



**USAID Kenya Business Development Services
Program
(Kenya BDS)**

Activity 1: Sub-Sector Selection

Status Report
27 February 2003

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Introduction

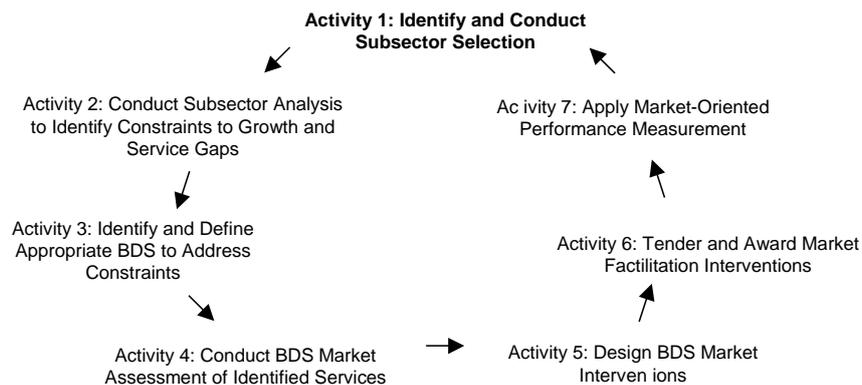
Kenya BDS Program and the Sub-Sector/Business Services Approach

The KENYA Business Development Services Program (Kenya BDS) is a microenterprise development activity that combines the sub-sector approach with business development services market development. It is the first USAID-funded activity to put this approach into practical implementation. The methodology assumes that business development services alone are not the solution. Rather, when grounded within specific sub-sectors of high growth potential, BDS can assist MSEs to more effectively produce and compete within product markets.

Over the five-year period, Kenya BDS will work in product markets of high growth potential, and identify market inefficiencies along the supply chain. As critical constraints are identified, the program will facilitate the delivery of appropriate business development services on a commercial basis. It is anticipated that our activity will result in:

- Increased market transactions between providers and suppliers of BDS;
- Enhanced skills of MSEs;
- Greater information and awareness within the market; and
- Overall more competitive MSEs.

Unlike the other SO7 contractors, Kenya BDS was not assigned specific sub-sectors for assistance. Rather, the Program was mandated to select 2-3 sub-sectors during the life of project. As detailed in the diagram below, the sub-sector approach to BDS market development will be standardized, and replicated in each of the 3 identified sub-sectors.



The purpose of this report is to capture the experience of “Activity 1: Sub-sector Selection,” and provide a summary of the findings and recommendations for the first sub-sector to be targeted under the Kenya BDS Program.

Objectives of Activity 1 Sub-Sector Selection

The objective of Activity 1 was to identify the first sub-sector for program assistance through a methodical approach, which balances the objectives of increasing rural household incomes with developing commercial markets for business services.

The Kenya BDS Team regards sub-sector selection as an extremely important activity, as it has a direct impact on the success and impact of the entire program. Therefore it was decided that, rather than commit the Program to 3 sub-sectors simultaneously at the beginning of project

launch, it would be more rational to adopt a phased approach. This would allow the program to: 1) initially service and ramp up activities in the first sub-sector; 2) monitor the ever-changing socio-economic and political climate given the new administration; and 3) capture lessons learned from implementation of the first sub-sector, and use them to tweak or modify future activities accordingly (i.e. what works, what doesn't, what have we learned, what may be applied moving forward).

Sub-Sector Selection Team and Scope of Work

To support the sub-sector selection activity, a small but diverse team was assembled to provide a comprehensive range of experiences and knowledge related to the Kenyan economy, BDS market, and microenterprise sector. The team consisted of core staff members David Knopp and Muli Musinga, as well as independent consultants Sunita Kapila and Stanley Karuga.

The scope of work for the team was to follow a methodical approach for sub-sector selection, which combined brainstorming, analyses of potential sub-sectors using both quantitative and qualitative data, and final selection based upon program-based evaluation criteria. The specific tasks of the team were to:

1. Develop a tentative list of 15-20 proposed sub-sectors through a brainstorming session. The raw list would then be assessed against an attractiveness matrix that weighs the potential for growth within the sector against outreach for business development services among rural microenterprise. Following the brainstorming session and application of the attractiveness matrix, a short-list of 4-6 sub-sectors would be identified which would form the basis of the initial assessment.
1. Collect information on each sub-sector in relation to specific selection criteria. This information was both quantitative and qualitative in nature, and drew from a variety of primary and secondary sources of information. Direct research with key stakeholders and informants from the sub-sector was essential.
2. Describe the primary actors operating in the sub-sector (producers, manufacturers, input suppliers, wholesalers, retailers, etc.) including their roles and interrelationships.
3. Create "blue-print sub-sector maps." These maps would present, in graphical form, all the major activities in the targeted sub-sector. It would include the various supply channels that transform raw materials into finished products, distribution of those products to final consumers, and the different markets or market segments to which products are sold.
4. Based upon the analysis, score and rank each of the six sub-sectors according to specific evaluation criteria.

The sub-sector selection team would then capture the results in a report outlining the methodology, as well as provide an oral presentation to USAID regarding the findings.

Sub-Sector Shortlist

Team Brainstorming

On December 16, the sub-sector selection team gathered for an initial brainstorming session. The purpose was to propose and discuss a laundry list of potential sub-sectors against an abridged

list of consideration criteria. Specifically, any proposed sub-sector had to: 1) maximize impact and outreach at the rural MSE level; 2) pose an existing unmet market demand and commercial orientation; and 3) be sensitive of other donor activity.

Regarding point 3, it was understood that DFID was soon to award a BDS-sub-sector activity in the green beans and dairy/livestock sub-sectors. Additionally the team was cognizant of the USAID – funded ACDI/VOCA Maize, Land O’ Lakes Dairy, and soon-to-be awarded horticulture tender. All efforts were made to avoid direct duplication of sub-sector efforts.

During the brainstorming session, the following “raw list” was established

1. vegetable extracts, herbs and spices (onion, garlic, cabbage, spinach)
2. small scale independent water providers
3. fruits (avocadoes, mangoes, papaws, pineapple)
4. nuts – peanuts, macadamia, cashew
5. oilseeds and vegetable oils
6. eco-tourism
7. export/domestic crafts
8. textiles and apparel
9. footwear industry
10. finished wood products
11. apiculture
12. poultry
13. fisheries
14. organic extracts of pesticides and herbicides (pyrethrum, neem, aloe)
15. auto parts fabrication (air/oil filters, seals)
16. silk
17. basic root crops (cassava, arrowroots, yams, sweet potatoes)
18. brick/block making, tiles, recycling
19. cordage, rope and twine
20. rice
21. wheat – bakery products

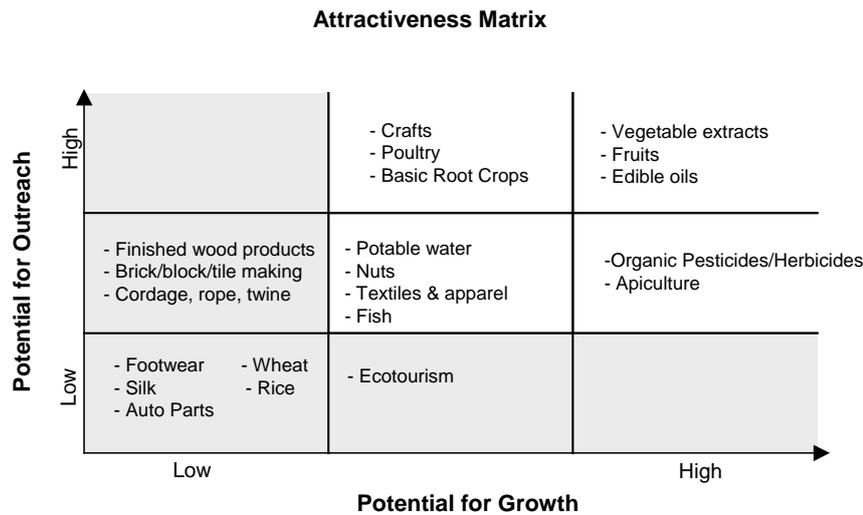
Attractiveness Matrix

Following identification of the raw list, an attractiveness matrix was applied to assist with further refining. The attractiveness matrix application was originally designed by Frank Lusby of Action for Enterprise, and endorsed as part of the business services/sub-sector approach by USAID/Kenya.

For Kenya BDS, the attractiveness matrix measured the “potential for outreach” against the “potential for growth” with segmentations in the low, medium, and high categories. It was recognized that the process was subjective to the background and knowledge of the selection team. To minimize such bias, each sub-sector on the initial raw list was thoroughly discussed by all members. A strong preference was made for those sub-sectors that had a strong, already-existing commercial orientation, unmet or latent market demand, and potential for the introduction or further development of value-adding business services.

The attractiveness matrix exercise resulted in a narrowing of the list to 12 potential sub-sectors which fell in the medium to high categories. It should be noted that characterizations of the sub-sectors was based upon current knowledge and potential at the time of discussion. For example,

it is possible that in six months sub-sectors such as eco-tourism or textiles and apparel may prove more promising. The following diagram details the results of the attractiveness matrix exercise.



