Sustainable Tree Crops Program

Assessment of Options and Opportunities for Tree Crop Development in East and West/Central Africa

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CONTENTS

Acronyms

ADC	Agribusiness Development Centre
AFRENA-ECA	Agroforestry Research Network for Eastern and Central Africa
AHI	African Highlands Initiative
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
C.Franc/CF	Cameroon Franc
CABI	CAB International
CDA	Coastal Development Authority (Kenya)
CFA Francs	Communaute Financiere Africaine Francs
CI	Conservation International
CICC	Conseil Interprofessionnel du Cacao et du Cafe
CIDEF	Cashew Industry Development Trust Fund
CIFOR	Centre for International Forestry Research
CIRAD	Centre de cooperation Internationale en Recherche Agronomique pour le Developpement
ECAPAPA	Easter and Central Africa Programme for Agricultural Policy Analysis
FAC	Fonds d'Aide et de Cooperation
FICA	Fondation Pour l'Investissement et la Commercialisation Agricole
FOFIFA	Centre National de Reserche Appliquee au Developpement Rural
G. Franc/GF	Guinean Franc
GTZ	Deutshe Gesellschaft fur Technische Zusammenarbeit GmbH
IARCs	International Agriculture Research Centers
ICIPE	International Centre for Insect Physiology and Ecology
ICRAF	International Centre for Research in Agro-forestry
IITA	International Institute for Tropical Agriculture
IPAR	Institute of policy Analysis and Research
IRAD	Institut de Recherche Agricole pour le Developpement (Cameroon)
IRAG	Institut de Recherche de Agricole de Guinea
KACE	Kenyan Agricultural Commodity Exchange
KARI	Kenyan Agricultural Research Institute
KSh	Kenyan shilling
LDI	Landscape Development Interventions
MgF	Madagascar Francs
NARS	National Agricultural Research Systems
NGO	Non-governmental Organization
ONCC	National Cocoa and Coffee Board
OQC	Observatoire Camerounais de Qualite
PCPEA	Projet Cadre de Promotion des Exportations Agricoles
PSCC	Projet Sernencier Café et Cacao
REDSO/ESA	Regional Economic Development Services Offices-East and Southern Africa
REMPAI	Resource Management and Policy Analysis Unit
SPCIA	Societe de Production et de Commercialisation d'Intrants Agricoles
T & V	Training and Visit system of extension
Tana	Antananrivo (Capital of Madagascar)
ToR	Terms of Reference
UCDA	Uganda Coffee Development Authority
UGTF	Uganda Coffee Trade Federation
USAID	United States Agency for International Development
USDA	U.S. Department of Agriculture
Ush	Uganda Shilling
WB	World Bank

Exchange Rates:

1 US$ = 6,080 Madagascar Francs

1 US$ = 61 Kenyan Shillings

1 US$ = 1,500 Ugandan Shillings

1 US$ = 1,200 Guinean Francs

1 US$ = 600 Cameroon Francs

Executive Summary

Although they are often overlooked, tree crops have a very valuable and highly sustainable (taken in its broadest terms to cover both environmental and economic features) role to play in Africa. Up to present, they have received little attention from local governments or international donors in terms of development assistance or support. Governments in the region have not established systems that work to support this sector of the agricultural economies and as a result they have failed to fulfil the potential of tree crops for:

- Income generation for small-holder farmers (which enhances food security but also can have direct inputs into local nutrition), commercial farmers, traders, processors and the country / region as a whole;
- Improving environmental quality in the form of stabilization of agro-ecosystems (prevention of soil erosion by water and wind, flooding; climatological balance) and
- Bio-diversification conservation and revival.

The current assessment provides an overview of the tree crop sector, with emphasis on the entire system of tree crop production, from research and technology through to marketing. The study was carried out at the request of the United States Agency for International Development/Africa Bureau's Office of Sustainable Development (USAID/AFR/SD). This document is based on the outcome of two missions. One was based on a three-person team that conducted field visits to Madagascar, Kenya and Uganda in May 1999, while the second was a four-person team that visited Guinea and Cameroon in June 1999. However, the observations and conclusions are also informed by the wider experience, particularly in Africa, of the consultants. The study assesses the potential for the creation of a sustainable support network for tree crops with the participation of: local governments; national, regional, and international institutions; private sector providers of services and private industry.

Tree crop commodities in the region are capable of generating a substantial amount of revenue. The reality of this can be judged from the simple consideration of coffee, cocoa and cashew. But once consideration encompasses the wide range of tree crops that are, or could be, exploited to great advantage the potential is clearly very substantial.

The approach of the assessment complements examination of traditional measures of constraints and comparative advantages of a regional tree crop network with analyses of: 1) technical constraints; 2) institutional constraints; and 3) policy constraints. The assessment demonstrates that although the different regions face some differences in intensity of constraints, generally the constraints exist in all of the components of a commodity chain

During the visits there was little evidence of any specific, rationally based, integrated approaches being taken to tree crops in other than isolated, and species specific, cases – and even here there were very clear deficiencies in a number of obvious elements needed for complete and sustainable approaches. From the base point of suitable, selected planting material through to the "end" user market, the gaps in material, knowledge and interactions were apparent. Much of what would be needed was theoretically available but simply not accessible or not readily accessible to those who needed it! These deficiencies did not reflect the lack of perception of the people involved or their eagerness to rectify them but generally a lack of practical possibilities, systems and infrastructure to allow the necessary exchanges, interactions and developments.

It was also noted that one of the major shortcomings of production to market chain was the lack interaction and information exchange. This was paralleled by an impossibly shortsighted approach to investment/reinvestment. Most of the systems were not sustainable economically because of the lack of inputs (physical, technical or knowledge based). This basically often meant that the systems were based mostly on a philosophy of an infinitely expanding extensive approach to production and exploitation! Some of the time frames were different but virtually none were justifiable in all respects of economic and environmental sustainability.

Based on the finding noted above, readily available data (without worrying about any specific tree crop commodity) and numerous interviews with representatives of the public and private agricultural and industrial sectors, this assessment concludes that there is a strong rationale for creating a tree crop support networks both East Africa and West/Central Africa.

Such networks would need to be responsive to requirements identified throughout the tree crop production continuum from planting material, through production to processing and marketing. They should take advantage of the unique natural features and capacities in the regions as well as exploiting the capabilities available at institutions and organizations in the regions. Certain activities should be further examined to determine their priorities for inclusion in the network's regional coverage:

- Research facilities and expertise
- Germplasm resources and improvement
- Extension and information provision
- Capacity building
- Market and process basis and potential
- Local and regional awareness
- Organizational and policy optimization
- Local and international commercial interaction

The assessment includes a discussion of several potential "network models" that would need to be further analyzed and refined to develop the most appropriate model(s) for East and West/Central Africa.

Finally, a section addressing "Next Steps" is included to guide USAID and other organizations interested in a commercially viable and sustainable tree crop industry in East and West/Central Africa.

1. Introduction

Fruit and nut tree-crop systems offer significant opportunities to generate income for smallholders in Africa. The overall objective of this consultancy was to determine within a broad conceptual framework, strategies by which tree crops can increase both rural incomes and foreign exchange, in a sustainable and environmentally constructive way. It was intended that the framework strategies would, by definition, include the commercial sector. (See also Section 4 'Rationale for the Assessment').

Two consultancies were undertaken, the first to East Africa, which covered Madagascar, Kenya and Uganda and in addition, was able to draw on the consultants' considerable experience of Tanzania and Mozambique. The second was to provide a sample of West/Central African countries and included Guinea and Cameroon.

Obviously the sample of countries and trees crops was limited. The countries were those feasible in the time and tree crops covered were specific, important examples in the different countries. They were designated for observation, on the basis that the principles, concepts and strategies developed would be applicable to tree crops in general and highlight problems that were generally relevant across countries.

In Madagascar the consultants concentrated on the possible development of cashew for both smallholders and estate farms, and, on how tree crops could be utilized to 'stabilize' the peripheral areas surrounding conservation areas, both in terms of environmental and economic stability. In Kenya the consultants looked mainly at macadamia, cashew, citrus, mango and bixa (*Bixa orellana)* a food colouring, and to a lesser extent coffee, and at institutional issues. In Uganda emphasis was placed on coffee, cocoa, mango and cashew.

