports for accessing foreign markets demanding quality produce is a likely candidate for initial interventions. USAID Mali through the IPM CRSP has already provided significant support to the capacity of this laboratory over the past five years. Proposed interventions under IEHA will build and complement these past investments.

The "clusters of excellence" proposal by Prof. Michael Porter of Harvard University suggests that this initiative prioritize infrastructure for crops produced in the IEHA areas of irrigated agriculture and seed production and marketing. This investment will directly complement investments to be made by the World Bank's Rural Infrastructure Project and other IEHA activities related to increasing agricultural trade. Donor coordination will ensure that the sets of investments fit together well and build upon one another.

Education and Training of the Next Generation of Malian Agro-entrepreneurs

The University of Mali was created in 1996. It brought the existing colleges and institutes together within a single institution. The agricultural school of the university of Mali (Institut Polytechnique Rural et de Recherche Appliquée-IPR/IFRA), one of the oldest agricultural training centers in West Africa, has developed over the past three years a new two-year, post-high school certificate program called BAC+2. This program aims at preparing the next generation of private sector agribusiness technicians in food and agricultural crop production, plant improvement and seed production, poultry, horticulture, meat production, management of forest and fresh water fish resources, and rural hydrological improvement. All the students in all disciplines take courses in farm management and basic agricultural economics.

IPR/IFRA has expressed interest in refining and strengthening the quality of its BAC+2 program in order to improve its attractiveness to the youth and to facilitate youth employment. Youth employment is one of the priorities of the President of Mali, Amadou Toumani Touré. In this respect, the GRM has recently launched a program to facilitate the access of young graduates to land in the irrigated zone of the Office du Niger. Similar initiatives are being designed.

Under the IEHA program, USAID Mali will use additional funds to establish a collaborative arrangement between a U.S. land grant university and the IPR/IFRA. The objectives or investment options in such collaborative effort would include:

- strengthening linkages between the IPR/IFRA and the labor market;
- Curriculum enhancement and development;
- Strengthening the capacity of the IPR/IFRA faculty and administrative authorities;
- Planning and conducting joint applied research and outreach on agricultural growth issues;
- Agricultural Economics;
- Rural Sociology;
- Environmental Planning & Management.

Policy Analysis and Outreach on Trade and Poverty Alleviation Linkages

Trade promotion is a major focus of the economic growth strategy of Mali and USAID/Mali's 2003-2012 CSP. Under the USAID strategy, the trade program will work to improve the

enabling environment to diversify and facilitate access to new markets of Malian products. This will require several analytical studies to inform the decision-making process of the Goverrment of Mali, the private sector actors and donors. However, analyses on the backward, forward linkages of export-led agricultural growth and of the impact of such growth policy on the most vulnerable groups of the society are not anticipated under the CSP. Under the IEHA program, USAID Mali will plan a series of analyses and outreach activities focusing on key areas related to trade promotion and economic growth. These include:

a) Identifying the nature of the intersectoral links that will ensure that market-led agricultural growth will promote broad-based economic and social development, and developing strategies to strengthen those linkages;
b) Designing market-friendly social safety nets to promote food security;
c) Identifying key public sector interventions needed to stimulate private investment and leadership in expanding broad-based growth (for example, more productive producer and trader associations actions aimed at expanding regional trade).

The linkages studies will cover all the issues related to employment creation, poverty alleviation, overall economic growth, gender impacts, and investment in social services improvement (health and nutrition, education, water and sanitation). A key investment question such as the impact on poverty alleviation and malnutrition of investment in one given subsector versus another will also be addressed.

Outreach activities would include the involvement of Malian partners at all stages of study-theme selection, study implementation, and results dissemination. The Malian National Committee of the Partnership to Cut Hunger and Poverty in Africa will play a prominent role in these activities.

5. Development of Environmental Impact Assessment and Environmental Audit Capacity in both Public and Private Sector.

Sustainable production in all irrigated areas (including *bas fonds*) is of primary concern under both the USAID Mali Strategy as well as the IEHA Action Plan. Increased public and private investment in irrigated production areas is being encouraged and facilitated wherever possible.

A well-designed EIA training scheme for DNACPN, local environmental consulting companies, and individual consultants in EIA methodologies would reduce the costs of various potential public and private industrial investments in Mali. GTZ has financed two EIA training sessions in Mali, one of five days for about 30 DNACPN staff, just after the promulgation of the 1999 decree and the other of 10 days for a range of participants from DNACPN, DNCN, the Ministry's *Secrétariat Technique Permanent*, consultants, consulting companies, NGOs and associations. As a result of the second training session, DNACPN sent those trainers to train additional Ministry of Environment staff.

