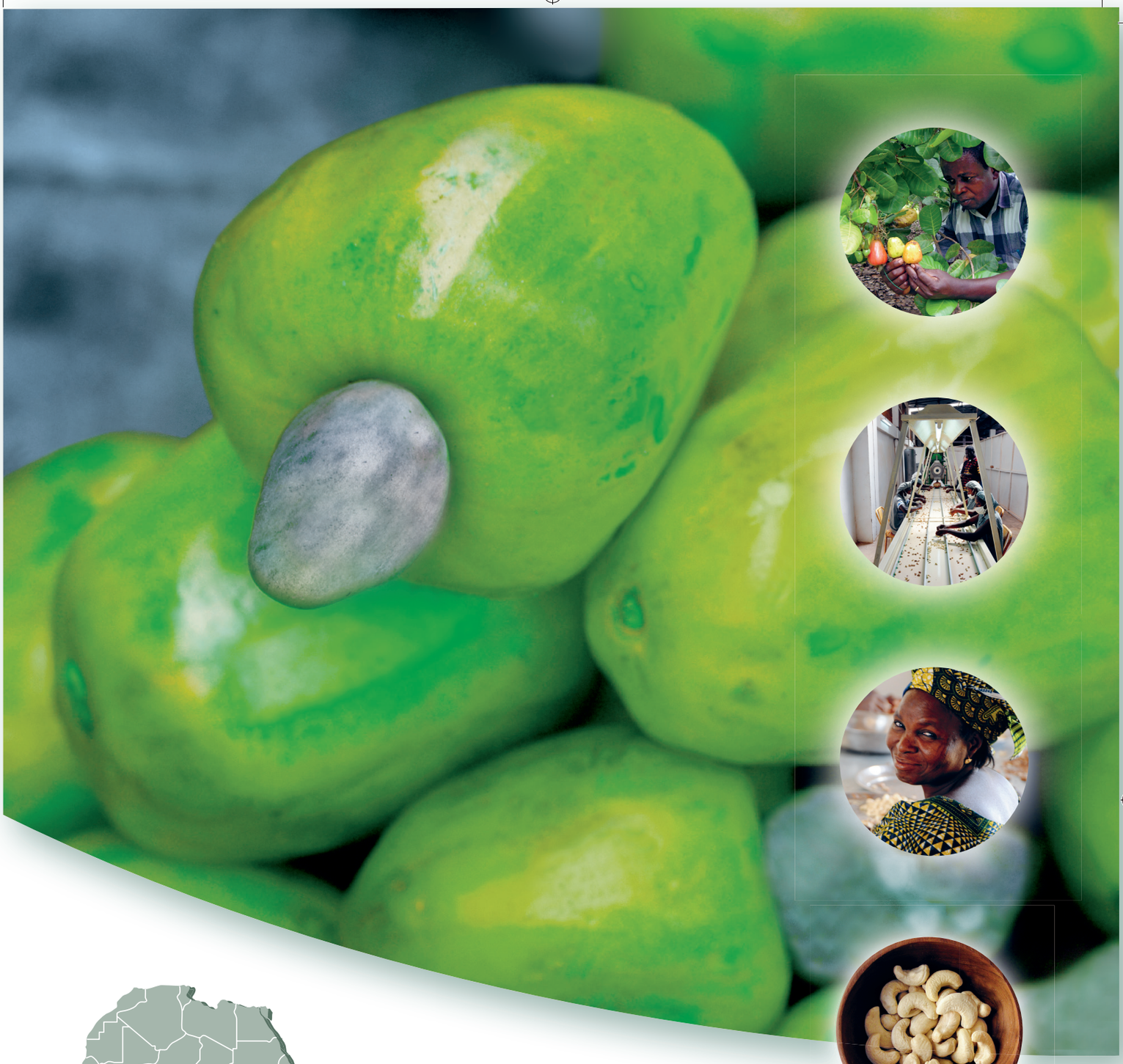

Analysis of the Cashew Value Chain in Mozambique

African Cashew initiative

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Analysis of the Cashew Value Chain in Mozambique

February 2010

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Executive Summary

Focus of the study and approach

This study is based on an analysis of cashew production in Nampula province in Mozambique conducted by two experts during November/December 2009. The report contains the conclusions of the study and a proposal to raise the productivity of smallholder cashew production through a supporting project, the first three year phase of which will work with producers in four pilot districts in Nampula.

After a brief look at the development of the global cashew sector and Mozambique's role in it, the cashew value chain and cashew production in Nampula province are analysed and described. This description also contains the results of the mission's data collection in the field, specifying the causes of today's low productivity.

Possibilities for improving the productivity of smallholder cashew production based on technologies readily available in Mozambique are then presented. These improvements include changes in the treatment and care of trees and speeding-up the renewal of the overage tree population. The economic feasibility of the proposed improvements at the producers' level *(micro-economic feasibility)* and their impact on the income of smallholders completes the analysis.

The current cashew sector policy is discussed and changes are proposed to support the project's efforts to introduce improvements. Finally, a proposal for the project's interventions is specified and costed.

The present situation

Since its independence in 1975 Mozambique has lost its place as the leading exporter of cashew nuts to Vietnam, India, a group of West African nations and Brazil; countries which have expanded their production in line with the near exponential growth in demand for cashew nuts in the world market. It is only in the last decade that Mozambique's production has shown steady growth again - albeit with strong fluctuations from year to year reflecting the weather conditions – accompanied by an increase of the percentage of processed nuts among the country's exports. The increase of processing capacity raises the value added in the country.

An 18% tax on the export of *raw cashew nuts (RCN)* was introduced in 2001 to protect the country's growing processing industry. These tax revenues are used by *INCAJU* (*National Cashew Institute/Instituto Nacional do Cajú)*, the state body in charge of the sector, to finance measures supporting producers, and consisting of extension services, seedling production and distribution to farmers and subsidising pesticides for smallholders. However, this tax and a ban on exports during the first months of the harvest have lowered the price of *RCN* for smallholders.

Because of inherent inefficiencies of the subsidies and distortions in the market, unwanted effects have emerged in the distribution of income from the tax and subsidies. These should be reviewed and an investment friendly environment should be created to encourage the private sector to enter this field, for example, in producing seedlings.

Secondary and primary data collected by the team shows that about 32 million trees produce roughly 81,000 tons of *RCN* annually, resulting in an average of less than 3 kg per tree. About 4.3 million trees are being sprayed and can produce up to 10 kg/tree.

However, many of the trees are old and need to be replaced. The number of seedlings produced and distributed by *INCAJU* and successfully planted is still so low that no rejuvenation has taken place and the average age of Mozambique's tree population continues to rise. Statistics given by *INCAJU* show that the gradual improvements in production are almost exclusively due to the disease control activities that *INCAJU* promotes.

The cashew marketing chain is long, involving several actors that buy, trade and partly process *RCN* before the nuts reach the exporter. This is due to a structure of production that leads to high marketing costs, where many producers furnish small amounts during a 3-month period in areas, many of which are remote and difficult to reach by truck.

Although in 2008 36% of the *RCN* were processed in Mozambique, the final processing and packaging of the nut kernels for the consumer is almost exclusively done in the consuming countries in Europe and/or USA. This means that less than 20% of the total value added accrues inside Mozambique, and the producers have a share of only 10% of what the final consumers pay.

About one third (10 million) of the nation's cashew trees are in Nampula province. Due to the higher productivity of the trees (20% were sprayed in 2008 versus 13% nationwide) half of all the recorded sales of *RCN* in the country are in Nampula province, which has an even greater share in the export of processed cashew nuts.

Economic analysis

A cash flow analysis for two types of grower was undertaken: **(1)** assuming all labour is paid (medium-sized growers, i.e. from 100 to 1,000 trees) and **(2)** assuming all labour is done by family relations (smallholders with less than 100 trees; the statistical average is around 30 trees).

Identical production methods and yields (10 kg/tree) were assumed for the two cases. However, the calculation assumes that spraying services are **not** subsidised and amount to 2,700 MTs/ha (instead of only 1,400 MTs/ha currently). The cost of seedlings was assumed to be 20 MTs/tree seedling with wages at 50 MTs/day.

Under these circumstances labour proves to be the largest cost for medium-sized growers, constituting 80% of the installation costs of a new plantation, which amounts to 8,000 MTs/ha in total, based on current prices. These costs are not accrued by smallholders.

From year 10 to 25, in which production peaks, the cash flow (annual receipts minus annual expenses) is positive and amounts to 6,000 MTs/ha in the case of the smallholder and 2,850 MTs/ha when labour must be paid.

Based on a 25 year period, investment in a new cashew plantation proves very profitable for smallholders. The *internal rate of return (IRR)* amounts to 68%. For the medium-sized grower, the *IRR* turns out to be 12% in the first case. If no subsidies are paid the cost of spraying a tree almost doubles from 20 to about 40 MTs/tree.

If an existing cashew plantation is assumed and spraying is introduced, the yield can be safely assumed to rise from 3 to 8 kg/tree. Considering the incremental costs of (subsidised) spraying, the income of the smallholder from cashew doubles from the equivalent of 70 US$/ha (i.e. per 70 trees) to 140 US$/ha. However, since the average smallholder owns only 20 to 30 trees, the doubling of his income is just a fraction of this and the contribution to poverty reduction must be considered minor.

It should also be noted that there are competing crops, such as sesame, that may deliver higher absolute net cash flows in favourable circumstances when the water stress is not excessive, i.e. when the crops receive sufficient water.

Impact on production

The proposed project is expected to reach about 10% of the cashew producers in the province, roughly 30,000 growers, during its three year implementation period.

Assuming an increase of the average productivity from the current 3 kg/tree to 8 kg/tree with proper management, the production of a typical grower with 30 trees would increase by about 150 kg per year, which is more than double the level of current production. If all growers reached by the project doubled their production, provincial production would increase by 10% and national production by about 5%.

Proposal for project approach

In order to reach 10% of the cashew producers in the province, i.e. 30,000 growers, the project should be launched in four districts: Angoche, Magovolas, Moma, and Mongicual.

The model of *Farmers Field Schools* (FFS) would be used, in which groups of about 25 farmers compare the recommended techniques with traditional production methods on a jointly-worked trial field for one year. The groups are led by facilitators (group members with leadership qualities) who will be trained by the project.

The project will employ a *National Coordinator*, who will work from an office in Nampula and be supported by a *Deputy Coordinator and a Specialist for supporting farmers organisations* and an *Office Manager* (administrator with secretarial and accountant duties). A driver and guards would complete the team.

The Nampula office would work with *4 District Coordinators*, one in each district, each of which would connect to between 5 and 10 extension technicians.

Each of the *extensionists* (8 in year 1 and 36 each in years 2 and 3) would in turn accompany 5 to 6 *facilitators*, and each of the *facilitators* (40 in year 1 and 120 each in years 2 and 3) would work with three *Farmer Field Schools*. In this way 120 FFS could be accompanied in year 1 and 540 each in years 2 and 3. This system would reach 3,000 cashew producers in year 1, 13,500 in year 2 and 13,500 (different) cashew producers in year 3, i.e. a total of 30,000 producers during the proposed implementation period.

The *Project Coordinator* would be supported by a *GTZ Coordinator* (junior expert in a halftime position) attached to the GTZ office in Maputo. He would support and backstop the project in the administration of financial matters and the realisation of training courses and *M&E (Monitoring and Evaluation)* activities.

One *International Short-Term Expert* would be responsible for providing technical backstopping and advice on curriculum development and, specifically, on economic aspects. He would also orient the development of an *M&E (Monitoring and Evaluation)* system to monitor the performance and assess the project's impact at the farm level. He would also propose and lobby for a policy environment that supports the development of the cashew sector.

National Short-Term Experts, most likely members of research and educational or professional training institutions (like *IIAM*), will be responsible for curriculum development and for the realisation of training courses for extensionists and facilitators, as well as the implementation of required field components for the monitoring system.

Training aspects

The training contents for the facilitators, extensionists and *District Coordinators* are to a large degree identical, since they cover aspects related closely with cashew production and marketing.

However, the training of the extensionists and *District Coordinators* includes a specific module on the economics of cashew production. This is so that trainees understand aspects related to productivity not only of cashew production, but also the methodology for determining the feasibility of investments and alternative crops, which would be beyond the present capabilities of most smallholders.

The foreseen modular construction of the training courses will facilitate the easy adaptation of the course contents to the specific needs of the trainees.

The proposed training of facilitators will be based on 4 modules of 5 days each, covering: (1) planting and diversification, (2) pruning, weeding, (3) integrated pest management, and (4) harvest and post-harvest activities and marketing.

The extensionists would receive training in groups of 10 by international and local specialists, consisting of 5 modules of 5 days each, covering: (1) planting and diversification, (2) pruning, weeding, (3) integrated pest management, (4) harvest and post-harvest activities and marketing, (5) economics of cashew production and (6) farmers associations.

The *ADPPS* training centre in Ithuculo appears to be suitable for the foreseen training activities.

Cost estimation of proposed project approach

The estimated project costs (assuming an exchange rate of 30 MTs/US$) amount to:

- 441,660 US$ for long-term and short-term experts, including per diems
- 106,500 US$ for the acquisition of vehicles and office equipment
- 632,760 US$ for technical staff at the project office in Nampula and office running costs
- 219,313 US$ for extension technicians
- 355,649 US$ for the FFS facilitators
- Assuming about 10% for contingencies, the total cost is estimated at 1,896,000 US$.

Recommended first steps

Once this project proposal has been discussed with the authorities concerned and a Project Agreement has been signed, the following steps should be initiated:

- Establishing a Steering Committee and defining its tasks
- Selecting implementation partners, defining an implementation strategy and procedures
- Contracting expatriate and local staff and establishing the office infrastructure
- Reaching agreements with organisations to provide trainers
- Holding a joint planning workshop with representatives of all stakeholders and agreeing on the planned activities and establishing a Plan of Operations for the entire implementation period of 3 years and Plan of Activities for year 1 and:
  - Training the first groups of extensionists by international and national specialists
  - Identifying and forming *Farmer Field Schools (FFS(localities, members, facilitators))*
  - Training the facilitators
  - Activating first *FFSs* in the districts.

Apart from these key steps, the project needs to develop additional activities to:

- Identify, after approval by *INCAJU*, private sector partners that are interested in the production of seedlings and advise them on the start-up of the activity
- Support efforts to improve smallholders' access to formal credit
- Help improve smallholders' access to inputs.

1.0 Introduction

1.1 Background information on the project

The **purpose** of the *African Cashew initiative (ACi)*, which is funded by the *Bill & Melinda Gates Foundation*, is to strengthen the global competitiveness of cashew production and processing in five pilot countries (Mozambique, Ghana, Burkina Faso, Cote d'Ivoire and Benin).

The support activities will assist 150,000 small-scale cashew producers to increase their productivity and gain an additional US$15 million in income per year. Furthermore, the project's support activities will develop 5,500 new jobs in local, medium and large-scale cashew nut processing industries.

The *African Cashew initiative (ACi)* contributes to alleviating rural poverty and promoting pro-poor growth in the pilot countries by increasing the income of poor small-scale farmers and creating new employment opportunities, especially for women. The promotion of local medium and large-scale agro-processing industries supports the diversification of the national economy and increases economic value-adding among the pilot African countries – the long-term vision aims for 60% of local cashew nut production to be processed by the pilot countries.

The project pursues five objectives in order to achieve its overall goal:

- Increase quality and quantity of cashew nut production, thus ensuring the competitiveness of African cashew production on global markets
- Strengthen local medium and large-scale cashew processing industries
- Improve market linkages along the value chain and promote African cashews
- Support an enabling environment for cashew production and processing
- Identify and analyse learning areas and implement innovative projects on a pilot basis.

The cashew project is implemented by *GTZ* in cooperation with three sub-grantees: *Technoserve*, a US non-governmental organisation; *FairMatchSupport*, a not-for-profit foundation based in the Netherlands; and the *African Cashew Alliance (ACA)*, a supranational platform of private public partners involved in the cashew value chain.

1.2 Objective and focus of the study

The objective of this study is to offer a country study on cashew nut production and the cashew value chain in Mozambique. Since Mozambique's processing sector for cashew nuts is relatively well developed thanks to the support it has received for many years from *Technoserve*, the study will focus on the primary production of cashew nuts, an analysis of the farming system of cashew farmers in Mozambique, review ongoing support activities and thus provide a comprehensive insight into the national cashew sector.