In Guinea the consultants concentrated on the possible development of cashew but with due regard to other tree crops, especially mango, oil palm, coffee, cocoa and avocado. This covered mostly small-holders and drew attention to the potential for mixed cropping of trees as a means to fully exploit differing conditions as well as stabilizing income. In Cameroon, the consultants looked mainly at cocoa, oil palm, various fruit trees and medicinal trees. In West/Central Africa, the focus of the mission was mainly on farmers, farmer associations, government and international organizations and a number of projects; the number of commercial organizations visited was limited.

Two reports were produced:

Assessment of Options and Opportunities for Tree Crop Development in East Africa, by Dr. Clive P. Topper, Prof. Peter D. S. Caligari and Gordon Straub.

Assessment of Options and Opportunities for Tree Crop Development in West/Central Africa, by Dr. Clive P. Topper, Prof. Peter D. S. Caligari, Jeff Hill and Jerry Brown.

In the **East Africa report**, detailed observations from each country were described in country specific annexes. While the main body of the text was concerned with:

- Defining tree crops
- General constraints, covering technical, institutional and policy issues, affecting tree crops
- Broad general principles applicable to tree crops in general
- Strategies to develop a regional tree crops program

In the **West/Central Africa report**, rather than duplicate much of the generalisations of the East Africa report, this report concentrates on the country specific observations only, often highlighting the constraints which are preventing tree crops from realising their potential. Observations, discussions, information, etc, obtained are reported, for each meeting or visit, in chronological order for the two countries. Because of the shorter timeframe and fewer countries visited in West/Central Africa, a more limited range of conclusions could be made.

The current report is a **synthesis report** that attempts to draw together findings from both the East and West/Central Africa reports as well as relevant wider experience.

The culmination of the mission to Guinea and Cameroon was a 2-day meeting of many stakeholders interested in the tree crops program to initiate discussion on an institutional framework for regional cooperation. A separate report will be forthcoming on this meeting.

In order to develop a tree crops strategy, it was obviously necessary to examine the current constraints affecting the entire process, from planting material and production through to marketing.

The main body of the text deals with the more generally applicable constraints, concepts and strategies, supported by examples from the individual countries. It was not an objective of this work to review previous and current work in the area of tree crops, or to provide large amounts of quantitative data in this field. A future would be to add more quantitative data to cover, in more detail, aspects of particular interest. Information and aspects specific to individual countries can be found in the relevant annex.

The term "network" has been used here to mean some form of collaborative organization, in which the sum of its achievements is potentially greater than the sum of the individual player's efforts.

The accuracy of the examples quoted in this report is very much dependant upon the consultants' interpretation of the responses obtained from various sources during the course of the consultancy.

2. Background

Background information on the countries visited in terms of population, economic indicators, general agricultural information can be found in a number of the appropriate standard references and Web sites e.g.:

Britannica Book of the Year: (Encyclopedia Britannica Inc)
CIA Fact Book at: http://www.odci.gov/cia/publications/factbook/index.html
FAO: http://www.fao.org/

3. Tree crop systems defined.

Quite simply, the botanical definition of a **tree** is: a perennial (i.e. lasting several years) plant, with a self-supporting woody main stem.

Crop is defined as: the produce of cultivated plants, which are of nutritional, monetary/ commercial, environmental and/or accommodational (housing) value.

Therefore, 'tree crops' are defined as woody perennials, which periodically produce a harvestable product that is of nutritional, monetary/commercial, environmental and/or accommodational value. Tree crops include trees, which produce fruits (e.g. mango, citrus, avocado etc), nuts (e.g. cashew, macadamia, etc), berries or pods (e.g. coffee and cocoa), leaves (tea), medicinal products (e.g. *Prunus africanus*), and other commercial products (e.g. colouring from Bixa, poles for construction).

Tree crops have a valuable and sustainable role to play in three very important arenas:

- Income generation for small-holder farmers (which enhances food security but also can have direct inputs into nutrition of the grower), commercial farmers, traders, processors and the country / region as a whole;
- Improving environmental quality in the form of stabilization of agro-ecosystems (prevention of soil erosion by water and wind, flooding; climatological balance); and,
- Bio-diversification conservation and revival.

It is because of these three major complimentary benefits (along with their greater stability than annual crops), that tree crops have a **unique** role to play in the development of sustainable agriculture. Others have recognized this as being so, for example, in Vietnam it is government policy to plant cashew to prevent flooding and protect the environment but as a consequence cashew exports have has increased from virtually zero to over 100,000 tons of raw nuts. What is more they have announced the extension of this policy to cover some 350,000 ha by 2010. (They are, however, just coming to recognize the need for the need to also include an agronomic package to retain production capacity!)

An additional benefit in some areas is that the planting of trees can help in securing title deeds/ownership of land, which is critical for increased sustainable crop production in general.

The unique features and role of tree crops requires that any consideration of them gives weight to their productivity and quality of product alongside their other desirable attributes and contributions. Their role in revenue production and food security provides the driving mechanism by which their environmental and biodiversity contributions will be made. It therefore follows that a simple consideration of them as a secondary part of other, more general possibilities or systems, will not optimize their potential or uptake.

Therefore, while we recognize that tree crops can make a very real and important contribution to reducing soil erosion, stabilizing soil conditions, and increasing soil fertility, these attributes need to be seen as **following** from their major input, to nutrition and alleviation of poverty. We also note that any definition of horticulture is likely to include a number, although possibly not many, of the tree crops. This is, of course, perfectly realistic but does not mean that tree crops must always be viewed in this way. It has been shown in many examples around the world, that when tree crops are simply viewed, handled, and judged alongside the many annual and biennial species, they always receive lower priority – if for no other reason than because of their longer time-frames for response and multiplication. In this way funding of research, extension and commercialization for tree crops is always less than optimal.

4. Rationale for the assessment

The starting premise / assumption of the current assessment was that 1) the contribution to revenue earning of tree crops had been clearly demonstrated in a number of species; 2) the role of tree crops environmental protection and safeguarding biodiversity was also firmly established but that 3) in the unique potential of tree crops in the region was far from being realized. The purpose of the current assessment was to determine whether or in what ways tree crops were constrained (or insufficiently supported), in terms of the following issues:

Technical

- priority within agricultural systems;
- production at farm level;
- farm gate price;
- research and extension;
- input and service supply;

Commercial

- Integrated business approach
- Marketing opportunities;
- Opportunities for value added;
- Diversification
- Lack of product supply
- Information systems,

Institutional

- National
- Regional
- International

Policy

- National
- Political
- Strategic

And subsequently, to determine, within a broad conceptual framework, including the commercial sector, strategies by which tree crops can increase both rural incomes and foreign exchange, in a sustainable and environmentally constructive way.

5. Tree crop systems

There are basically two systems, smallholder, and estate or plantation.

Smallholder systems are very variable even within a specific agro-ecological system, but they usually plant a number of tree species within their mixed or intercropping systems, along with a number of annual crops. For smallholders, tree crops contribute to minimizing risk. Those with more land sometimes devote a specific area of their farm to one particular tree crop others integrate them or even use them as boundary markers.

The degree of commercialization of farm tree crops is very variable and ranges from:

1. The purely subsistence level (e.g. the production of fruits like mango or citrus for home consumption),
2. production for home and the local market,
3. production for a regional / export market through local factories (e.g. juice factories), farmer associations or local traders.

Estate / plantation systems are usually restricted to a small number of intensively grown species in order to maximize production and hence profit. Production levels / output can be increased by setting up links with smallholder outgrowers. The linkage arrangement varies from simply purchasing produce to more complex contractual arrangements whereby the estate provides inputs etc and the farmer is obliged to sell to the estate at an agreed price.

The importance of estate / plantation systems varies greatly from country to country and from crop to crop. For example, cashew in Tanzania is virtually entirely smallholder produced, but in Mozambique, estates play a much larger role (or at least they did in the past). Coffee in Uganda is mainly a smallholder crop, while in Kenya it is mainly grown on estates.

The fertile lands in the South West of Cameroon are dominated by large commercial plantations of oil palm, rubber, banana and papaya. The presence of such large estates has tended push smallholders onto more marginal lands. While in Guinea most material is grown by smallholders.

6. Technical constraints limiting the current production potential of tree crops.

Some constraints may appear under more than one heading.

6.1 Priority of tree crops within agricultural systems

Commercial tree crops often achieve low priority because of the understandable drive for food security, but this sometimes overlooks the comparative advantages that some areas have for producing high-value tree crop products over lower-value, unpredictable food crops. A notable example is cashew production along the coastal regions of East Africa and the drier parts of the Northern Guinea Savanna (which extends right across West Africa); cashew thrives in poor soils and low rainfall, whereas annual food crop production in these areas is risky. Obviously a holistic approach to agricultural development should be adopted, where due attention is given to food crops, but also where the potential of tree crops is exploited to the full – including their role in nutrition.