Support for capacity building in the area of EIAs should include the following steps:

- An experienced international EIA consultant should appraise how the application of the 1999 decree is working and recommend a) changes to the 1999 decree, if necessary and b) training that would best accelerate the improvement of the EIA and environmental audit (EA) process. The consultant should perform this appraisal in the context of the institutional structure and equipment of the Ministry and its decentralized offices, particularly the Direction Nationale de l'Assainissement et Controle de Pollution des Nuisances, with focus on its ability to perfume EIAs and EAs; and the technical expertise outside the Ministry that EIA requires.

- With the Ministry of the environment and relevant partners from the private sector (and NGOs if appropriate) design a training plan, with long and short term elements, and show how the whole would lead to more efficient EIA process.

- Conduct training necessary, or identify an appropriate entity to conduct training.

- Outline a strategy to develop or reinforce a sustainable in-country training program.

This would also increase Malian capacity in environmental impact analysis, thus reinforcing the Ministry of Environment's wider capacity to manage natural resources. This investment would provide accelerated access to the benefits mentioned above for construction of irrigation infrastructure and various public/private investments on stream (Sugar Factory, Tannery, etc.). Other beneficiaries would be individual private-sector consultants, consulting companies, and NGO staff who would participate in the training.

The IEHA Program for FY04-FY08

IEHA guidance from USAID/Washington indicates that USAID/Mali could receive roughly $4 million in incremental Development Assistance resources for FY03 and approximately $6 million for each year thereafter, through the life of the program.

1. Harnessing Agricultural Technology for Malian Agriculture

Irrigation technologies which may improve the production capacity of the low lying bas-fond irrigated areas utilized primarily by small farmers and women's groups will be of particular interest/focus under additional IEHA funding. These technologies will enhance and support the improved (technologically enhanced) low cost Construction of Irrigation Infrastructure in Small Valley-Basins and Large Plains (*bas-fonds*) efforts described above. In addition, enhanced pump efficiency, where applicable particularly in small farmer conditions, can provide low cost and more energy efficient water movement mechanisms/systems and designs where appropriate. Information dissemination, specifically targeting small farmer groups and individuals, will also be of primary focus under the program with an effort to increase market information exchange capacities/opportunities geared to bringing the smaller producers into the mainstream.

Biotechnology has the potential to deliver significant long-term benefits to Mali by increasing pest and disease resistance, increasing tolerance of environmental stresses, and improving nutritional value of crops grown by Malian farmers. Recognizing this, IEHA is putting

significant emphasis on ensuring that African countries have access to the tools of modern biotechnology.

The preliminary results of Mali's recent biotechnology assessment identified proposed actions/needs to enhance production capacity in Mali under a longer term scenario:

The organization of a strong biotechnology research team in Mali around rice, tomato, sorghum, millet and cowpea. This could involve mapping, molecular biology, and genetic transformation conducted by a new generation of scientists who should be able to host new technologies developed elsewhere in the mean time. Among possible development programs could be the development of 5-10 year programs for the control of rice virus, tomato viruses, insects on cowpea, protein enhancement in sorghum and millet. In all cases collaboration should be established within Mali and outside Mali with relevant and capable laboratories throughout the world.

Support for Biotechnology Policy Development and Enforcement.

There is a serious problem with both the development of and effective implementation of the existing phytosanitary regulations due to inadequate training and lack of the laboratory tools necessary for rapid diagnostics, together with the problem of obsolete regulations. What is more, Mali by itself cannot drastically modify the existing plant quarantine protocols without reference to the guidelines of the Inter African Phytosanitary Council of the African Union. These guidelines are, in turn, linked to the framework of the International Plant Protection Convention whose Secretariat is at the FAO, which governs sub-regional movement of plant material. With additional IEHA funding, USAID could assist with training policy and regulatory and enforcement staff in effective quarantine procedures and provision and utilization of the right tools. With the introduction of GMOs in World Trade, the assistance of Mali not only to develop its biosafety framework but to be able to implement it could have significant effects for agricultural production and trade both in the medium and long term. The implementation of any biosafety protocols will require a priori capacity in biotechnology.

The issue of intellectual property rights and the impact on trade in new seed varieties and other research products, as well as the staff training are critical for the Mission's CSP export-oriented Strategy. The lack of capability in these areas prevents Mali from taking advantage of improved GMO varieties currently on the market in both rice and cotton specifically. Pest-resistant varieties of these crops can dramatically reduce the need for harsh pesticides, as well as dramatically increase yields and productivity.

Assisting Mali to draft its biotechnology and biosafety policy document using the June 2002 biotechnology, biosafety and intellectual property workshop report would be a strategic starting point.

Properly used, biotechnology can help Mali accelerate its economic growth by increasing agricultural productivity and by improving environmental management through reductions in the use of pesticides. Moreover, the development of low cost technologies through the application of biotechnology could directly reduce poverty and improve food security and nutrition.

Therefore, USAID/Mali plans to continue to expand its activities in the area of biotechnology using FY 04 - FY08 IEHA funds.

As above, biotechnology is a two-edged sword. If not properly applied, it can have harmful effects on human health and the environment, and in some instances may adversely affect Mali's export markets. Moreover, unless the biotechnology products are affordable, farmers will not adopt them.

