



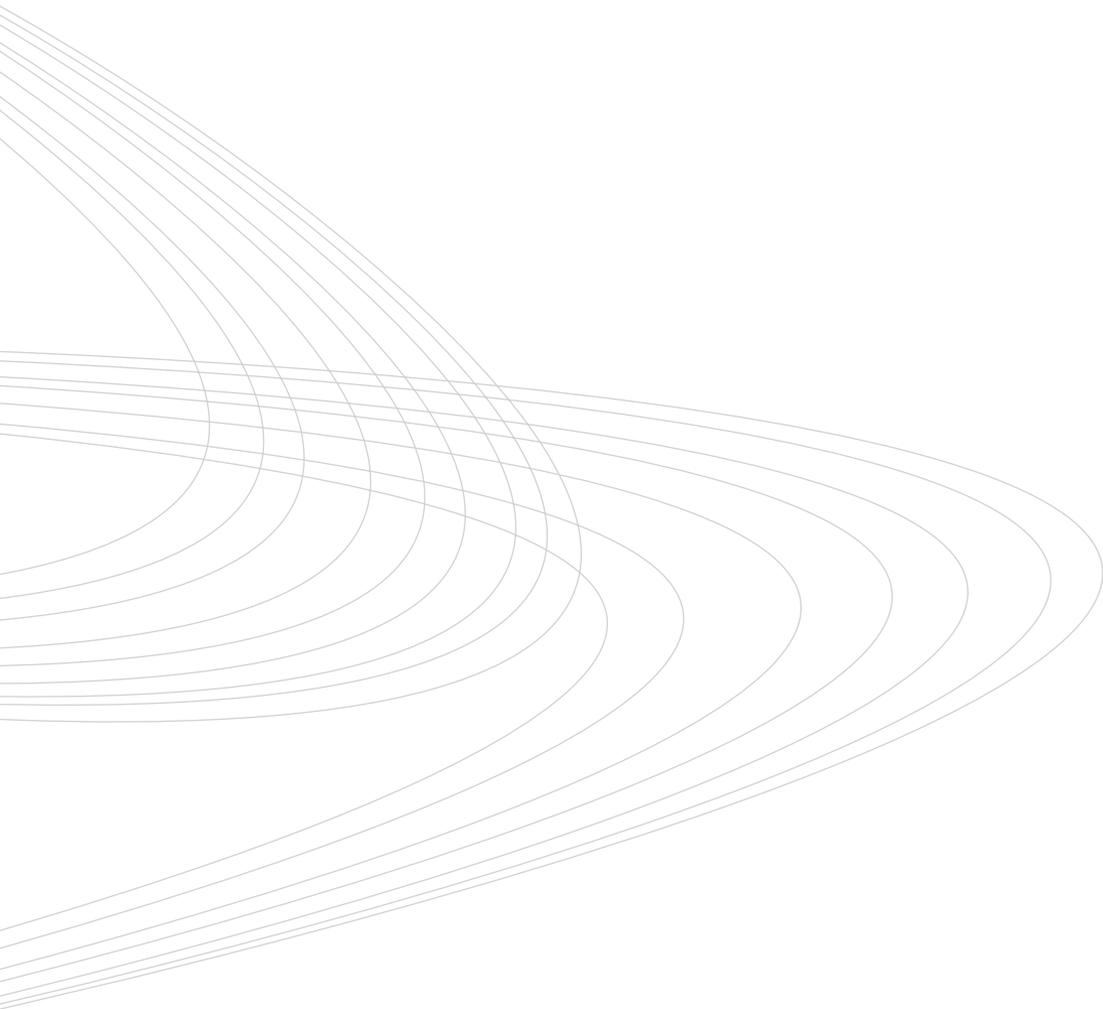
# CASSAVA DISEASES in AFRICA

*a major threat to food security*

**CASSAVA DISEASES**  
in central, eastern and southern Africa (CaCESA)

**Strategic programme framework**  
2010–2015





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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
Rome, September 2009

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## Abbreviations and acronyms

|          |   |
|----------|---|
| ACMV     | Africa cassava mosaic virus   |
| ASARECA  | Association for Strengthening Agricultural Research in Eastern and Central Africa |
| CAADP    | Comprehensive Africa Agricultural Development Programme                           |
| CaCESA   | Cassava diseases in central, eastern and southern Africa                          |
| CABI     | Centre for Agricultural Biosciences International                                 |
| CATISA   | Cassava transformation in southern Africa   |
| CBSV     | Cassava brown streak virus  |
| CEMAC    | Central African Economic and Monetary Community                                   |
| CIAT     | International Center for Tropical Agriculture                                     |
| CMV      | Cassava mosaic virus  |
| COMESA   | Common market for Eastern and Southern Africa                                     |
| CRS      | Catholic Relief Services  |
| ECHO     | Humanitarian Aid department of the European Commission                            |
| EACMV    | Eastern Africa cassava mosaic virus   |
| EACMV-Ug | Ugandan variant of the eastern Africa cassava mosaic virus                        |
| EMPRES   | Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases |
| FAO      | Food and Agriculture Organization of the United Nations                           |
| FCC      | Food Chain Crisis Management Framework  |
| FCC-EMU  | Food Chain Crisis – Emergency Management Unit                                     |
| FEWS NET | Famine Early Warning Systems Network  |
| GIS      | Geographic Information System   |
| GLCI     | Great Lakes Cassava Initiative  |
| IDMC     | Internal displacement monitoring centre   |
| IDP      | Internally displaced person   |
| IITA     | International Institute of Tropical Agriculture                                   |
| KEPHIS   | Kenya Plant Health Inspectorate Service   |
| LoA      | Letter of Agreement   |
| MDG      | Millennium Development Goal   |
| MoA      | Ministry of Agriculture   |
| NARS     | National Agricultural Research Systems  |
| NGO      | Non-governmental organization   |
| QMP      | Quality management protocols  |
| SOFI     | State of Food Insecurity  |
| TCE      | Emergency Operations and Rehabilitation Division, FAO                             |
| UN       | United Nations  |
| UNDSS    | United Nations Department of Safety and Security                                  |
| UNHCR    | United Nations High Commissioner for Refugees                                     |