Formerly, support for trees has come mainly in the form of agroforestry, which is usually concerned with the use of trees for conservation purposes, especially soil conservation, and the provision of fuel wood. The main protagonist of agroforestry, is the International Centre for Research in Agroforestry (ICRAF), which is co-ordinating both AHI and AFRENA (East and Central Africa).

As already mentioned, when tree crops are classed as horticultural crops, they are often given lower priority than the annual crops with a similar classification. Furthermore, the techniques and approaches used for tree crops such as cashew, mango, cocoa etc are quite different to those used for, e.g. tomatoes and cabbages.

Finally, there is often an attitude within National Agricultural Systems, that because tree crops make money (cf. food crops like cassava), they can look after themselves. This approach is fine, providing that some of the profits are reinvested into supporting and developing the tree crop. Sadly, this is often not the case. For example, although Cameroon was heavily dependent on the export of cocoa, over the past 10 years the level of investment, at least in research, has been negligible.

6.2 Production constraints at the farm level

6.2.1 East Africa

All of the commercial processing organizations visited in the three study countries in East Africa, lacked sufficient raw material from the farm level to run at anywhere near full capacity. These ranged from e.g.

- cashew processing in Madagascar,
- macadamia processing in Kenya,
- fruit juice production in Kenya, both inland and coastal factories,
- coconut oil production in Kenya
- Bixa production in Kenya

In Mozambique (which was not one of the countries included in the study tour), the large cashew processing factories are closing because of low production and low quality of nuts, combined with an inability or unwillingness to purchase nuts at the same price that traders are paying for export to India.

Other important crops studied (but where processing units were not visited) were also suffering from production problems. A few examples follow:

- Coffee production in Kenya has declined 60% over the last 10 years.
- Coffee production and quality in Uganda is low.
- Cashew production in Mozambique has declined from 240,000 tons to a current figure of between 40 and 50,000 tons per annum; cashew production in Kenya has also declined from around 40,000 tons to approximately 10,000 tons.
- The citrus industry in Kenya has collapsed.

6.2.2 West/Central Africa

In Guinea coffee yields have declined and presently yields, from the mainly old plantations, are extremely low, in the region of 70 to 100kg/ha. The quantity and quality of Cameroon cocoa has also deteriorated due to reduced grower interest fuelled by fluctuating world market price, low farm gate prices, a chain of middlemen reducing profitability and a lack of preparedness for liberalization.

6.2.3 Underlying reasons

The reasons for low or declining production obviously vary from crop to crop and clearly generally come back to the grower's activity or inputs. However, these are generally a reflection of influences that come from other sources and are one or more of the following:

- Low **farm gate price** and/or seemingly high trader / middlemen profits and fluctuating world prices
- Lack of grower technical knowledge and technology transfer – **research and extension**
- Lack of **quality planting material** in country and/or reaching the grower

These factors are discussed in further detail below.

In contrast, there are some examples of significant production increases, e.g. cashew in Tanzania which has increased from 16,000 tons in the late eighties to 100,000 tons by the late nineties; cocoa in Tanzania, which has increased from almost zero to 4,000 ton in the last 4 years (pers comm). Cocoa production in Uganda has increased over the past 8 years but still stands at less than 3,000 tons despite is a much greater demand.

6.3 Farm gate price

Although in many cases factory-gate prices were reasonable, the price actually received by the grower was often very low. This was usually the result of a chain of middlemen all of which added costs to the product without actually adding value, and which eroded the profit of the lower part of the chain i.e. the producer or farmer.

Obviously traders are a very necessary link in the production process and are often unreasonably maligned. The simple matter of transport from growing site to processing unit is a major consideration and one reason why many of the middlemen exist. However the complaint of unreasonable differentials from cashew growers in Madagascar would appear to be justified; here the factory gate price for raw cashew in 1998/99 was in the region of US$ 0.50/kg but the farmer only received around US$ 0.10.

The excessive profits made by middlemen was a subject that was frequently raised e.g. at Kenya Fruit Processors, Kenya Bixa, etc. The complaint of an extended chain of middlemen resulting in low farm gate prices was also common. There was an obvious lack of farmer organizations that are able to bulk their commodity and transport it to the factory/exporter and hence enable the farmer to benefit directly from higher prices.

In Cameroon, the most frequently heard complaint was related to the low farm gate price of cocoa resulting from an excessive number of middlemen and the fact there was no premium price paid for better quality cocoa. Efforts to secure higher prices by selling directly to the exporter were often frustrated by bureaucratic requirements.
With no set quality standards in operation or arbitration service, traders often offered prices below what farmers thought was reasonable. With only three exporters, the degree of competition is very low and concerns were voiced that the issue of quality was being used to depress farm gate prices.

In Mozambique, there is a proposal by processing companies to ban raw nut exports, which is almost guaranteed to keep farm gate prices and hence production, low.

At the other end of the spectrum, Ugandan coffee farmers are reported to receive up to 80% of the export price. Also on a positive note, Mars (the large chocolate manufacturer) is embarking on a program of buying cocoa direct from farmer associations in the Ivory Coast and paying a premium for quality. Such a venture should ensure that the farmer gets a higher percentage of the world market price.

Another problem for farmers selling their produce was the possibility of great fluctuations in prices. For example with the product from Bixa, the farm gate price in Kenya had ranged from 80 KSh/kg down to 18 KSh/kg within recent years. This does not encourage production, and makes it difficult for farmers to feel secure in their livelihood. It also makes growers wary of investing in any inputs for their crop growing since they cannot judge what returns they might expect to receive for the crop at the end of even the current growing season

6.4 Research and extension constraints

With declining government budgets for research and extension, the ability of governments to carry out these essential activities is becoming even more limited than it was before the introduction of structural adjustment programmes. As examples:

- In Madagascar, cashew research essentially stopped in 1980's and cashew extension is virtually non-existent. Most of the rural areas are not even served by any radio programme that could be utilized for extension messages.

- Kenyan cashew farmers have no information or technologies with which to combat the devastating effects of powdery mildew disease. According to the Kenya Nut Company, there is no extension service serving macadamia producers other than their own employees, who act as buyers during the harvesting season and as extension agents during the growing season.

- The FAO citrus project in Kenya undertook justified research, but the level of impact at the farmer level appears to be minimal, and now the citrus industry is in poor shape.

- The claim that the usual situation for mangos in the vicinity of Bawazir Fruit Processing Factory near Mombassa was not to produce any fruit is an example of research and extension failing to address a particular problem facing agro-industry.

- Very little research on cashew is being undertaken in Guinea, and despite some external fact-finding missions to other producing countries, the planting material (seeds) was variable and dubious quality. When this is sold to the farmers as a relatively long-term investment, the negative implications are clear.

- In Cameroon minimal cocoa research was undertaken during the last 10 years, funding was at such a low level that salaries were not paid.

Extension is an essential strand of the production process that needs to be further encouraged, with effective ways of facilitating both participatory research and extension to all parts of the production chain. The approaches developed by cashew research in Tanzania, the 'Farmer Trainer Training' of GTZ and the Farmer Field Schools of CABI perhaps provide some potential models that could be further developed on a regional basis. It is important to stress that technology transfer should cover the whole production chain, from techniques required by growers and those who supply them, through processing and on, to marketing.

Note:

- Some of the coffee levy in Kenya (3%) goes towards research and extension. In Uganda only 1% is levied on coffee and a small amount goes to research.

- The cashew export levy in Tanzania is 3%, of which 1% goes to research and extension, (although at least until recently, extension lacked the experience with which to successfully obtain the money from CIDEF). However extension 'benefits' from the second WB loan of $25 million to develop an extension service; the second phase of the programme being a more participatory version of the straight T & V system developed in the 1st phase, in the hope that there will be a more measurable impact during the second phase of the programme, (but there are doubts about the sustainability of the extension system overall).

- In Mozambique a huge 14.5% is levied on the export of raw cashew nuts in order to protect its own processing industry. Some of the money raised by this levy has recently found its way to research and extension, although both of these activities are limited by a lack of trained personnel.

6.5 Planting material

The situation with regard to many of the species in relation to germplasm and germplasm improvement is chaotic and ineffective. There was evidence of some introductions of new material but this was generally on an *ad hoc* basis. There were some adaptation trials but these were generally very restrictive and there was little actual breeding work to produce improved genotypes specifically suited to the regions concerned. There are, of course exceptions, as with cashew breeding in Tanzania and more recently a start in Guinea and the international rationalization and availability of cocoa germplasm, but in general there was little in terms of coordinated or effective breeding efforts.