Although the potential gains are enormous, biotechnology research can be costly and will require highly skilled technicians and researchers. Further, given the controversies surrounding biotechnology, the full participation of stakeholders will be necessary in order to build a consensus of the priority to be given to biotechnology research, the appropriateness of the application or release of biotech products, and the structure of regulatory policies governing biotechnology in Mali.

A conducive policy environment, reliable institutions, and legislation that ensures biosafety and the protection of intellectual policy rights are crucial if Mali is to realize the benefits of biotechnology research while avoiding adverse effects. Some progress toward achieving these objectives will be made by USAID and its partners using the IEHA startup money and FY 03 funds.

The establishment of the Biosafety Commission will be the cornerstone of this effort. Thus, in FY 04 and beyond, USAID will continue to provide further technical assistance and training for the Biosafety Commission, as well as operational support to that organization until it is fully established. Ultimately, of course, the Biosafety Commission will have to be supported by Mali's public sector, supplemented by revenues from the services that it provides to the biotechnology industry.

During the FY04 - FY 08 period, USAID will continue to strengthen the capacity of Malian researchers to handle biotechnology, and will link up those researchers with the international biotech research community, including U.S. universities, the biotechnology industry, and the CGIAR network.

A well conceived public sensitization program will also be required to educate the public about biotechnology and its potential uses, and to ensure that African decision makers have the information they need to formulate responsible biotechnology policy.

Finally, support will be provided for research projects that apply biotechnology to addressing critical production problems facing Malian farmers. The potential applications of agricultural biotechnology in Mali are quite broad. With respect to crops, examples of biotech applications include:

- Development of maize that is resistant to the plant parasite, Striga;
- Development of tolerance to drought and other abiotic stresses for a number of crops.

With respect to animal production, examples of biotech applications include:

- The development of diagnostic tests to detect economically important diseases, such as trypanosomiasis and Contagious Bovine Pleuropneumonia and African Swine Fever, as well as the creation of drugs and vaccines to combat these diseases;
- The development of a suitable delivery medium for a newly developed thermostable vaccine against Newcastle Disease in poultry;
- Improvement of animal feeds, through the identification of ruminant bacteria that digest tannins more effectively and the modification of those bacteria to improve their effectiveness;
- The identification and use of DNA markers linked to useful traits in local cattle breeds, such as those displaying unique cholesterol profiles; and
- The development of DNA markers to characterize different strains of the tick-borne virus disease, to aid in field detection and diagnosis, as well as development of improved vaccines.

The development of a research agenda will depend upon a number of factors, including the economic importance of the crop, the impact of the constraints affecting it, the probability of developing solutions through the use of biotechnology, and the amount of time and resources needed to accomplish the task. It will also depend upon what research is already underway and by whom. Opportunities to leverage research funds from other public and private center entities will also influence the application of USAID resources.

In order to maximize the impact of this biotechnology support program, USAID will seek to access complementary funding and in-kind support from centrally-funded USAID activities, including the Program for Biosafety Systems (PBS) and the Agricultural Biotechnology Support Project (ABSP) II. The PBS will carry out both global activities and country or region-specific activities. These activities will include training courses; the development of manuals or other information technology; the creation of models for biosafety systems; support for policy analysis to inform decision-making; and technical assistance for short-term activities. ABSP II is designed to support collaborative technology development between international and U.S. institutions (universities and private sector) and developing country institutions (public and private). In addition, research funded under ABSP II will seek to develop new tools and determine how these tools might be used to benefit farmers. It may also be possible to construct, under this overall initiative, activities that will meet the objectives of the Agency's Global Development Alliance.

2. Support for the construction of irrigation infrastructure in small valley-basins and large plains (*bas fonds*).

The DAD Project (Développement Agricole du Delta) being implemented by CARE Mali has demonstrated ways in which productivity can be enhanced and risk reduced. DAD has introduced improved technology into the controlled flooding system. Intensification of rice production under improved water control has resulted in increases in yield from less than 600 kilograms per hectare to more than two tons per hectare. This increase resulted from careful location of control structures, introduction of new, more appropriate varieties, better village organization and technical assistance. The location and subsequent management of the control

structures resulted from a well-planed hydraulic study in consultation with the villagers that maintain and operate the improved control system.

The DAD-type system would be even more effective with the addition to the technical package of simple grain storage facilities. This would allow the farmers to keep a part of the grain produced in good years to be consumed or sold during the inevitable bad year each three to five years. Even if one year in three produces a very poor crop, there should still be ample opportunity to put aside part of the crop in the better years to be able to get through the bad year. Another possible improvement within a DAD-type perimeter would involve more precise knowledge of the land contours. The use of a contour map of the area would make it easier to locate the needed protection dikes more precisely. Use of a contour map would also enable project leaders to divide the entire area into different levels through the use of internal bunds around areas of nearly equal elevation. Additional ditches would convey water to the various levels. This would seem to be a natural "refinement" of the overall water control already in place or to be put in place during future development.