From the attractiveness matrix results, twelve sub-sectors were identified as having medium to high potential for both growth and outreach among rural MSEs. To further refine the list, team members decided it was best to gather additional information over a two-day period and then reconvene for further analysis. Following this exercise the team arrived at a final short-list for analysis, with the vegetable extracts, edible oils, basic root crops, fruits, fish, and organic pesticides were determined as having the most potential for intervention.

Analysis of Short-List

To maximize time and resources, it was decided to divide the short-listed sub-sectors among the team for further analysis. Data collection was to entail both primary and secondary research, with the information to be organized in four areas:

1. *General Characterization* – Size of the sub-sector, MSE employment, contribution to GDP, geographical distribution, participation of women, rural impact
2. *Key Players* – Critical actors and stakeholders within the supply chain
3. *The Market* – domestic/international supply and demand, linkages with other industry and sectors
4. *Strengths, Weaknesses, Opportunities, Threats*

Analysis of the six shortlisted sub-sectors comprised a period from December 19th to January 10th. This period was particularly challenging given the Christmas and New Year holidays, as well as the presidential elections. The team was able however to gather the necessary information in support of sub-sector evaluation and selection.

Annex A provides a summarization of the data collected on each shortlisted sub-sector.

Scoring of Shortlist

Evaluation Criteria and Scoring Process

Evaluation was based upon weighted percentages that mirrored the objectives and goals of the Kenya BDS program. The following table details the selection criteria and related rationale.

Sub-sector Selection Criteria	Rationale	Percentage	Ranking (1-3)	Score (% x ranking)
Potential for increase in rural household incomes	Potential exists to significantly increase revenues or sales within a range of areas or along all levels of the supply chain	25		
Significant number of MSEs in the sub-sector to maximize outreach	Critical mass of active or "latent" MSEs exist with potential for program leverage, including women participants in the supply chain	20		
Existing market demand for the good or service	Willingness to purchase particular product is evident, and there is potential competitiveness of the sub-sector in relation to the world market.	20		
Potential for positive synergies with donors and government	Opportunity exists to leverage off and complement other sub-sector based programs and activities.	5		
Existence of linkages conducive to market-based approach	A variety of actors exist in the sub-sector who are linked through mutually dependent commercial transactions and relationships.	10		
Potential for employment generation	Significant opportunity exists for job creation within the sub-sector, and ability exists for USAID to have an impact on the sub-sector.	15		

Each member of the team individually ranked each sub-sector according to the specific criteria, which were later combined to establish an average rankings. The scoring process resulted in the following:

Fruits	2.23 points
Organic Pesticides	1.98 points
Edible Oils	1.83 points
Fish	1.73 points
Vegetable Extracts	1.58 points
Basic Root Crops	1.55 points

Findings and Recommendation

Questions for Follow-on Activities

The fruits sub-sector has emerged as the initial recommended sub-sector for assistance under Kenya BDS. During the analysis, key questions arose among team members, which must be addressed during Activity 2 and 3 "Sub-sector Analysis and Constraints Identification."

- First, should the follow-on sub-sector analysis target the domestic or export markets, or both? The domestic market consumes nearly 99% of national fruit production, however the export value of fruits is increasing.
- Second, should the follow-on sub-sector analysis target fresh or processed fruits? The bulk of Kenya's fruit exports are in the form of fresh fruits (avocados accounted for 48% of total fresh fruit exports in 2001), however passion fruit and mangoes are the most popular in terms of juices in the local market. There is market potential for fruit juice concentrates, jams and marmalade, dried fruit, and avocado oils for cosmetics.

- Finally, where should the follow-on sub-sector analysis target in geographic terms? Mangoes are primarily produced in the coastal areas, whereas avocados and passion fruit are produced in the highlands. Is there enough overlap among supply chain actors within each commodity to justify one comprehensive analysis?

These questions will be explored and addressed in-depth during Activities 2 and 3 of Kenya BDS.

Lessons Learned from Activity 1

Kenya BDS is putting into practical implementation the conceptual framework for sub-sector based BDS market development. From the experience of Activity 1, the following lessons learned were identified:

- *Sub-sector selection is subjective* – While the sub-sector scoring criteria and percentage weighting assist in applying a methodical process for selection, the brainstorming session and attractiveness matrix ranking exercises are somewhat influenced by the particular biases of each team member. All efforts should be made to include participants with a variety of technical backgrounds and sub-sector knowledge.
- *Information at the MSE level is often difficult and varied* – Several team members had difficulty in extracting critical market information from processors and exporters, as such data was viewed as proprietary. The level of sub-sector analyses conducted in the past was also varied. For example, donors and industry stakeholders have commissioned a significant amount of research in areas such as horticulture and fish, whereas information on niche sub-sectors such as vegetable extracts is less available.
- *Definition of the sub-sector is critical to defining program scope and activity* – A sub-sector may be defined as “All the firms that buy and sell from each other in order to supply a particular set of products or services to final consumers.”¹ A challenge under Activity 1 was to define or set the parameters at the product level. For example, a single commodity such as passion fruit may be assessed as a sub-sector, with its particular set of commercial relationships within the supply chain. Additionally, fruits in their entirety may be identified as a sub-sector. A facilitator must be clear in the definition of sub-sector in question, as follow-on activities may differ.
- *Proper resource allocation at each stage of the sub-sector/business services approach is important* – The process of identifying sub-sectors and the follow-on analysis can be time-consuming and expensive. It is important to weigh such activity within the framework of their intended objective, and moderate resources accordingly. During Activity 1, team members had to be mindful of the purpose of the shortlist assessments, and resist the temptation of going too deep in terms of an upfront analysis.

¹ “Sub-sector/Business Service Training and Strategic Planning Workshop,” Lusby and Panlibuton, November 19-23, 2002, Nairobi, Kenya.

Annex A

Analysis of Sub-Sector Shortlist

- Vegetable Extracts
- Fish
- Fruits
- Organic Pesticides
- Edible Oils
- Basic Root Crops

Vegetable Extracts Sub-Sector

Size of the subsector

Over the last 20 years, the production and export of Kenyan fresh vegetables has grown rapidly. There has been also been an increase in the number of industries engaged in food processing but not at the rate of fresh produce export. The horticulture sub-sector is now ranked second to tea in generating foreign exchange earnings.¹ In the early eighties, the export tended to be in bulk to wholesale markets. Now it is through tightly integrated supply chains where the export is sent in the form of “prepared foods”- washed, cut, packed in individual ready-to-cook packages. The packaging is done in production units owned by and attached to the export houses and are tightly controlled for hygiene. The prepacks are supplied directly to the distribution centers of various supermarkets. The export figures for these semi-processed produce is subsumed under the figures for horticultural export and it is difficult to identify their volume distinct from the total volume of vegetable export.

Another form of export of vegetables to Europe is in the form of dehydrated and canned vegetables. Dehydrated and canned vegetables also have local markets, while processed foods using a vegetable base such as sauces and soups have a regional market within COMESA. The major portion of the processing and export is in the hands of a few (4) large firms. Annual production of tomato pulp, paste, sauces and dehydrated vegetables varies from company to company and exact figures were difficult to obtain in a highly competitive industry.

Estimates of Quantities of Tomatoes, Cabbage, Spinach, Onions, and Garlic which are Annually Processed for Local Use or Export

Dehydrated or Canned Vegetable	M. Tonnes	Kshs
Tomatoes, pulp, pastes, and sauces	5000	120 million
Dehydrated vegetables (tomatoes, onion, garlic, cabbage, and spinach)	8000	60 million

The combined volume of processed fruits and vegetables (juices, jams, sauces, canned products) was estimated in 2002 at 280, 000 tonnes. In comparison, only about 100,000 tonnes is exported as fresh produce. The breakdown of the processed food into fruit or vegetable base is not available however and would need a full survey of all the fruit and vegetable processors.

The increase in the last 20 years of the number of vegetable processors from one or two to more than ten has run parallel to the increases in urban populations and the broadening of consumer tastes. There seems an overwhelming emphasis on tomato based products and there are four different kinds of tomato sauces (with varying shades of red) being produced in close competition with each other.

¹ “ Production and Export Statistics for Fresh Horticultural Produce”, Ministry of Agriculture and Rural Development, July 2002, Nairobi.

Market Demand

Most producers of tomato pastes for hotels and homes say that there is more demand locally and regionally than they can meet. This is also borne out with packaging companies, one of whom is informally undertaking its own investigation of the capacity of the tomato value chain in Kenya.

Of the dehydrated vegetables, demand for export and domestic consumption is currently met by 2 processors. They estimate that Kenya could sell up to 15000 tonnes per annum if the electricity and fuel costs could be brought down and vegetable supply could be guaranteed.

Export markets for dehydrated vegetables are : England, Holland and Germany. About 3,000 tonnes are exported annually ; the rest (5000 tonnes) is used locally. The local demand is rising as a local multinational initiates production of a new range for the regional market; UNILEVER has recently bought Knorr and will now undertake the Knorr line of products including vegetable cubes, soups etc. which use dehydrated vegetables. The armed and security forces are also large consumers of dehydrated vegetables.