The development of this crucial and underpinning aspect to any tree crop system raises a number of crucial issues such as: phytosanitary compatibility; integrated trial networks; and germplasm exchange agreements. These would need to be faced - but the requirement is apparent and urgent. Crop improvement by means of breeding, multiplication and distribution inevitably takes time! This means that one is always several years behind where it is needed (even using the "crystal ball approach" of many breeders) – and the case of these crops it is evidently more than this!

There is a basic need for access to a broad genetic base of material that would enable breeders to react to continuing requirements for improvements in yield, in quality, in resistance/tolerance to biotic and abiotic stresses as well as to market demands. If material is only to be brought into the region when a demand arises, it is already too late. An appropriate collection of germplasm (*in vivo* and/or *in vitro*) needs to be established for **all** tree crop species. It would seem sensible, because of high costs etc, to consider having an extensive germplasm collection of each crop at one designated centre of excellence in the region for each crop, with dispersed sub-centres or nurseries.

This raises a number if issues that would need further discussion particularly in terms of infrastructure, plant health protection and simple logistics. The risk of having all the nuclear germplasm of one species in one place is open to dangers from disease infection, infrastructure change and distributional restraints. This might be covered in a number of ways. One solution that has been adopted in cocoa is to have a germplasm stock, quarantine facility and distribution point outside the growing region of the crop (this is in fact on an international basis and is located in Reading). This allows any material to be introduced into the region, to be first screened and tested for disease, without risk to any production area. The inspection and issuing of phytosanitary certification takes place in the UK before dispatch to any recipient that requests particular genotypes – it also enables a reliable disease free bank of germplasm to be safeguarded as insurance.

Once material is introduced into the region it needs to be established and propagated in a suitable way for that species. Also during this phase, there would be basic establishment trials, leading on to carefully designed regional trials to assess their value against existing material – with specific and relevant tests for any particular desired traits.

Existing material needs to be more fully evaluated and the idea that it is possible to identify "good mother trees" on the basis of phenotypic observation of trees in the field must be rectified. The relationship between individual tree performance and the genotypic potential has been shown to be poorly correlated and does not form a rational basis for crop improvement. Material must be suitably multiplied and tested in properly designed trials, if progress in improvement is to be made.

Once material has been tested and selected over the region, (which incidentally requires a sound data collection and analysis system integrated across the countries concerned), it needs to be multiplied further and a realistic set of protocols established for propagation, distribution, further propagation and introduction to growers in suitable packages.

There also would need to be a defined, although perhaps less formal, network/chain for subsequent dispersal so that material can be introduced into a country, to a specific area, to growing zones and then to growers and smallholders. This requires both a "chain" of distribution, which might be channeled through organizations such as NARPs, and to the extension services and NGO's but also the necessary techniques and know-how to allow optimal multiplication in which disease and mistakes are minimized.

The above mainly covers the preliminary position with regard to material and is simply a scheme for acquiring, selecting and distributing material. If the region is going to logically plan, to develop and maintain a definite market presence then a breeding program for each crop is also needed. This need not necessarily require an extensive set of facilities or personnel but for example the centre of excellence would be required to make controlled crosses (i.e. planned pollinations) between complimentary genotypes to produce new combinations of traits with particular reference to the needs of the region. After some preliminary selection amongst the progenies produced then the subsequent trials and selection could be carried out by the same chain of sites and people involved in the distribution of planting material. It would, of course, require suitable information and data planning and management.

It is not going to be possible to elicit a rapid response or answer to the problems encountered with tree crops by breeding and selection. By virtue of the very nature of the growth habit, it will usually be years rather than months before improvements become apparent, at least in terms of germplasm and planting material. This underlines why it is so important to take urgent action to set up systems and undertake careful planning to meet as many eventualities as may present themselves at a later date.

Material: Germplasm is needed at a number of levels. There is no doubt that some improved germplasm that is already in the region has not been accessible to NARS from other countries in the region. This is not through any unwillingness between the "players" and more a matter of simple information constraints and infrastructure problems. At the next level in the "chain" it was clear that some material had been acquired but not been fully tested by NARS, mainly because of financial restraints. In addition at the level of the grower, it was apparent that despite the desire of all the "players" much of the improved material had not been effectively made available to growers. This again reflects the need for an effective set of mechanisms to facilitate the outward flow of germplasm as it becomes proven and "packaged" (i.e. the agronomic practices required to multiply and grow it have been established).

6.6 Input and service supply constraints

The provision of extension services has been discussed above (6.4.1).

Credit availability for small-scale farmers is at best problematic or at worst, non-existent in all of the countries visited. Major factors that can influence credit availability are:

- In some cases credit is available but there is no organization capable of disbursing the money to a multitude of diverse smallholders, e.g. the Cashew Improvement Programme in Tanzania.
- High interest rates, which can reduce the profitability and attractiveness of any transaction

Even in Cameroon, where farmers seem to have readily adopted the idea of farmer associations and the importance of credit, major problems persist. In one association, which managed to get a loan, they defaulted on the repayment because the bank holding their savings collapsed. In another instance, farmers built up a fund with their own saving but were unable to obtain any matching credit to make the venture more worthwhile.

Even for small businesses credit is a problem. For example, in Kenya it was noted that the current interest rate of 22% (down from the previous level of 30%) was a major disincentive to potential business development, particularly amongst small-scale developments, as the profitability of any venture is significantly reduced.

Inputs like fertilizer, pesticides, 'non-local' tools, are in almost all cases, either in short supply or simply not available. An important factor in this respect is the problem of cash flow; farmers have money at harvest time but later in the season when inputs are required, the money has been spent on other goods. Therefore attention needs to be given to the provision of inputs at the time when farmers sell their produce. For example in Tanzania fungicides to control the devastating cashew powdery mildew disease need to be available at the time farmers are selling their harvest, 8 months later when the fungicides are needed, money is in short supply again. Farmers in Cameroon only buy fungicides to control cocoa black pod disease when they have money, which only occasionally, this leads to a very limited, erratic and inefficient system of control.

The question of inputs for resource poor smallholders, is however a complex one. Such inputs are not widely used, usually because of lack of capital at the right time and the increased level of risk, this is especially so for annual crops. Understandably, for pragmatic reasons, farmers are not prepared to invest in, for example, fertilizer if the risk of crop failure due to drought, pests or diseases is high.

Therefore the agronomic and economic response to any particular input should be clearly demonstrated over a number of years. Once the basis for an input has been clearly established then steps need to be taken to ensure adoption and uptake. The necessary steps will include appropriate extension information, availability of credit, and at least in the initial years, continuous and timely supply of the input in question.

In some respects, the low use of inputs can be an advantage, as it can help promote the possibility of integrated pest and disease management, low input farming and even organic farming. However, even these approaches still rely on certain inputs, particularly information and training. The gathering, and subsequent sharing, of knowledge and experience of sustainable systems of plant growth and protection, within different agronomic systems, should form a vital step forward. The development of truly sustainable systems means that all parts of the system need to be viewed as an integral whole. This requires that they are environmentally "friendly" and lead to stable soil

fertility, whilst at the same time being financially optimized in ways that are integrated with the potential that the region presents.

For information regarding the supply of new planting material see above.

6.7 Commercial constraints

6.7.1 Integrated business outlook and training

At most of the commercial enterprises visited in East Africa, the consultants felt that a considerable prospect was present, but that much of it remained as a latent possibility due to a number of rather obvious "gaps". In a number of the businesses these "gaps" were recognized and attempts made to overcome them, but in the main, the necessary opportunities, skills and possibilities were not explicitly present. This meant that in a number of instances the longer-term future of the enterprise was far from certain.

This uncertainty took a variety of forms and differed over individual cases, but in all such cases there was at least one obvious "gap". In many cases there was a problem of supply, and solutions to overcome this were rather scarce. The "newness" perhaps of a "liberalized business" environment might explain the following tentative observations: lack of forward planning, particularly in terms of supply; inability to source at the quality levels required; a lack of clear financial analysis; and a lack of an ability to cope with a changing scenario of supply and demand as well as price structure.

The lack of an integrated business outlook, underlined the need for those involved to learn or develop business and marketing skills; the development of a training programme at various levels of agribusiness and associated activities, would seem essential. Training needs are many and various but in terms of commercial aspects, the complete range from simple awareness seminars to full MBA scale courses might usefully be made available to targeted players. The overall objective would be to assist in the creation of an 'awareness environment' which would facilitate entrepreneurial activity.