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A government agricultural extension officer showing a farmer how to care for the cassava plant

Credit: FAO/J. Spaull

## EXECUTIVE SUMMARY

This regional strategic programme framework, entitled “**Cassava diseases in central, eastern and southern Africa**” (CaCESA), has been prepared by the Food and Agriculture Organization of the United Nations (FAO). It aims to assist countries affected by cassava pests and diseases. These are significantly affecting groups such as internally displaced persons (IDPs), returnees and the vulnerable whose food security is threatened.

CaCESA is designed to assist vulnerable farm families in selected districts of 15 countries<sup>1</sup> in central, eastern and southern Africa. These countries are categorized in two groups: (i) countries already affected by the Ugandan variant of eastern Africa cassava mosaic virus (EACMV-Ug) and cassava brown streak virus (CBSV) diseases and where some mitigation activities are ongoing (Burundi, Congo, Democratic Republic of the Congo, Kenya, Rwanda, Tanzania and Uganda); and (ii) countries threatened by the spread and progress of cassava diseases (Angola, Central African Republic, Gabon, Malawi, Mozambique, Sudan, Zambia and Zimbabwe).

The overall outcome of activities undertaken in the CaCESA initiative will be the improved production and productivity of cassava. The programme proposes five outputs relating to:

- supply of healthy cassava stems to vulnerable families;
- wide and comprehensive awareness campaigns, sensitization and publicity;
- national and regional coordination of stakeholders in the cassava commodity value chain;
- better cassava growing, processing and conservation practices; and
- control and management of the spread of the disease, whether this is due to an insect vector and/or spread of infected cassava stems.

These outputs require capacity building at different levels to enable their accomplishment. This will be achieved through activities implemented according to the situation on the ground and the strength of both the government and non-governmental organizations.

Overall, some 17 activities are identified as options for implementation. The total combined budget for a full programme over five years (2010–2015) for the 15 countries is estimated at USD 112.5 million. Considerable contributions to the achievement of the five outputs are already being made by projects and in-kind contributions from some of the governments affected. The programme framework complements existing projects and programmes and promotes common approaches to dealing with cassava pests and diseases in the region.

<sup>1</sup> Countries included in the CaCESA framework: Angola, Burundi, Central African Republic, Congo, Democratic Republic of the Congo, Gabon, Kenya, Malawi, Mozambique, Rwanda, Sudan, Tanzania, Uganda, Zambia and Zimbabwe



A cassava plant resistant to the African cassava mosaic virus

Credit: FAO/G. Napolitano

## PART I – BACKGROUND

The regional strategic programme framework for Cassava diseases in central, eastern and southern Africa (CaCESA) covers 15 countries<sup>1</sup> (see Figure 1). The population of the area is around 290 million people, a significant proportion (estimated 20–25 percent) of which uses cassava as a staple. The local importance of cassava depends on the role it plays with other food crops in local diet and food basket. Cassava being a staple crop, cassava diseases have an immediate impact on food supply. In some districts, food shortage and insecurity have reached the point where farm families require external assistance.

In this situation, vulnerable people who use cassava as a major food crop can be helped to recover from displacement and/or shocks in a sustainable manner only if they can access good quality and disease-free planting material. This requires solid services for breeding and releasing new varieties, capable arrangements for clean stem multiplication and the capacity for local disease control under an improved field production system.

1

### Some statistics for the countries included in the CaCESA framework:

- Total population: 291 800 000<sup>2</sup>
- IDP: 5 598 000<sup>3</sup>
- Refugees: 1 598 000<sup>4</sup>
- Poverty incidence: 51 percent average<sup>5</sup>
- Proportion of undernourished: 39.5 percent<sup>6</sup>
- Vulnerable population exceeds 30 million<sup>7</sup>. These are persons who are at risk of becoming food insecure under exposure to risk factors and stressful situations

<sup>1</sup> Countries included in the CaCESA framework: Angola, Burundi, Central African Republic, Congo, Democratic Republic of the Congo, Gabon, Kenya, Malawi, Mozambique, Rwanda, Sudan, Tanzania, Uganda, Zambia and Zimbabwe

<sup>2</sup> The State of Food Insecurity (SOFI) 2008

<sup>3</sup> Internal displacement monitoring centre (IDMC)