The two major purposes of the country study are to:

- Analyse Mozambique's cashew value chain (with a major focus on the production and processing of cashew nuts)
- Based on the results of the value chain analysis, review ongoing support activities and propose further steps to be taken.

This study concentrates on the analysis of cashew production in Mozambique with a focus on the Nampula province, which accounts for about 40% of the national production and almost 50% of the volume of raw cashew nut sales.

Because of this the province is considered representative of the remaining areas of production in Mozambique and the results of the analysis and the strategy for reinforcing the sector developed on this basis are seen as applicable to the whole country.

The strengths and weaknesses of production are identified in the analysis and the potentials for the enhancement of production are explored. Threats that might hamper or impede the development are discussed. Together this covers the four elements of a *SWOT analysis* *(see chapter 3)*.

In the second step, and based on the analysis, a strategy to improve the quantity and quality of production of *raw cashew nuts* is proposed and the steps necessary for its implementation are developed.

This analysis was made somewhat difficult since no reliable data exists on the cashew sector, and on primary production in particular. *INCAJU*, the public entity regulating and supporting the sector, only collects data at the trading points, and hence does not furnish production data. Data referring to the producer's level (yield, cost and revenue data) are only available from the *TIA (Trabalho do Inquerito Agrícola – the annual agricultural sample survey)*.

2.0 Analysis of the Mozambican Cashew Sector with a Focus on Nampula Province

2.1 General Aspects of the Cashew Sector

2.1.1 Global aspects

Global production of *raw cashew nuts* (*RCN* – which refers to nuts in their shell) has in the past 25 years expanded from around 0.5 million tons to 3.25 million tons (2007). The share of Mozambique - once a world leader in cashew production and exports with shares of nearly 40% and 35% - has receded during this time to a mere 2% of global production as shown *in the figures 2.1*.

Reasons for Mozambique's declining share include the internal conflict during the 1980s, export policy changes, a failed liberalisation attempt in the processing sector, the general difficulties of intensifying production systems based on country-wide smallholder ownership of trees and the difficult control of various pests and diseases , as well as the rapidly expanding production in a number of competing countries. Vietnam, the region of West Africa and India produced 30%, 29% and 19% of global production in 2007, respectively, according to *FAO statistics*. Attempts are now being made in Mozambique to revive the sector and recover a larger share of the expanding market to benefit local producers.

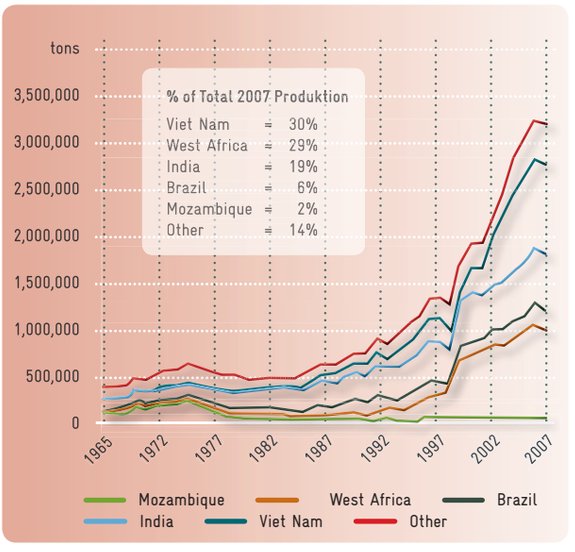
2.1.2 Development of cashew production in Mozambique

Cashew production in Mozambique was introduced and maintained by the Portuguese during colonial times and declined after independence. The agricultural statistics of 2005 indicate 32 million cashew trees.

Figure 2.2 below shows the development of cashew production during the last decade; in addition to the registered sold volume (solid bars) the diagrams also shows the total *estimated production volume (EPV)* assuming 10% *(orange line)* and 30% *(green line)* domestic consumption and therefore unregistered production.

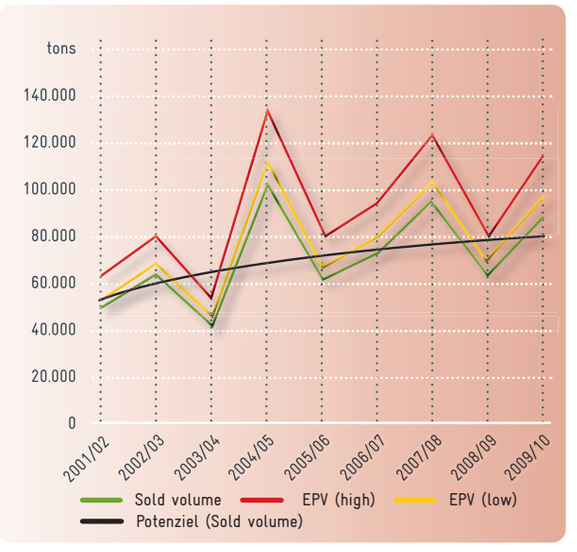
As the *black trend line* indicates, the sold produce has increased from around 50,000 tons per year (2000/01) to about 80,000 to/year, with 81,000 to/year as the average during the last four seasons, albeit without much consistency or dynamism. The big fluctuation in production from year to year has been caused by changes in weather conditions. Production is hit especially hard in times of insufficient rainfall, because all cashew trees in Mozambique are cultivated without irrigation. The slight increase in production is probably a result of the promotion of pest control through a spraying programme subsidised by the *National Cashew Institute*, *INCAJU*, and the increasing demand from the expanding national processing industry which has offset the decreasing yields of overage trees. Planting rates are insufficient to maintain the present age structure of the country's cashew trees. The reasons for this include the low return from cashews in comparison to that of annual crops like groundnuts, maize or cassava wherever these can be grown successfully. Thus cashew is mostly grown on marginal land.

Figure 2.1: Global production of raw cashew nuts



Source: Technoserve, based on FAO statistics

Figure 2.2: Sold volume and estimated production volumes (EPV) of cashew over time



Source: INCAJU (see Table 1 in Annex 2)

2.1.3 Regional distribution of production and sales

No truly reliable data exists on the volume of production and the processed and/or exported volumes of cashew nuts in Mozambique. This is due to several factors:

- The figures of marketed cashew nuts in the districts are collected by the extensionists of *INCAJU* who visit local shops and traders to collect information on the quantities they sell. However, shopkeepers and traders may worry that this information could reach the tax authority which might cause them to report figures that are lower than the volumes they actually traded. Hence there is a tendency to underestimate the quantity.
- A portion of the cashew nuts are processed and consumed by the farming families and/or are sold to the public along roadsides. This part of production does not either appear in any statistical data. Key sources estimate that between 10% and 30% of production goes to the informal sector, with differences from region to region and between farms of different size.

The ambiguity of these figures hinders the exact estimation of yields, as only marketed volumes are recorded. The exported quantities also seem to be underestimated. Since taxes are paid for the export of unprocessed nuts, it is suspected that part of the exports are not declared. Hence, actual production may exceed the official figures.

42% of Mozambican farmers own cashew trees, albeit in small numbers, with the statistical average being about 20 trees per farmer. The exact number of trees (estimated to number 32 million countrywide) and the number of trees in production (estimated at around 19 million trees) are unknown.

Assuming about 32 million trees and a production of 80,000 tons the average yield per tree is about 2.5 kg. If we say that production is underestimated by 20% then the average yield is between 2 and 4 kg per tree. Considering what has been said, the average yield is estimated at 3 kg/tree. This is low compared to the potential yield of 8 to 10 kg/tree that can realistically be achieved in a country with proper tree management – spraying included. Accepting the figure of about 19 million *productive trees*, the present average yield of these trees is 4.2 kg/tree, based on the volume marketed through the channels monitored by *INCAJU*, and 5 kg/tree when including home consumption, nuts processed on-farm or sold along the roadside. *These figures are presented in the following table:*

Table 2.1: National cashew average yield estimates, actual and potential yields per tree

Type	Unit	Value
Average total cashew nut production	to/year	80,000
A) Average yield based on total tree population of 32 million	kg/tree	3.0
B) Average yield of 'productive tree' population of 19 million ► based on registered marketed volume ► including estimated home consumption and unregistered sales	kg/tree	4.2 5.0
C) Potential yield applying available production techniques	kg/tree	8 to 10

INCAJU has been improving production, most notably by trying to overcome the low level of replanting that prevents the adequate rejuvenation of the cashew tree population. However, in 2005 only 5% of tree owners reported replanting cashew trees during the previous 12 months. Since 2004, increasing numbers of grafted tree seedlings have been produced (1.34 million in 2008) for distribution with the support of donors and NGOs.

Additionally, *INCAJU* is supplying, at no cost, the chemicals for spraying trees to protect them against powdery mildew. This measure benefited 4.3 million trees in 2008 – approximately 25% of productive trees.

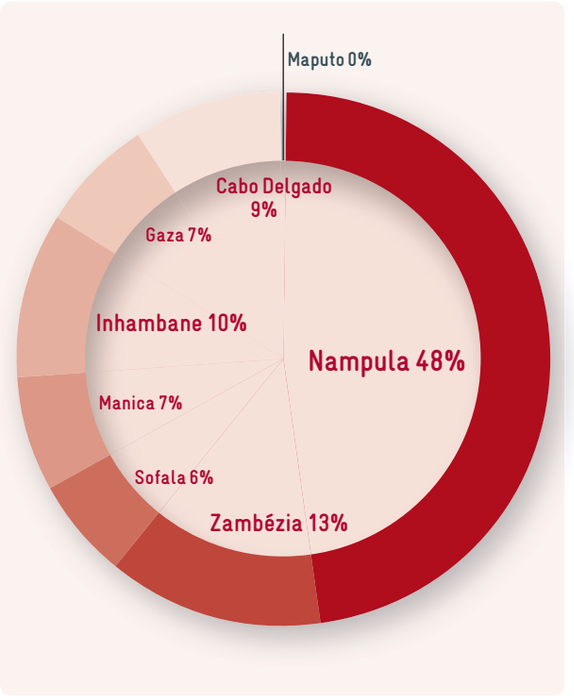
2.1.4 Selection of a province for the study

According to *INCAJU*, 40% of the production of raw nuts is concentrated in the Nampula province, with Inhambane, Cabo Delgado, Gaza and Zambezia provinces following with between 21% and 10% of the total volume. 48% of the national sales volume of cashew nuts comes from Nampula province. This shows that a larger portion is marketed here than in other provinces. This might be due to the proximity to the port of Nacala, the most important point of export of RCN and processed cashew nuts, while other provinces are further from consumer markets. In the southern provinces, informal markets may also play a significant role. The farmers and/or small traders of Gaza province, for example, sell a significant of their cashew nuts directly to Maputo.

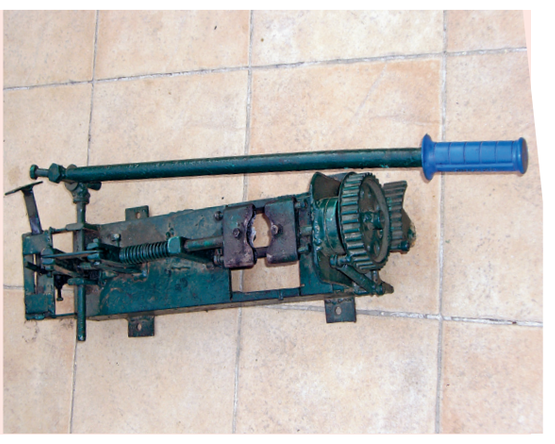
Because of its importance to cashew production in Mozambique, Nampula province was selected as the pilot province to implement the project. For this reason the study team concentrated its investigation there.

The national figures on the sale of cashew nuts reflect the regional distribution of production and the concentration of marketing channels in Nampula province, where most of the recently revived national processing facilities are also located. *Figure 2.3 on the right* illustrates this situation:

Figure 2.3: Sales of raw cashew nuts 2007



Source: INCAJU 2009



2.2 Analysis of Cashew Production in Nampula Province

2.2.1 Cashew production in Nampula province (statistical data)

No statistical data for the province of Nampula for the entire decade could be obtained during the research of the study. The values for the years 2003/04 till 2007/08 are shown in *figure 2.4.*

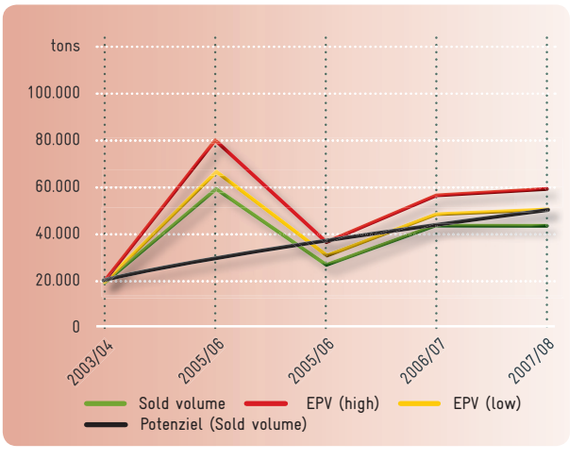
A comparison shows that the development of sales and the estimated production volume in Nampula run parallel to the national figures. The average volume of sold production during the period *represented in the figure 2.4* is 44,600 tons of raw nuts.

Based on this figure and the number of trees in the province, which is estimated to be 10 million, the average production per tree is calculated at between 4.5 kg to 5.4 kg/tree if it is assumed that 20% of the nuts may do pass through the official marketing cannels. These figures are well above the national standard.

Although these figures are estimates and unreliable, it can be assumed that the farmers in Nampula province take better care of their cashew trees because they depend more on the income from selling cashew nuts, their only cash crop.

Figures from *INCAJU* on the spraying rates support this hypothesis: In 2007 and 2008 18% and 20% respectively of the cashew trees in Nampula province were sprayed as opposed to only 10.5% in 2007 and 13.4% in 2008 at the national level. In 2009 25% of the cashew trees in Nampula province were sprayed – a 5% increase in comparison to 2008. The total number of trees which were sprayed in 2009 in Mozambique is not known.

Figure 2.4: Sold volumes and estimated production volumes (EPV) – Nampula province



Source: INCAJU and Fichas do Supervisor Provincial

2.2.2 General aspects of cashew production and marketing

2.2.2.1 Farming systems including cashew

Today 42% of Mozambican farmers own cashew trees, albeit in small numbers and with between 10 to 20 trees per farmer on average. In some districts of Nampula the share of farmers who own cashew trees is even higher and reaches 60% to 80%. Most of these farmers inherited the trees after independence as individuals or as community groups.

Cashew trees are not often among the crops cultivated within the farming system. Most of smallholders are semi-subsistence farmers who grow maize, cassava, beans, ground nuts or other crops for home consumption. Cashew trees are most often scattered throughout the farmland but are not actually cultivated, even when they are the only product on the family's land that brings in cash.

Cashew is also an important supplementary crop in subsistence production, especially in drought years, when food is scarce among the poorer farmers. The cashew harvest in Nampula starts in October after the dry season – for the smallholder families a critical season regarding food security. Therefore food scarce families harvest the cashew nuts as early as possible and sell them directly in order to use the income to buy staple foods.

One advantage of cashews is that during the first two to three years cashew trees planted with the recommended spacing of 12 m x 12 m can be intercropped with staple food crops or with other cash crops like groundnuts or sesame. In the third or fourth year the trees produce the first fruits, providing the farmers with a cash income.

Because of this possible intercropping farmers do not suffer from a severe reduction in production. This even makes it possible for smallholders to establish new cashew plantations while also producing enough food for the family's needs. However, later the canopy of the cashew plantation closes and intercropping is no longer feasible. Productive cashew plantations are therefore always pure stands comprising of cashew trees only.

There are three production types of cashew in Mozambique:

- A significant part of the cashew trees are abandoned, growing on communal land (bush land) and do not belong to an individual farmer. The fruits of these trees are picked occasionally by the local population. The production and yield of these trees are not known.
- Cashew trees are also owned by smallholders with about 10 to 20 trees on average, ranging from 5 to 10 trees/ smallholder up to a hundred trees for medium-scale farmers. These trees do not grow as part of a regularly spaced population, but are scattered all over the farmland or,

more frequently, near houses. Many smallholders do not consider cashews as a crop, but just harvest the fruits regularly without taking measures to increase the yield and/or to improve the quality of the nuts. Due to poor replanting, such trees are frequently too old, many older than 30 years, and as such produce less and lower quality nuts (the nuts of old trees and old varieties are generally smaller than those of young trees). In addition to this the yield and the quality of the nuts are further reduced because the recommended agro-technical measures are not carried out. In these circumstances the yield is estimated to be about 3 kg or less of raw nuts per tree only.