Incomplete or unstructured business planning was noted above and is clearly an area in which the various input and output variables need to be understood and factored into analyses and models in a range of scenarios. There is need for a variety of such analyses, which must include social as well as economic aspects, to run from the smallholder right through to the exporter. Such analyses must not fall into the trap of concentrating solely on the major economically important factors but also the stability ones, the risk minimization and the reality of the practical situation that the grower is actually working in. Nevertheless, the major factors that are going to influence the exploitation of tree crops are the evolution and construction of sound marketing and production packages.

In West/Central Africa, the focus of the mission was mainly on farmers, farmer associations, government and international organizations and a number of projects; the number of commercial organizations visited was limited. The farmers associations of Cameroon, although making good progress, would benefit from training in business and management techniques to give them a more integrated business outlook.

An example of where an integrated approach was being attempted was with SPCIA in Guinea. This company originally started out as a funded program and had since been developed into a company that was supplying inputs as well as training and technical advice. The "development agents" were also involved in buying back the production from

the growers. They then sold the produce either to other buyers, to processors or exporters.

6.7.2 Marketing opportunities

Market skills might be usefully broadened at all levels in the production chain in forms suitable for the particular "players" and, as already mentioned in Section 6.6.1, these should include both local as well as more global possibilities. The balance of being able to sell some of their produce locally (some of which may be unsuitable, ill timed or simply uneconomic for the export market), opens a number of valuable buffering features. The importance of the high returns possible from the export of tree crop products should not be diminished, or understated. However, there is a need for careful attention to be paid to developing and accessing the obvious additional market outlets that can be seen to have potential within the region – export and food security need not necessarily be opposing elements. Opportunities for growth in tree-crop agribusiness are significant in the region, but the industry must mature in its ability to access new markets.

6.7.3 Opportunities for value added

The East African agribusiness sector has a wide array of firms ranging from large and diverse enterprises to small, family-owned, operations that export raw product for processing elsewhere. Some of these businesses have aspirations to expand to value-added export operations. However, the number exporting value-added, processed products is currently quite small. Even some of the larger businesses merely performed export functions in a dependent manner; that is, they depend on family or long-standing connections with buyers in other markets, or with one or two distributors that they have traditionally used for specific products

An inspiring example of value added came from the Ziwani Farmer Group Association in Kilifi, Kenya, where the association has been using simple manual technology to process cashew. They can sell raw nuts at around 40 Ksh per kilo but when processed the kernels are worth up to 500 Ksh. They have started with a local market but are developing, through grouping produce, to move into a modest export potential. But, they have short-term marketing problems; this is possibly another example of where there is a lot of potential but one component may be missing, even if temporarily, which is jeopardizing their operation.

Ironically, in the same area, there is what looks like a successful semi-automatic cashew processing factory, with imported Indian technology. The capacity of the factory is 4 tons of raw nuts per day.

On the other hand, Tanzania has experienced a remarkable increase in cashew production but so far has not been able to benefit from any value added to the crop, as all the raw nuts are exported to India for processing. In Mozambique, production and quality of cashew is still low and the authorities are still grappling with the issues of trying to obtain a balance between protecting the processing industry, (by banning exports) and ensuring that reasonable market forces operate. Simply banning exports generally only ensures that production and quality remain low and that the rural cashew producing population remains poor.

Uganda, being a land-locked country with high transportation costs, needs to maximize all aspects of value added activities in order to gain financially acceptable returns to balance the transport costs.

In Guinea, cashew nuts are mainly exported to Guinea-Bissau or to the Ivory Coast, with a small amount being processed for roadside sale. As production hopefully increases, greater consideration will need to be given to processing in country to add value to the crop. Currently there is no mango processing plant in Guinea, in spite of the huge production of good quality mangoes with a long harvesting season and good demand on the world market; this appears to be an opportunity that should be exploited.

In Cameroon there is an increasing diversity of tree crops being grown within the cocoa system, opportunities to add value to these crops via local processing, should be explored.

6.7.4 Diversification

In East Africa there did seem to be a lack of diversity both between and within commercial operations. Nearly all the commercial companies visited rely on a small number of products and sometimes only one (e.g. coconut oil). Clearly any business needs to decide its own focus and breadth of operation, but the ability to react to change or exploit opportunities is also an essential feature of commercial success. Knowledge of different tree crops and their potential along with processing and marketing strategies, might be brought into a more interactive forum to useful advantage.

The one notable exception was Kenya Fruit Processors Ltd. at Thika, where the factory was built solely for the production of passion fruit concentrate for the USA and European export markets. The limited seasonal production of passion fruit and limited radius of collection meant that the factory was closed for 8 months of the year. As a consequence, the new owner expanded activities to include:

- Processing oranges from Tanzania (Kenyan oranges being of poor quality and expensive)
- Importing concentrates from South Africa and preparing them for the local market (long life "Tetra" packs).

At the field level, in the cocoa farming systems of Cameroon there is already a diversity of tree crops being grown and efforts are being made to expand this further. Such diversity provides the farmer with alternative sources of income and reduces the risk of dependency on one crop. Cocoa can also have an important role to play in conservation and bio-diversity.

To assist with tree crop development and diversification it is suggested that a full inventory should be made of all of the tree crops grown in the various countries involved in the network, with details of their growing requirements and prospects/market potential, including by-products. Eventually this should result in a comprehensive database that is regularly updated. Such a list might include at least the following:

Range of tree crops

Coffee
Cocoa
Tea
Cashew
Macadamia
Mango
Citrus
Avocado
Papaya

Jack fruit
Lychees
Shea nut
Coconuts
Oil Palm
Medicinal trees
Bixa
Cola

Criteria for assessing the potential and priority of the different tree crops should be clearly elaborated.

6.7.5 Lack of product supply

This again has been noted above and need not be repeated but a variety of mechanisms might be brought to bear from the commercial organizations to partially alleviate the problems encountered.

Partly it reflects a lack of the basic knowledge about the possibilities that exist with tree crops, of processing potential and market diversity. There is a clear lack of knowledge of the scientific base underlying tree crop science (germplasm, breeding, propagation, growth, husbandry, fruit physiology, post-harvest, processing, etc) both at the level of growers at one end and processors at the other. An obvious need therefore, exists for links to be formed between these, and information networks to be established to cover such gaps. So for example, the planned growing of trees with different harvesting dates and the use of particular genotypes for specific processing might be beneficial to both growers and processors – such genotypes exist! As another approach, it might merely be a matter of the application of technology for example – can produce be grown successfully over a longer growing season if irrigation is introduced – if so is it economically viable? Alternatively, are there other crops in the same locality (growing or that could be grown) that can be processed using the same facilities, at a time or in a way that would not compete with the main product? Can material be partially processed by the growers to allow its transportation over further distances or for it to be stored for longer?

6.8 Information flow constraints

The necessary information chains appear to be incomplete. Thus, as noted previously, the various "actors" that would be needed to complete a sensible fruit crops exploitation scenario are not necessarily in contact with each other, or do not know of the constraints and requirements that exist in other parts of the chain. At the same time the technical skills and information are not being transferred or communicated fully.

In Cameroon, farmers repeatedly complained of lack of information on issues ranging from current cocoa prices to technical information. The situation is made worse by two factors (1) in the past, information on cocoa prices at least, were widely known and (2) the perceived opinion that information is deliberately being withheld from them in order to keep prices low.

An interesting example of a possible attempt to partially rectify the information bottleneck was seen in Mombasa where the consultants jointly visited locations with CDA representatives, KARI staff, Ministry Extension Officers and even small-scale farmers. This provided optimism that such interactions were becoming reality and that they might

be encouraged and developed. We also learned of off-station trials that were a collaborative effort between research and extension. Clearly other elements need adding but this is the sort of activity that a regional network might look to foster at all levels.

6.9 Infrastructure constraints

There were a number of infrastructure issues that arose and which might be articulated more powerfully by a "common voice" - such as one that a network might provide. For example, the poor state of the roads in a number of areas directly affected the timing and quality of transporting produce to processors, thereby limiting their potential to source their supplies, which in nearly all the cases we visited, was a limiting factor. It was noted, however, that a possible approach to partially overcoming some of these problems would be to initiate a preliminary processing before transportation to the main processor. This might also open up a number of local market opportunities including employment.