Main competitors for dehydrated vegetables are Egypt, China and India. South Africa is a smaller player but Kenya (one company in particular) is the largest producer of dehydrated vegetables.

Regional markets (Uganda, Tanzania, Rwanda and Burundi) demand tomato products such as tomato sauces, purees and pulps; only about 5% of the total production goes into export.

Domestic market absorbs most of the tomato products; the tourist industry is a large consumer.

Synergies with Donors and Government

The food processing industry especially with regard to vegetable extracts is not an area that has drawn much attention recently or in the past from donors or the government. The processors we spoke to say that there is “ no policy” with regard to food processing and there is much more focus on the export of fresh produce. Their advocacy in the past has been with regard to taxes and levies imposed and has been through the office of the Kenya Manufacturers Association.

The MSE Potential

The primary actors in the subsector are

1. small scale farmers/producers
2. input suppliers
3. exporters/processors
4. brokers
5. transporters
6. technical experts and researchers
7. government policy makers and parastatals
8. importers' auditors
9. consumers.

MSEs are involved in the subsector primarily in the form of small producers, farmers who as small businesses contract with the processors for tomatoes and the assortment of vegetables which are dehydrated or canned. The processors usually contract small scale farmers who in fact account for 75% of Kenya's agricultural production. About 30% of the smallholdings are owned by women and can range from half an acre to five acres. The area of land under the cultivation of vegetables, herbs and spices in 2000 was 89,280 hectares out of 236,815 hectares under cultivation for horticultural crops i.e. about 38% of the total. Vegetables that covered the major part of this land were those that are mostly for the local market : cabbages, tomatoes, kales, onions, carrots and garden peas .² These "local " vegetables are also the ones which are most used for processing into flakes, powders, pulps, soups, sauces, and vegetable juices.

Constraints

The fundamental problems that confront value addition to vegetables in Kenya have not changed dramatically over the last ten years, but the international market in which they compete has. Kenyan agriculture is almost entirely rain-fed. This means that most of the cultivation and harvesting is during the rainy season and because of the constraints of storage and transport, this is also when a lot of " surplus" is wasted. Over and over, there are accounts of "rotting fruit and vegetables" by roadsides and in villages since all produce is not able to be used /bought/transported. A huge vacuum exists in terms of value addition at/near the farm gate.

On the other hand, urban food processors complain of not being able to access the supplies they need and of struggling to get the quality they want. The number of food processing companies has grown very slowly compared to the number who are able to export a whole variety of fresh produce from coconuts to chillies to Europe. The market for the processors is largely local but two products do have a European market : canned/bottled French beans and dehydrated vegetables. The demand for both is however being affected by tough competition from China who as one processor put it " seem to be able to produce everything for nothing (i.e. at no cost) "!. In Kenya, the cost of energy (fuel and electricity) are seen as the biggest cost factors in processing ; expensive packing material is another.

The food processors are in short supply of R and D that could enhance their product quality and diversity. Three of the five processors interviewed thought that a food processors association (such as the one that services the fish and fresh produce exporters) could be of tremendous help to them in market intelligence and bringing in new knowledge and ideas. The processors tend to rely for this expertise on the European importers of their products but find the European input very limited and self-serving. This input comes in the form of visits by the importer's agents and auditors who besides checking on standards might advise on technologies and new developments in the field.

Linkages conducive to the market based approach

² "Production and Export Statistics for Fresh Horticultural Produce", Ministry of Agriculture and Rural Development , July 2001, Nairobi.

Technical assistance to the smallholders has usually been delivered through the exporters and NGOs . The small producers who supply their vegetables to the exporters receive their inputs through the exporter's agents and are assisted throughout the growing cycle on how to use them.

The small scale farmers who have not contracted with exporters or processors are not linked to specific input suppliers. Food processors tend to have a more hands-off relationship with several of them buying their supplies from brokers or transporters. Those processors who have tried contracting with farmers are not very happy with the experience since they do not get the quantity contracted for. This appears a common problem for both vegetables and fruits processors and exporters - the small scale farmers are not able to be consistent or reliable with quality or quantity of their produce .

The number of MSEs – the small farmers, transporters and brokers as well as small scale input suppliers- who are linked to vegetable extracts sub-sector are estimated at about 200000 (see estimates below) . The potential for embedded services through existing input suppliers is quite significant since they are the ones who offer most of the technical advice. There is additional potential for support to small scale business service providers who can help organize the farmers into groups for greater efficiency of production and markets and offer them current market information.

BDS Entry Points

Constraints to the productivity of small producers:

The biggest hurdles to small farmers' share in the market are their inability produce consistent quantity and quality and weak linkages to value adding opportunities. The reasons are:

- Lack of knowledge for the need for consistency and the know-how to deliver this
- Scattered efforts to improved the production on project basis which is time bound and not rooted into local institutions
- Limited access to appropriate technologies
- Little or no knowledge of value adding opportunities.
- Small scale farming is a business and farmers tend to address multiple markets. Just as contractors sometimes default on their contracts with the small farmer, the farmers play the field in finding maximum price for their produce.

Possible solutions:

- Institutional innovations e.g. Horticulture related institutions at the local level which penalize and reward quality and quantity.
- Market education: Broaden the horizons and knowledge base of the small scale farmer through training that explains their place and potential in the globalised marketplace.
- Market information: the producers are completely at the mercy of price fluctuations without understanding the reasons why or having any strategy around that.
- Technical assistance to increase production. Individual farmers produce very small amounts; that is why producer groups are attractive. The farmers also need help in linking up with institutions who can work on their behalf and assure them of good

prices.

Employment

There are currently 12 vegetable processors that produce for retail chains, hotels and export. Two supply dehydrated vegetables to the international and local markets while four produce tomato sauces, purees and pastes. Only one produces and cans tomato juice. Frozen vegetables for the local market is a new line being experimented with by two companies.

The total number of small scale farmers whose tomatoes, cabbages, spinach, onion and garlic are bought by processors for value addition annually would be about 20,000-30,000 (based on estimates from two processors). If one then includes estimates of casual labour brought in at the time of harvest, brokers, transporters etc., we could estimate employment generated through the processing of these vegetables to be between 160,000 –240,000.

The (industrial) employment directly generated in the production plants at an average of about 200 persons is only around 2000 persons. Therefore, one could estimate total employment generated by the processing of vegetable extracts to be approximately 200,000 persons per annum. If the production processes at the farm level can be made more consistent and tailored to the processors' needs for quality and quantity, the numbers of MSEs and employment in the sub-sector could increase.

Strengths, Weaknesses, Threats and Opportunities

Strengths

- Kenya is already an established player in vegetable export to the EU with established systems for production and delivery. The demand by importers and producers is for consistency in quality and quantity.
- There is proven capacity in the country to deliver market education to the farmer in the form of embedded services. This now can be the platform for commercial delivery of this education and training.
- Previous to structural adjustment, the farmers were used to selling to parastatals which were the primary marketing institutions. The development of institutional links which can be of assistance is well established
- The registration of producers as legal entities / registered companies with joint accounts has made it easier for them to negotiate prices for business services and input supplies.

Weaknesses

- There are no established mechanisms of creating the shift in the producers' thinking from traditional to modern contexts of their production. Farmers follow instructions but their limited grasp of the entire value chain inhibits initiative
- Lack of information about the market and its global context minimizes farmer initiative in forging business linkages.
- There is often politicization of /political interference with groups who come together as farmers or entrepreneurs efficiency.

Opportunities

- Kenya has a vibrant food industry which exports regionally and internationally. The demand for dehydrated vegetables is large even in the country. The tomato based products are being studied for export packaging innovations by the leading packager in the country.
- Exporters already deliver embedded services in the form of information about standards and international markets. If this can be broadened to the discussion about potential entry points, enterprises and producers can be encouraged to perform better and to diversify according to market.
- There is a trend towards the formation of legal companies by small producers for the sake of obtaining technical assistance ; this infrastructure of clusters makes it easier for BDS to be offered to rural enterprises.

Threats

- The dominance of China in the world market as a supplier of vegetable extracts especially in the form of dehydrated vegetables.
- Traditional forms of land inheritance and farmers' groupings undermine the cohesion of farmers' groups and economies of scale necessary for vegetable quantities required by processors.
- Unorganized and highly competitive sub-sector where there is little sharing of knowledge or ideas.

Fish Sub-Sector

Size of the subsector and potential for rural income increase

The fisheries sector is broken into three primary areas: 1) inland lakes and dams; 2) coastal marine region; and 3) aquaculture. Of these the largest source of fish as a commodity is Lake Victoria whose fish is harvested by fisherfolk of all three East African countries. The fish sub-sector has suffered from inadequate attention from the policy makers in Kenya perhaps because it is seen more as regional rather than a national resource. Artisanal fishing restricts fishing to within 10 kilometres of the shores. The governing statute for the fish sub-sector Sessional Paper 4 is dated 1980.