- Finally there are trees that belong to farmers who take care of them, spraying, weeding and pruning them regularly. Most of these trees are scattered throughout the farmland and are of all ages since these farmers replant them, especially after years of high product prices. A portion of these younger trees are in plantations with regular spacing. The yield of such trees between 8 to 25 years old can be estimated at 8 to 10 kg/tree. Some medium-sized farms have hundreds of cashew trees.

2.2.2.2 Environmental aspects of cashew production

Cashew trees are generally deemed suitable for marginal land that cannot be used for annual crops or more demanding trees. Due to its physiological characteristics the plant can survive dry spells much better than other crops (e.g. citrus). In fact, the shading of the soil by the tree permits grasses to thrive where they would otherwise have been scorched by the sun.

Another environmental aspect concerns the possible impact of climate change. It is expected that storms and cyclones will occur more often and will be stronger than in the past. An example is cyclone *Jókwe* which destroyed between one third to half of all cashew trees in Mongicual district in 2008, and where fallen trees can still be seen today. As a countermeasure, the project will promote the substitution of tall-growing trees, recommend producing only seedlings with a short trunk (half-trunk). It will also recommend planting cashew as a plantation. This helps minimise the damage from cyclones as half-trunk cashew trees are less prone to being uprooted by strong winds, especially when grown as part of a plantation. An added advantage is the fact that it is easier to carry out agro-technical measures such as pruning or spraying in plantations of smaller trees.

It is unknown whether and how climate change will influence the annual quantity and distribution of rainfall. But since cashew is more resistant to drought than most other crops, lower annual rainfall will improve the competitiveness of cashew.

In summary, cashew is a tree crop highly adapted to the ecosystem (climate, soil and weather conditions) in the northern coastal areas of Mozambique.

2.2.3 The cashew value chain

According to a recent study by *Technoserve*, only 18% of the value added within the chain from the Mozambican producer to the consumer outside the country takes place in Mozambique. This is due to the ongoing low levels of RCN processing in Mozambique and the fact that roasting and packaging for final consumption (42% of the value added) is literally non-existent in the country.

Following its independence, the processing of nuts in the country declined and practically ceased in 2002. During this year, the entire marketed production volume of about 50,000 tons was exported as raw nuts. However, since then the processing industry in Nampula province has been revived with the support of foreign assistance. A number of processing factories started operating (again) in 2001 and in 2008 36% of the marketed production volume was processed in Mozambique.

After a dispute about minimum wages in the cashew sector was eventually resolved in favour of the processing industry's interests, and due to the increased margins for the processors which followed, the number of operating processing factories was forecast to increase to 25 in 2008/09. In the same season the processing volume of cashew nuts within the country was forecast to reach 35,500 tons.

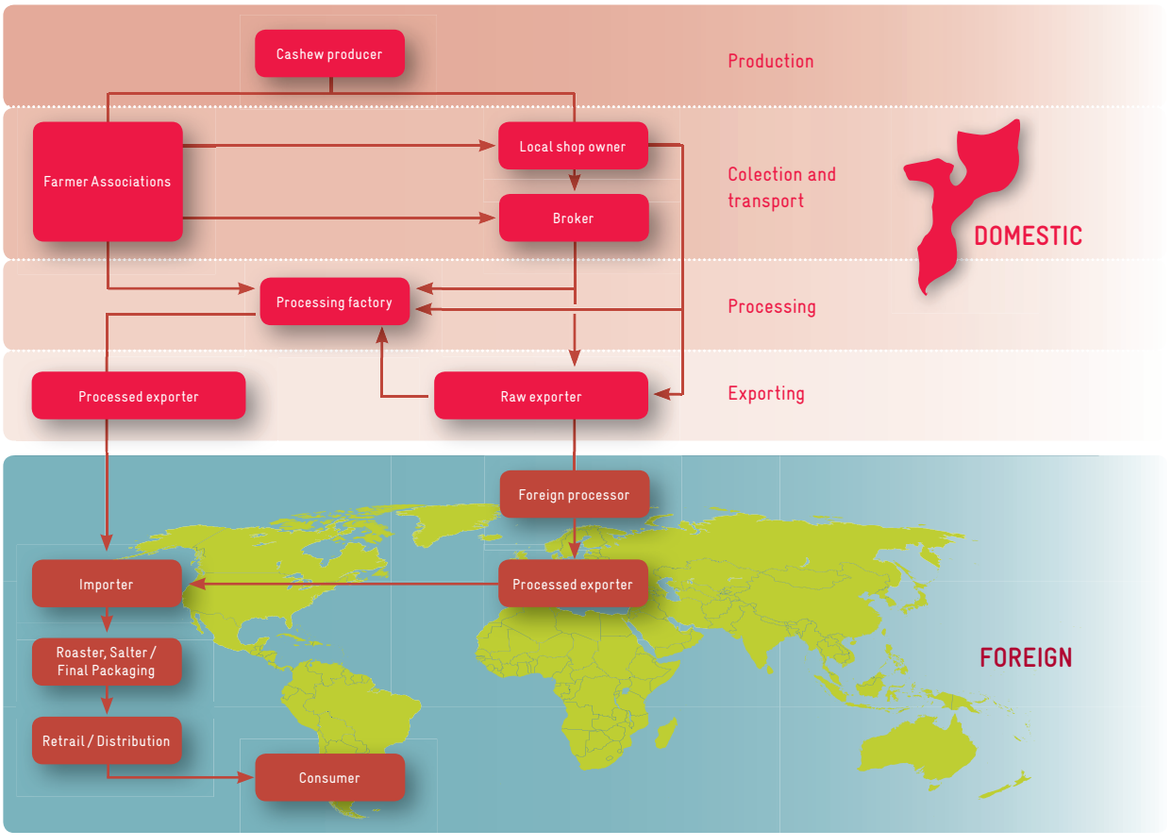
A number of stakeholders are involved in producing, marketing, processing and exporting cashew nuts. Up to seven parties can be involved in channelling the product from the grower to the consumer outside Mozambique. *Figure 2.6 on the following page* illustrates the complex marketing chain of cashew nuts

The upstream actors are not included in this chapter as *INCAJU* is the only actor supplying tree seedlings in significant numbers as well as chemicals (free of cost) for spraying the trees. *INCAJU* is also subsidising the acquisition of sprayers. Therefore, other potential input suppliers (traders) play an insignificant role and can be neglected in the present context.

A number of **national and international NGOs and donors** were and still are active in the sector at the farmers' level, organising technical assistance to smallholders, promoting producers' organisations and trying to improve market linkages and income from cashew production. In Nampula, prominent NGOs in the sector are, for example, the *Cooperative League of the United States of America (CLUSA)* as well as *Ajuda de Desenvolvimento de Povo para Povo (ADPP)*. Donors currently working with the farmers in Nampula include the *Netherlands Development Organization (SNV)* and the *Agrifuturo Project* funded by *USAID*.

Others organisations have been involved in recent years. A project funded by the *French Development Agency (AFD)*, for example, worked with 43 farmer groups in Nampula between 2000 and 2006.

Figure 2.5: The cashew marketing system

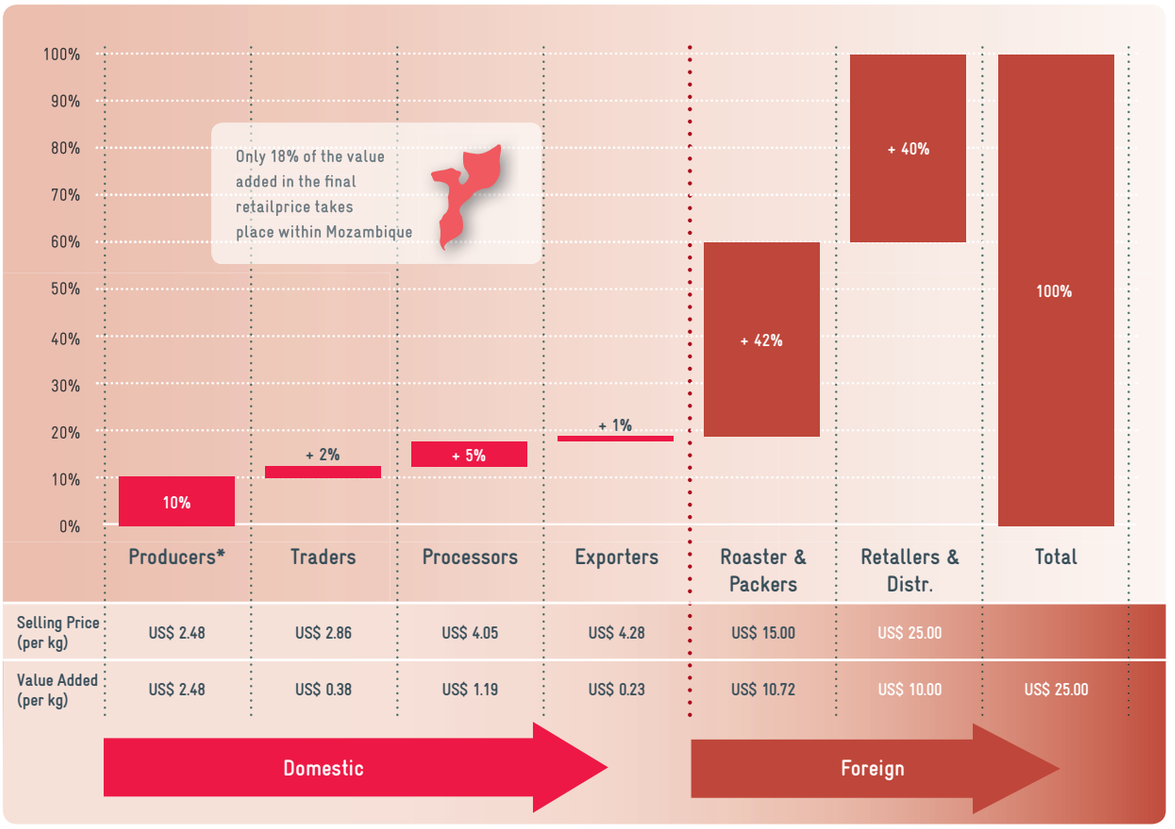


Source: Technoserve, ibid.

Raw cashew nuts (RCN) enter the local market where **traders and buyers** are involved. Depending on the size of the farm or production of cashew nuts, the location (near/far from factories and/or roads) and the degree of organisation, farmers sell to small local traders, bigger trading companies or directly to the factories. In most cases, several buyers are located between the producer and the cashew factory or the exporter *(see Figure 2.5)*. This structure often reduces the profit for the producers and also the smaller buyers to a minimum. It should also to be noted that no difference is generally made between good and poor quality *raw cashew nuts*. Some factories started to pay a premium for better quality raw material after an initial selection at the farm level, but no comprehensive quality system is in place. Prices vary according to the season rather than to the quality of the product.

If the *RCN* are not directly exported for further processing to – mostly – India, the Mozambican **processing factories** constitute the next step in the cashew value chain. After the breakdown of the industry, many smaller factories opened in the north (Nampula and Cabo Delgado provinces) and the south (Gaza and Inhambane provinces). Their number varies from season to season. Every year some smaller ones stop processing (mostly due to lack of financing for raw materials) and others

Figure 2.6: Value added at each link of the value chain



Source: Technoserve, ibid

(re)open. Approximately 25 can be counted in the whole country, half of which are situated in Nampula. The processing industry has been – and is partly still – heavily supported by **external donors/NGOs**. This most significant of these is the American NGO *Technoserve* which has greatly assisted factories during over years.

Processed cashew kernels are then exported through various channels. In the south of the country, exports mainly go to South Africa via road. The few processing factories in Gaza and Inhambane loosely cooperate, for example through shared use of trucks. In the north of Mozambique, the majority of processors are organised in the *association Agro Industriais Associados (AIA)*. Through its office and warehouse in Nacala, *AIA* jointly exports the processed cashew kernels of its members through container ships. The produce of a few of the smaller factories without official *AIA* membership are also marketed this way. Only one of the larger factories in Nampula – *OLAM International* – does not exporting through *AIA*. The international corporate group uses its own marketing channels and apparently sees no comparative advantage in joining *AIA*.

Since *AIA* was founded it has sold its export to one sole client, the Dutch broker *Global Trading & Agency BV. Global Trading* imports the processed kernels to Europe. After further roasting and packaging into small sachets the cashews are sold on the European market. Most of the value added is done within these last steps *(see Figure 2.6)*. As is shown, less than 20% of the consumer price (final product value) is generated inside Mozambique (production, trading, processing and exporting), while roasters and retailers share the bulk of the value added. Producers captured only 10% of the final product value.

The numbers in *Figure 2.6 above* relate to the situation in 2007/8. Even if absolute prices have changed, the relative figures have not altered significantly.

Further actors involved in the cashew sector in Mozambique include the Government body *Instituto Nacional do Cajú (INCAJU)*, the *national association Associação dos Industriais de Caju (AICAJU)* as well as the *African Cashew Alliance (ACA)*.

INCAJU is an independent Government institute responsible for the promotion of the cashew sector. The institute has decentralised structures in the cashew regions of Mozambique and provides extension services to farmers at the district level. On the regional and national level, *INCAJU* is responsible for setting policy. It is financed by the export tax on *RCN*, although introducing *INCAJU* in the budget of the Ministry of Agriculture is currently being discussed.

More marginal actors – so far – are *AICAJU* and *ACA*. **AICAJU** is an association of industrial players in the cashew sector. It is supposed to represent the interests of those actors to the Government *(INCAJU)*. However, *AICAJU* does not seem very active in lobbying and its organisational structures are still weak. **ACA** constitutes a federation of many actors along the cashew value chain in Africa. Membership is cross-national, and its aim is to support effective marketing of African cashew on the world markets. In Mozambique, *ACA* is not yet well-established; a national office has yet to be built up. The future vision of *ACA* is to support market linkages in trading processed kernels and representing African processors and producers on the world market.

Table 2.2 lists the stakeholders on the Mozambican side and their main functions:

2.2.4 SWOT analysis of the cashew sector

In order to get primary data on production, to analyse the factors underlying the actual production figures and to determine strengths and weaknesses, the mission inspected trees and conducted group interviews with producers in various districts of the province, interviewed key public and private sector stakeholders, and collected and analysed additional statistical and other information. Some vagaries continue to exist in the data collected:

- **The exact age of the trees is often unknown.** Many producers could only guess the age of their trees, especially if they were planted by the previous generation. Such trees are usually over 30 years old.
- **The intensity of care of the trees varies considerably between owners and over time. In intensive treatment, trees will be pruned regularly (at least every 3 to 5 years), and each year unwanted new shoots on major branches will be removed (called *limpeza* by some).**
- **The term *limpeza* is also used when referring to the weeding of the immediate area below the tree, creating confusion of the true meaning of the respondent's answer.**
- **The level of home consumption and of production of nuts not sold through channels that are monitored by INCAJU can only be estimated and needs to be kept in mind when estimating the total yield of cashew trees.**

Table 2.2: Mozambican stakeholders in the cashew sector and their functions

Stakeholder	Function
~ 1 million smallholders	Production of raw nuts
Private service providers (most often themselves producers of cashew)	Provision of contracting services (spraying cashew trees)
Local and regional cashew traders	Collection of raw nuts and sale to processors or raw nut brokers/exporters
Local processors (around 25)	Processing of raw nuts; sale to export brokers; local sales
Brokers	Brokerage of transactions between local and foreign stakeholders
AIA (Association of processors for joint marketing of processed nuts)	Servicing company focusing on exporting and marketing of processed kernels
Donors and NGOs, e.g. CLUSA, ADPP, SNV, USAID, AFD	Promotion of producers' associations; technical assistance to producers and processors; introducing value-added activities
AICAJU (Industry association)	Promotion of industry interests, consistent policies and practices among its members
INCAJU (Governmental Cashew Institute)	Policy setting; extension services providing seedlings and pesticides; provision of loan guarantees to processors; export tax collection
ACA (African Cashew Alliance)	Marketing support to African cashew producers and processors on the world market

2.2.4.1 Results of the analysis

Apart from the general weakness that many smallholders actually **collect** cashew nuts and do not really **cultivate** them, the results of the analysis can be summarised according to the four criteria of *SWOT analysis* as presented in the following sub-chapters.