Compared to total-control systems, controlled flooding (even the improved DAD-type system) is clearly less productive on a per-hectare basis, with yields just above two tons rather than exceeding six, and considerably riskier. As mentioned earlier, the wide annual fluctuations in annual rice output from the Mopti Region, where controlled and uncontrolled flooding predominate, compare unfavorably with the steady increases in the Ségou Region, home of the Office du Niger.

However, when viewed from the twin perspectives of return on investment and ability to generate increased production rapidly, the improved DAD-type system is quite attractive. From 2000 to 2002 paddy production in the DAD zone around Djenné increased by an average of 55,840 tons per year, after an investment of less than one million dollars in infrastructure. A similar increase from one of the large total-control gravity systems would cost a large multiple of that amount. In 2000 incremental production above the 1997 baseline was 97,840 tons; in 2001 it was 69,678 tons; and in 2002 there was inadequate flooding and the crop failed. The three-year average was thus 55,840 tons.

In essence, investment in DAD-type controlled flooding can produce more rice per dollar invested, even under the pessimistic assumption of one crop failure every three years, than the same amount invested in expensive total-control perimeters with high yields assured each year. Financial analysis by the study team shows that conversion of an area from rice cultivation with uncontrolled flooding to a DAD-type controlled flooding system produces a very attractive IRR. Investment of only 156,000 CFAF ($250) per hectare, resulting in an increase in annual yield of two tons per hectare, produces a stream a benefits over 20 years that give an IRR of 43 percent. This rate assumes one crop failure every three years. The average annual increase will be 1.3 tons per year—two harvests averaging an increase of two tons and one harvest with none.

Controlled flooding with the DAD model has social and environmental as well as economic advantages not to be underestimated. The social cohesion is greater than with high-investment total control systems because the system is built on existing villages and their social structures. There has been virtually no settlement from outside and no social upheaval instigated. Those

who farm the land tend to be people with use rights rather than farm laborers working for an influential absentee. The DAD-type system, which is labor–intensive and requires few purchased inputs, has an impact on a large number of people, including the poorest. Environmentally, the system has no major negative impacts and is positive in the sense that it maintains the water table at a higher level and produces increased biomass.

One big advantage is that the beneficiaries can, with ease, be heavily involved in the planning, creation and management of water control structures. This reduces costs and helps assure the good management and durability of the system. Proper planning and development can pay big dividends in increasing output and maximizing the efficient use of water.

Bas-Fonds

In small, inland valley basins and on the larger plains of Mali-Sud, there are numerous opportunities to build simple water retention structures that increase productivity and the area under cultivation, using the bas-fonds type of irrigation development. The bas-fonds system presents many of the same advantages as controlled flooding but with somewhat less risk. The advantages include the social grounding of the system in established villages, the potential for improving production at relatively modest cost, and a substantial impact on poverty. The system is less risky because it is dependent on rainfall in a well-watered area and not on the arrival of a river's flood crest.

It is a traditional system that, in its undeveloped state, offers opportunities to women since it tends to be neglected by men and thus allows their womenfolk to grow rice or horticultural crops for income. Indeed, in many places undeveloped bas-fonds appear to perform very well from several points of view—output, women's income and harmony with other production systems (rainfed agriculture, livestock and fisheries). In many cases, they would best be left undisturbed. As mentioned previously, developing irrigation structures for bas-fonds and the larger plains in southern Mali involves widely varying characteristics of individual sites and very different levels of sophistication of control structures. What is absolutely crucial for all of them is that the structures be the right ones and that they be properly placed. The irrigation study team visited one site where they had been misplaced in relation to the stream. The villagers advised that if they had been consulted, they would not have recommended the site that was chosen. This points to the need for participation of the beneficiary villages in the selection and design of sites. Plains can start with partial water control and later be converted in whole, or more likely in part, to total control. This has been the case with the Kléla plain, which the study team visited. In moving to total control it is important to keep costs down while establishing conditions for attaining much higher yields. If the plain can be endowed with water-retention structures that would permit a second crop on 25 percent of the area or more, its viability will be enhanced considerably. Cultivation of high-value horticultural crops will greatly add to profitability. The configuration and size of each plain will be different and will have an appreciable impact on both the cost of development and possibly on yields. In any case, there is every indication that carefully selected sites of sufficient size can provide the full benefits of the bas-fonds system provided that high-quality training and organizational work accompany development. This kind of follow-up was not evident in earlier efforts.