Average annual total production of fish in Kenya is estimated at 180,000 Metric tonnes (MT) valued at Ksh. 6.667 million to the fishermen with a retail value of Ksh. 25,004 million. Prior to the 1999 EU ban of fish from Lake Victoria, 1,892 MT of fish and fishery products was exported annually from Kenya, earning the country 3,426 million Ksh in foreign exchange.³

Some statistics:

- Marine fish caught in 2000 totaled 4,763 tons and were valued at K.Shs. 284,198.
- Kenya's export of fish and fishery products in 2001 stood at about US\$50 million. The fish industry was the fourth most important foreign exchange earner in the agricultural sector. There are 20 fish exporters.
- Over 92% of the total annual catch is from Lake Victoria, the second largest lake in the world (Kenya 6%, Uganda 45%, Tanzania 49%). There are plans underway to harmonize the regulations in the 3 East African countries, which govern the fish industry. The total catch may be broken down as follows:
 - 92.5% Lake Victoria
 - 3.1% Other inland lakes
 - 3.9% marine and coast
 - .5% aquaculture

The MSE potential

Key stakeholders include:

- Community-based artisan fishermen
- Middlemen traders
- Fish processing factories and exporters
- AFIPEK – Kenya Fish Processors and Exports Association
- Department of Fisheries, Ministry of Agriculture and Rural Development
- EPC – Export promotion council
- KEMFRI – Kenya Marine and Fisheries Research Institute

The fishermen who engage in sales sell directly to the wholesale buyers, exporters' and processors' agents who buy the days' catch as soon as it is brought to the shore. The trading

³ "Diagnostic Report: Kenya Fish Sub-Sector," Department of Fisheries, Kenya Fish Processors and Exporters Association, and Export Promotion Council, December 2002, Nairobi.

and small scale processing and marketing is dominated by women and is carried out through microenterprises located mostly in Kisumu and Nairobi.

It can be safely assumed that the trading and processing related to the catch from aquaculture would almost definitely be all through MSEs since this is not an area of interest to large scale processors or exporters of fish.

Market Demand

- Domestic market - Ranges from selling to communities neighboring the landing sites to urban centers. Product is primarily Tilapia, although Nile Perch is consumed in limited quantity by high-level hotels. Fish is mostly sold whole and fresh, although there are consumers for dried, smoked, or filleted. Strong presence of middlemen. The domestic market could be improved significantly if a concerted effort was made to promote fish as a nutritious staple, which can withstand the effects of drought.
- Export market – Export industry constitutes the largest part of the formal fish industry in Kenya. Market is dominated by 18 processing plants for export located around Lake Victoria, Nairobi, and Mombassa. 80%-90% of Nile perch caught from Kenya is used to produce fillets for export. EU used to consume 87% of total fish exports in Kenya, however the recent bans have had negative developments on the industry but it is recovering. Germany, the Netherlands and Belgium are key importers.
- Coast based processing is mostly for the packaging and export of tuna brought in by European trawlers from Tanzania, Mozambique, Seychelles and Somali coasts. The squid, octopus, shrimps and lobster are mostly used by the hotels along the coast.
- Mauritius with its cheaper labour and fuel costs has a competitive tuna industry. Competition from Morocco, the world's main producer of octopus, and Cuba, the largest producer of lobster.

Potential for synergies with donors and government

Government is keen to organize the subsector and make it more efficient. It was the European Union and the Government which had supported the development of AFPEK. Although there do not appear to be any particular policies, programs or projects being designed currently to address the constraints in the subsector, there is definite enthusiasm among the lead players to undertake targeted measures for change.

Linkages conducive to the market based approach

There exist hundreds of fisherfolk who supply the lead firms. They operate as individuals but are being encouraged to form groups and these could potentially be the MSEs at the base of the chain. Currently the services being offered are for the most part in the form of embedded services from the lead processors and exporters. They are seen as “technical assistance” offered through AFPEK agents and a small levy (KShs. 1 per kilo of fish) is imposed for this. The buying agents for the local market are often women and would benefit greatly from BDS targeted at their sub-sector and the local market.

Potential for employment generation

The fish sector provides employment and income to over 500,000 Kenyans engaged in fish production and related enterprises, fish trade, and industrial fish processing. Of this, 30,000 fishermen operate along Lake Victoria, while an unspecified number of women are engaged in the retail selling of raw, dried and cooked fish. The gender division between catching and selling is quite marked. Whether either of these key activities will grow with greater efficiency in the chain depends to some extent on whether the market demand continues to grow. The provision of services will in itself create employment although not in the numbers that are engaged in the production (i.e. catching and processing) of fish products.

Strengths, weaknesses, opportunities, threats

Strengths

- Nile perch is only sourced from Lake Victoria.
- Following lift of recent EU ban, Kenya fish exports by both value and volume have been steadily increasing
- Fish sub-sector is a significant contributor to employment and incomes at the rural MSE level.
- There is already some improved organization of the industry through an initiative on the 12 Lake Victoria landing beaches with Beach Management Units and plans to build cold rooms and sanitation to ensure hygienic handling.
- An active umbrella organization exists: the Association of Fish Processors and Exporters of Kenya. AFIPEK was established in 2001 as a result of the EU's and the government's demand for better organization and monitoring of the fish industry .It is currently building what it considers to be public infrastructure – sanitation and cold rooms at the landing sites – at a cost of K.shs. 1 million. A levy per kilo of fish has been imposed and goes into a fund jointly managed by AFIPEK and the fisherfolk.

Weaknesses

- Policy - Three recent bans on fish exports to the EU have severely hampered the sector. Most recently, a EU decision 1999/253/EC suspended fish products, fresh, frozen or processed, caught in Lake Victoria. The ban was lifted in 2000 November after stringent safety and quality controls were put into effect. Additional constraints include: multiple levies, disharmony of regulations, lack of national fish quality control laboratory.
- Fishermen - Constrained by poor fishing gear, ice, weak infrastructure (roads, communication, electricity) at the landing sites. Additional fish production constraints include: lack of access to credit, inadequate savings options, over-dependence on Lake Victoria, seasonality of fish, lack of organization among fishermen, inadequate sanitary conditions at fish landing sites, and fish spoilage. Gender roles: men fish; women sell.

- Excessive transport costs since the lack of facilities at the landing beaches means that every catch is immediately bought by the exporter's agents and transported to the processing plants. A processor needs 8-10 tons of fish everyday to break even.
- Export – Constraints include: high prices on fish landing beaches, lack of HACCP systems auditors, improper fish handling practices from harvesting and packaging, and lack of a national fish quality control laboratory. The costs of packaging and fuel are also constraints.
- No comprehensive assessment of the national fish stock especially marine resources. From experience it is known that the Kenyan coast's stock is lower than that of Somalia or Tanzania (because of the effect of monsoons).

Opportunities

- BDS interventions may include: organizing into producer groups or clusters to achieve economies of scale; assisting processors with backward and forward linkages; market information; alternative (value-added) product development; fishermen inputs and technology; alternatives for transport and storage; introducing better quality and control standards; and development and promotion of domestic fisheries consumption.

Threats

- Diminishing Nile perch stocks and “over-fishing of Lake Victoria”
- Lack of alternative products. Aquaculture and coast is weak to nonexistent.
- Reliance on the EU export market.
- Heavily unorganized sub-sector, with dominance by a few large processors.
- 210 NGOs work around the Lake and this obviously will influence the development of commercial BDS.

Fruits Subsector

Size and Potential for Increasing Household Incomes

In the year 2000, the fruits subsector covered approximately 143,000 hectares, or 60% of total area under horticulture, with production estimated at about 2.2 million MT, valued at approximately Kshs 19.1 billion. Thus out of the estimated total domestic value of horticultural production of Kshs 42.7 billion, fruits accounted for nearly 45%. Fruits in Kenya are largely for domestic consumption and only about 1% of the volume is exported, and thus the low export share amounting to Kshs 1.6 billion of total horticultural export earnings estimated at Kshs 20.2 billion in 2001.

Although disaggregated data is not readily available, it is quite clear that the bulk of Kenya's fruit exports are in the form of fresh fruits. Among the fruits, avocado accounted (in 2000) for the largest share in export earnings estimated at Kshs 608.9 million or nearly 56%, followed by macadamia nuts (13.6%), mango (11%), melons (7%) passion fruits (6%), pineapple (3%) and papaya (2%). Fruit exports value rose from Kshs 1.1 billion in 2000, to Kshs 1.56 billion in 2001, representing a 43% increase. Avocado still maintained the lead fetching Kshs 759 million representing a 25% increase over the previous year. For mangoes, the export value increased from Kshs 118 million in 2000 to as high as Kshs 485 million on 2001, representing a 311% increase. Data available indicate that the five selected fruits (avocado, mangoes, passion fruits, pineapples and papaya) together accounted for Kshs 843.2 million or 77% of total fruit export earnings generated in the year 2000.