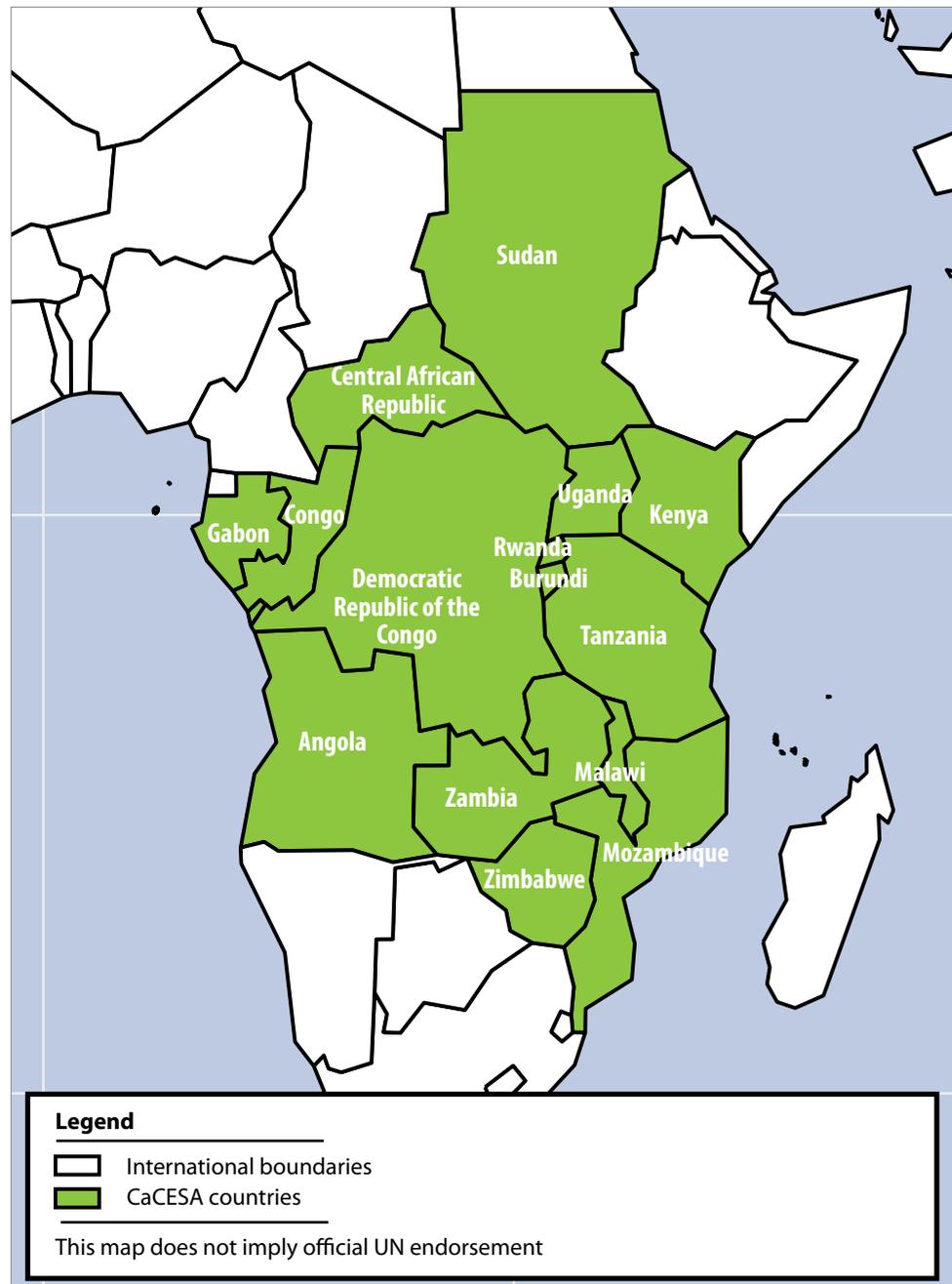
<sup>4</sup> United Nations High Commissioner for Refugees (UNHCR)

<sup>5</sup> SOFI 2008

<sup>6</sup> World Bank

<sup>7</sup> Food and Agriculture Organization of the United Nations (FAO) and Famine Early Warning System Network (FEWS NET)

Figure 1: CaCESA countries



2

## 1.1 Vulnerability<sup>8</sup> in the region

Despite sustained humanitarian efforts, 115 million people across the 15 countries targeted by the CaCESA remain undernourished.

Precarious livelihoods and a succession of crises, both natural and human-induced, have displaced millions, eroded coping capacities and affected the resilience of communities.

There is a growing need for new strategies and greater collaboration among all humanitarian partners to achieve a sound emergency situation analysis and response. A stronger focus is needed on building resilience in order to assist vulnerable populations who are no longer able to restore their own livelihoods.

3

Table 1: Estimate of IDPs and refugees by country included in the CaCESA and proportion of undernourishment

| Countries                        | Population <sup>9</sup> | IDPs <sup>10</sup> | Refugees <sup>11</sup> | Proportion of undernourished in total population 2003–2005 <sup>12</sup><br>% |
|----------------------------------|-------------------------|--------------------|------------------------|---|
| Angola                           | 15 600 000              | < 19 000           | 12 069                 | 46  |
| Burundi                          | 7 600 000               | Undetermined       | 24 468                 | 63  |
| Central African Republic         | 4 100 000               | 108 000            | 7 535                  | 43  |
| Congo                            | 3 500 000               | < 7 000            | 38 472                 | 22  |
| Democratic Republic of the Congo | 56 900 000              | 1 400 000          | 177 390                | 76  |
| Gabon                            | 1 300 000               | Undetermined       | 8 826                  | -   |
| Kenya                            | 34 700 000              | 300 000            | 265 729                | 32  |
| Malawi                           | 12 900 000              | Undetermined       | 2 929                  | 29  |
| Mozambique                       | 20 100 000              | Undetermined       | 2 767                  | 38  |
| Rwanda                           | 9 100 000               | Undetermined       | 53 577                 | 40  |
| Sudan                            | 36 900 000              | 1 935 000          | 222 722                | 21  |
| Tanzania                         | 37 500 000              | Undetermined       | 435 630                | 35  |
| Uganda                           | 28 000 000              | 869 000            | 228 959                | 15  |
| Zambia                           | 11 300 000              | Undetermined       | 112 931                | 45  |
| Zimbabwe                         | 13 000 000              | 960 000            | 3 981                  | 40  |
| <b>Total</b>                     | <b>291 800 000</b>      | <b>5 598 000</b>   | <b>1 597 985</b>       |   |