3. Support for Seed Multiplication and Dissemination

As mentioned previously training for technical and business staff will continue to be an important component of expansion of seed production interventions to the commercial seed sector in particular. For crops which offer profitable seed businesses, it will be necessary to provide conditions where these businesses can plan and profitably market the seed. This will be a major emphasis in the follow-on years of the programs. Further work will specifically target the enhancement of loans to be made available through BNDA; other advice and logistics may be supplied as needed. Strengthening and identification and testing of various loan guarantee mechanisms will be instituted. The US will continue to provide good long-term technical training (e.g. Iowa State) and MBA programs. As many emerging managers as possible will continue to be sent for the American Seed Trade Association Management School short course organized annually at the Krannert School at Perdue. Lessons learned programs will be emphasized through visits to seed companies in East and Southern Africa. Language will play a role in the choice of training locations and/or some language training may be necessary to expand the potential learning experiences and visits.

4. Support for Agribusiness Development

Over the course of the implementation of the current country strategic plan, the sustainable economic growth strategic objective team adopted the "commodity systems development approach" known as "subsector approach". This approach requires that all participants in the subsector be involved in identifying and collectively resolving the issues which constrain efficient production and delivery of products to markets. Specifically, private businessmen will be the driving force in the process, since it is their businesses which must adapt to the changes in the business environment. USAID Mali and the AEG team will pursue this approach to design interventions most likely to enable enterprise growth, profitability and employment creation. Under the IEHA program, activities for each fiscal year workplan will be identified in close collaboration with the producers, inputs suppliers, processors, millers, transportation companies, researchers/analysts, and extension personnel. All these stakeholders and partners will receive assistance to become effective participants in identifying and resolving the constraints.

The above-described approach will be followed to determine the specific activities to be initiated during each year between FY04 and FY08. This period will coincide with the full implementation phase of the IEHA program. At this stage, the constraints to agribusiness development would have been already identified and prioritized. Based on this analysis, a schedule for implementation will be developed.

5. Development of Environmental Impact Assessment and Environmental Audit

Support for capacity building in the area of EIAs should follow a "Need Assessment" process. The status of EIA in Mali should be assessed (the institutions, the regulations including those related to pesticides, the staff, the association in place,the private sector and the environment problems etc.). This will lead to some recommendations to be put in an action plan. USAID/W could help in finding an appropriate consultant. The priority activities should be planned for FY05-08. They will include training and equipment, particularly the pesticide assessment and residue monitoring will need appropriate equipment. The training in EIA of any activity should

concern not only the Ministry of Environment agents but also agents from the other Ministries, NGOs and private sector. This type of training and its application is key to environment protection by minimizing the negative effects of the activities.

6. Support for Analytical Studies and Assessments

Comparative Analyses of Investment Options. USAID/Mali will evaluate the results of proposed studies looking more closely at which investments in the rice subsector and potentially other sectors will have the largest impact on rural incomes and agricultural growth; i.e. investments in improving the trade capacity and market infrastructure or investments in raising farm productivity will be evaluated. Follow-on work involving IFPRI and or other partners will be explored in order to fully exploit the results of initial studies in these areas.

Results of all studies envisioned for FY03 will be factored in to the ongoing IEHA efforts where applicable. In addition, further analyses will be undertaken as needed in order to fully realize the impact of all interventions throughout the program. Of particular interest will be the results of the work on structure of linkages from agricultural growth in Mali to other sectors of the economy (backward, forward, consumption, fiscal, employment). Understanding the nature of these linkages is critical for an understanding of how growth in the agricultural sector (e.g. through export promotion) affect employment and income in other sectors – particularly the generation of jobs for the poor. The results of these and other studies will guide not only the IEHA programs but also the further refinement of the USAID Mali CSP interventions in the Accelerated Economic Growth Program.

Assessment of the North Program Options (vulnerable groups) The North Special Objective was designed by USAID/Mali in 1997 as a five-year program (1998 – 2003) to consolidate peace and stability in the north and foster national unity in Mali. The program as designed is intended to move progressively from relief (provision of food, shelter and other assistance to returned refugees) to sustainable local development. As the program approaches the conclusion of the first phase, economic, social and political development activities have fully supplanted relief efforts and the Special Program for the North has achieved measurable successes, though many needs and constraints remain. A more detailed assessment needs to be done on the North in order to identify remaining constraints and develop an action program for the North, which could be integrated into the IEHA Action Plan.

Follow-on studies and/or interventions will be a priority based on the first year results of the initial assessment. These activities and/or follow-on studies will target the vulnerable groups in the North brought about by sporadic conflict in the region. The Africare Microfinance Program instituted in FY02 in particular will be reviewed and evaluated with an eye towards potential expansion and the most effective groups to target under an expanded program for the North regarding MFI interventions. Full synergy and compounding effects of the overall USAID Mali program in the north will be assessed in view of all other USAID Mali SO interventions in the North and how best to complement the programs and interventions. Various high impact communes will be identified and evaluated specifically for past response of the populations towards the initial MFI pilot programs instituted through the Africare MFI interventions and their results to date.