Strengths

Several conditions regarding the cashew sector in Nampula province constitute strengths, at least in comparison to other regions of the country:

There is a long tradition of producing cashew nuts in the region. The cashew tree was introduced by the Portuguese already in the 16th century . During the 1960s Mozambique already exported a significant amount of cashew nuts to India, whereas during the 1970s Mozambique was the leading producer of cashew in the world with a share of between 30% and 40% of global production. As a consequence of this the country has a good knowledge of cashew growing, producing and processing.

The capacity to process part of the production volume is increasing. Privately owned factories in Mozambique are capable of producing about 30,000 tons to 40,000 tons of *raw cashew nuts*. The processing industry is concentrated in Nampula province which has a share of about 65% in the national capacity. This is due to the fact that the main export point for *RCN* and processed cashew kernels is the port of Nacala in the province of Nampula which keeps export costs relatively low. For years the cashew processing industry has been supported by *USAID* through the NGO *Technoserve*.

Due to the soil and climatic conditions and the general distance of consumer markets (in the country) there are few crops that can compete with cashew. Cashew is grown mainly in the provinces and districts along the coast. The cashew tree is relatively resistant to drought and has no high requirements regarding soil fertility. For this reason cashew trees grow on the marginal, dry sandy soils at the coast, where other food crops do not grow. In addition to this, Nampula province is situated far from Maputo and other big cities which have a high demand for crops. For this reason fresh crops cannot be marketed easily and then only with high transport costs, whereas cashew nuts are exported via the port of Nacala. This makes cashews more competitive.

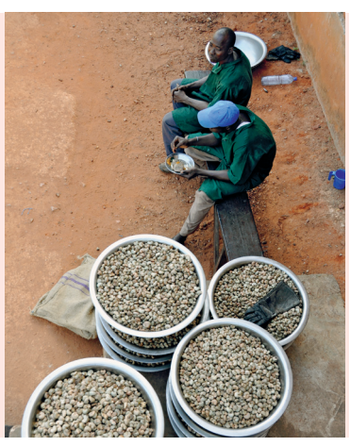
Cashew nuts are often smallholders only cash crop. The vast majority of smallholders in Nampula province are subsistence farmers. Their only cash crop is the cashew tree. For this reason the cashew tree plays a big role in the livelihood of small farmers. The cashew harvest starts at the end of the dry season, which is the most crucial season for poor farmers' survival. They use this chance to harvest the cashew nuts, sell them immediately and buy food with the revenue. Cashew nuts are therefore also important in terms of food security.

Production in the region benefits from its proximity to the port city of Nacala, the export harbour situated in Nampula province. For this reason transport costs and, as a consequence, export costs, are relatively low, which makes cashew production in Nampula more competitive than in other provinces, even the south of the country, which offers better natural conditions for growing cashew. By the same token, it is assumed that this is why the processing industry is concentrated in Nampula province.

Weaknesses

While the list of strengths is generic rather than specific, the list of weaknesses (or constraints) observed is exhaustive. The factors restricting production have been grouped into five areas. Also, when identifying problems, the mission tried to identify underlying root causes. The distinction of cause-effect relationships forms a basic step of the assessment mission and allows the formulation of solutions to the most significant constraints. The following weaknesses/constraints have been identified:

Low productivity of smallholder cashew production. The average yield in Mozambique is between 2 to 4 kg *RCN* per cashew tree. This is very low taking into consideration that young cashew trees between 10 and 25 years old have the potential to produce between 10 and 15 kg per tree, some well managed trees can even produce up to 60 kg per year.



Low production potential of existing trees.

- Many old and/or abandoned trees (strong decline of yield after year 25). The cashew tree starts to produce in its third year, reaches its peak between the 10th and 25th year, and after the 25th year there is a decline from year to year *(see Figure 4.1 in chapter 4)*. It is estimated that 25% to 30% of the cashew trees in Mozambique are older than 25 and up to 40 years old. These trees produce very little or do not produce at all. From an economic perspective these trees should be replaced by new trees with a higher production potential.
- In addition to low production, the old trees produce relatively small nuts, considered to be of low quality. As described above, many Mozambican smallholders inherited cashew trees from colonial times and do not really take care of them. Therefore many trees are abandoned and grow in the bush areas on communal land.
- Low genetic production potential of old tree varieties. Older tree varieties do not often have a high production potential since they were planted before selection or cloning was introduced.

Insufficient crop and pest management (low usage rate of ICPM). Most smallholders do not consider their cashew trees as a crop to be cultivated, but instead just harvest or collect nuts to sell. For this reason no specific cultivation techniques are applied, which results in low yields. Only about 2.5% of the trees are pruned regularly and 20% to 25% of the trees are sprayed. Only about 25% of farmers weed. Also, no reliable information exists about the economic effect of these operations. It was reported that neither *INCAJU*, which recommends spraying cashew trees, nor any other research institutions have carried out field trials to discover the effect of single cultivation techniques or of *Integrated Crop and Pest Management (ICPM)*. However, the yield of trees that are not yet overage (trees younger than 30 years) will increase from about 3 kg/tree to 8-10 kg/tree if *ICPM* is applied, according to the estimates of *INCAJU's* technicians and farmers who applied these techniques. This means that if the majority of the farmers applied *ICPM*, the yield and therefore the production would easily more than double.

Damage to trees by fires. Throughout the country, and in Nampula province, farmers burn grass and bushes at the end of the dry season in order to clear the land for the next crop. These fires frequently get out of control and destroy cashew trees. In cases where no weeding was done, such fires burn the cashew trunks and the grass burning under the trees destroys their leaves. It is estimated that 30% to 50% of the trees are damaged in this way every year. Although most of them recover after one or two years the loss in production and consequent drop in income in just one year is tremendous. *INCAJU* has tried for many years to stop this practise, but with little success, suggesting it will continue.

Insufficient replanting rates. As discussed above, there are about 10 million cashew trees in Nampula province. If it is assumed that the trees reach 30 years, 1/30 of the trees should be replanted every year in order to maintain the age structure, about 333,000 trees. Assuming an improved survival rate of 75% of the seedlings after planting, then about 410,000 cashew trees seedlings have to be planted every year in order to maintain the age structure of the tree population.

The capacity of the *INCAJU* nurseries in Nampula province is currently about 700,000 seedlings annually, however, only about 230,000 seedlings are produced annually. Furthermore, the actual survival rate is estimated at only about 50%, which means that only 115,000 of the cashew trees planted every year survive.

The conclusion from these figures is that the present planting rate is insufficient to even maintain the given age structure, which is deteriorating as the average age of the cashew trees increases. There is therefore a danger that the average yield and the total production will decrease further unless the effects from the aging trees are not compensated by other measures, such as an increase in spraying and/or pruning.

In order to significantly improve the age structure of the tree population more old trees must be substituted every year. It is assumed that one third of the existing cashew trees, about three million, are older than 30 years. If these trees are to be replaced

during the next 10 years then an additional 300,000 trees have to be planted every year. Assuming a survival rate of 80%, then another 400,000 seedlings have to be planted in Nampula province annually.

These calculations show the need of a programme that ensures the production, distribution and successful planting of about 800,000 seedlings annually during the next 10 years.

Lack of interest in planting cashew trees. There are different reasons for the low replanting rate. As discussed above, one important reason is the lack of interest in replanting among those smallholder farmers that do not see cashews as a commercial crop. In addition to this is that most small farmers do not have the financial means to buy seedlings and/or the family labour is insufficient to clear fields, dig holes, plant seedlings and take care of them properly. The absence of assistance by the extension service is another reason behind the lack of interest in planting trees, especially in remote areas.

Restricted availability of good quality tree seedlings at the village level.

- Insufficient investment in tree nurseries
- Inefficient management of nurseries
- Weaknesses of the distribution system
- No involvement (and investment) of the private sector due to market distortion (free tree seedlings distributed by *INCAJU*)

The production of cashew seedlings is done exclusively by *INCAJU*, which distributes the seedlings to villages. *INCAJU* also owns the mother gardens from which the clones are taken to graft onto seedlings. The mother trees are selected from modern varieties with a reduced trunk height and with a high yield potential. This has a double positive impact:

(1) the pruning and spraying can be done much easier and more efficiently and (2) these trees are less vulnerable to storms (cyclones), which according to forecasts will occur more often in the future due to climate change. In addition to this, these varieties have a higher yield than the existing trees.

Seedling production by *INCAJU* suffers from problems that are typical for nurseries run by state enterprises. Management of the nurseries is generally poor. In one case half of the grafted seedlings did not survive because the grafting was not done properly. It is clearly the responsibility of the management to see to it that labourers are trained and monitored appropriately so that the quality of work is satisfactory.

Nurseries in Mozambique have to ensure that adequate means of transport are available for distribution, as farmers cannot fetch the seedlings from the nurseries themselves. However, *INCAJU* does not have sufficient transport capacities to distribute seedlings. A significant portion of them are therefore not distributed or are not distributed in time or at the right time. Clearly this makes no sense.

The same applies to irrigation. In many cases the lack of an adequate irrigation system or disrepair were behind nurseries whose capacities were only 50% or less.

INCAJU gives up to 50 seedlings to smallholders free of charge. Even if a farmer buys more seedlings he only has to pay a nominal amount which comes nowhere near to covering the costs. This means that the production of seedlings is highly subsidised, which is the most important reason why the private sector is and will not be interested in producing cashew seedlings.

In summary, the analysis shows that there are considerable inefficiencies in *INCAJU's* production of cashew seedlings. In the long run the production of seedlings should thus be transferred to private sector enterprises working under competitive conditions. This stimulates efficiency and a market-oriented production and distribution.

When seedlings are produced by the private sector, the farmers have to pay for them. According to information received from *INCAJU*, seedlings cost about 15 MTs to 20 MTs to produce. With 70 seedlings/ha the costs for the seedlings amount to about 1,400 MTs (48 US$), which is between 10% and 15% of the total costs of establishing a cashew planta-

tion. For this reason it is not expected that these costs will significantly influence the willingness of farmers to plant cashew trees.

Low rate of survival of planted tree seedlings. As discussed above, the survival rate of trees is estimated to be only about 50% at present. This is due to reasons such as an inefficient distribution system which results in too much time between the seedlings leaving the nursery and being planted, a time during which they are not watered.

Another consequence of the lack of transport is the delay in delivering the seedlings to villages, which means that farmers cannot plant the seedling at the right time. Also, the planting has to be done at the beginning of the rainy season after the first heavy rainfalls, otherwise the seedlings die because of water stress. This is one reason for the low survival rate of planted cashew seedlings.

Another difficulty for smallholders is that the seedlings are usually delivered to the village, which is often several kilometres from the field. The burden to bring the seedling to the field then lies with the smallholder who does not have any transport. In some cases the seedlings remain in the village for several days – and in most cases without water – before they are planted. This means that the seedlings are planted while under water stress, which lowers their survival rate further.

In some years the rainfall is irregular with droughts in between. If a drought persists for more than one week, the planted seedlings have to be watered, which is a heavy workload for the farmer because very often they have to carry water over a distance of several kilometres to the field and water the plants by hand. Thus watering is not done regularly which results in a large percentage of the seedlings dying.

Additionally, the majority of the small farmers do not possess the proper planting technique. One method is to put organic material into the planting hole which helps to retain water for a longer time and makes it available to the roots of the seedlings. In this way the seedling survives longer, even without rain.

Also, strong wind often breaks the grafted seedlings. This can be avoided by tying the seedling to a supporting stick.

Low quality nuts. The quality of cashew nuts produced in Mozambique is relatively low. This results in an low average price. Reasons for this are manifold:

- *Smaller nuts growing on older trees.*
  As a rule the nuts from old trees are smaller than nuts from young trees or trees of medium age. The size of the nuts is one important criterion for their quality. Since the cashew trees in Mozambique are overage, the average quality of nuts is below the international average. According to processors, the nut count is often above 200 nuts/kg, which indicates that they are not high grade (180 nuts maximum).

- *Trees affected by diseases.*
  The most prominent disease among Mozambican cashews is *powdery mildew disease (PMD)*, which leads to shrivelled nuts and low output ratios. The disease is more prominent near the coast and in trees which have a closed canopy in which moisture is contained and where the temperature is higher. Tree varieties which are resistant to this disease have been found to yield less than non-resistant varieties which have been sprayed properly to contain the disease. However, presently only 20% of trees have been sprayed.

  Apart from *PMD*, other diseases occur, but they have been of little importance until now (e.g. anthracnose, a fungal infection affecting trees in the nursery, and heliopeltis, a pest affecting young shoots on existing trees). Also, when insects damage the nuts, the kernel is often partly coloured black or have holes. Such kernels cannot be sold.

- *Inadequate harvesting and post-harvesting techniques.*
  Cashew nuts are normally harvested two to three times a week by collecting the fruits which have fallen from the trees. If hired labourers are used, they are normally paid per kg of collected nuts. In order to increase their salary some just pick those fruits that are easy and quick to pick.

After harvesting and separating the nuts from the cashew apples the nuts have to be dried in the sun for two to three days. Because the nuts loose weight with the drying process farmers try to sell them with a higher moisture content than the recommended 12% to 14%. If these nuts are stored for weeks or even months they will start to rot. Cashew nuts should also be stored in jute bags instead of plastic bags as is frequently done, since they cannot breath in plastic bags and become mouldy easily.

- *Highly inefficient marketing system.*
Smallholders sell small quantities of nuts, sometimes only a few kilograms, to local shops. But these low selling volumes lead to higher unit costs for the buyers that collect the nuts. For this reason small traders or shops are needed to collect the nuts and sell bigger quantities to middlemen. In some cases these middlemen collect even bigger quantities and sell them to wholesalers, who sell them to exporters or to the processors.

At each step money is usually paid in advance from the final buyer to those that sell to him, so that those buying from the farmers can be paid. At each step the loss of some percentage of the advanced money must be accounted for in order to maintain the profit margin, which also depresses the price paid to the ones selling, and finally that paid to the producers.

In summary, this marketing chain of several levels is inefficient and reduces the farm gate prices for small farmers. Due to poor infrastructure (such as bad roads) transportation costs are very high for traders, which reduces the farm gate prices further, especially in remote areas. In addition to these inefficiencies there is the export ban on *RCN* at the beginning of the harvest season and the export tax of 18% which reduces farm gate prices further. Market information systems that include cashew have been built up with donor support, in which data is regularly collected at the district level with information processed by *INCAJU (or MINAG's Statistics Division)* and then broadcast via radio.

However, reliable independent market information systems are costly, and therefore information collection may not include all districts or be done with the required frequency. Also, the continuation of donor-initiated activities in this area has not always been guaranteed. Efforts are dependent on understanding how the agents in the system benefit the producers, benefits which are sometimes not measurable. In several cases priorities in the districts have led to the use of funds meant for collecting market information for more immediate activities. Also, specific difficulties with donor funding have at times impeded the uninterrupted functioning of activities.

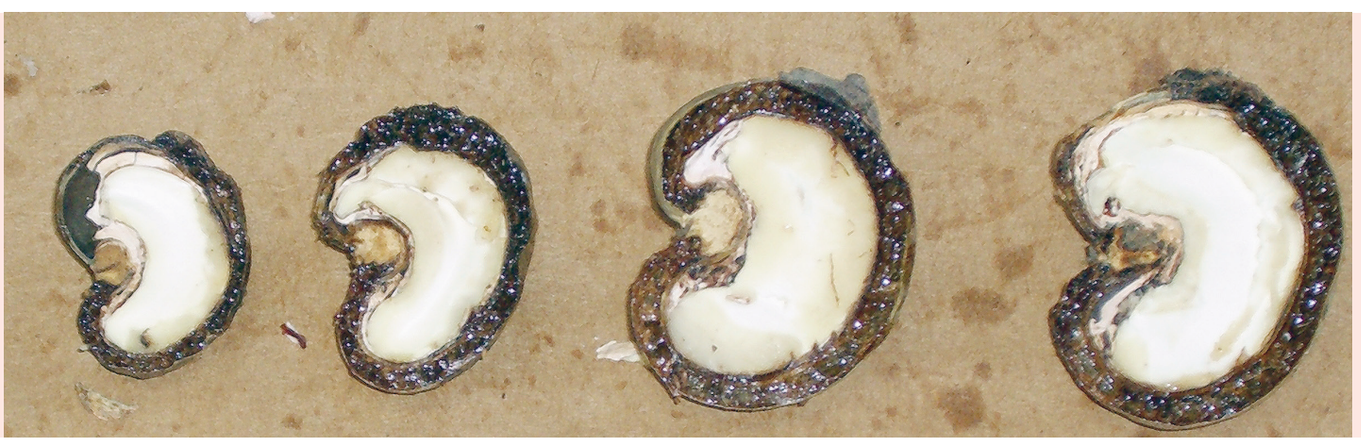
Smallholders, especially those in the more remote areas, have difficulties in getting independent and reliable market information. Traders often have better information and therefore have more market power. This too reduces the farm gate price of *RCN*.