<sup>8</sup> **Vulnerability** refers to the full range of factors that place people at risk of becoming food insecure. The degree of vulnerability for an individual, household or group of persons is determined by their exposure to the risk factors and their ability to cope with or withstand stressful situations

<sup>9</sup> SOFI 2008

<sup>10</sup> IDMC, December 2008; UNHCR, December 2008

<sup>11</sup> IDMC, December 2008; UNHCR, December 2008

<sup>12</sup> SOFI 2008

## 1.2 Importance of cassava in the region

Cassava is produced mostly by smallholders on marginal and sub-marginal lands in the humid and semi-humid tropics. It is efficient in carbohydrate production, adapted to a wide range of environments and tolerant to drought and acidic soils. In Africa, an estimated 70 million people are dependent on cassava as a primary source of food contributing over 500 kcal<sup>13</sup> per day per person.

In the targeted 15 countries, over 4 million people live in districts of high cassava production<sup>14</sup>. Often these are among the most remote and poorest areas. Cassava has a reputation as a poor person's crop, a crop of last resort, though it is also stigmatized due to the toxicity of certain varieties if they are not properly prepared.

Cassava's importance for food security in the region is attributable to its intrinsic character. Cassava is tolerant to drought and can generate acceptable yields even on depleted and marginal lands. In the event of civil strife, cassava can remain in the soil and untended, and normally be harvested later without major qualitative deterioration. Cassava is not usually easy to loot or steal in large quantities because of the labour for harvesting and the need to carry heavy roots from the field coupled with the processing requirements, and so will continue to be available even after temporary displacement of the household. Also, the crop does not require the use of expensive inputs such as fertilizer or purchased seeds (it is vegetatively propagated, usually by the farmer taking their own cuttings).

When compared to other cassava producing regions such as West Africa or Latin America, yields in central, eastern and southern Africa tend to be lower. Of the countries in the region producing over 500 000 tonnes per year, Central African Republic, Zambia, Rwanda, Mozambique and the Democratic Republic of the Congo stand out as below the regional average of 8.8 tonnes/hectare. Annex 1 provides the cassava productivity and production in 2007 for the 15 countries targeted by CaCESA.

<sup>13</sup> SOFI 2008

<sup>14</sup> FAO estimates

Also, the full range of potential uses of cassava is under-exploited in central, eastern and southern Africa. In some countries (notably Malawi and Zambia) there are programmes to promote further development of the cassava production sector, as an alternative to maize in increasingly drought-prone conditions, with investments in post harvest treatment facilities, and marketing, but these are in their initial stages.

## 1.3 Cassava related diseases



Leaves of a healthy cassava plant

The shrunken and discoloured leaves of a cassava plant sick with CMV

Credit: FAO/G. Napolitano

In addition to wide variations in productivity, the whole cassava production system in the Great Lakes region is under serious threat from new strains of cassava viruses, such as the Uganda variant of the East African Cassava Mosaic Virus (EACMV-Ug) and CBSV. These are just the latest in a long line of strains of disease affecting cassava crop (with new variants appearing in 1983, 1993, 1997, 2004). Although timing is not regular, depending on biological events and conditions such as area under cultivation and climatic factors, it seems that major new diseases or strains of cassava disease tend to appear every 7–10 years.