Monitoring and Evaluation

The purposes of monitoring and evaluation are to: (1) track the progress of investments so that adjustments can be made when necessary (monitoring); and (2) assess the impacts of investments to satisfy investors and justify the expenditure of additional resources (evaluation)

In the context of USAID-funded investments under IEHA, these purposes are interpreted to mean that ongoing projects may be redirected (or potential projects redesigned) based on the results of monitoring; resources might also be reallocated across projects. Under IEHA, the USG hopes to attract many other co-investors, including the private sector, other donors, and host country governments. Because of budgetary deadlines, in some cases IEHA management may be in the position of using the results of monitoring (rather than impact assessments) to justify the expenditure of additional resources.

The monitoring and evaluation system proposed for IEHA consists of:

- Project input and output progress indicators for monitoring investments and their immediate results;
- A causal chain of project-related and other progress indicators and information on exogenous factors, plus counterfactual analysis, for evaluation of the final impacts of the investments on income and hunger.

The Growth Framework and Indicators

For the purpose of delineating the full chain of causality from the investment through to hunger reduction, the main growth schema chart for IEHA is supplemented by adding project (investment) inputs and project objectives. Having used these inputs, the investments will first achieve their immediate objectives (loans, adoption, construction, etc.) and then they will produce project impacts. There will thus be five types (levels) of investment-related indicators:

- Investment (project) inputs
- Investment (project) objectives
- Investment (project) impacts
- Intermediate impacts
- Final impacts (agricultural growth, rural incomes, hunger)

Note that conceptually, the indicators proceed from the investments, which directly or indirectly improve/increase agricultural production and/or marketing, via the market (where producers, marketers, and consumers meet to exchange quantities and in the process determine prices) to the consumers of food. Investments made under the Initiative are intended to affect many households in the first instance through their roles as producers or marketers of food and other agricultural products. Resulting increases in farm household income or farm employment are then spent (by many of these same households) on food in their role as consumers. Farm income spent in rural areas on nonfood items also raises the income of other nonfarm rural households.

Increases in agricultural production also permit greater consumption of food within the farm household and lead to a greater supply of food for the economy.

IEHA's objectives include increasing both food access and food availability. These relationships reflect IEHA's nature as an *agricultural* initiative to reduce *hunger*. (Investments are not specifically targeted to improve food utilization, but changes to higher value crop or livestock activities often entail education that tends to improve utilization as well.)

For practical reasons, the investment-related indicators in the growth framework oversimplify the real chain of impacts, so they should not be interpreted as the complete set of information needed to discuss causality or attribute impact. These limitations will be taken up below.

The Need for Consistent Indicators for IEHA

While each Mission frames its own Program Monitoring Plan for the entire Mission portfolio, IEHA management and funding sources also need to have a monitoring and evaluation plan that reports on the impacts of IEHA investments consistently across the Initiative. Thus at the final impacts level, there will be consistent indicators used for monitoring and evaluating IEHA investments. It is envisioned that IFPRI will provide the required data for this level of indicators following from their work in progress.

At intermediate levels, the indicators will be carefully chosen and formulated to permit some meaningful aggregation across programs. For example, the percent change in the gross value of marketed surplus could be calculated for individual countries, and since the absolute data would also be available, these data could be used to calculate the same statistic for all the countries in the Initiative.

Project output indicators will measure changes brought about by the IEHA investments. Project objective indicators measure the immediate effects of the investment, which will usually be of interest to the project and the Mission more than to the management of IEHA. Project impact indicators measure the immediately subsequent effect of the investment that can be usefully aggregated across the Initiative. In an agricultural finance project, the number of loans made would be a project objective indicator, while the increase in the quantity of maize produced would be a project impact indicator. In a technology transfer project, the adoption rate would be the objective, and the change in yield, the impact. A sub-regional research project would lead first to several new varieties being developed and then to increased yield in one or more of the countries in the sub-region. A marketing policy project might achieve liberalization in a commodity market, measured first as an increase in the number of buyers in the market, and second as a reduction in transactions costs, as competition forced the buyers to be more efficient (thereby increasing the prices paid to farmers and/or reducing the prices charged to consumers).

One purpose of the growth framework applied here is to derive those indicators that might be aggregated across the Initiative and that lead clearly to the achievement of the Initiative's goals. Thus these indicators have to do with increased or improved agricultural production and marketing, which result in greater farm and rural income, and eventually in reduced hunger. The project objective indicators are of great interest to project managers, to missions funding the

projects, and can also be used in the annual reporting to explain the reasons for the impacts documented.

Specific project inputs will vary considerably across investments. However, they can be summarized easily in terms of financial cost, level of effort, and other general measures. Indicators will not be grouped by pillar, as pillars are actually objectives, and many projects will achieve more than one of these objectives. Indeed they may attain all of them to some extent.