Number of MSEs Involved in the Fruits Subsector

Fruits are grown in a wide range of ecological zones in Kenya with Coast, Eastern, and Nyanza provinces being important for mangoes, Central and Eastern provinces for avocados, Eastern and Nyanza provinces for passion fruits, Central province for pineapples, Eastern for papaya and Nyanza for bananas. Except for pineapples, where Delmonte and Kakuzi multinational companies produce under large scale irrigated farms, the rest of the fruits are predominantly produced by small to medium scale farmers under rain fed conditions.

Key institutional stakeholders in the fruits subsector include the Ministry of Agriculture and Rural Development (MOARD), Horticultural Crops Development Authority (HCDA), Ministry of Local Government/Local Authorities, Kenya Plant Health Inspectorate Service (KEPHIS), Pests Control Board, Kenya Agricultural Research Institute (KARI) and Fresh Produce Exporters Association of Kenya (FPEAK). A few donors currently involved in one way or the other in the fruits subsector includes GTZ, IFAD, and JICA. Key private sector stakeholders include farmers, traders, transporters, processors and exporters.

The main type of MSEs in the fruits subsector consists of fruit tree nursery operators, small-scale farmers, transporters, traders/brokers, exporters, and processors. Data on the number of MSEs under these categories are largely missing, but MOARD and HCDA reckon that there are approximately 150,000 small-scale farmers producing fruits in plots of up to 0.8 of a hectare. Thus about 60% of the estimated 250,000 farmers involved in horticultural production are growing fruits, though it should be noted that many of them combine with other horticultural and non-horticultural crops as well as livestock. Data is scarce but the

number of farmers growing avocado, passion fruits, mangoes, pineapples, and papaya together could easily reach 80,000 or more.

While men do most of the transportation role, the bulk of MSEs involved in the actual fruits cultivation and marketing/vending are women though the actual number is not known. A few traders interviewed during the study floated a percentage 70%. According to the HCDA, the number of registered fruit trees nursery MSE operators is estimated at 400 countrywide, though there are probably an equal number of unregistered operators. There are no transporters purely dedicated to fruit transport and most of them are owners of mini-trucks/lorries, buses and *matatus*, but the size is not known though considered large. Most exporters combine fruits and vegetables in their export consignments, with the bulk of fruits being exported in the form of fresh fruits by an estimated 300 small to medium firms and the rest by four large exporters consisting of East African Growers, Home Grown, Veg-Pro and Sun Ripe. While the larger firms depend on the large contracted farmers and/or their own managed firms, the majority of small to medium exporters depend to large extent on brokers who buy from farmers and transport the produce to their clients as per specifications.

The volume of Kenya's fruits processed in to the various products such as pulp, concentrates, juices, jam and marmalades is estimated at 7.5%. The fruits already being processed in significant scale include coconuts, macadamia nuts, pineapples, and concentrates (oranges, grapefruit mangoes, passion fruits, papaya and tomatoes. Processed fruits export earnings in the year 2001, amounted to Kshs 448 million. Processed pineapple exports accounted for Kshs 411.5 million or approximately nearly 92%. Orange juice was the second having earned some Kshs 33 million. Among the selected fruits, passion fruit and mangoes are the most popular in terms of juices in the local market as well as in the region. Papaya is processed into wine and related products by only 2-3 companies in the country. Avocado processing, especially into cosmetics oils is minimal despite the high potential. Only two firms (Elinda and Bio-industries) are known to be undertaking avocado processing. This is perhaps because of the long standing dependence on cheap imported avocado based cosmetics, which probably explain the predominance of *Pears* and *Satin Sheen* brands in the local market. Overall, there are about 40 medium to large sized companies involved in the processing of fruits. These firms are facing very stiff competition from processed fruit products from especially South Africa and Israel for mango, passion, apple, grapes, and orange juices, among others.

The number of informal establishments involved in fruit processing is not well known, but key informants reckon that there is probably over 1,000 *Jua Kali* or artisanal type of fruit processors for the local market, most of whom are women. These MSEs who prepare and deliver juices to stores and restaurants for direct sale and consumption using simple equipment with minimal investment outlays have flourished considerably in the recent past. According to Dominion Fruit Processors Ltd, these MSEs and the very small ones operating from house kitchen may now be commanding over 70% of all fresh fruit juices consumed in the country (homes, lower market restaurants, and kiosks in the smaller to medium urban centres). With the increased competition from the *Jua kali* processors, the large formal fruits processing establishments are now attempting to penetrate into other regional markets where demand is showing some growth. Interviews with a few fruit processing enterprises indicated that Kenyan processed fruits are competitive at least in the regional markets, though some selected products such as processed pineapples and juices were also competitive in the more sophisticated export markets in Europe.

There are a sizeable number of MSEs involved in the processing of fruits and vegetables, making it a subsector worth considering for business development services. However, the main issues revolve around a number of things: High cost of the raw materials (e.g. fruit juices, and fruit juice concentrates account for 50-60% of total fruit processing costs. Inadequacy and irregularity of supply for some key commodities to ensure supply matches market demand situations. Passion fruit supply in particular has not been able to match demand and installed processing capacity. Lack of competitiveness of Kenya's products on the world market (quality and cost). Poor quality and expensive packaging materials, which on average account for 10-20% of total cost of processing. High cost of equipment for processing. Lack of information on investments and market opportunities among prospective investors. There is also general lack of capital among prospective local investors.

Market Demand Potential

Market demand potential should be assessed in terms of both local (whose growth will largely depend on population growth, income increases and urbanization) and export markets, which will depend largely on income increases, price and quality competitiveness of country's products. Bananas (both as a sweet fruit and for cooking, which is treated as a fruit), Pineapples, Mangoes, Papaya, Citrus fruits, Passion fruit, and Avocados dominate the fresh fruit market in Kenya⁴. For the fruits subsector as whole, the local market consume about 99% of the total production volume. Most of this is consumed at home, food kiosks, institutions and hotels, largely in the form of whole fresh fruits or fruit salads/deserts, with a small proportion being processed locally. The balance of local production (1%) is exported mainly as fresh fruits, except for pineapples, which are predominately in processed form (by Del Monte).

At commodity level, the proportion of export volume as a percentage of total production vary with 20.6% for avocados, 4.3% for macadamia nuts, 3.7% for passion fruits, and 2.4% for mangoes. Contrary to common believe, a very insignificant proportion of pineapples (0.01%) is exported according to available data from HCDA⁵.

The main export markets for Kenyan fruits are Europe (78%), Mid-East (20%) and Africa (2%).

Avocado is by far accounts for the largest volume of fresh fruit exports having accounted for about 55.6% and 48% in the year 2000 and 2001 respectively. France is currently the largest market for avocados, having accounted for 10,614 MT worth Kshs 303.1 million or nearly 86% of the total avocados export value in the year 2000⁶. This was followed by UAE with 5%, and the Netherlands 5%. According to the Export Promotion Council, there is a growing market for Fuerte and the new Etija and Linda varieties. The steady growth of avocado export volume from 6,700 MT in 1993, to 15,400 MT in 2001, and the doubling of unit export values from Kshs 29,000 to Kshs 57,000 per MT in the same period seems to support this observation. Although avocado oil processing is almost non-existent in Kenya, there is some

⁴ At least looking at it in terms of proportion of production, and volume of exports.

⁵ Lack of disaggregated data in terms of fresh and processed makes it more difficult to carry out proper analysis.

⁶ Disaggregated figures for 2001 are not available.

potential for growth as long as quality and price competitiveness is ensured, which raises the issues of crop husbandry, post harvest handling and cost of shipping. The fruit has other unexploited uses such as making oil for specialized cooking, chocolate and ice cream. *By virtue of its contribution in export earnings, and the potential for processing into cosmetics, and the aforementioned products, avocado is a good candidate for promotion through business development services.*

Passion fruit is suited to the Kenyan case for a number of reasons. It already has good local and export markets particularly as fresh fruit (relatively smaller in the form of juice). It is less bulky than avocados and mangoes, thus lower unit costs of freighting. It is small sized as a fruit, and therefore suited to the “*food combination packs*” that are becoming popular in Europe. It has a shorter maturity period (18 months) as compared to other fruits. It can be grown in a wide range of areas in the country (especially Eastern, Nyanza and Rift Valley). It can be harvested throughout the year thereby providing the farmer with continuous flow of income. It has relatively high nutritional content, which is in line with modern society dietary preferences. Its price margins are fairly high (Kshs 40 per Kg at farm gate and Kshs 80 per Kg at the consumer level or factory gate).