2.2.4.2 Opportunities

The analysis also shows that there are opportunities to improve the productivity and production of cashew nuts in the province. These factors include:

An increasing demand for cashew nuts on the world market. The world market for cashew nuts has been growing six fold since the 1980s, from 0.5 million tons to over 3 million tons in 2006 and 2007. According to *Technoserve*, the compound annual rate of growth was still over 7% during the five years leading up to 2007.

Expanding processing capacity in the country. *Technoserve* and other donors have been involved in promoting cashew processing and the country now has a processing capacity of nearly 36,000 tons. There is even a willingness to expand to accommodate the increasing local production volume since obstacles that hampered the processing capacity between 2006 and 2008 have been removed.



Strong involvement of the private sector in processing. While there was just one processor in the 2001/02 season, by 2009 the number of processors had increased to 25 according to *Technoserve* data. These are private enterprises which have to compete successfully in the world market. While at present they benefit from donor support, *INCAJU* offered bank guarantees and the protection created by the early-season ban on exports of *raw cashew nuts* as well as the 18% export tax on unprocessed nuts, there is a chance that, with a strong managerial capacity, several may prove strong enough to compete successfully in the world market.

Potential to exploit market niches (ex. Fair Trade). There is a potential to seek market niches that help to attain premium prices in the world market, e.g. by producing under the Fair Trade label or in similar setups. However, in order to benefit from this, the smallholders need to create organisations that can play a role in marketing and provide extension advice so that they can meet the conditions set by market partners.

Expected increase of the producer's price. Increased prices among producers can be expected for three reasons:

- *Increasing demand for cashew nuts in the world market.* As stated in the previous chapters, the global demand has been increasing almost exponentially for over two decades. The authors have been unable to find a study that projects the past trends into the future. Such a study would have to consider the market potential based on per capita consumption in the importing countries and maybe compare the development over time with similar products (e.g. Macadamia nuts). The disrupting effects of the worldwide peak in agricultural product prices in 2008, and the subsequent decrease through economic stagnation in 2009, would need to be taken into account.

- *Increasing demand by the local processing industry.* This has been described in the previous chapters. It must be mentioned that the increasing percentage of raw cashew being processed in the country signifies a reduction of *INCAJU's* income and hence of the Government of Mozambique from the tax on exports of raw nuts.

- *Potential to streamline the marketing chain.* There is a potential to reduce transaction costs in the marketing chain, most notably by better organising the producers and the way they sell the *raw cashew nuts*. However, farmer organisations need support for such improvements.

2.2.4.3 Threats

A number of threats also exist that Mozambican producers will have to take into account. These include:

Natural disasters that may destroy trees (increasing threat of cyclones). The effect of natural disasters was clearly demonstrated in 2008, when cyclone *Jókwe* passed through Nampula province and destroyed 1.47 million cashew trees and 113,000 grafted seedlings and damaged two nurseries, seriously affecting their capacity to produce seedlings. Assuming that global warming will continue and cause more intense and extreme weather phenomena, such disasters may strike more frequently in the future. The damage can be minimised, however, by adapting the way cashew trees are grown and shaped. Trees with a more open and less dense canopy and branching out closer to the soil surface (half-trunk) are more resistant to damage than regular-size and dense canopies.

(In the long run) a potential reduction of precipitation due to climate change. Fears about climate change include the possibility that annual rainfall figures may fall. The combination of impacts, both positive (less mildew) and negative (extended periods of water stress), could damage the productivity of cashew and lead to more wildfires harming trees. However, this could be compensated by adaptations in the production technique.

Fall of the world market prices. The danger that the market for cashew nuts might become saturated soon if production in

the main producing countries - especially those in West Africa, Vietnam and India continues to expand quickly - cannot be taken lightly. However, this can only be assessed if a thorough study of global demand and supply is conducted. One might assume that in such a situation the larger and more dynamic or better organised producers would persist in the market, whereas countries with many low volume producers and an inelastic agricultural sector would become non-competitive sooner. However, since a large part of the costs in cashew production are labour costs, countries where production is based on smallholders might weather periods of reduced prices more easily than those where production is dependent upon wage labour.

National policies that are not conducive to an enhanced business climate. The chance that the Government of Mozambique may reverse its economic policy of private sector promotion, market liberalisation and adapted fiscal policies appears slim in the eyes of the mission. The strong linkage to major bi- and multilateral donors that promote economic policies that support the private sector makes it very probable that the present governmental policies – and hence private sector development as well as a conducive business climate – will be maintained.

3.0 Proposed Project Approach and Intervention Strategy

3.1 Proposed Areas of Intervention and Fields of Activities

3.1.1 Other projects in the cashew sector in Mozambique

As mentioned above, some projects have already been implemented in the cashew sector in Mozambique. An ambitious project was implemented by *Agence Francais de Developpment (AFD)* from 2001 to the end of 2006. The main objectives were to increase production and strengthen farmers' groups in three southern districts in Nampula, namely Moma, Mogovolas and Angoche. The total cost of the project was 4.9 million Euros. According to information gathered, the project was neither very successful nor sustainable. The rejuvenation component apparently registered few successes because the survival rates of seedlings were far below the expected rate. Additionally, there was no sustainable increase in the production of the three districts.

The *European Union* also financed a project through the NGO *Adventist Development and Relief Agency (ADRA)*. The project lasted about 6 years and aimed to support the cashew production in provinces in Mozambique. The project was closed two years ago. According to the desk officer it was not very successful and had a limited impact.

USAID is currently financing two projects related to the cashew sector: The biggest one is *AGRIFUTURO*, which promotes the value chain of nine crops of which one is cashew. Close cooperation exists between the *ACi* project and *AGRIFUTURO* and complementary activities in the cashew sector will be developed. *AGRIFUTURO* is implemented nationwide.

USAID also finances a fund which, through commercial bank credits of up to 15 months, supports processing companies in acquiring the raw material to produce processed nuts throughout the year. Credits are given once a business plan has been presented and if the clients have a safe market to sell the processed nuts.

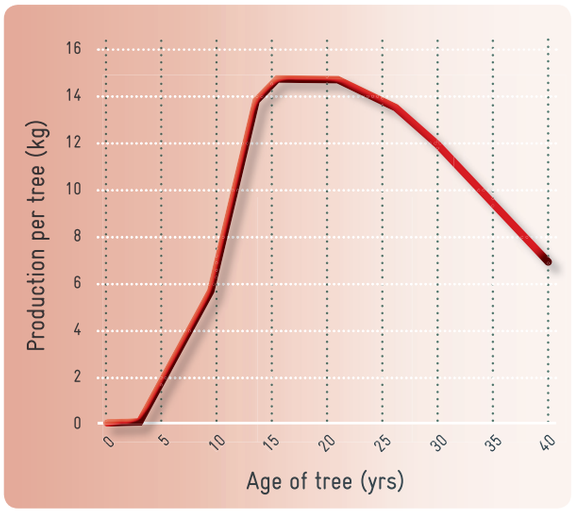
3.1.2 Production-related aspects

The analysis led to the identification of three key intervention areas where significant improvements of the producer's situation can be achieved: (a) Rejuvenation of the tree population, (b) Improvements in production technique to enhance the trees' productivity and product quality and (c) Improvements in marketing of cashew nuts.

3.1.2.1 Rejuvenation of the tree population

As a key factor influencing the production volume, the age of many trees must be considered. Many trees have clearly surpassed the age in which they can produce attractive volumes of fruit. Such trees fall into the age range (>30 years) in which production decreases to levels that warrant their replacement (*see the following figure 3.1* on the development of the yield over time in relation to traditional tree varieties). Trees of 50 years are not uncommon.

Figure 3.1: Raw cashew nut production per tree (kg)



Due to their old age these trees do not possess the yield potential of younger trees, even if they are treated according to the recommendations for best practices. Their yield will not only be below that of younger trees under best practice conditions, but it will also be below that of younger trees that only receive minimum care (*limpeza* only, but no pruning or spraying).

As has been calculated above, assuming an improved survival rate of 75% of seedlings after planting, about 410,000 cashew trees seedlings have to be planted every year in Nampula province in order to maintain the given age structure of the tree population.

Again: the capacity of *INCAJU's* nurseries in Nampula province is about 700,000 seedlings annually, resulting in only 115,000 newly planted trees being successfully established (surviving) in the field.

So, in order to replace an assumed 3 million trees that are too old to become productive in the next 10 years, 300,000 trees have to be installed every year in addition to the number needed to maintain the age structure. Presuming a survival rate of 75% to 80%, another 400,000 seedlings have to be planted in Nampula province, elevating the total number of required trees established in the field to 800,000 annually during the next 10 years.

As a consequence of this situation, key future activities are: an increased production of tree seedlings to replace old trees in Nampula province and fewer losses from the seedling production stage onwards.

Need to transfer existing nurseries to the private sector and support the establishment of additional private nurseries. This situation is typical of the management of nurseries by state organisations. Many projects have in the past tried to improve such situations without touching the question of who is responsible for nursery management and have failed to achieve long-term improvements. This is due to the lack of competition in publicly run systems which prevents efficiently operating nurseries from surviving. It is therefore imperative to develop a strategy to transfer the existing nurseries from the public to the private sector during an adequate period of time – say 3 to 5 years.

The mission therefore strongly recommends determining a strategy to achieve this change of responsibility for seedling production. The state should in future refrain from producing seedlings itself and concentrate on regulating and supervising the sector, i.e. by setting rules and standards and certifying seedling producers and seedling production.

Clearly, private nurseries cannot distribute seedlings free of charge. The first step is therefore the abolition of the distribution of seedlings free of charge to producers, even by INCAJU. On the one hand this will make cashew growers value the trees as an investment that needs to be taken care of. On the other hand the possible comparison between various seedling producers will help ensure that the more efficient seedling producers survive and ensure constant improvements over time. If necessary, the seedling producers must receive a subsidy during the transition period.

Looking at the policy to be followed at the field level, the project will not support the replacement of individual trees, but ought to recommend the establishment of tree stands that follow proven techniques. Hence, farmers should be advised to plant their seedlings at the recommended spacing of 12 m by 12 m, and should plant at least half a hectare (about 35 trees) minimum.

This will help farmers view their cashew trees as a crop that is worth being actively managed and takes them away from collecting/harvesting fruits from trees that stand scattered on their property and which are not taken care of properly. Also, since the project does not need to support large commercial producers, an upper limit of 10 ha or 20 ha should also be observed. Hence it is recommended that the project limit its support to establishing tree stands of between 0.5 and 10 or 20 hectares.

Recommended types of seedlings

Modern varieties and forms of trees combine to make cashew production more efficient and economic. A key element is the way trees are shaped.

As in other tree cultures, treatments and harvesting are facilitated if the trees are not permitted to grow as tall as is the case now. *INCAJU* has proven that trees of varieties that branch out low above the soil and that are shaped accordingly create these advantages for the producer. It has also been observed that such trees are much less prone to damage by storms. In this way the risk of loosing a large part of the trees during cyclones can be minimised.

3.1.2.2 Improved crop and pest management

A range of measures is needed to enhance the production of individual trees, independent of their age. The mix of recommended practices is known as *integrated crop and pest management (ICPM).*

Table 3.1: Calendar of activities in cashew production

Plant's stage / Human activity	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Flowering												
Nut ripening												
Weeding												
Spraying												
Harvesting												
Transplanting seedlings												

ICPM normally includes preventive measures (pruning, cutting unwanted shoots, weeding, biological control of harmful organisms and, if needed, the use of chemicals to control them). The preventive measures would be complemented by emergency measures to control harmful organisms in case of outbreaks of actual diseases or when major attacks are observed. These could be applications (spraying) of chemicals but would be strictly applied and consider economic threshold levels.

In Mozambique *ICPM* has, until now, been composed of only preventive measures and includes calendar sprayings of part of the crop with subsidies passed on through INCAJU. The *table 3.1 (on the last page)* shows the activities in cashew production and the times of the year when they are executed.

Spraying regime
INCAJU is supporting farmers who own at least 100 cashew trees to become contractors for spraying (port: *provedor*) other producers' trees.

In the system, eligible farmers receive two days of training, a subsidy for buying a mist sprayer and are then licensed to treat the trees of other cashew producers according to the recommendations of *INCAJU. INCAJU* furnishes the contractors with the chemicals free of charge. The farmers whose trees are sprayed pay the contractor an amount recommended by *INCAJU* (between 15 and 20 MTs/tree for several applications in the season 2009/2010). Since small farmers have little money, some provedores take in kind payment from smallholders of 2 kg to 3 kg of cashew nuts per tree. With the given price of 10 MTs to 13 MTs/kg the provedor makes good profit. For Nampula province, *INCAJU* recommends three calendar sprayings at two three-weekly intervals, but more if necessary.

The weaknesses of this system can be seen in the following:
- The calendar spraying technique leads to excessive use of pesticides
- There are not enough contractors, especially in remote areas, and only between 20% and 25% of the cashew trees overall are being sprayed
- The contractors have a tendency to give priority to treating their own trees and owners of larger numbers of cashew trees
- Some smallholders claim that the contactors do not spray the trees as thoroughly as needed
- The heavy subsidies of this system may not be sustainable in the long run
- With a price for *raw cashew nuts* around 10 MT/kg, the spraying is economically feasible if the yield per tree is increased by at least 2 to 3 kg/tree. If the tree is overage it is questionable whether the farmer gets an incremental benefit from the spaying; if the yield potential does not allow an increase of at least 4 to 5 kg/tree, this measure is not profitable for the farmer.

3.1.2.3 Improvements in marketing

Frequently, improvements in the area of marketing are needed to complement increases in production. This is also the case in the cashew sector. Improvements in this area have the potential to contribute significantly to increasing the revenues of the producers.

The improvements require on the one hand that the Government of Mozambique sets favourable conditions, e.g. the viability of the existing tax on exports of *RCN* and the export ban until the end of December should be reviewed in the long run. Such a tax can be justified to protect domestic processing facilities during an initial phase of establishment. But in the long run, Mozambican processors should become competitive on the world market and be able to survive without a protectionist export tax on *RCN*.

Favourable conditions for cashew marketing can also be increased by providing better market information. For the farmers in particular, such an information system is of vital interest. Farmers often sell to the closest buyers and traders without knowing about regional cashew prices. Their conditions (e.g. no storage and/or transport facilities, hunger and therefore urgent need for cash) very often prevent them from selling elsewhere, but better information about prices would in some cases probably lead to higher revenues for farmers.

Meanwhile, producers can gain by organising themselves in associations or other suitable forms in order to offer larger and uniform lots for sale that are more attractive for buyers. Some of the measures mentioned fall outside the range of measures that farmers can control. Joint action of the stakeholders should be promoted in order to help implement the required changes in this area. *CLUSA*, for example, is supporting the creation of farmers' organisations in the province of Nampula, and their efforts to promote joint marketing should encompass cashew nuts.

Selling as an association or cooperative has several advantages. Larger and uniform lots are more attractive for buyers. The individual finds themself in a better position for negotiating a higher price when selling together with others. If well-managed, an association can equip itself with a small storage facility where the members can guard their produce until the end of the season when prices usually raise. Organised farmers can also more easily sell directly to the cashew factories, avoiding the number of middlemen that are often situated along the value chain.

The producers need to be made aware of the potential added income that can be created by cooperative forms of marketing. Joint action of the stakeholders should be promoted in order to help implement the changes in this area. For example, some donors and NGOs such as *CLUSA, ADPP* and *SNV*

are supporting the creation of farmers' organisations in the province of Nampula. Such efforts can include the joint marketing of various agricultural products, cashew nuts being only one of them.