Indicator Level	**Type of Indicator**	**Aggregation Issues**
Project inputs	Financial cost, level of effort	Virtually none
Project objectives	Reflects the immediate response of the beneficiaries or others to the project's interventions. E.g., no. of loans granted, adoption rate, no. of competitors in a market.	Vary widely, so aggregation would not be that useful
Project impacts	The effects of projects that are common across IEHA. e.g., area, yield, transactions costs.	Probably some data issues; conceptually, they can be aggregated and should be useful
Intermediate impacts	The collective impact of many interventions as measured by farm and farm household budget items (cost of production inputs, value of home consumption, gross value of marketed surplus, etc.)	Probably some data issues; conceptually, they can be aggregated and should be useful
Final impacts	The collective impact on many households as measured by rural income, hunger/malnutrition, etc.	Perhaps minor data and definitional problems

Evaluation and Attribution

Indicators are typically actual statistics (rather than projections or simulations). Thus they are useful for describing the situation *before and after* an investment is made. In order to evaluate the impact of an investment, however, one needs to know what would have happened in the absence of the investment, all other things being equal (i.e., occurring exactly as they did). One needs to compare the situation *with* the investment to that *without* it. For this purpose it is necessary to employ *counterfactual analysis*. Counterfactual analysis usually means using economic models to project what would have happened in a particular situation. Such models can indeed be used either ex ante to predict what results an investment might lead to, or ex post to project what would have happened without the investment. The former analysis can be used to select among investments, whereas the latter can be used to evaluate them. Models can sometimes also be used to determine the attribution of impacts among different factors and investments.

In order to attribute positive impacts to the investments made, rather than to the effect of other factors, both economic models and indicator-based analysis need to have information on *key factors other than project inputs* that influence—both positively and negatively—the outcomes of concern. Thus in sub-Saharan Africa, HIV/AIDS, conflict, drought and floods are some of the

major factors that might hamper the achievement of project objectives. Non-IEHA investments and unrelated improvements in the policy environment are examples of factors that could lead to positive outcomes. In some cases these data may be formulated into indicators, in which case this would be a fifth category of indicators; in other cases, formulating indicators will not be practical. In either case analysis of these factors will be useful in supporting the indicator-based analysis. Much data of this type will be employed in the economic models that will be developed and/or provided by IFPRI.

IEHA and Non-IEHA IRs and Indicators

IEHA provides missions with additional resources. As these resources are programmed through Action Plans, missions also develop monitoring and evaluation plans for the new investments, just as they would in conjunction with their own strategic plans. The growth schema provides the analytical framework to develop the IEHA monitoring and evaluation plan. The growth schema, while general in nature, is specific in scope to IEHA. It is not expected, therefore, that all SOs in a mission's strategic plan will be subsumed under the IEHA growth schema.

In the case of Mali, the philosophy behind SO9 (Productivity and Incomes Increased in Selected Agricultural Subsectors), namely, poverty reduction through rural economic growth, with a strong emphasis on agricultural development, very closely matches that of IEHA. The other SOs in the USAID/Mali CSP seek to enhance human capacity and improve governance, objectives that when accomplished will also contribute to poverty reduction.

There is no need to add IRs to the USAID/Mali's SO9 to accommodate the investments to be made in Mali under IEHA. The project impact indicators for the IEHA investments in Mali will feed into the existing IRs.

The project objective indicators will be determined when the activities are designed. Project input indicators will be measured in dollars and level of effort; these amounts will also be determined when the projects are designed.

Relationship of Indicators to Pillars

As noted earlier, IEHA has six pillars or focus areas. These areas can be further broken done in terms of typical objectives and expected results to be obtained from IEHA-funded investments, all of which eventually lead to agricultural growth and reduced hunger:

Scientific and technological applications will 1) raise the productivity of food and export products and 2) increase the stability and volume of supplies. Agricultural technology also 3) improves product quality, 4) relieves pressure on natural resources, 5) reduces post-harvest losses, 6) helps producers respond to markets, 7) helps entrepreneurs develop profitable enterprises, 8) raises farm incomes and 9) lowers the price of food to consumers.

More efficient agricultural trade and market systems will 1) raise African competitiveness in export and domestic markets, 2) connect African farmers to consumers, and 3) integrate African countries into global markets. More effective market systems will 4) add value to products and processes, 5) deliver high-quality, safe products, and 6) reduce costs for consumers.

Furthermore, they will 7) create a climate and infrastructure that attract private and foreign investment to Africa's agricultural businesses.

Community- and producer-based organizations contribute to agricultural growth by 1) providing a wide variety of business, training and leadership development services and 2) giving a political voice to the economic interests of farmers. Such organizations can also 3) create basic linkages between farmers (especially small-scale farmers) and businesses (input vendors, food processors, manufacturers, traders and food outlets) or research groups that are unable or unwilling to deal with them individually.

Developing human capital, infrastructure and institutions is fundamental to agricultural growth. These are expected to 1) build Africa's human and institutional capacity to shape and lead policy and research, as well as 2) provide agricultural education. There has been significant policy reform, but there is an urgent need to 3) restructure institutions created during central government control of markets and services that now find themselves ill-equipped to work in a liberalized market environment.