7. Institutional constraints / considerations

7.1 National Programs

The participation of National Programs in a regional tree crop network will be essential, but there are limitations:

- Very few government resources are now available in East and West/Central Africa to assist in the development of sustainable agriculture.
- National budgetary support for the agricultural sectors throughout both the regions have steadily been reduced over the past several years and will very likely continue to receive insufficient and ever smaller budgets. Hence National Agricultural Research Systems and Extension Services are severely under-budgeted and are unable to provide even the minimal technical services required to support national agricultural development.
- National agricultural programs throughout East and West/Central Africa have traditionally sought and have received international donor support to cover technical programs as well as core operating expense budgets. International donor support has also been steadily diminishing over the past years, leaving the programs resource poor and ineffective.
- This is despite the fact that the agricultural sector drives the national economy in each country of the two regions, for example in Uganda the agricultural sector alone accounts for 80%-90% of national employment while the same sector is allocated only about 3% of the national budget

What is required:

- Restructuring and strengthening the national institutions to make them more responsive to client demands and market needs.
- Management issues of the institutions must also be addressed in order to restructure research agendas, attract higher levels of national budget and international donor support.
- Stakeholder and client requirements must be understood and addressed
- Linkages with other public and private organizations (national and regional) active in the broader range of activities from production to market (research, technology development and transfer, programs supporting marketing organizations, universities,

producer and marketing associations, international programs and NGOs) must be developed.

7.2 Regional Programs

There are a number of regional programs and networks operating in East Africa.

The Association for Strengthening Agriculture Research in Eastern and Central Africa (ASARECA). It has been operating since 1994. It was established by the region's National Agricultural Research Institutions (NARIs) from ten nations in Eastern and Central Africa (Burundi, Congo, Eritrea, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda).
The primary objective of ASARECA is to address issues associated with regional collaboration in agricultural research and to assist the NARIs to identify, prioritize, formulate, and coordinate the implementation of regional research programs, projects, and networks. ASARECA also is charged with identifying and promoting the adoption of best practices in technology development and transfer (including the exchange of germplasm) and to represent the interests of the region in African and other international settings.

ASARECA has managed regional agricultural networks since its inception in 1994 and has about 19 networks, some funded, others still requiring funds. Regional networks support potatoes, beans, root crops, bananas, livestock, maize, wheat, rice, coffee, policy matters, etc.

CAB International (CABI) maintains an African Regional Center in Nairobi, Kenya and has a number of programs in both East and West Africa.

IITA has a mandate to develop sustainable systems in sub-Saharan Africa and manages regional programs and also leads two inter-center initiatives: Ecoregional Program for the humid and subhumid tropics of sub-Saharan Africa and the Systemwide Program on Integrated Pest Management.

7.3 International Centers

The International Centre for Research in Agroforestry (ICRAF) is an International Agricultural Research Center with an East Africa regional center headquartered in Nairobi, Kenya. ICRAF has been implementing the African Forestry research Network (AFRENA) and the African Highlands Initiative (AHI) through agreements with ASARECA. ICRAF uses the benchmark approach in its studies – see IITA also. It is commonly perceived that ICRAF and its regional programs in East Africa does not generally focus on income generation or employment factors of commercial tree crops, but rather emphasizes soil fertility replenishment. Recently ICRAF has revised its strategy and focus in agroforestry. It is also working in West Africa, for example, the tree domestication program operating in Cameroon, which does in fact focus on income generation.

The International Institute for Tropical Agriculture (IITA) has its regional headquarters at Ibadan, Nigeria, it also has 6 sub-stations, one of which is in Cameroon and another in Benin. Its goal is to increase agricultural production in a sustainable way, in order to improve to improve the nutritional status and well being of people in tropical sub-Saharan Africa. IITA is involved in a number of networks, most notably the cassava network.

IITA uses the benchmark approach in the moist and humid forest zones of West and Central Africa. Benchmark areas represent major features of eco-regions and are selected on the basis of eco-region, bio-physical and socio-economic features of those regions, they are also complimented by pilot sites which are located outside the benchmark area but within the same eco-region. Research is concentrated into a limited number of sites. This approach originally centered on natural resource management but activities have expanded to include research on crop improvement and plant health. Six benchmark and 6 pilot sites are currently operational.

7.4 Private organizations

There are a variety of levels of organizations that are relevant o any consideration of their involvement in tree crops.

There are local organizations which actually handle inputs and but produce from the grower – these were not readily targeted in the visits. These may operate simply at the local level or form a step the in the selling chain. There are more widely active organizations that can operate on a country basis and so move produce from different producing regions, such as SPCIA in Guinea. The next level of organization is perhaps the exporter, often entrepreneurial; who move produce between countries or markets. And, then there are the international buyers and users who often interact with the end-user.

The above basically describes an oversimplified chain for fresh/raw product. Often the one for processing is also like this with the main processing occurring some way down the chain. There are however good examples of at least initial or intermediary processing within the chain and some at the local level. The role of end-user and international companies and their buyers clearly needs to be examined in more detail. It would appear that at present there is little interaction or feedback in the production/processing/selling chain and little incentive from one end to the other of response to needs and requirements – leading to unstable and unsustainable chains in circumstances of other than an ever expanding production scenario.

8. Policy and Policy Constraints

Agriculture remains the single most important sector of the economies of countries in both East and West/Central Africa, generally speaking:

- It produces half of the region's gross domestic product,
- Generates more than 50% of the foreign exchange,
- Provides for well over half of the employment in both regions (80%-90% in Uganda).

However, the average annual per capita income varies from country to country but is generally very low (estimated at $200/per capita in Uganda) with a high percentage of the population in both regions, living below the poverty line.

Causes of this poverty amidst natural resource abundance are extremely complex, and despite being frequently studied and analyzed, may still not be fully understood. Primary factors (past and current):

- under-investment in rural areas,
- inadequate access to and application of technologies for production and marketing

- inadequate access to financial services (primarily in rural areas)
- macro-economic policies which have favored urban over rural development, monetary policies, investment policies, government price and market control policies, public institution policies
- agricultural polices that have been ignored or poorly implemented;
- regional trade barriers and
- degradation of the region's natural resource base.

Before the 1990's, farmers in many countries of East and West/Central Africa had traditionally been isolated from any state modernization strategies and were subject to unjustified rates of explicit and implicit taxation due to government policies which favored the industrial sector over agriculture.

Overvalued exchange rates and inappropriate fiscal policies which reduced the prices paid to farmers for their crops (particularly export crops), interest rates, and wage rates were among the most serious policies working against the development and growth in the region.

This prompted the major donor organizations to encourage a move towards liberalization – see next section.

8.1 Liberalization

As a result of intense international pressure through structural adjustment programs supported by donor organizations like the International Monetary Fund and the World Bank, the governments of East and West African countries began the adoption of macro-economic and trade policies, which, in principal removed past distortions and began the emergence of new public and private sector leaders and institutions. These international donors advocated both reductions of the state's intervention in the economy and liberalization of pricing and other policies, allowing market forces and the newly liberalized economies to function without undue intervention.

This reorientation towards liberalized policies dramatically changed the relationship between the governments and the countries' agricultural sectors. In summary this package of policy reforms realized the following:

- reorganized public sector institutions;
- adjusted exchange rates;
- relaxed foreign investment restrictions;
- eliminated price controls and import/export restrictions;
- began private sector initiatives to determine agricultural priorities; and,
- consolidated democratic processes and institutions.

These reform packages were designed to bring about growth in trade for income generation and poverty reduction.

Governmental commitment to the reforms has been variable, sometimes weak, and has often been characterized by resistance or avoidance.

Of all the countries visited in both East and West/Central Africa, the issue of liberalization was the most contentious issue in Cameroon. Liberalization was being blamed by some, for all the problems facing the cocoa industry (and no doubt other industries as well). When in fact, lack of preparedness for the new liberalized scenario, lack of

competitiveness (only 3 main exporters) and lack of support services (not even guide cocoa prices had been broadcast over the radio) were probably the main factors exacerbating problems in the cocoa production chain.

The primary macro-economic policy issue facing a sustainable regional tree crop support network is the less than full implementation of the liberalization policies. Any program to support a viable commercial regional tree crop network must include a component to consolidate and improve the implementation of existing macro-economic policies in order to allow the market to function and the sector to grow.

8.2 The future

While some recent economic growth rates have been promising, continued limited employment opportunities, low incomes, scarce land, and a lack of access to technical and financial services, still represent the status of people living in the rural areas of both regions. It is essential that sustainable productive activities be undertaken by the different rural populations as quickly as possible, and that these activities have sufficient income generating potential to raise the standard of living of the two regions. Equal attention must be given to improving on-farm productivity and incomes and creating opportunities for off-farm employment.