The *ACi* will concentrate on exactly this form of functioning farmers' groups. Besides providing agricultural extension advice to Farmer Field Schools, the project will support the participating farmers in organising themselves for joint marketing. This can be in the form of an association or cooperative, but does not necessarily have to be formalised. The important factor here is to provide farmers with the knowledge and capacities on how to sell their produce together, e.g. explaining the potential benefits, teaching business skills and possibly providing measures to construct a stockroom or facilities for sorting nuts according to quality.

3.1.3 Economic aspects and expected impacts of the project

Many members of the smallholder community are illiterate. Therefore, most are unable to realistically estimate the economics of crop production, and even more so in the case of a permanent crop like cashew.

Still, even under such circumstances and even accepting that the profitability of a crop must not be the only criterion for decision making, producers must know the economics of cashew production and must be made aware of the implications of maintaining a loss-making business over several periods without taking steps to make it more economically advantageous or switching to other crops that render a higher income.

Cashew producers must be able to calculate or at least to estimate with an acceptable degree of correctness the cost effectiveness of changes in the production system (i.e. that of different intensities of production, for example comparing the less or more intensive maintenance of trees).

Also, and more importantly, cashew trees reach their full productivity only in or near the tenth year. Aspects of investment analysis and liquidity must therefore be considered when cashew plantations are to be established anew or when existing plantations are to be rejuvenated.

Similarly, a producer must be able to compare the viability of an investment in cashew production with other alternatives, including annual crops, and he must be made aware of how to rate aspects of risk and the varying degrees of susceptibility of alternatives to the risk posed by climatic variations like droughts. It is therefore imperative to build the awareness of cashew producers of the economics of cashew production and to enable them to weigh the economics of different options.

3.1.3.1 Impact at the farm level

As reported, many smallholders do not care for cashew trees, but just collect the nuts. They do not have costs related to cashews. Assuming a yield of 3 kg/tree and a price of 10 MTs/kg the revenue from the nuts is about 30 MTs/tree, equivalent to about 2,100 MTs per ha. In addition to this, farmers produce alcohol *(aguadente)* out of the dried apples which has a market price of about 20 MTs/l. The aguadente is often used to pay casual labourers employed for harvesting. It was reported in Nampula province that on average farmers get 0.125 l of alcohol per kilogramme of nuts harvested.

Figure 3.2: Cashew yield/revenue

Others produce juice out of the apples and consume it or sell it on the market if the farm is situated near a town or a bigger road.

It seems to be that farmers in other regions take more care to produce alcohol, probably because of better market opportunities such as in the province of Gaza, which is nearer to the big market of Maputo and with a lot of tourists (and potential clients) arriving in Gaza. Some farmers reported that their revenue from aguadente was as high as the revenue of sold nuts, which significantly boosts income. The differences in the production of alcohol may be because of religious reasons as well, since there are more Muslims in Nampula province than in the south of Mozambique.

The following cash flow analysis *(see next page)* was made of a new cashew plantation to assess the profitability of cashew nuts and to analyse the incremental benefit for smallholders when better cultivation practices are chosen. The total cash flow contains 25 years, but due to space constraints on one page, only 17 years are presented. However, it is important to remember that until the 25th year it is assumed that each year involves the same outflows and inflows

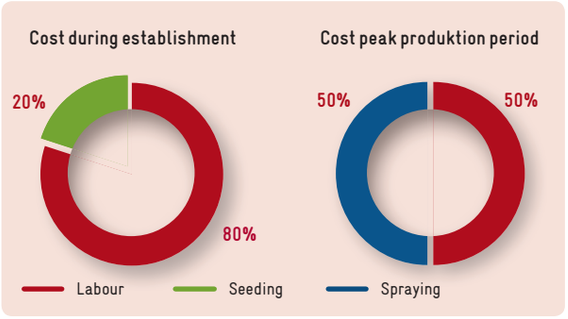
Smallholders carry out all or most of the work on their farms with family labour. In the rural areas of Nampula province, finding work is almost impossible, especially for unskilled labourers. Therefore, opportunity costs for labour must not be considered and the input of family labour is not a cost item for the smallholder.

However, two alternatives were considered in the cash flow calculations: one excluding labour costs, assuming that a smallholder is establishing and running a new cashew plan-

tation with family labour only, and a second assuming a commercial farmer has to hire and pay casual labour for all the labour needs *(see the cash flow analysis, Table 3.2)*.

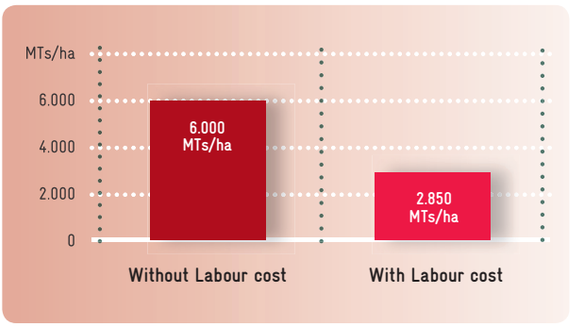
For a commercial farmer the main costs in the establishment of a cashew plantat ion come from labour during the first two years. These have a share of over 80%, whereas the seedlings account for the remaining 20%. By contrast, the smallholder has to bear only the costs of the seedlings. During the peak of production between the 16th and the 25th year, about half of all costs for a commercial farmer are labour costs while the other half are spraying costs.

Figure 3.3: Cost split



The balance cash flow (the margin obtained when the annual costs are subtracted from the annual revenues) amounts to about 6,000 MTs/ha (207 USUS$/ha) without considering the labour input and 2,850 MTs/ha (98 US$/ha) including labour costs. During these years the value of the labour input of about 55 working days per hectare is about 110 MTs per day (3.8 US$/day) (balance cash flow without labour costs divided by the required days of labour) whereas a casual labourer costs about 50 MTs/day. In other words: when working in a cashew plantation the family labourer gains the equivalent of twice the salary of a casual labourer, which can be assumed to indicate the opportunity cost.

Figure 3.4: Balance Cash flow



The *Internal Rate of Return (IRR)* of cashew turns out to be very high when labour is not accounted for (in the case of the family farmer) at about 68% over 25 years. When including labour costs it is reduced to about 12%. However, the profit and therefore the *IRR* will increase if the small cashew trees are intercropped with food crops during the first three years. Sesame is one such crop that has a high tolerance to heat and water stress and renders a product (grain) and by-product (straw) that have various uses. In addition to this, there is a high demand for sesame in the country, the price is attractive and the Gross Margin is promising

In this case there is a positive balance cash flow from the first year onwards when not considering the labour costs and consequently an *IRR* cannot be calculated (it would be indefinite). However, when considering all labour costs the *IRR* is about 62%.

After the 10th year, when cashew trees are in full production, the balance cash flow (comparable with the Gross Margin of an existing plantation or an annual crop) is about 6,000 MTs/ha/year (200 US$) without the costs of labour and about 2,850 MTs/ha/year (100 US$) if the labour costs are fully considered.

3.1.3.2 Expected impact on poverty reduction

Assuming an estimated yield of 3 kg per tree and 70 trees/ha, a smallholder who just collects the cashew nuts will at present harvest 210 kg nuts per ha. At an average price of 10 MTs/kg the gross margin would be 2,100 MTs/ha (about 70 US$).

Compared to the 6,000 MTs/ha with the new plantation and/or the improved cultivation techniques, the income is more than doubled in this way. With the application of ICPM to existing cashew trees, an increase of 5 kg/tree (from 3 kg/tree to 8 kg/tree) can be assumed. Even if we consider that the farmer has to pay on average at least 2 kg/tree for spraying, the incremental benefit (not considering the incremental need of labour) is about 3 kg of nuts per tree, resulting in the doubling the farmer's income from cashew from 70 US$ per ha and year. The increase in income varies from farm to farm according to the number of trees or the area.

On average farmers own about 20 to 30 trees. This means that just by having the trees sprayed the potential of an increase of income with the existing cashew trees is about 30 US$/year for the average smallholder. In addition to this it has to be stated that this incremental yield can only be achieved if the trees are not overage – which in many cases is a fact – and the trees respond to the improved cultivation techniques.

This calculation shows clearly that with the existing cashew trees the impact on poverty reduction on the majority of smallholders is very limited. If one assumes an impact of 30 US$/year and a family of six people, then the contribution to the daily income per person is just 0.014 US$/day per family member.

Table 3.2: Cash flow analysis of a Cashew tree plantattion

Cash flow analysis of a Cashew tree plantattion (25 years)																					
Year	Unit	Nr. of Units	price/ unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	...
Inflows																					
Production of Cashew/tree	Kg/tree	10				1,0	3	5	7	7,5	8	8,6	8,8	9	9,2	9,4	9,6	9,8	10	10	10
Revenue of Cashew/tree	MTs/tree					10,0	30,0	50,0	70,0	75,0	80,0	86,0	88,0	90,0	92,0	94,0	96,0	98,0	100,0	100,0	100,0
Production of Cashew/ha	kg/ha					70,0	210,0	350,0	490,0	525,0	560,0	602,0	616,0	630,0	644,0	658,0	672,0	686,0	700,0	700,0	700,0
Revenue of Cashew/ha	MTs/ha		10			700	2100	3500	4900	5250	5600	6020	6160	6300	6440	6580	6720	6860	7000	7000	7000
Revenue of aguadente/ha (0,125 l/kg de castanja)	l/ha		20			175	525	875	1225	1313	1400	1505	1540	1575	1610	1645	1680	1715	1750	1750	1750
Total gross revenue (MTs/tree)	MTs/ha					13	38	63	88	94	100	108	110	113	115	118	120	123	125	125	125
Total gross revenue (MTs/ha)	**MTs/ha**					**875**	**2625**	**4375**	**6125**	**6563**	**7000**	**7525**	**7700**	**7875**	**8050**	**8225**	**8400**	**8575**	**8750**	**8750**	**8750**
Total gross revenue ($/ha)	**$/ha**					**30**	**91**	**151**	**211**	**226**	**241**	**259**	**266**	**272**	**278**	**284**	**290**	**296**	**302**	**302**	**302**
Outflows																					
Labour costs																					
Clearing of the land	Manday/ha	150	50	7.500																	
Lining, digging the holes	Manday/ha	4	50	200																	
Transport of the seedlings to the field (3 km)	Manday/ha	5	50	250																	
Planting	Manday/ha	2	50	100																	
Irrigation of the seedlings	Manday/ha	2	50	100																	
Replanting missing plants (20%)	Manday/ha	2	50		100																
Weeding (limpeza) (1 hours/tree, 2 times)	Manday/ha	12	50			240	504	720	960	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Pruning (1 hour/tree)	Manday/ha	12	50		60	120	240	360	480	600	600	600	600	600	600	600	600	600	600	600	600
Harvesting (1,5 MTs/kg)	MTs/kg		1,50			105	315	525	735	788	840	903	924	945	966	987	1.008	1.029	1.050	1.050	1.050
Drying of the Cashewnuts	days	1	50			10	20	30	40	50	50	50	50	50	50	50	50	50	50	50	50
Drying of the Cahew apples	days	1	50			10	20	30	40	50	50	50	50	50	50	50	50	50	50	50	50
Production of aguadente (1 litro por 8 kg castanhas)	days	5	50			250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
Labour costs total				**8.150**	**160**	**735**	**1.349**	**1.915**	**2.505**	**2.938**	**2.990**	**3.053**	**3.074**	**3.095**	**3.116**	**3.137**	**3.158**	**3.179**	**3.200**	**3.200**	**3.200**
Inputs																					
Seedlings (required Qty + 20%) (Costs incl. Transport)	seedling	70	20	1.400	280																
Costs of spraying/ha (excl. chemicals)	MTs/tree	70	20			280	560	840	1.120	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Voltraid (10 ml/arvore 3times)	l	0,03	500			210	420	630	840	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
karate (5 ml/tree 2times)	l	0,01	350			49	98	147	196	245	245	245	245	245	245	245	245	245	245	245	245
Total Outflows excl. Labour (MTs)				**1.400**	**280**	**539**	**1.078**	**1.617**	**2.156**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**	**2.695**
Balance Cash flow (Gross Margin 1) (MTs/ha)				**-1.400**	**-280**	**336**	**1.547**	**2.758**	**3.969**	**3.868**	**4.305**	**4.830**	**5.005**	**5.180**	**5.355**	**5.530**	**5.705**	**5.880**	**6.055**	**6.055**	**6.055**
Balance Cash flow (Gross Margin 1) (US$)				**-48**	**-10**	**12**	**53**	**95**	**137**	**133**	**148**	**167**	**173**	**179**	**185**	**191**	**197**	**203**	**209**	**209**	**209**
IRR 68%																					
Total Outflows incl. Labour costs (MTs)				**9.550**	**440**	**1.274**	**2.427**	**3.532**	**4.661**	**5.633**	**5.685**	**5.748**	**5.769**	**5.790**	**5.811**	**5.832**	**5.853**	**5.874**	**5.895**	**5.895**	**5.895**
Balance of cash flow (Gross Margin 2) (MTs)				**-9.550**	**-440**	**-399**	**198**	**843**	**1.464**	**930**	**1.315**	**1.777**	**1.931**	**2.085**	**2.239**	**2.393**	**2.547**	**2.701**	**2.855**	**2.855**	**2.855**
Balance of cash flow (Gross Margin 2) (US$)				**-329**	**-15**	**-14**	**7**	**29**	**50**	**32**	**45**	**61**	**67**	**72**	**77**	**83**	**88**	**93**	**98**	**98**	**98**
IRR 12%																					

A significant contribution can only be achieved in the long run by establishing new plantations of at least two to three hectares per smallholder. As shown above, 1 ha in full production, when not accounting for labour costs (assuming that the necessary labour input is provided entirely by family labour), results in a Gross Margin of about 200 US$/ha/year. This is about 0.09 US$/family member per year. If a farmer grows 3 ha, the poverty reduction effect per family member will be about 0.30 US$/day in the long run.

3.1.3.3 Impact on the volume of production

In order to have a noticeable impact, the project is expected to reach about 10% of the cashew producers in the province, about 30,000 growers during its implementation period of 3 years.

As discussed above, an increase in the average productivity in Nampula province from the current 3 kg/tree to 8-10 kg/tree with proper management appears realistic. With this increase of 5 kg/tree the production of a typical grower with 30 trees would increase by about 150 kg per year, which more than doubles the actual production.

The increase of total production in the pilot districts will depend on the degree to which the recommended technical package is used (in terms of percentage of full, partial and non-adopters). Assuming 100% adoption by the targeted 30,000 tree owners, the total production differential could reach about 4,500 tons a year – which corresponds to at least 10% of the province's and 5% of the nation's present production volume.

On the one hand not all participating farmers in the *Farmer Field Schools (FFS)* will apply the recommended *ICPM* cultivation techniques entirely and/or 100% correctly. This has an impact on the average yield increase. On the other hand the future members of the *FFS* will own a number of trees above the average, since experience shows that farmers with more trees or bigger plantations are more interested in new technologies and innovations.

At the national level, the project's effect would result in increased receipts for the Government of Mozambique through the tax on exports. These must be balanced with the increased volume of subsidies for the acquisition of pesticides and mist sprayers and, in the medium and long-term, the need to multiply the production of tree seedlings which are now distributed free of charge to the growers.

The described effects and the idea that the government might, in the long-term, better support the build-up of private sector capacity for seedling production and service provision, suggest that after a transition period subsidised direct government intervention in production, and hence the costs associated with such subsidies, may be reduced.

3.1.3.4 Impact on the quality of production

As we have learnt, the quality of cashew nuts delivered by the farmers is below international levels. Various measures are possible to improve this quality. But first it has to be stated that as long as the processors and exporters are not willing to pay prices according to quality there is no incentive for the farmer to produce high quality nuts. This has been the case so far.

Organised farmers could easily perform an initial selection of *RCN* according to quality aspects. At the moment, *RCN* are not usually priced according to their quality. Buyers pay the same price per kg without considering better quality products. Some processing factories have stated that they would pay according to quality criteria if such a system were introduced effectively. While a single farmer without storage facilities could hardly manage to sort out his nuts, this could be possible in an association. This implies, however, that there is sufficient production in general so that the nuts of lesser quality are actually in less demand. So far, every raw cashew nut, regardless its quality, will find a buyer on the Mozambican market.

So far only one factory purchases according to quality, paying 2 MTs (20%) more than for average quality nuts. Due to high demand, farmers are able to sell their low quality nuts for the average market price. But the processor is mixing the high quality (bigger) nuts with the other raw material because he would otherwise treat the labourers unequally, which might lead to bad relations since those which process the high quality nut would benefit more because they all are paid by the kilogramme of processed nuts.