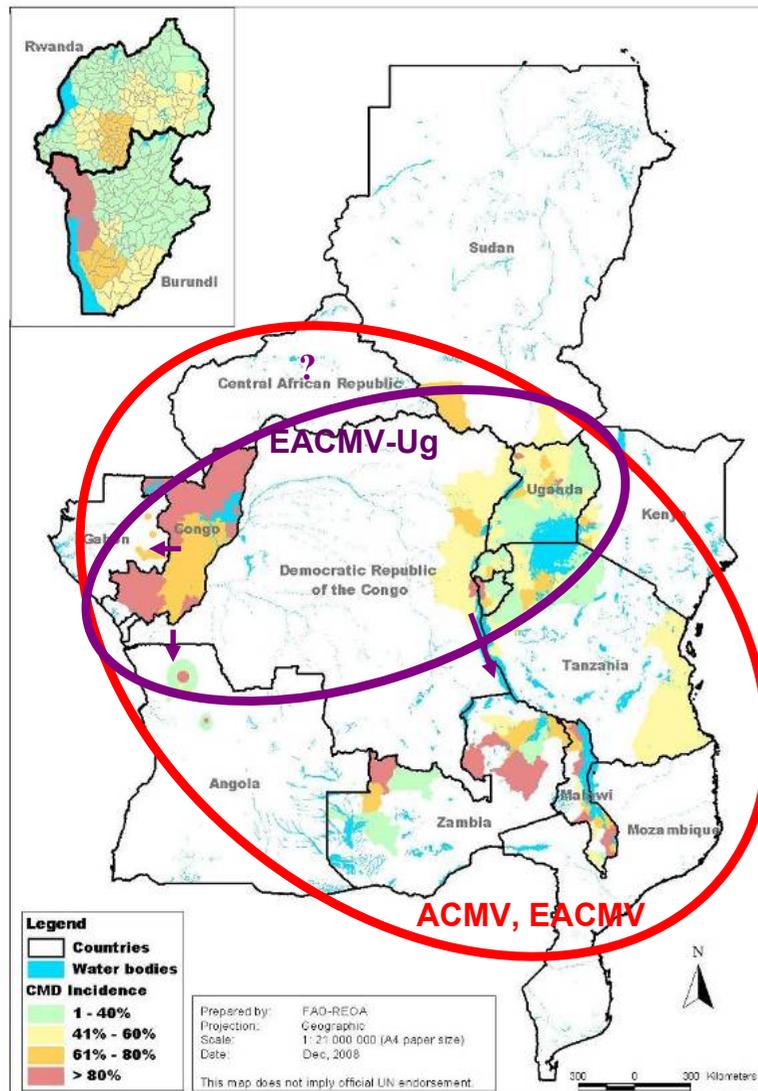
The two current viral diseases, spread by a whitefly vector (*Bemisia tabaci*) and the movement of planting materials, now pose a severe threat to cassava culture in many areas in the region. According to researchers at the National Agricultural Research Organisation (NARO), Uganda, there has been a significant increase in the density of whitefly populations in recent years, to the extent that whitefly has in itself become a crop pest causing damage to cassava leaves as well as being a disease vector. Maps showing the extent of the spread of the various strains of cassava mosaic virus (CMV), and CBSV among the 15 countries are able to show that the epicentre for the newest strain of CMV has reached the southern parts of Burundi. At the local level, the spread pattern is not regular and is not predictable, which suggests that movement of planting material is a factor in the spread, particularly if the stems are not of the highest quality and health status.



Akena is a disease resistant variety of cassava grown in the field

Credit: FAO/C. Ferrand

Figure 2: CMV incidence (various strains) in eastern, central and southern Africa in 2008



Source: Adapted by FAO from various IITA reports.

Figure 2 shows (purple) that the most severe variant (to date) of CMV, the EACMV-Ug, has spread from Uganda to devastate cassava production throughout the Great Lakes region, reducing cassava yields of affected farms by up to 80 percent, and the disease appears to be moving southwards. The spread of the disease has been accelerated by the transport of vegetative material by population displaced as a result of conflicts. Another effect of the conflicts in the Democratic Republic of the Congo and Burundi is that communities cut off from government services have been unable to organize large-scale, coordinated responses to the disease. Figure 2 (red) also shows the broader area which is affected by the previous strains of CMV, namely the EACMV and the Africa cassava mosaic virus (ACMV).