Emphasis must continue to be given to agricultural policy implementation, with a specific focus on sustainable development of the sector. Continued work is needed to:

- strengthen the ability of free market forces to work;
- create new incentives for production increases;
- allow the private sector and farmer's organizations free market access;
- increase national government investments in research;
- develop mechanisms to allow private sector involvement in provision of agricultural services (transfer of technology, credit, etc); and,
- reform agricultural institutions.
- lack of investment / reinvestment in agriculture

In addition, countries in both regions should explore the feasibility of creating an export tax "check-off" of 2 %– 3% of export value of tree crops to support institutions that will participate in the network.

A regional commercial tree crop network would provide a very good vehicle for promoting further regional analysis of the reforms in order to raise governmental, public, and industry awareness of the likely impact of the reforms, and to identify specific reform measures to increase productivity and growth.

8.3 National Trade Policies and Regional Trade

The information given here is based solely on East Africa as this was not concentrated on during the briefer visit o West/Central Africa

8.3.1 The Vision

Over the past 15 years, East African Countries have signed a multitude of regional trade agreements setting the stage for a free regional trade structure. All of the countries in the region belong to: the Preferential Trade Area for Eastern and Southern Africa (PTA); all countries belonged to the East African Community, which collapsed in 1977; the Common Market for Eastern and Southern Africa (COMESA) was signed in 1993 with the goal of eliminating all trade barriers by 2000; the Economic Cooperation under Unilateral Trade Liberalization agreement was signed also in 1993 to facilitate trade and payment procedures between countries; and, an East African Community agreement is scheduled for signature on July 31, 1999 (Kenya, Uganda, Tanzania, which also aims for a zero tariff regime by the year 2000. As with national macro-economic and sectoral policies, despite good intentions of creating an East African free trade regime, these attempts to create such a regional trading block have not been successful.

8.3.2 The Reality

Official export/import records of regional agricultural trade demonstrate a low volume of trade among East African countries. Trade policies (particularly tariffs, extra taxes and import controls) and non-tariff controls have contributed to the lack of official inter-regional trade among countries in eastern Africa. Countries in the region, while publicly supporting the various regional trade agreements, appear to have been pursuing national strategies formulated in the interest of "food security" (i.e. protection against agricultural export to neighboring countries in times of scarcity or low national commodity prices).

Unofficially, there has been a significant amount of informal and unofficial trade among East African countries, but since much of the trade is conducted through unofficial channels (smuggling, false recorded invoices, etc.), it does not appear on official records. No specific data are available for estimating inter-regional trade in tree crop commodities, but it can be assumed that such trade does exist through the informal channels.

Other non-tariff barriers to regional trade also impede the potentially important trade of agricultural commodities within the region. Such non-tariff barriers include; phyto-sanitary restrictions, complex and cumbersome customs procedures; export/import restrictions; official and unofficial harassment of traders; bans on agricultural commodities; high transportation costs; illicit border charges; and, unclear and misunderstood grades and standard requirements.

It is clear that policy formulation which favors regional trade has not been followed-up with strict implementation, and that the positive trade policies (liberalized exchange rates and elimination of marketing/price controls) are offset by inward-looking national food security strategies, high export taxes, import controls, and little access to capital.

8.3.3 The Requirements

National governments are still unwilling to open their borders through comprehensive trade policies, which would support free regional trade, despite the myriad of regional trade agreements.

Inter-regional trade will be an important focus of the proposed tree crop network, and the activity must include efforts to rationalize and harmonize national policies of trade liberalization. Such measures as uniform implementation of existing trade policies, harmonized transportation and customs/border charges; phyto-sanitary

restrictions, documentation and customs' administration should be addressed through this network.

Also, an effort to make more transparent regional trade agreements and national policies to ensure that private sector traders understand the systems and the risks related to regional trade. Local businesses are not certain how to work in a system where risks mandate from national governments and not from the regional trade regulations. Most private business entrepreneurs do not fear a true free market system. On the contrary, they are anxious to compete and prosper in an understandable and transparent free market structure. They fear the government's continued manipulation of the system, and will work around the system until transparency is reached and all players understand the rules and regulations, and sense that they are being evenly applied. Monopolies work rather for the businessman and against the producer and these must be discouraged.

8.4 Institutional Policies

All of the institutions that will be related to, or be a direct participating member of the tree crop network, will have their own internal set of operating and networking policies, some of which may impede the development of the network and constrain its ability to operate. Questions concerning the role of research, extension, post-harvest and marketing institutions and what is expected from them in such a network must be answered. Incentives to institutions to participate and tools for sustainability are policy driven and also must be dealt with. Participation of private sector groups and their capability to provide services (not in competition with public sector institutions) is crucial to the development of the network, and incentives for participation will also have to be developed. Technical assistance to national and regional policy makers will be required to help design institutional reform strategies. A well-designed regional agricultural commodity network (including a tree crop network) with appropriate policy emphasis can have a positive impact in both the regions by:

- supporting regional economic cooperation;
- providing fora for policy dialogue associated with regional economic and agricultural institutions and coordination of that dialogue with similar efforts at the bilateral level;
- strengthening regional technical institutions;
- facilitating discussions among the regions' Ministers of Agriculture concerning common policy issues; and,
- planning activities which are important to the countries but which, by their nature require a regional approach or for which a regional approach provides significant economies of scale.

9. Rationale for Regional Tree Crop Networks in East and West/Central Africa

A network could have a uniquely instrumental role in, for example:

1. Developing a format for promoting direct linkages between small holders, rural communities, NGOs, technical service providers, researchers, innovation drivers, commercial enterprises, market developers, input industries, the supply sector etc. All of these need a common forum, an assurance of delivery of obligations and a confidence that investment of time or money will lead to effective implementation.

2. Rationalizing institutional issues on the basis of regional needs but with a clear focus on tree crops. This would allow clearly defined objectives which would support national efforts but with a synergistic effect from the regional base.

3. Providing an important forum for attacking the market issues that underlie the further exploitation of produce from the region. It could establish grade and type standards, providing the necessary harmonization that would lead to international acceptance. The prospect for defining "regional brand image", organic standards, quality assurance and market supply would all be relevant areas of coverage.

4. Increasing the potential for new product development, which could be enormous. The network could provide the background, the catalysis and the development chain needed to bring these to market reality. There are a number of fairly obvious prospects for simple process and preservation approaches, which generally are underdeveloped from our superficial research – e.g. jam making, preserves, bottling etc. These can be made into products with high quality labels and with regional connotation.

5. Providing a more equal voice for all the "players" in the tree crops arena in determining priorities and approaches. It is anticipated that these 'voices' might more accurately reflect the regional needs rather than those perceived by others to be the needs of the region.

6. Reducing duplication of effort by attempting to solve regional cross-country technical problems

7. Providing a teaching format for training trainers as well as researchers in appropriate aspects of approach, strategy and problem focus. Providing costly extension materials.

8. Facilitating and enabling a supply of improved germplasm to fit the region's needs and allow a continuing competitive place in the market. The importance of plant health and quarantine can be tackled and the initiation of breeding programs aimed at the region's needs, can be organized and undertaken

9. Exploiting the commonality of tree crop techniques in terms of vegetative propagation, nursery development, tree breeding programmes, experimental layouts, pest and disease control, application technologies, etc'

10. Supporting 'Centres of Excellence' for individual crops for the benefit of the region

11. Maximizing the catalytic potential of a network together with the inherent possibilities of income generation from tree crops within a community, to provide solutions to community development problems, like for example youth involvement in agriculture and youth employment creation.

12. Helping to produce feasibility plans for sustainable exploitation, which cover the complete "chain".

10. Possible activities of the "tree crop networks"

The network should have an integrated approach addressing issues across the board, from production to marketing, a practical orientation and focus on actual problems. Special assistance should be given to processing industries because of the:

- Value added
- Employment created, including associated artisans
- It can act as a driving force for the general development of the crop in the region

It should be noted that assistance to processors should NOT be at the expense of the producers, as would appear to be the case with the cashew processing lobby in Mozambique.

The network must be responsive to smallholder problems and needs; even the most commercialized crop in East Africa, coffee, is mainly produced by smallholders (60% in Kenya, 80% in Tanzania and 100% in Uganda). There is, quite rightly, a significant move towards involving all stakeholders, particularly farmers, in setting the agendas of research / extension programmes. When it comes to commercial tree crops, it will be necessary to balance this to involve, to a greater degree, processors, traders and marketing people.