The fruit is popular in the local market as a fruit, salad or juice. Most exporters and processors indicated that the fruit has a high export market demand (especially the purple variety) as well as in the local market as a fruit or juice. The processors feel that there is likely that shortages will emerge in the near future unless production is enhanced. *It appears a promising subsector that is worth further analysis.*

Approximately 71% of all Kenyan **mangoes** are produced in Coast and Eastern provinces though there is potential for area expansion in Central, Rift Valley and Nyanza. About 98% of mangoes are consumed domestically largely as fresh fruit although demand for juices is increasing rapidly. The export market demand has been declining especially since the sealing of in the previously large Saudi Arabia and Oman markets due to the high level of mango weevil infestation. The main export market competitors are the Gambia, Ghana, Costa Rica, Puerto Rica, and Mexico. Our main constraints in competing with these countries include: (i) poor quality of our produce due to poor crop husbandry, lack of product standardization, weevil infestation and poor post harvest handling techniques (ii) unsuitable varieties for sea freight (iii) poor sea freighting facilities (iv) high air freight costs. According to MOARD and processors such as Dominion Ltd, the local market generates far too many varieties and fresh or processed mango exports (pulp and concentrates) may not be effectively exploited without standardizing the product and controlling the weevil menace. *From a market growth potential point of view, mangoes rank lower as compared to passion fruits and avocados.*

Employment Potential

The fruits subsector consists of approximately 150,000 farmers of which the small-scale producers are the majority (probably 95%). Statistics on actual employment by commodity are not available and what is provided here should be taken with caution. If we base our estimate on the often-floated multiplier of 8 by key subsector informants, it could be argued that the fruits subsector employs approximately 1.2 million people⁷. This includes farmers,

⁷ That is for every farmer there are eight people who find gainful employment in the horticultural sector commodities.

farm workers, transporters, traders, vendors and employees in processing and exporting firms, hotels and restaurants.

High employment is more likely to occur with growth in subsectors that are characterized by the large cultivated area and volume of production, large and high export value, high market/unmet demand, year-round production systems, early maturity of produce, possibility for processing, and linkages with other sectors of the economy among others. If this holds true, then among the fruits being assessed in this report *passion fruit, avocados and mangoes rank high in terms of the potential to stimulate growth through business services development.*

Positive Synergies with Donors and Government

Within the short time that was available for this short and brief subsector analysis, only a few other donor and GOK programs with possibilities for positive synergies with the fruits subsector were identified. These includes:

- The *Horticultural Produce Handling Facilities Project* funded jointly by JICA and GOK. This project was commenced in 1993 and completed in 19.. It comprised the construction of buildings and pre-cooling equipment for handling in seven areas including Nkubu in Meru, Sagana in Kirinyaga, Mwea in Embu, Limuru in Kiambu, Yatta in Machakos, and Kibwezi. The commodities targeted are French beans, booby beans, snow peas, avocado, mangoes, and Asian vegetables.
- *Eastern Province Horticultural Produce and Traditional Food Crops (EPHTFC)* funded jointly by IFAD and GOK. This project, which covers Eastern province, is in its second phase. It consisted of horticultural development component which was aimed at rehabilitating irrigation water facilities, support to horticultural marketing, traditional food crops development component aimed at improving planting materials, support to processing, and product promotion, extension and adaptive research and institutional strengthening.
- *Taita Hills Horticultural Production Centre* funded jointly by the Federal Republic of Germany and GOK.
- *Semi-Arid and Development Program* jointly funded by the Netherlands and GOK. The second phase has just ended and its management and implementation styles changed considerably.

Linkages of the fruits Subsector with other Sectors

Forward and backward linkages of the fruits subsector with other sectors of the economy are weak and limited. Production and marketing seem highly linear and geared towards human consumption. Processing is currently low and by-products are not widely utilized as inputs in other sectors. Only by-products of passion fruits are so far known to have economic uses. The rind residue after extraction of pectin could be used as filler in poultry, cattle and pig feed. The seeds can be used for consumption and for industrial purposes. Except the forward linkage to the hotel industry, the other linkages one can talk about include those pertaining to

transport and/or shipping sector, farm level inputs supplies (mainly imported except labour), manufacturing (equipment such as pulper-finishers, blenders, filters, can seamers, retorts, concentrators, aseptic fillers, tetra brik form-filer sealer and labelers) and plastic packaging industries.

Strengths, Weaknesses, Opportunities, Threats

Strengths

- Favourable ecological conditions for a wide range of vegetables, fruits and flowers.
- Located along the North-South flight corridor;
- Well established market relationship with European markets
- Readily low cost labour and reasonable availability of skilled manpower;
- Kenya is signatory to UPOV convention (attracts breeders/researchers);
- Large domestic market;

Weaknesses

- Inadequate infrastructure especially roads and water;
- Poor quality planting materials;
- Low quality produce;
- High costs of inputs;
- Inadequate specialized extension staff;
- Poor post harvest handling leading to huge losses;
- Wide spread ignorance on pesticide use and product handling;
- Lack of cooling facilities in rural areas;
- Disorganized marketing channels and unfunctional small scale farmer contracting system
- High handling charges at main exit ports;
- High freight costs;
- Inadequate cargo space;
- Lack of affordable credit to smallholder farmers;
- Inadequate market promotion abroad;
- Ineffective and bureaucratic regulatory systems

Opportunities

- HCDA existing facilities are under-utilized
- Fresh fruit consumption is rising in the European market
- Potential for processed fruits is largely untapped

Threats

- High use of pesticides vs new MRL regulations;
- Expiry of preferential treatment under LOME Convention
- Adverse publicity concerning use of chemicals, social issues such as child labour etc, and environmental aspects;
- Competition from imports;
- Lack of EU standard pack houses (due to duty/VAT on equipments);
- Lower airfreight charges in competing countries e.g. South Africa.

Bio-Pesticides Sub-Sector

Pyrethrum and the Neem tree as sources of bio-pesticides or natural-based pesticides are the only two plants that are considered in this report, with a particular emphasis on Pyrethrum as having market potential.

Size of the Bio-pesticide Subsector

Pesticides used in the world market consist of bio-pesticide or natural-based and synthetic-based; with pyrethrum being the main source under the former category. Kenya is the largest producer pyrethrum in the World, currently accounting for approximately 65% of the global supply. The other significant world producers include Tasmania state in Australia (20%), Tanzania (8%), Rwanda (5%) and Papua New Guinea (2%). More closer home Uganda, Rwanda and Tanzania also produce some small amounts.

Pyrethrum is mainly grown in the Rift Valley, Central and Nyanza provinces with some little production in Eastern and Western provinces. The major growing districts are Nakuru, Nyandarua, Kisii and Uasin Gishu which together account for close to 75% of the total national production. West Pokot is nevertheless coming up as a major producer with farmers in the area obtaining as high as 1,000 kg of dry flower hectare.

Pyrethrum is one of Kenya's important crops in terms of foreign exchange earnings, income and employment generation. It is predominantly an export crop in Kenya with over 97% of total output being exported. It is currently the fourth largest foreign exchange earner in the agricultural sector after tea, horticulture and coffee having fetched approximately Kshs 9.8 billion⁸ in 1999, through the exportation of pyrethrum flowers and extracts.

The Neem tree as a source of bio-pesticides is nowhere near pyrethrum. Its potential is broader than pyrethrum but is so far untapped. It was only in 1998, that experiments were tried with the application of Neem ground into paste and sprayed at a horticulture farm with fantastic results.

MSEs Involved and Potential for Increasing Household Incomes

The pyrethrum subsector has approximately 200,000 small-scale farmers with average land holding amounting to less than 2 hectares of which the average size of plots under pyrethrum is less than 0.4 hectares. There are 234 co-operative societies handling the crop, 780 self-help groups and 5,000 large farmer growers who are licensed by PBK to grow and deliver the crop directly to the PBK factory. According available data, pyrethrum production is also among the most profitable agricultural enterprises in the country, achieving an estimated gross margin of Kshs 48,000 per hectare per year in a good season (Nakuru district), as compared to other main competing enterprises such as maize (Kshs12, 000), potatoes (Kshs 32,000), and green peas (Kshs 7,000), per hectare per year⁹.

Overall, the Neem tree subsector directly and indirectly provides income-earning opportunities to about 2 million people. Under an ICIPE program supported by the

⁸ Source-Ministry of Finance & Planning/CBS Statistical Abstract (2000).

⁹ A draft study by Mary Kiiru and Co.

government of Finland, some 6, 000 people are believed to be involved in the collection of Neem leaves and seeds which the ICIPE factory processes into Neem fertilizer, sprays, soaps, powders, repellants and insecticides.

Potential for Market Demand for Bio-pesticides

The main pesticide uses are in the production of wheat, maize, and rice (37%), fruits and vegetables (26%), soybeans (9.4%), cotton (8.6%), sugar beet (3%), oil seed rape (2%) and other food and non-food crops (14%). In 1995, world consumption of pesticides was approximately 2.6 million MT of active ingredients valued at US\$ 38 billion. About 2.2 million MT or 85% of this was used in agriculture with over 75% being used in developed countries, particularly the USA, Western Europe and Japan. The main export markets for Kenya pyrethrum products include the USA (60%), Europe (25%), Asia, (5%), Australia (2%), India and Middle East (2%), and others (6%) of pyrethrum exports.

While the global market for pesticides is valued at US\$ 28 billion, pyrethrum based products account for an estimated value of US\$ 100 million or 0.3% of the total. Thus, despite the growing trend in favor of natural based pesticides, the pyrethrum subsector accounts for an insignificant amount in the global pesticide market. At the domestic level, Kenya's pesticide market is estimated at Kshs 400 million per annum. The domestic market for insecticide is expanding with the increase in population and awareness on the dangers of insect borne diseases especially malaria.