Figure 3: Distribution of CBSV in eastern, central and southern Africa in 2008

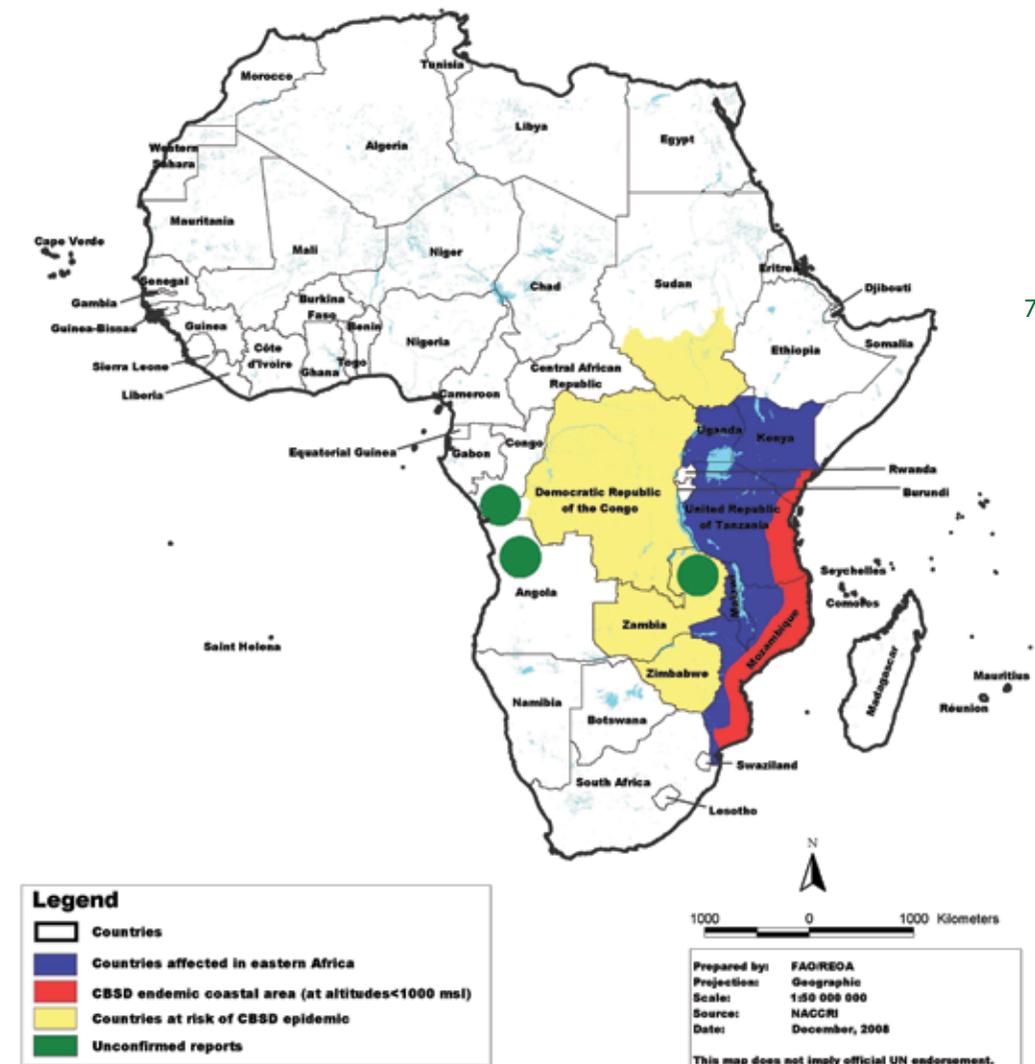


Figure 3 illustrates the distribution of CBSV, a viral disease spread mainly through infected planting materials. Symptoms can affect leaves, stems and roots. CBSV is more difficult to diagnose. Definitive signs of root damage appear late, making early positive identification of the disease difficult. Again losses can be close to total in affected fields. Previously (from the 1930s), CBSV was known only in lowland and coastal east Africa (below 800 metres above sea level) and along the shores of Lake Malawi. Since 2004, there have been worrying reports of CBSV at higher altitudes in Uganda, western Kenya and north-western Tanzania (Great Lakes Cassava Initiative [GLCI] 2008). In some cases, e.g. Ukerewe (Lake Zone, Tanzania), the impact of the latter has had a devastating effect.

For the time being, the replacement or substitution of cassava varieties susceptible to viral diseases with varieties tolerant or resistant to these diseases has been the main direction favoured by national agricultural research institutes and the International Institute of Tropical Agriculture (IITA). At the same time, large-scale distribution of planting materials also has the drawback that it tends to reduce the diversity of varieties grown in large areas,

and that this in turn can render the cassava production system more susceptible – sooner or later – to subsequent pests and diseases. A combination of short- and longer-term options is therefore required to address the immediate needs of rural populations as well as to ensure long-term sustainability of the crop and preserve biodiversity.

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### CMV symptoms on cassava plants

notably discolouration of leaves; root yield is dramatically reduced



Credit: FAO/C. Ferrand

9

### CBSV disease symptoms on cassava plants and roots

leaves and stem show limited symptoms but roots are damaged and unusable



Credit: IITA

**Table 2: Cassava disease status by country (in CaCESA)**

| Countries                        | Affected by Ug-EACMV | Affected by CBSV | Affected by a previous strain of CMV |
|----------------------------------|----------------------|------------------|--------------------------------------|
| Angola                           | X                    | X                | X                                    |
| Burundi                          | X                    |                  | X                                    |
| Central African Republic         |                      |                  | X                                    |
| Congo                            | X                    |                  | X                                    |
| Democratic Republic of the Congo | X                    | X                | X                                    |
| Gabon                            | X                    |                  | X                                    |
| Kenya                            | X                    | X                | X                                    |
| Malawi                           |                      | X                | X                                    |
| Mozambique                       |                      | X                | X                                    |
| Rwanda                           | X                    |                  | X                                    |
| Sudan                            | X                    |                  | X                                    |
| Tanzania                         | X                    | X                | X                                    |
| Uganda                           | X                    | X                | X                                    |
| Zambia                           |                      |                  | X                                    |
| Zimbabwe                         |                      |                  | X                                    |

## 1.4 Current cassava disease programmes

Given the severity of the current cassava disease outbreaks and the threat they pose to the food security of millions of people, a number of donor-funded cassava disease programmes have been operational within disease-affected areas of Burundi, the Democratic Republic of the Congo, Kenya, Rwanda, Tanzania and Uganda. In particular:

a) The FAO Regional Cassava Initiative, sponsored by the Humanitarian Aid department of the European Commission (ECHO), involves: (i) the multiplication and distribution of CMV-resistant planting material in five worst-affected countries; (ii) support to country and regional data and information management; and (iii) the basis for improved consensus and coordination mechanisms. The project, implemented in two phases between 2006–2009, works by multiplying and distributing material to primary beneficiaries and then relies on subsequent farmer-to-farmer re-distribution. It is estimated that a minimum of 500 000 households have received improved vegetative material from nurseries in this programme. Furthermore, it is estimated that some 2 000 farmers, individually contracted or engaged in some form of Farmer Field School activity, now have the skills and knowledge to generate planting material.

b) The Great Lakes Cassava Initiative (GLCI), funded by the Bill and Melinda Gates Foundation and implemented by the Catholic Relief Services (CRS), addresses cassava disease in six countries. This programme (2008–2012) covers cooperative research into new varieties, surveillance in partnership with the IITA and also involves multiplication

and distribution of materials, together with communication and farmer awareness activities. By 2012, the programme aims to have provided resistant planting material to over 1.1 million households and transferred skills on disease identification.

c) The United States Agency for International Development is sponsoring a cassava project, implemented by the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). This project (2008–2012) focuses on: (i) developing knowledge on CMV and CBSV diseases; (ii) developing multiplication system for generating quality material of improved varieties; (iii) building capacity on cassava production; (iv) supporting the development of policies and standards for cassava; and (v) scaling-up processing technologies.