The most important measures to increase the quality of nuts are good cultivation such as pruning, pest management and weeding and substituting overage trees with new plantations of cashew trees. To achieve this objective best practices in cashew growing will be transferred to the farmers through extension technicians and the facilitators of the *FFS* and a major effort will be made to rejuvenate the cashew tree population in the four pilot districts.

This needs a sound strategy for producing nurseries and convincing politicians, other donors and NGOs not to subsidise the production of seedlings in order to give the private sector the chance to enter this market.

3.2 Implementation Strategy

3.2.1 Methodological approach

Given the low levels of literacy among smallholders, the difficulties of using modern means of communication and the need to communicate to a large number of those involved, especially women, in local languages rather than in Portuguese, are reasons that favour a tiered system for the intended knowledge transfer. This way the number of people targeted by project personnel is multiplied and the follow-up of changes introduced at the producer level is done by those close to the producers or by the producers themselves. In other African countries in which the situation of smallholders resembles that of those in Mozambique the approach called *Farmer Field Schools* (FFS) has proved most effective. The main characteristics of the FFS-approach *are explained in the box below.*

Strengths of the FFS approach

Adult education: FFSs ensure the integration of the adult farmers' existing knowledge/experience into the programme.

Convincing facilitators: The group facilitators are more convincing because they grow the crops themselves. Usually they are colleagues from the same or a neighbouring village. They are usually elected by the group, receive training and their judgement is therefore respected.

Based on crop phenology and time: The assistance of the growers is based on the crop phenology and continues throughout the year ensuring that farmers can immediately use and practice what is being learned and are not overburdened by theoretical knowledge that cannot be applied right away.

Group study: Groups members can support each other, both with their individual experience and strengths.

Field School Site: Field Schools are always held in the community where farmers live so that they can easily attend. The FFS will choose a stand of trees in which the recommended techniques are demonstrated and applied by the group members and where they themselves practice the operations which they then repeat with their own trees.

Building groups: One of the jobs of the facilitator is to assist the FFS to develop the group spirit so that participants support one another after the FFS is over. This is done by having elected officers (head, treasurer, and secretary), and thus having a group identity. Such groups may even choose to extend their activity into the area of marketing by creating a marketing association.

Basic science: FFS focus on basic processes through field observations, season-long research studies, and hands-on activities. It has been found that when farmers have learned about basics, combined with their own experiences and needs, they make effective decisions.

Trial fields: The FFS determines a stand of trees in a field for group study where farmers practice the recommended techniques and can carry out studies without personal risk. Here the groups can treat one group of trees in the traditional way and another in the recommended way. The advantages of the recommended techniques are thus demonstrated convincingly.

Evaluation and Certification: The results obtained with the traditional and improved techniques in the trial field are evaluated economically at the end of the production period. FFSs may include field-based pre- and post-tests for the participants. Then certificates can be awarded, which have a motivating effect, especially on those without school certificates.

Follow-up All FFSs normally benefit from a longer follow-up period, in which the facilitators support the groups even after the direct involvement of the project has ceased. Regarding cashew trees, follow-up during a 3 to 5 year period is recommended when the planting (new or as a substitution of old trees) is demonstrated.

Community action: Once they have introduced communities to group action, FFSs may foster further community action, thus leading to other socio-economic benefits for the rural population.

Adapted from: Gallagher, K.D.: Farmers Field Schools (FFS) – A Group Extension Process Based on Adult Non-Formal Education Methods. Global IPM Facility 1999
See: http://www.farmerfieldschool.net/document_en/FFS_GUIDe.doc

The *FFS* system has an added advantage over the frequently used **Training and Visit System** since it makes the field activities more independent of the official extension services and their often precarious financial. In the *FFS* system extension officers supervise/backstop facilitators (up to 5 or 6 per extensionist) who are members of the farming community that have been trained for the purpose. The facilitators guide/accompany the groups of farmers formed at the village level throughout the season. A facilitator may work with up to three groups of 20 to 30 farmers and is usually someone with hands-on experience of the crop that is at the centre of the programme.

The described structure is also proposed for this project *(see figure 3.7 on the next page)*. The generic activity flow is visualised in the schematic below.

Figure 3.5: Activity flow in extension programmes using Farmer Field Schools

3.2.2 Area and organisational structure of implementation

3.2.2.1 Districts proposed for implementation

It is not recommended to implement the strategy in the whole province but rather in four pilot districts. To implement the proposed strategy seems possible in respect to the available resources given in the calculation below.

Implementation is to cover four districts in Nampula province. The proposed districts *(see the figure 3.6)* were selected using the following criteria:

- District is one of the main cashew producing districts of the province
- All districts are closely spaced to facilitate logistics and backstopping by the project staff located at Nampula
- High population density (at least 25% of the province's total in the four districts)
- Total population in the four districts should be approximately one million (170,000 families with 80% or 135,000 being farming families)
- Processing industries exist in the districts (at least 5 factories in the four districts)
- Farmers organisations exist
- *INCAJU* and *MINAGRI* technical staff are sufficient in number for the project's needs

Based on these criteria the districts of Mogovolas, Moma, Angoche and Mogincual are proposed for the implementation. They are grouped together in the south-east of the province.

Figure 3.6: Districts in Nampula province proposed for the implementation of the Project

3.2.2.2 Organisational structure

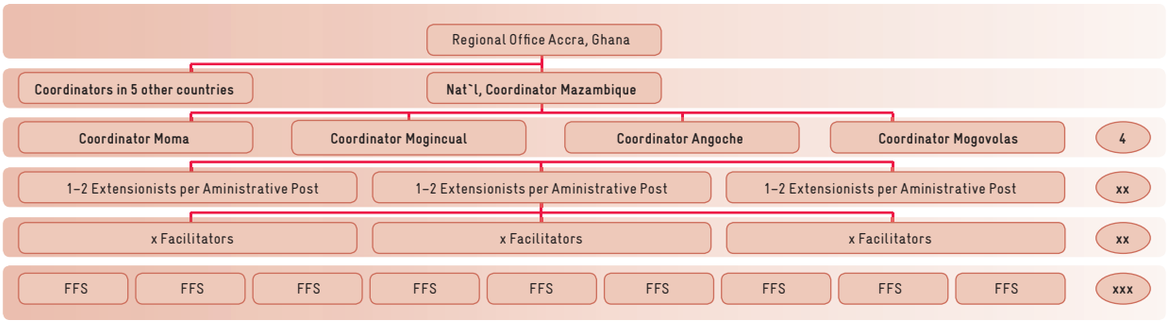
The project has to avoid building parallel extension structures. This would create high costs in the long-run which cannot be managed in a sustainable way. However, some *INCAJU* and *MINAG* staff in the districts are currently underutilised due to limited financial resources for transport, communication, etc., weak management, bureaucratic procedures, etc.

Therefore, the team recommends cooperating closely with these governmental organisations, especially with *INCAJU*. They are the only organisation with specialised knowledge of the cashew sector and with sufficient extension agents at the district level. In addition to this, and according to the information from the Director, *INCAJU* is very interested in cooperating with this project.

The organisation of the project will follow the structure successfully used in other countries within the project *African Cashew Initiative (ACi) – Analysis of the Cashew Value Chain in Mozambique* with it's headquarter in Accra, Ghana *(see figure 3.7 on the following page)*.

The strategy should be defined and approved by a Steering Committee, which consists of representatives of important stakeholders in the cashew sector in Mozambique and especially in the province of Nampula such as *INCAJU* on the national and provincial level; NGOs active in the cashew sector in Nampula; representatives of farmer organisations, processing industry, traders, exporters, *ACi*, etc. The Steering Committee should meet two to three times a year and one of its tasks should be to lobby on behalf of the cashew sector and coordinate and harmonise the strategies and activities between the different actors in this sector.

Figure 3.7: Proposed organisational structure of the Project Component Mozambique



3.2.2.3 Project personnel

Capacity needed

To meet the target of 30,000 farmers during a 3 year period, the number of *FFS* should develop from 120 in the first year to 540 in the second and third year. The number of smallholders reached and of extensionists needed to train and supervise the facilitators in year 1 (ratio 1:5) and in years 2 and 3 (ratio 1:6) are indicated in the *table 3.3 below*.

Table 3.3: Number of farmers reached, of FFS, of facilitators, of extension technicians and District Coordinators needed

Type	2010	2011	2012
Farmers	3000	13500	13500
FFS	120	540	540
Facilitators	40	120	120
Extensionists	8	36	36
District Coordinators	4	4	4
National coordinator, deputy coordinator (agricultural economist) and 'expert of farmers organisations'	3	3	3

In the case of the proposed project the facilitators that accompany the farmers' groups are to be chosen among the cashew producers in a participatory way at the village or community level. Likely candidates may be producers that have been chosen to provide spraying services (*provedores*).

Proposed project personnel

The project would employ a **National Coordinator**, who would work out of an office in Nampula and be supported by a **Deputy Coordinator** (agricultural economist) and a **specialist for supporting farmers organisations** and an **Office Manager** (administrator with duties as secretary and accountant). A driver and guards would complete the team. The Nampula office would work with **4 District Coordinators**, one in each district, each of which would connect to between 5 and 10 extension technicians.

Each of the **extensionists** (8 in year 1 and 36 each in years 2 and 3) would in turn accompany 5 to 6 facilitators.

Each of the **facilitators** (40 in 2010 and 120 each in years 2 and 3) would work with three Farmer Field Schools.

In this way 120 *FFS* could be accompanied in year 1 and 540 each in years 2 and 3.

This system would reach 3,000 cashew producers in year 1, 13,500 in year 2 and 13,500 (different) cashew producers in year 3, i.e. a total of 30,000 producers during the proposed implementation period of three years.

The **Project Coordinator** would be supported by a **GTZ Coordinator (junior expert)** in a half-time position which would be attached to the *GTZ* office in Maputo. She or he would support and backstop the project in the administration of financial matters, the realisation of training courses and M&E activities surrounding the performance of the project, especially concerning the logistics and the contracting of national short-term experts. This person would also support the project's networking with other donors and NGOs and promote dialogue between the project and relevant governmental institutions.

One **International Short-Term Expert** would be responsible for providing technical backstopping and advice on curriculum development and, specifically, economic aspects. He or she would also orient the development of an *M&E* system for performance monitoring and assessment of the project's impact at the farm level and propose and lobby for a policy environment that supports the development of the cashew sector.

National Short-Term Experts, most likely members of research and educational or professional training institutions (like *IIAM*), would be responsible for curriculum development and for the realisation of the training courses for extensionists and facilitators as well as the implementation of required field components of the monitoring system.

3.3 Training Activities

3.3.1 Training of facilitators

In order to train the facilitators it is necessary to account for a certain percentage of dropouts, so the number of trainees needs to be 20% higher than the *figures in Table 3.3 on page 41*, hence 48, 216 and 216 during the three years for a total of 480 individuals.

The training of facilitators would include four modules of five days each, covering: **(1)** planting and diversification, **(2)** pruning, weeding, **(3)** integrated pest management, **(4)** harvest and post-harvest activities and marketing. Economic aspects would be an integral part of these modules.

The number of courses, based on 20 participants per course, is (mathematically) 2.4 in year 1 and 10.8 each in each of the following years, their number augmented by 2 refresher courses in the second year and 9 in the third year.

3.3.2 Training of extensionists

The training and monitoring/backstopping of the facilitators is done by extensionists who will be selected from among the members of the extension service and *INCAJU* in the pilot regions. A total of 80 people are needed during the three years: 8 in the first and 36 additional ones in each of the following two years.

The extensionists will receive training in groups of 10 by international and local specialists. This training consists of six modules of five days each, covering: **(1)** planting and diversification, **(2)** pruning, weeding, **(3)** pest management, **(4)** harvest and post-harvest activities and marketing, **(5)** economics of cashew production and **(6)** farmers associations.

One such course will be held in the first year and four each will be carried out in the second and third year to train new project staff plus, in addition, one refresher course in the second year and four in the third year.

3.3.3 Training contents

The training contents of the courses are to a large degree identical insofar as far as they cover aspects closely related to cashew production and marketing.

However, the training of the extensionists includes a specific module on the economics of cashew production, as this group should understand aspects related to productivity not only of cashew production, but also of the methodology for determining the feasibility of investments and alternative crops, which would be beyond the present capabilities of the majority of smallholders.

The modular construction of the training courses will facilitate the easy adaptation of the course contents to the specific needs of the trainees. A proposal for the contents of the course (to be refined) is given in the *table 3.4 on the following page.*

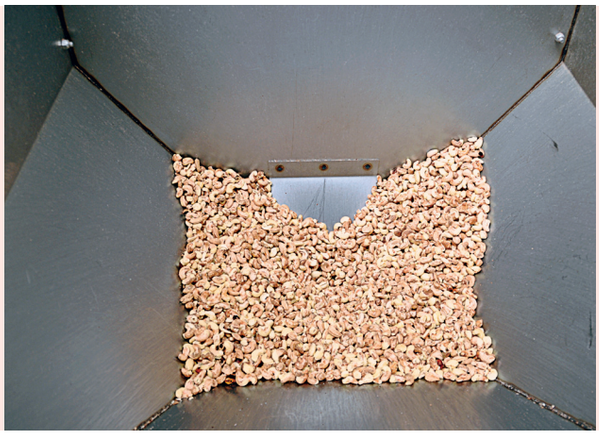


Table 3.4: Proposed main contents of the training modules

Training Course CASHEW PRODUCTION for extensionists (E) and FFS facilitators (F) (contents to be refined by project staff)

Objective: Participants know how to increase the productivity and profitability of cashew production as well as of nursery management and are aware of gender and HIV aspects

Method: Short exposure to the relevant theories, brief presentation of research results, group exercises in the classroom and in the field building on/incorporating participants' experiences

Module 1:
Integrated Crop Management (ICM) in cashew nut production (for E+F)
- Pruning and cleaning trees
- Prevention and treatment of pests and diseases
- Natural and chemical control measures
- Use of mist sprayers / health protection
- Harvesting and post-harvest techniques
- Marketing of cashew nuts
- Increasing the value added of by-products

Module 2:
Planting and plant substitution (E+F)
- Field preparation for planting
- Suitable times for planting
- Proper seedling care before and after planting
  - Supply of nutrients
  - Physical support
  - Plant protection
  - Watering

Module 3:
Intercropping and diversification (E+F)
- Reasons for diversification (aspects of risk)
- The 'machamba' as a production system
- Production planning involving various crops
  - Aspects of food security
  - Aspects of soil fertility
  - Labour requirements and monthly budgets
  - Economic aspects (income effects, liquidity aspects, monthly cash flow)
- Intercropping of cashew with annual crops (costs and benefits, problems)

Module 4:
Farmers associations (FA) **/ Cross-cutting issues** (E+F)
- Types of farmers groups and their characteristics
- Benefits expected from group action
- Differences between FA and private enterprises
- Management of farmers associations
- Factors determining an FA's success or failure
- Legal aspects of FAs
- Gender aspects in cashew production
- Precautions against HIV

Module 5:
Nursery management
(E and persons interested in establishing private nurseries)
- Plant selection for rootstocks
- Grafting of plants
- Production techniques and plant hygiene
- Logistics (seedling distribution)
- Economics of producing tree seedlings (fixed and variable costs, unit cost calculation, investment analysis, etc.)

Module 6:
Adult Learning and Didactics for rural advisors (E+F)
- Differences between adult and child education
- The learning process
- Communication techniques
- Visualisation techniques
- How to increase the rate of adoption of new techniques (management of demonstration fields)

3.4 Estimated Costs of the Project

The costs of the proposed project have been estimated using the principals of cost estimation (using the higher estimates in case costs vary).