The current world annual production of pyrethrum is estimated at about 12,000 MT of dried flowers valued at approximately US\$ 100 million, as compared to world demand of approximately 20,000 MT per annum valued at nearly US\$ 170 million. This implies an unmet market demand of nearly 40%.

Commercial production of pyrethrum materials "in vitro" in green houses, which has been on trial in the recent past has shown this to be uneconomical and is therefore unlikely to take off as a substitute to natural pesticide production. The market price of Pyrethrin is not yet high enough to enable this new development to thrive. In addition, the natural source of pesticides is relatively high yielding and fast growing plant with limited climatic conditions restrictions. *Experts interviewed during this study indicated that the future of the pyrethrum is bright owing to the world's preference for natural insecticides for a sustainable environment. Pyrethrum is a natural substance hence environmentally friendly.*

Pesticide use has been growing rapidly and sales increased by about 72% and 81% in the developed and developing countries respectively between 1983 and 1993. The use of natural based pesticide is expected to grow with increasing intensification of agriculture worldwide, and the decline in synthetic based pyrethroids as a result of the increasing awareness and on their inherent harmful effects on human health, livestock and environment.

The apparent excess demand, together with the rapidly changing global trend of moving away from synthetic-based products in favour of natural-based pesticides augurs well for the pyrethrum subsector in the future. In addition, should the recent research and development efforts into diversification of usage of pyrethrum beyond the traditional domestic insecticide sector become successful, it is likely that its market could expand further.

The attractiveness of Neem lies in the fact that as *Europe imposes ‘ minimum pesticide residue’ laws, natural or bio pesticides for use on crops exported to the EU are going to be much in demand.* Because of the fear of toxic residues in food products associated with chemical pesticides, there is a growing demand for plant-based pesticides. Though many plant chemicals have been found to be useful for this, Neem is the only plant from which pesticides have been commercially manufactured and been acceptable to farmers in Kenya (as in other countries where these are used). At present, there is no documented export of Neem or its products from Kenya. Local consumers buy all the 5 tons of Neem product produced monthly at ICIPE. There are no statistics available on the output of the NGOs and women’s’ groups engaged in Neem soaps manufacture

Potential for Employment Generation

Employment in the subsector is largely at the production level, and almost none at the processing level given that PBK is the only processors. The producers of aerosol cans and coils used highly mechanized systems. Pyrethrum planting, weeding, spraying and harvesting are all done manually, making the subsector the most labour intensive enterprise among all Kenya’s agricultural activities. Women mainly do these activities. Being economically viable in plots averaging 0.5 hectares, it is a strategic crop for poverty reduction in the country. Its production requires about 3.3 man-years per hectare followed by tomatoes (3.13) and estate tea (2.0)¹⁰. That is, it provides over three full time jobs per hectare per year.

Overall, the Neem tree subsector directly and indirectly provides income-earning opportunities to about 2 million people. Under an ICIPE program supported by the government of Finland, some 6, 000 people are believed to involved in the collection of Neem leaves and seeds which the ICIPE factory processes into Neem fertilizer, sprays, soaps, powders, repellants and insecticides.

With these employment figures the bio-pesticides can be said to employ about 4 million people.

Potential for Linkages with other Sectors of the Economy

Recent trials on new uses of pyrethrum provide a good opportunity for increasing linkages with other sectors. These includes;

- The *control crop pests* by combining pyrethrum and non-toxic piperonyl butoxide to produce a powder, Maize Stem Borer, and termites by the use of a liquid that has been prepared by mixing pyrethrum powder with sesame oil and used deep-frying oil.
- Animal feed industry through the supply of PYMARC powder, which are remains of pyrethrum processing.
- Pets shampoo (being tried).

Potential for Positive Synergies with Donor and Government

¹⁰ Presidential Report on Employment in Kenya (1990).

The only known initiatives that are likely to have some positive synergies with stimulated growth of the subsector include:

- **Kenya Institute of Organic Farming (KIOF)**, program. This is an NGO, which has been promoting organic farming and developing pyrethrum-based products, which are effective in controlling insects such as aphids, white fly, spider mite, and mealy bug.
- **Farming System Kenya (FSK)**. An NGO, which has been experimenting on ways of controlling the maize stem borer using the pyrethrum marc. With a grant from UNDP Global Environment Facility (GEF), the NGO aims at sensitizing farmers on the use of this product.
- **KARI**, which has been, involved with research on the use of by-products from pyrethrum to control the cigarette beetles and the tobacco moth.
- **GTZ**, which has done the most research on Neem in Kenya and established two nurseries presently in Kilifi and Eastern District.
- The **Aga Khan Foundation**, which is keen to support a Neem plantation on their Kwale and Kilifi projects.
- **Several NGOs and CBOs** now engaged in Neem cultivation and the use of its leaves and seeds commercially.
- **Saroneem Biopesticides Company** which has set up the first industrial development of Neem in Africa and is now in negotiations with a local cosmetics firm to develop Neem shampoos and soaps of export quality.

Strengths, Weaknesses, Opportunities, Threats

Strengths

- Traditional position as world's largest producer and exporter
- Production is now increasing after long term declines during the 1990's
- Pyrethrum has no threats from crop disease and pest;
- Potential for substantial increase of flower production from both yield increases and area expansion (from 27,000 hectares to 1.4 hectares).
- Established dried flower processing facilities (only one in Africa)
- Knowledge and expertise in down stream value added products
- Established overseas and domestic market

Weaknesses

- Poor profitability or net prices to farmers thus constraining availability of products to industry
- Many attractive competing enterprises coupled with lack of incentives to pyrethrum farmers

- Lack of competition/PBK's monopoly
- Unavailability of clean high yielding materials
- Poor infrastructure especially roads in key producing areas
- Small market in international terms
- Lack of economies of scale
- Legislation no longer appropriate to liberalize economy and globalization
- GOK policy on imports/tax regime discourages domestic manufacture.

Opportunities

- International trend now favours natural pesticides for which pyrethrum is our speciality.
- Expansion of usage potential outside traditional insecticides
- Availability of potentially suitable land for area expansion amounting to 1.4 million hectares, as compared to the current 27,000 hectares
- East African regional location-potentially center for flower processing and value addition
- Pivotal role of insecticides in malaria prevention programs

Threats

- Development of competing producing countries
- Globalization-MNC'S establishing large central manufacturing bases
- Increased competition from cheaper synthetics which are available on a regular and consistent basis
- Cheap imports/dumping

Edible Oils

Edible oils in Kenya are extracted from a large number of oil crops leading among them oil palm, sunflower, safflower, sesame, rapeseed, soybean, castor, coconut, groundnut, cashew nut, cotton, and maize. While Kenya is ecologically suited for cultivation of all these crops, it is only Sunflower and Sesame that are currently cultivated specifically for oil extraction. Extraction of edible oils from maize and, to a lesser extent, cotton is done as a secondary activity (as a by-product). For these reasons, the sub-sector study on vegetable oils focused only on Sunflower and Sesame.

Size of sub-sector and potential for increase in rural household incomes

In terms of cultivation, oil crops are not an important part of Kenyan agriculture. All oil crops cultivated in Kenya account for only 2% of the total area under cultivation and their value amounts to less than 2% of the value of maize. From a consumption perspective however, the edible oils and fats sub-sector is an important one equal to the size of maize and dairy sub-sectors. The annual requirement for edible oils and fats in Kenya is estimated to have stood at 320,000 tonnes in 2002. Only up to 5%¹¹ of this annual domestic demand for edible oils is produced from oil crops cultivated locally and the rest is imported an annual bill estimated to be equivalent to all the country's earnings from horticulture exports. It is for this reason that there has been deliberate government policy to promote local production of oil crops to reduce this import bill.

Estimates by the Ministry of Agriculture indicate that there are roughly 100,000 farmers cultivating different oil crops in Kenya today. About 10% of these cultivate sunflower and sesame. Sunflower cultivation is today concentrated in parts of Rift Valley province, supplying a processing plant based in the Province (Ellianto in Nakuru) while sesame is largely cultivated in the Coastal strip covering Kwale, Kilifi, Malindi and Lamu Districts. The outreach potential for cultivation of these crops is however much higher as the crops can perform well in virtually all medium and low potential agricultural zones in the country.

While there is an immense potential for expanding the area under cultivation of sunflower and sesame, a major factor holding this back is the economics of cultivating the crops. Available estimates (compiled by UNDP in 1997) show that, taking all inputs into consideration, a farmer would need to be paid a farm-gate price of between Kshs 14 –16 per 1 kg of sunflower for the farmer to break-even. The prevailing factory-gate price for sunflower today is however Kshs 14 per kg and the farmer is normally paid between Kshs 8 – 10 per kg by brokers at their farm-gate. While this rate of return is still much better than the returns in maize, it is clear that this remains a major constraint to the expansion of the sub-sector and it is only with increased productivity that the sub-sector would stand a chance of having a meaningful impact on rural household incomes.