Integrating vulnerable groups and countries in transition into sustainable development processes will 1) help the chronically poor and hungry in rural Africa find viable paths out of poverty by accumulating assets, 2) reduce the vulnerability of poor people to weather-, market- and conflict-induced shocks, and 3) enhancing the capacity of countries to manage shocks that have regional and national impacts.

Finally, environmental management contributes to agricultural and rural sector growth through the 1) conservation and production of environmental goods and services that generate public and private economic benefits. Proper environmental management 2) makes agricultural production and water management sustainable and 3) reduces or reverses degradation caused by inappropriate farming practices, overgrazing and poor forest management.

Proposed Indicators

The indicators included are both direct indicators of program impact and related indicators of influencing factors.

Final Impact Indicators

The *ultimate goals* of IEHA are to cut hunger and to cut poverty. The *primary objective[s]* are to:

- Rapidly and sustainably increase agricultural growth
- Rapidly and sustainably increase rural incomes

These goals and primary objectives are clearly interrelated. The literature also makes it clear, however, that achieving one does not guarantee achieving the others. In light of the multiple goals of the Initiative, it is appropriate for the monitoring and evaluation plan to incorporate indicators for each of these goals. The indicators chosen are as follows:

- Cut hunger

    - Number/proportion - under-5-year-old malnutrition (underweight, stunting, and/or wasting)
    - Number/proportion of adults with body mass index (BMI) < 18.5
    - Number/proportion – "Undernourishment" of adults

- Cut poverty

    - Number/proportion living on less than $1/day
    - Number/proportion of population below poverty line-upper bound[20]
    - Number/proportion of population below poverty line-lower bound[21]
    - "Poverty gap ratio: incidence three times depth of poverty"

- Rapidly and sustainably increase agricultural growth
    - Real/nominal growth rate of (per capita) agricultural GDP

- Rapidly and sustainably increase rural incomes

    - Real/nominal growth rate of (per capita) rural household expenditures

Intermediate Impact Indicators

These might include:

- Farm income, nonfarm income
- Gross value of marketed surplus
- Cost of production inputs
- Value of food consumed at home

Project impact indicators

At the investment component (project activity) level, the investments that are eventually selected by the Mission will determine what indicators are appropriate based on the types of output to which they lead. A project will generally have more than one activity/component and affect more than one pillar. The growth schema provides guidance on the types of outputs that should lead to agricultural growth and the reduction of hunger (and how they do so). The following table relates some typical investments to project impact indicators on the growth schema and to pillar areas.

Investment Component	Pillar	Project Impact Indicator(s)

[20] Cost of minimum food basket (food poverty line) plus cost of non-food essentials equal to the expenditures on non-food essentials by households whose *food cost* equals the food poverty line.
[21] Cost of minimum food basket (food poverty line) plus cost of non-food essentials equal to the expenditures on non-food essentials by households whose *total expenditures* equal the food poverty line.

Bilateral		
Agricultural research-yield	S	Yield, input quantity per unit of output
Agricultural research-quality	S	Product price, product quality
Agricultural research-growing season	S	Cropping intensity
Agricultural research-storage	S	Post-harvest losses
Agricultural research-nontraditional crops	S	New product
Agricultural research-handling, processing technology	S, T	Product quality
Irrigation expansion	I	Area
Seeds	I	Transactions costs, input cost per unit, quantity marketed, quantity exported, producer price, consumer price, product condition
Development of producer and trade associations	O	Quantity marketed, quantity exported
Technical assistance to agribusinesses	T	Product condition, product quality, enterprise profitability, export price received
Environmental management	E	New product
Regional		
Trade harmonization	T	Quantity exported, fresh; quantity exported, processed, transactions costs (transport time)
Development of regional agricultural research organizations	I	New product, yield, product quality
Technical assistance to share best practices	S	Yield, product quality, new product, etc.
Technical assistance to regional NGOs	O	Yield

S Scientific and technological applications
T Agricultural trade and market systems
O Community- and producer-based organizations
I Human capital, infrastructure and institutions
G Vulnerable groups and countries in transition
E Environmental management

Project Input Indicators

Project inputs can be measured relatively easily for aggregation across the Initiative by using cost and level of effort.

Information on Other Key Factors

Other key factors would include: HIV/AIDS; conflict; weather; world markets; policy and non-IEHA interventions by USAID, other donors and government. Collection of this type of information for impact assessment should be standardized to provide a consistent basis for IEHA reporting and analysis. Perhaps IFPRI can collaborate with the various missions in defining and collecting these data, since many of these variables will also be incorporated into IFPRI's models.

Other Data Issues

Millennium Development Goal (MDG) 1 is to "reduce the proportion of people living in extreme poverty by half between 1990 and 2015." Given the similarity of this goal and IEHA's goal of cutting hunger in half, it seems appropriate to incorporate data and indicators assuming base years of both 1990 and 2003, the former being the base year for the MDGs and the latter, the first year of investment under IE

Project input indicators

Project inputs can be measured relatively easily for aggregation across the Initiative by using cost and level of effort.