The network could be involved in the following activities:

Developing linkages
- Initiate Working Groups to promote discussion, exchange of ideas, knowledge etc between all stakeholders

Information
- Disseminate information, knowledge and techniques
- Co-ordinate the flow of information
- Maximise the value of information – ensure added value
- Make available extension material, leaflets, videos etc.
- Provide marketing information

New planting material
- Optimise availability of material/germplasm
- Co-ordinate germplasm enhancement and crop improvement
- Enable safe/phytosanitary germplasm exchange and/or quarantine

Awareness
- Raise profile of tree crops and their researchers
- Put Africa on the map for these crops
- Promote Regional Conferences, publications, provide focus through crop based societies
- Increase nuclear size of sector
- Increase lobby strength

Research
- Promote and assist regional centres of excellence for each crop to benefit the region as a whole.

Extension
- Make available extension material, leaflets, videos etc.
- Provide information on most efficient extension approaches

Commercial
- Help marketing
- Provide commodity profiles

- Information on outlets.
- Business planning assistance
- Increase linkages with commercial operators.

Training
- Co-ordinate training in research, extension, processing, business administration, marketing
- Co-ordinate training exchanges

Organisation
- Rationalise consultant input and make widely available resulting information
- Optimise donor input
- Minimise donor fatigue

11. Possible network models

11.1 Model 1 - Make the network within ASARECA (at least for East Africa).

This organization is already in existence, it has a small administrative core and has an existing constitution. It also has a Governing Body that includes representation from the Ministries of Agriculture of participating countries. This Body lays down the policy aspects, sets priorities and judges project proposals, but agreements with donors are done directly with the institutions being funded, thus helping to keep the focus of the organization on the relevant issues.

Medium to long-term strategic goals:

- To enable agricultural research in the region to play a leading role in promoting market/income-generation orientated agriculture
- To serve as the main forum where strategies and ideas for agricultural research and their relationship to agricultural development in the region are conceived and exchanged.

Medium to long-term objectives:

- To promote regional economic growth by developing, introducing and disseminating agricultural technologies which both create markets and respond to prevailing and future economic opportunities for new technologies, as well as maintaining the long-term sustainability of the agricultural resource base.

Activities for achieving the objectives:

- Analyze and identify the objectives and optimal areas for new regional research investment that support the strategy
- Devise research programmes that produce technologies targeted to the achievement of the priority objectives.

Currently there are 19 network proposals under ASARECA, of which less than half are fully funded.

Advantages: It would mean that a new structure was not needed; there would be no additional administrative structure required; the organization is already recognized as a vehicle by those involved within countries and by donors/sponsors.

Disadvantages: ASARECA already has a set framework, is focused mainly on research and is not fully attuned to dealing with commercial organizations or encouraging commercial inputs. This will mean that tree crops might be competing with all other crops.

11.2 Model 2 – a separate ASARECA type network focused solely on tree crops – this model could be used for both East and West/Central Africa

Set up a new organization with a rather similar philosophy to ASARECA, working from a base of what is seen as the needs and constraints from the point of view of technical, organizational and commercial considerations. Again with a rather minimal core staff to administer and/or manage the Network and make maximum use of existing national, NGO, commercial, regional and international organizations, companies and bodies.

Advantages: It would allow a constitution and membership that would be totally appropriate to tree crops, their agricultural position and importance, at all levels of growers and farmers. This would include their potential revenue earning capacity at local, country and regional level, the inclusion of commercial concerns (both internal and external to the Region) and hence the possibility to cover the broad spectrum of needs from production, through processing to marketing.

Disadvantages: A new body would be created. It might appear as a competitor to ASARECA, although in reality this would not be the case, as it would focus solely on tree crops. It might also lead to increased Donor concern of "yet another organization to deal with".

11.3 Model 3 – 'Independent' Regional / International network

Set up a rather different structure which is determined in consultation with the major "players" who would include national representatives, NGO's, donors, national commercial interests, multinationals and trade organizations as appropriate. The regional basis would need to be safeguarded through careful drafting of its constitution and location. This would also allow a rather different emphasis in the structure with a greater profile for extension activities but also to include nutrition and health aspects. There would also be a need to include in the mission statement that environmental issues and biodiversity would be considered as integral to all activities but also that commercial activity was not only acceptable but essential. The input of funding, grants, contracts and agreements with commercial concerns would be a main aim of this network – although donations might be the only realistic starting point. The need for a clear and realistic view of commerce, both local and international, would give a ready focus for much of the underlying activities.

Advantages: Mainly as model 2 above, but would allow a greater input from the "players" and a wider thinking review of the possibilities.

Disadvantages: Again mainly as model 2 above, but with a greater time frame before it is up and running, a greater degree of initial uncertainty and a greater initial financial input.

11.4 Model 4 – 'Internationally' managed network

This would have many of the features noted above would be actively managed by an "external" agency with a strong international flavour. Thus it might be managed by an international organisation or centre, for example an IARC or an organisation like CABI.

Advantages: This would clearly have advantages in terms of access to facilities, administrative expertise and systems, organisational frameworks and experience.

Disadvantages: It would however, also detract from the clear regional "ownership" of the network. It would also mean that the management and focus of the Network would be one amongst others in any competition for resources, outlook and priorities.

12. Recommendations

12.1 Establish tree crops networks

The assessment leaves little doubt that the original premises of the mission were correct. In these regions, tree crops can 1) contribute in a major way to revenue earning; 2) tree crops have a realistic role in environmental protection and safeguarding biodiversity and that 3) the unique potential of tree crops in the regions was far from being realized.

It was also apparent that there were a number of obvious but potentially soluble constraints that were present that limited the present potential to achieve the full potential of tree crops.

Therefore our initial conclusion is that the setting up of tree crop networks, initially one in each of East Africa and West/Central Africa would be not only justified but also timely.

12.2 Establish level of interest and support for an East and West/Central African network

During the consultancies to both East and West/Central Africa, a high level of interest was expressed in a regional tree crops network, but obviously only a limited number of countries were visited and a limited number of organizations met. Therefore, a specific detailed consultancy or study to determine the level of support of the following should be made:

- Government organizations
- Donors,
- Commercial companies residing in the region
- Commercial companies based outside of the region but benefiting from E. African produce
- NGO's, etc

The "Sustainable tree crop program – stakeholder roundtable" at IITA, Cameroon (see below) also expressed considerable support for an institutional framework for regional cooperation.

12.3 Nature of Networks

The exact nature and form of the Networks needs to be decided and agreed in consultation with all the players in the planting material to end-user chain as the Networks must include all the levels of involvement if they are to succeed and be sustainable. Thus some of the players are the ones that might normally be expected to be willing to be involved (and a number are actively participating in very relevant areas of parts of the "chain") such aid agencies, Ministries, NGOs etc but commercial concerns (local, regional and international), marketing organizations and processors.

The following questions need to be decided in a consultative process:

What organizational/network functions need to be completed to facilitate regional cooperation in sustainable tree crop development?

What structures or elements of an organization/network are needed to formulate, guide and implement collaborative activities across countries?

What is the role of various partners e.g. policy makers, industry, trade associations, research and extension groups, farmer and business groups, NGO's?

What countries should be involved or become members?

What is the full range of alternative tree crops?

What are the priority tree crops and the criteria on which priorities can be made?

What sub-groups or committees are required to tackle specific problems or areas of interest?

12.4 Establish potential level of funding

Although it might be more usual to cost a program of activities to be undertaken and then find the funding, with the possible establishment of a network that has the potential to undertake a continuous program of useful long-term work, in this instance it would probably be more appropriate to try and establish the potential level of funding from:

- Government organizations (including expertise, manpower and facilities)
- Donors
- Commercial companies residing in the region
- Commercial companies based outside of the region but benefiting from E. African tree crop produce

Willingness to support the following different network areas should be evaluated at the same time:

- Management of the network
- Core programs
- Specific short and long-term projects.

Particular mention should be made of the need to assess the role of levies on tree crop exports for funding the network and national programs. This assessment should be conducted as an in-depth consultancy.

Ways of mobilizing funds from the different supporting organizations need to be elaborated for both:

- The immediate future to get the network up and running (to get over all the initial obstacles) and
- The long term to ensure sustainability

12.5 Work programs

Once the above structural aspects of a regional network have been resolved, then appropriate regional sub-groups can concentrate on developing actual detailed work plans and financial requirements.

13. Sustainable tree crop program – stakeholder roundtable at IITA, Cameroon

The culmination of this mission to Guinea and Cameroon was a 2-day meeting of many stakeholders interested in the tree crops program to initiate discussion on an institutional framework for regional cooperation. A separate report will be forth coming on this meeting.

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