Existing market demand for the good or service

Analysis shows that there is a large unmet domestic demand for sunflower and sesame for

¹¹ Indeed, domestic production of edible oils and fats has been going down since the mid 1990s and industry players estimate that local production is now at less than 2% (estimates by the two largest Oil firms in Kenya - KAPA and BIDCO Oil industries)

edible oil extraction. This is particularly accounted for by the increasing awareness among (middle and high income) consumers of the superiority of cholesterol-free edible oils as opposed to the cheaper cooking fats (largely from palm oil) that are heavy on cholesterol. To service this growing demand, a number of cooking oil firms have in the last couple of years been advertising for contract farmers to cultivate these crops (particularly sunflower). The supply has however to date not been sufficient to meet their demand and estimates from two of the largest firms (BIDCO and KAPA) indicate that it is only 6% of their requirements that is met through local production. Indeed, discussions with these firms indicate that a major constraint to production on their part is shortage of supply or raw materials which has forced them to operate their plants at much lower levels than the installed capacities.

Potential for positive synergies with donors and government

There was a significant amount of donor/government interest in promoting oil crop production in the country up to 1997. The World Bank, International Fund for Agricultural Development (IFAD), and the International Development Research Centre (IDRC) funded some of the major initiatives. These programs came to an end before the results were fully felt and follow-up phases initiated following the 1997 freeze of foreign aid to Kenya by most donors. Efforts are now under way to revive some of these initiatives. IFAD is already working with a consortium of other donors and local NGOs to identify appropriate ways of supporting the sub-sector.

The Government on its part has developed a policy paper on oil crops. The thrust of this paper though is to start oil extraction from 1,200 oil palm trees that were introduced in Kenya in the 1990s under the World Bank project and have now matured; and promote expanded cultivation of the oil palm tree in the country (coastal zone).

There are indications that with increased donor and government interest in supporting the sub-sector, there will be need for commercialization of interventions to avoid mistakes made in the past. This is a role that could be played by a facilitator for development of a commercialized market for business development services in the sub-sector.

Existence of linkages conducive to market based approach

Discussions with edible oil factories in Kenya indicates that an area of intervention that could have immediate impact on the sub-sector relates to the broad area of out-grower schemes. The factories have been advertising in the local dailies for farmers with a capacity to supply at least 6 metric tonnes of sunflower to apply to be contracted as out-growers. The factories would then supply the farmer with seeds and agrochemicals to produce the crop and sell it to the factory at a pre-agreed price. The response to these adverts has however been low given that most farmers have small pieces of land incapable of producing the required 6,000 metric tonnes of sunflower. To overcome this, farmers would need to organize themselves in a way that enables them to supply the commodity as a group. The oil factories have no capacity to organize farmers into these units and feel this an area of intervention that could easily spur growth in the sub-sector.

Strengths/weaknesses

The key strength of the edible oils sub-sector is that Kenya is agro-ecologically suited for

cultivation of a large range of oil crops, including the oil palm. Considering that even Malaysia, the Worlds largest exporter of crude palm oil, did not cultivate the palm tree indigenously but introduced it only in the last 40 or so years ago. Current feeling is that, with proper promotion, Kenya could cultivate most of its edible oil requirements in the short-term and even manage to export to other countries in the sub-region. While a significant part of domestic demand will continue to be for the lower priced, lower quality, cholesterol-heavy cooking fats (palm-oil based), the strong movement towards cholesterol-free edible oils provides a good opportunity for Kenya to expand its cultivation of sunflower, sesame and other oil crops that provide this type of edible oil. These fetch a premium price in the market and could have higher returns to the producers as well.

The major weakness of the edible oils sub-sector in Kenya is the economics of production. At current cost structures and prevailing market prices, farmers are unable to break-even. While there are indications that better crop husbandry and better application of high yielding seed varieties could significantly increase productivity and reduce per unit costs, the current low prices for the output stands as a major disincentive for farmers to enter into the cultivation of the crop.

The competitive advantage of palm oil and consumer unawareness of health concerns in (cholesterol-heavy) cooking fats stands out as a significant weakness of the edible oils sub-sector in Kenya. While plans are underway to commercialize the cultivation of oil palm in the coastal zone, there are no doubts that this initiative requires a long time to mature. Involvement in the sub-sector would therefore be at the level of kick-starting the sub-sector, which can hardly be done on a commercial perspective. While the full impact of business development service initiatives could be immense, this would of-course not be expected to come within the five-year period of the Kenya BDS project.

Basic Root Crops

Kenya cultivates three main roots/tuber crops comprising Cassava, Arrow roots and Sweet potatoes. Among these three, Cassava stands out as the one most widely cultivated in Kenya and also the one with the highest potential for commercialization. For this reason, we focused on cassava for analysis of the roots and tuber sub-sector.

Cassava was introduced in Africa from South America by the Portuguese more than 400 years ago. It is today cultivated throughout sub-Saharan Africa and is considered second to Maize as staple food. Whereas in South America and Asia, cassava is increasingly cultivated for industrial application, in Africa it continues to be largely cultivated for subsistence.

Size of sub-sector and potential for increase in rural household incomes

In Kenya, Cassava is cultivated in virtually all medium and low potential districts in the country. It is however cultivated as a major staple food in Nyanza, Western, Eastern, and Coast Provinces. Estimates indicate that there are over 300,000 farmers cultivating this root crop in the country with a total acreage of 98,000 hectares under cultivation. In 1999 production of fresh cassava tuber stood at 910,000 metric tones and is estimated to have been on an upward trend since the mid 1990s.

Cassava production in Kenya is largely for household consumption and it is only 20% of the output that is marketed. The main market outlets are local shopping centers and the major urban areas where it is sold fresh. There is however a growing market in the food industry where it is sold in its dried form to be milled and mixing with other cereals-based flours, largely wheat for the baking industry; and millet, sorghum for baby weaning food.

Research shows that the productivity of cassava is much higher (2-3 times) that of maize which indicates that that promotion of this crop as a substitute for maize would have significant impact on household incomes. This is particularly so given that the crop is even more suitable in marginal zones where the productivity of maize is much lower.

Existing market demand for cassava

While unquantified, estimates indicate that there is already a significant unmet domestic demand for cassava, as fresh tuber or in dried form for the food industry. It is however clear that this demand could not support the full commercialization of the sub-sector from the current production for subsistence purposes to production for the market. This transformation could only be possible through exploitation of the immense potential for industrial application of cassava.

The potential domestic demand for cassava for industrial use is unlimited. In the animal feed industry it is estimated that the demand for cassava to replace maize as the main base for animal feeds exceeds 500,000 metric tones (or 50% of current production). There is also a large demand in the Starch industry – where starch is used in pharmaceuticals, textile, paper & pulp, adhesives, brewing, among others. This industry currently relies on imports. There is also growing demand in the food industry where cassava is used as compound flour mixed with wheat, millet, or sorghum.

In addition to domestic market, the international demand for cassava cake for animal feed has been rising in Europe over the last decade and there are indications that this trend will continue.

Potential for positive synergies with donors and government

There has been keen interest in promoting cassava as an industrial crop in Africa for some time now. The USAID funded East Africa Root Crops Research Network based in Uganda but covering the greater Eastern Africa is perhaps the biggest ongoing initiative. Most of the work has however not yet moved from research level to commercialization. This is the key area that interventions would have the highest impact.

Existence of linkages conducive to market based approach

While the main area of intervention to open up the commercialization of cassava is getting local industries to start using cassava in their production processes (e.g. use in the feed industry), support for semi-processing would add significant value. As fresh tuber, Cassava is bulky and highly perishable with any harvests going bad within 48 hours. Simple processing of cutting the tuber into small pieces and drying these would greatly reduce the weight and increase the shelf life of cassava. This would pave way for transportation of the crop from the usually remote marginal areas where it is cultivated to the urban centers where industrial application would be possible.

Estimates show that current production levels of cassava could easily be tripled from the current average of 8 tonnes per ha to 30 tonnes per ha with improved crop husbandry and disease control measures. This is an area that could be addressed through business services.

Strengths/weaknesses

The key strength of the cassava sub-sector is the immense potential of increasing the productivity of smallholders through the substitution of lower value crops (such as maize) to cassava in medium and low potential zones. Kenya is agro-ecologically suited for production of cassava in large portions of its marginal lands. Commercialization of cassava would therefore affect a large number of households in the whole country.

While a challenge, the fact that the cassava sub-sector is largely unexploited presents itself as an opportunity for many leverage points. From commercialization, awareness campaigns to promote production and also spur local demand, technology for semi-processing, crop husbandry, marketing systems; there are many intervention areas that could easily spur growth in the sub-sector. In addition, there are strong linkages of the sub-sector and the growing animal feeds industry. Estimates indicate that the adoption of cassava as an animal feed base would cut the prices of animal feeds by more than half on the one hand and also reverse the trend in rising importation of animal feeds.

Despite the immense potential, however, the single greatest weakness of the cassava sub-sector is the fact that it is a sub-sector at its early stages of commercialization where over 80% of all production is consumed by the household. While all indications are that focused interventions in commercializing the sub-sector would yield positive results, it is likely that

this could take time and could even have less than expected results. Involvement in the sub-sector would be at the level of kick-starting with possibilities of no immediate results.

Annex B

List of Meeting Contacts and References

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