d) An IITA project entitled “Integrated protection of cassava from emerging pests and diseases that threaten rural livelihoods”, is meant to increase and sustain cassava productivity and improve livelihoods of farmers through the reduction of crop losses due to pests and diseases in sub-Saharan Africa (2007–2010). This project is sponsored by the International Fund for Agricultural Development.

e) The Common Market for Eastern and Southern Africa (COMESA) is also implementing a programme entitled the Cassava transformation in southern Africa (CATISA). It aims to analyse and help accelerate cassava commercialization in southern Africa in order to help improve food security in the region. CATISA focuses on the rapidly growing commercialization of cassava – an integrated food staple market-shed in which cassava commercialization offers significant potential for improving food security in drought prone areas in five countries, the Democratic Republic of the Congo, Malawi, Mozambique, Tanzania and Zambia. The programme budget of USD 2 million was complemented with start-up funds provided by the Swedish International Development Cooperation Agency.

There are several other local and international non-governmental organizations (NGOs) with varied range and scope of operations ranging from research to development and across districts of the same country to across countries.

The current emergency response strategy has significantly concentrated on large-scale multiplication and distribution of clean planting materials of improved (resistant or at the very least disease-tolerant) varieties, and awareness campaigns.

Even in the absence of total replacement of stocks with improved materials, this approach can work by introducing resistant or tolerant materials alongside traditionally-preferred but susceptible varieties. The result is then to reduce the level of infection and effectively “protect” preferred local varieties.

The programmes have deployed disease-tolerant varieties developed by IITA and tested by national programmes.



A crop of cassava that is resistant to the African cassava mosaic virus

Credit: FAO/ G. Napolitano

## PART II – SITUATION ANALYSIS

### 2.1 Introduction

In early 2009, FAO conducted a regional review of the work on cassava diseases. This review identified areas for improvement to ensure a more holistic approach in efforts to combat cassava diseases. The findings and problem tree presented in Figure 4 are the result of contributions from the people met during a comprehensive assessment and programming mission. It was derived from interviews with farmers, extension workers and administrators in the Ministries of Agriculture in each of the six countries visited (Burundi, Kenya, Malawi, Tanzania, Uganda and Zambia). Reports provided to the team – such as the Kimetrica baseline survey – also contributed to the analysis, while field observations served to confirm these sources.

The resulting analysis has already been presented to several groups of knowledgeable cassava workers and developers, such as during the Entebbe Regional Meeting on Cassava, under the FAO programme in January 2009, to validate and update the analysis in light of their local knowledge and experience. Slight modifications were made to the problem tree as a result of this iterative process.

The review revealed a number of initial and underlying causes including weakness in farmer education and information; lack of institutional capacity on the part of government plant health and extension services; and challenges in the research, release and multiplication of new varieties. The rest of this section looks at some of these cause-and-effect relationships in more detail.

### 2.2 Findings

The main finding of the FAO review was that there is a current and desperate need for clean planting material of improved cassava varieties. This was expressed at all levels from government to farmers, and in each of the countries visited.

In addition, the following points were noted:

- **High disease incidence for both cassava diseases:** the mission confirmed qualitatively the findings from recent surveys of high levels of disease in northern Uganda, central Uganda, south-west Burundi, Lake Zone of Tanzania, Malawi, northern Zambia and central Kenya, among others.
- **Lack of well functioning coordination structures at national level:** for instance, in Burundi a committee exists nominally with representatives of research, government, extension and other stakeholders, but cannot operate in a sustained manner without donor funding; in Uganda no committee exists although in previous cassava disease emergencies (as well as a recent one for banana wilt) one operated quite successfully, possibly a sign of a change in the priority attached to cassava by the different stakeholders.
- **Growing coordination exists between the two main programmes (FAO/ECHO and GLCI) at working level:** there is however currently no steering mechanism to keep these programmes under review. They are essentially accountable only through their periodic donor evaluations.
- **Lack of farmer participation in varietal selection:** in some cases cassava varieties are being released, which fail to be adopted by farmers; this can be attributed to the lack of involvement of farmers in the selection process and/or lack of consultation regarding preferences/palatability. Not adopting improved material increases overall disease pressure on traditional varieties. Ultimately it also represents a waste of the resources devoted to developing and testing the cassava variety by researchers.
- **Variable quality of planting materials distributed:** within the multiplication and distribution programmes for improved planting materials, cuttings are not always taken correctly using an appropriate tool, resulting in damage (splitting the cutting dries it out) and the distribution of cuttings which will not germinate. There was also evidence of poor handling and labelling of material to be distributed.
- **Long distances from multiplication sites to beneficiaries:** infrastructure constraints are a major problem in rural areas throughout the region and pose a serious problem for farmers needing to obtain planting materials. Long distances by road in such conditions again result in damaged cassava cuttings.
- **Need for improved field practices:** spacing of planting, handling cuttings, use of fertilizer or manure where these are available, weeding and field hygiene all left room for improvement. It seems that in some areas traditional cassava production knowledge has been lost, due to displacement of populations and extended periods away from farming, to migration of young adults, or to loss of labour capacity due to diseases such as AIDS.
- **Need for a better understanding and when appropriate for wider adoption of farmer coping strategies:** in the absence of disease resistant material, coping strategies for mitigating the impact of cassava diseases were much in evidence. These range from harvesting early to avoid CBSV damage (although this reduces eventual yield by as much as 50 percent and places an additional burden on those involved in post harvest processing), cleaning the white portion from CBSV affected roots, consuming