3.4.1 Costs of experts

These costs amount to 441,660 US$ during the total period and include:

- The salary of a permanent GTZ Coordinator (Junior Expert) at the GTZ office Maputo working half-time for the project, amounting to 72,000 US$ per year and 216,000 US$ in total
- Flight and other travel costs of the GTZ Coordinator within Mozambique, amounting to 5,220 US$ per year and 15,660 US$ in total
- The cost of international short-term experts working for the project two months per year, being 66,000 US$ per year and 198,000 US$ in total. This is based on 22,000 US$/month honorary fee, 4,500 US$/month per diems, and a cost of 5,700 US$ for international flights
- The cost of national short-term experts working for the project two months per year to prepare curricula and carry out training courses (4,000 US$/year and 12,000 US$ in 3 years)

3.4.2 Investment costs

These costs amount to 106,500 US$. These are composed of:

- Office and communication equipment (1,500 US$ in year 1)
- The cost of a four-wheel-drive car (40,000 US$ in year 1)
- The cost of 6 motorbikes (30,000 US$ in year 1 – for the Deputy Coordinator, the Specialist for supporting farmers organisations and the 4 District Coordinators)

3.4.3 Costs of technical staff a t the project office in Nampula and office running costs

These costs amount to 632,760 US$ for the total period and consist of:

- The salary of the National Coordinator and his housing allowance, which amounts to 48,000 US$ per year and 144,000 US$ in total (based on 4,000 US$/month including social security contributions)
- The salary of the Deputy Coordinator (Agricultural Economist and Marketing Specialist) and his housing allowance, which amounts to 24,000 US$ per year and 72,000 US$ in total (based on 2,000 US$/month including social security contributions). It is important that one expert, specialised in economics and marketing, is employed by the project to advise and supervise the extensionists, to support the marketing of cashew nuts, especially through farmers' organisations such as farmers' groups or associations, and to advise the management of such farmer groups on how to maximise the benefits for the members by marketing products, buying inputs jointly or rendering services to its members
- The salary of a Specialist for Supporting Farmers Organisations (Institution Building and Capacity Development Specialist) and his housing allowance, which amounts to 24,000 US$ per year and 72,000 US$ in total (based on 2,000 US$/month including social security contributions). At the provincial level such a specialist should be available to support farmers groups that want to develop into formal associations and in order to advise existing associations in strengthening their organisational and managerial capacities. He will cooperate closely with NGOs working in this field in Nampula
- The salary of the Office Manager, which amounts to 6,600 US$/yr and 19,800 US$ in total (based on 550 US$/month including social security contributions)
- The salary of the driver, which amounts to 4,800 US$ per year and 14,400 US$ in total (based on 400 US$/month)
- The cost of guards and ancillary office costs (electricity, stationary etc.) which amounts to 1,800 US$ per year and 5,400 US$ in total (based on 150 US$/month including social security contributions)
- The rent for the 3-room office which amounts to 12,000 US$/yr and 36,000 US$ in total (based on 1,000 US$/month)
- The salaries of the 4 District Coordinators, which amount to 48,000 US$ per year and 144,000 US$ in total (based on 1,000 US$/month including housing allowance and social security contributions)
- The allowances of the Deputy Coordinator, the Specialist for Supporting Farmers Organisations, and the 4 District Coordinators, which amount to 19,800 US$ per year and 59,400 US$ in total (based on 10 nights/month/person and 1,000 MTs/night equalling 330 US$/month/person at an exchange rate of 30 MTs/US$)
- Running costs of the project car of 5,000 US$ per year and 15,000 US$ in total (20,000 km per year at 0.25 US$/km)
- Running costs of the motorbikes of 13,500 US$/year and 40,500 US$ in total (based on 6 motorbikes, 50 km/day/motorbike, 300 work-days per year = 60,000 km/yr and based on variable costs of 0.15 US$/km)
- Travel costs of the Coordinator of 3,420 US$/yr and 10,260 US$ in total (assuming 2 flights/yr to Accra and back at 2,000 US$ each, 6 flights/yr to Maputo and back at 300 US$ each, 16 international overnight allowances of 180 US$/night and 18 in-country overnight allowances of 30 US$/night)

3.4.4 Costs of the extension technicians

Cooperation is intended with *INCAJU* and *MINAG* which are key players in the sector. It is assumed that *INCAJU* and *MINAG* can be persuaded to reorient the work of their agents in the project area so that they can serve as supervisors of the *FFS* facilitators. Their salaries must then not be considered as a project cost. The costs associated with the training of the extension workers and with their work execution itself amount to a total of 219,313 US$ during the 3 year period and include the following:

- The costs of training the extension technicians (extensionists) and including, in year 1, six project staff members, of 2,257,500 MTs in total. The cost calculation for the training courses considers 25 days of the course, 10 participants/course, a cost of the 2 trainers of 2x3,000 MTs/day, room and board for the participants of 350 MTs/day/trainee, and costs of training material of 100 MTs/day/trainee)
- The costs of one 5-day refresher course in year 2 and four such courses in year 3, amounting to 262,500 MTs in total
- The contribution of the project to the extensionists' use of their motorbikes in the follow-up of the facilitators, which amounts to a total of 4 million MTs in the 3 years

3.4.5 Costs of the FFS facilitators

The costs associated with the training of the facilitators and with their work amount to a total of 355,649 US$ for the 3 year period and include:

- Incentive payments to the facilitators, which amount to a total of 1.2 million MTs (based on 50 MTs paid per meeting with the FFS members, 3 FFS per facilitator and 20 meetings with each FFS during the year = 3,000 MTs/facilitator/year. With 40 facilitators in year 1 and 180 in years 2 and 3, the annual totals are 120,000 MTs in year one and 540,000 MTs in each of the years 2 and 3)
- The costs of handouts (leaflets) given to the FFS members, amounting to 180,000 MTs in year 1 and 810,000 MTs in each of the following two years for a total of 1.8 million MTs (based on a cost of 60 MTs per handout)
- The cost of the initial training of the facilitators, which totals 7,224,480 MTs during the 3 year period. The calculation considers 20 days of the course, 20 participants/course, a cost of the 2 trainers of 2x3,000 MTs/day, room and board for the participants of 350 MTs/day/trainee, costs of training material of 100 MTs/day/trainee a transport allowance of 50 MTs/trainee covering 4 trips, and the need to train 20% more people than the number of facilitators actually needed
- The cost of two 5-day refresher courses in year 2 and of nine such courses in year 3, totalling 445,000 MTs

3.4.6 Training institution

It is suggested that training be carried out at *ADPP's* training centre in Ithuculo. This training centre has the following advantages:

- Sufficient capacity (up to 40 participants) to train facilitators and technicians
- Existing didactic material for training, e.g. pin boards, flipchart stands, etc.
- The possibility to offer full board in the centre itself
- About 100 ha of cashew trees, which can complement the trainees' theoretical lessons with practical exercises
- Equipment for processing the nuts and extracting the juice from the cashew apples
- Additional crops, which are important for the objectives of diversifying farm production and incomes
- The centre has trainers who will be able to train the participants in *ICPM* and who know the situation on small farms because they already advise farmers groups on cashew production
- Training material for cultivating cashew, which only has to be adapted to the needs of the project

In the cost calculation, the cost of training is based on the rates of this training centre.

3.4.7 Contingencies

In order to cover additional expenses that cannot be foreseen at the present time, contingencies of 175,000 US$ (roughly 10% of the calculated total costs) are included in the budget.

Table 3.5: Costs of Project Business Skills to Farmers in FFS – Mozambique, Nampula Province

Year				2010	2011	2012	Total
No. of Farmer Field Schools (FFS)				120	540	540	1.200
No. of farmers in FFS				3.000	13.500	13.500	30.000
Cost of experts	**Unit**	**US$/unit**	**No/yr**	**US$**	**US$**	**US$**	**US$**
GTZ Coordinator Maputo (half-time, 6000 US$/calendar month)	cal. month	6000	12	72.000	72.000	72.000	216.000
National flights and travel costs for GTZ-coord.(5 days/visit) [1]	visit	870	6	5.220	5.220	5.220	15.660
International short term experts [2]	month	33000	2	66.000	66.000	66.000	198.000
National short term experts	month	2000	2	4.000	4.000	4.000	12.000
Subtotal							441.660
Investment costs							
Furniture, office equipment, communication	set	1500	1	1.500			1.500
Car, 4 wheel drive	unit	40000	1	40.000			40.000
Motorbikes	unit	5000	6	30.000			30.000
Subtotal							71.500
Cost of technical staff and running costs of the project office Nampula							
Coordinator salary incl. housing cost	month	4000	12	48.000	48.000	48.000	144.000
Deputy coordinator incl. housing cost	month	2000	12	24.000	24.000	24.000	72.000
Farmers organisation specialist (FOS), incl. housing cost	month	2000	12	24.000	24.000	24.000	72.000
Office manager/acountant/secretary [3]	month	550	12	6.600	6.600	6.600	19.800
Driver	month	400	12	4.800	4.800	4.800	14.400
Guard, cleaning, electricity, stationary, etc. [3]	month	150	12	1.800	1.800	1.800	5.400
Office rent (three rooms)	month	1000	12	12.000	12.000	12.000	36.000
Four district coordinators incl. housing cost [3]	month	1000	48	48.000	48.000	48.000	144.000
Allowances for deputy, FOS, and district coordinators (330 $/month each) [4]	month	330	60	19.800	19.800	19.800	59.400
Running costs of the car	km	0,25		5.000	5.000	5.000	15.000
Running costs for the 5 motor bikes (50 km/day, 300 days/year)	km	0,15		13.500	13.500	13.500	40.500
Travel costs of the coordinator (to Maputo and international travel) [5]				3.420	3.420	3.420	10.260
Subtotal							632.760
Costs of extention technicians							
Subtotal extension technicians (see calculation below)							219.313
Costs of facilitators							
Subtotal facilitators (see calculation below)							355.649
Contingencies							
Subtotal contingencies (~ 10%)							175.000
GRAND TOTAL (US$)							**1.895.883**
GRAND TOTAL (EURO)							**1.365.036**

Table 3.6: Calculation of the cost of extension technicians and facilitators

Costs of extentionists [6]	Unit	Total 2010	Total 2011	Total 2012	Total 3 yrs
No. of extension technicians needed	No	8	36	36	80
No.of courses needed to train extensionists (10 persons/course)	No	0,8	3,6	3,6	8
Cost of training extensionists (plus, in 1st year, 6 project staff members) [7]	MTs	367.500	945.000	945.000	2.257.500
No. of 5-day refresher courses for extensionists	No		1	4	4
Cost of 5-day refresher courses for extensionists	MTs		73.500	189.000	262.500
Costs of transport (motor bikes) for extensionists	MTs	400.000	1.800.000	1.800.000	4.000.000
Subtotal (MTs)					6.579.400
Subtotal (US$)					219.313

Cost of facilitators					
No. of farmer field schools	No	120	540	540	1.200
No. of trained farmers (Ongoing training)	No	3.000	13.500	13.500	30.000
No. of needed facilitators	No	40	180	180	400
No. of trained facilitators (20% more than no. of trainers needed)	No	48	216	216	480
Costs of the FFS (incentive for facilitator)	MTs	120.000	540.000	540.000	1.200.000
Costs of handouts for farmers	MTs	180.000	810.000	810.000	1.800.000
No. of training of facilitators	No	2,4	10,8	10,8	24
Cost of the training of facilitators	MTs	722.448	3.251.016	3.251.016	7.224.480
No. of refresher training courses per year (5 days/course)	No		2	9	11
Costs of refresher ToTs per year (5 days/course, 2 trainers)	MTs		100.000	345.000	445.000
Subtotal (MTs)					10.669.480
Subtotal (US$)					355.649

Exchange rate (US$: MTs)	30
Exchange rate (US$: Euro)	0,72

Base values used in the calculation of the costs of training extensionists and facilitators and determining costs associated with their work execution	Unit	Value
No. of participants per training course for extentionists	No	10
No. of training days fextensionists [8]	days	25
Costs of trainers for training facilitators or extentionists (per day per trainer)	MTs/day/p.	3000
Costs of room and board (full board) during training for extensionists or facilitators (per day and per person)	MTs/tr.day/p.	350
Costs of training material (per day and per person)	MTs/tr.day/p.	100
Costs of training for extensionists (2 trainers per course)	MTs/course	262.500
No. of trainees needed in training course to produce one trained facilitator	No	1,2
No. of training days for facilitators [9]	days	20
No. of participants per ToT for facilitators	No	20
Costs of transport for facilitators to the training (to and back, 4 times)	MTs	50
Costs of one training course for facilitators (2 trainers per course)	MTs	301.020
Costs of transport (motor bike) for extensionists [10]	MTs/year	50.000
No. of facilitators supervised by one extentionist	No	5
No. of participants per FFS	No/FFS	25
No. of field days/year per FFS	No/FFS	20
No. of FFS per facilitator	No.FFS/Facil.	3
Incentive paid to facilitator per field day assisted	MTs/field day	50
Cost of handouts for farmers	MTs/farmer	60

1 6 flights/year, 300 US$ each, 30 days allowances, (30 US$/day and 80 US$/night) sums up to 5220 US$/year
2 Costs of an international short term expert: 4500 US$/month per diem, 22,000 US$/month honorar fee, 5700 US$ for international flights
3 including expenses for social security 30.5%
4 Costs for overnight staying of district coordinators (10 nights per month, 1000 MTs/night, 10,000 Mts/month/coordinator)
5 Costs of travel for the coordinator: 6 national flights/year to Maputo 300 US$ each, two international flights/year to Accra 2000 US$ each. In addition to this per diems of 30 US$/night for 18 nights in Maputo, 180 US$/overnight for 16 nights in Accra
6 The salaries of the extentionists are paid by INCAJU or MINAG. Each extentionist is assisting the field days of each facilitator he supervises two times during one training month. There will be 10 training months per year.
7 The training in year 1 will include 6 project staff members, hence (8+ 6)/10 trainees requiring 1,4 courses at a cost of 25 days/course x 9500 MTs/day
8 Training for extentionists: 5 modules, 5 days each: (a) Planting and diversification; (b) Pruning, weeding; (c) Pest management; (d) Harvest and post harvest (e) Economics of Cashew production
9 Training for facilitators: 4 modules, 5 days each: (a) Planting and diversification; (b) Pruning, weeding; (c) Integrated pest management; (d) Harvest and post harvest.
10 Costs of transport by motorbike (investment 5000 US$, residual value 500 US$ economic live 6 years) depreciation 750 US$/year, fuel 80 US$ /month, maintenance and repairs 50 US$/month, 10,000 /year) 0,15 US$/km or 5 MTs/km. Average distance is about 25 km/visit

3.5 Next Steps

Once this project proposal has been discussed by the authorities concerned and a Project Agreement has been signed, the following steps will have to be initiated to begin the project implementation:

- Establishing a Steering Committee and defining its tasks.
- Selecting implementation partners and reaching agreement on the implementation strategy and procedures.
- Contracting expatriate and local project staff and establishing the office infrastructure.
- Reaching agreements with organisations that can provide trainers.
- **Holding a joint planning workshop with representatives of all stakeholders. Reaching agreement on the planned activities (Plan of Operations for the entire implementation period of 3 years and Plan of Activities for year 1, which should include the following):**
  - Realisation of training for the first groups of extensionists by specialists (international and national) Group size should not exceed 10 people – the course may be split into two or more sections
  - Identifying and forming the *Farmer Field Schools* (localities, members, facilitators, selection of plots for the field demonstrations)
  - Training of the facilitators (20 people per course, modules 1,2,3,4 and 6 above).
  - Activating first *FFS* in the districts.

Apart from these key activities, the project needs to develop additional activities to

- Identify, after approval by *INCAJU*, private sector partners that are interested in the production of seedlings and advise them on the start-up of the activity.
- Support efforts to improve smallholders' access to formal credit.
- Help improve smallholders' access to inputs.

List of Acronyms

ACA	African Cashew Alliance
ACi	African Cashew Initiative
ADPP	Ajuda de Desenvolvimento de Povo para Povo
AIA	Agro Industriais Associados
AICAJU	Associação dos Industriais de Caju
AFD	Agence Française de Développement
CLUSA	Cooperative League of the United States of America
EPV	Estimated Production Volume
FAO	Food and Agriculture Organization
FFS	Farmer Field School
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
ICPM	Integrated Crop and Pest Management
IIAM	Instituto de Investigação Agrária de Moçambique
INCAJU	Instituto Nacional do Cajú
IRR	Internal Rate of Return
M&E	Monitoring and Evaluation
MINAG	Ministério de Agricultura
MT/MTS	Metical/Meticais (Mozambican currency unit)
NGO	Non-governmental Organization
PMD	Powdery Mildew Disease
RCN	Raw Cashew Nuts
SNV	Netherlands Development Organization
SWOT	Strengths, Weaknesses, Opportunities, Threats
TIA	Trabalho do Inquerito Agrícola
USAID	United States Agency for International Development

Notes

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