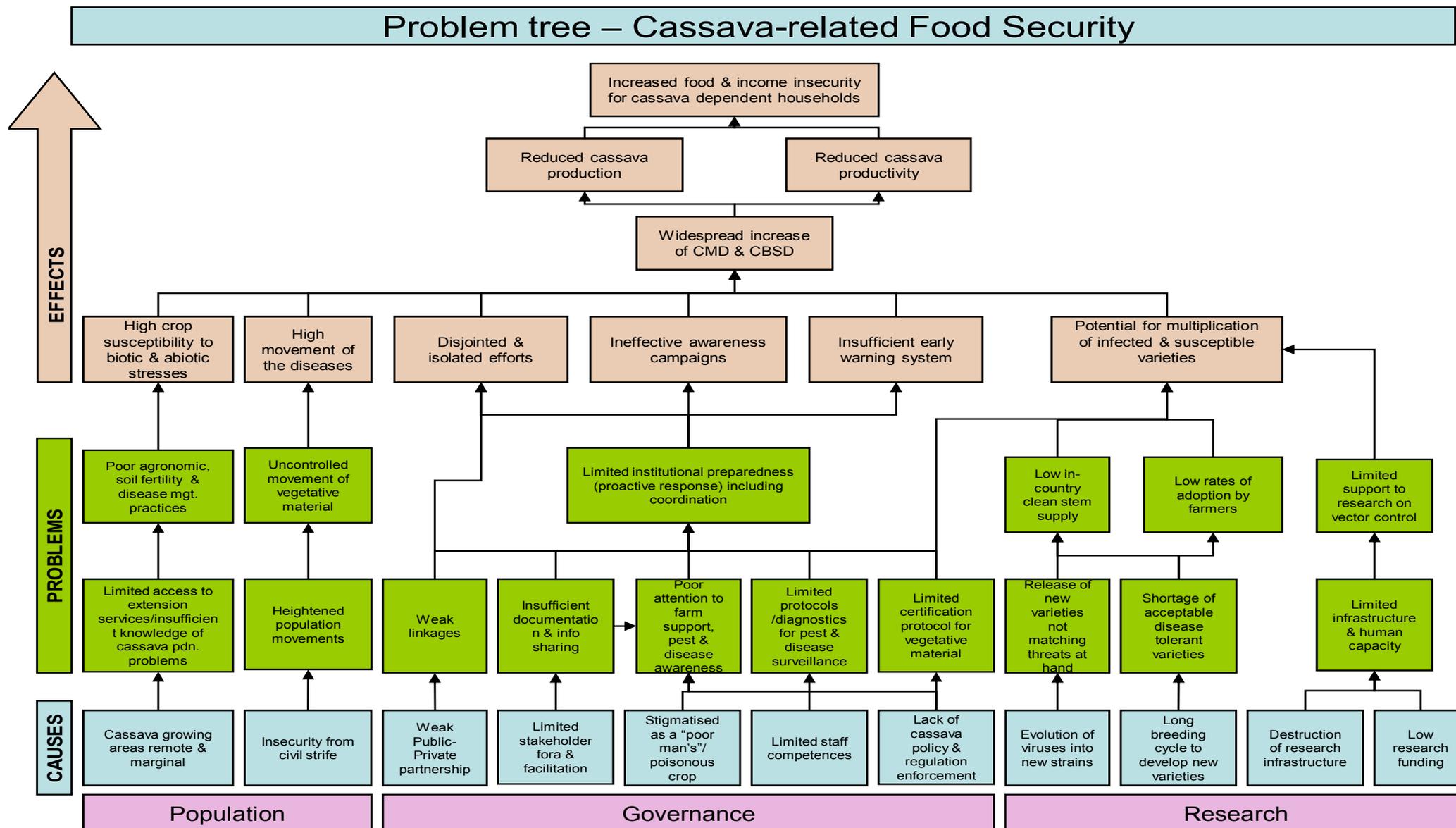
CMV affected parts (leaf), switching to other crops (usually millet), and ultimately migration. There is a pressing need for better understanding of the coping strategies within the overall context of the production system in the affected regions.

- **Lack of systematic surveillance of multiplication sites:** surveillance of multiplication sites is essential to ensure that only “clean” (disease-free) planting material is distributed. Where surveys are being done these are infrequent and they tend not to sample by variety but use a composite sample for a site, which reduces their usefulness. In the absence of adequate resources for surveillance (training, testing, logistical support, etc.) sampling protocols may not be followed as systematically and rigorously as would be expected, and there is always the possible risk of cross contamination. There is still limited capacity for laboratory testing for CBSV and EACMV within the region. Delays between sampling and issuing test results discourage local efforts to help farmers. Material should not be distributed before results are available but this is difficult to control.
- **Lack of more general surveillance:** there is an urgent need for development of a field test to give an immediate result for CBSV and EACMV (for subsequent confirmation by laboratory). This would help with controlling multiplication sites, but also establishing the extent of the spread of the disease beyond the multiplication sites and understand better the spread of the two diseases. Surveillance should also include data collection on whitefly incidence to test the assumption of its role as a potential short range vector. Such a test could also be used at multiplication sites. The benefit would be that management decisions could be taken on the ground without delay.
- **Little or no awareness material on the diseases:** extension services appear to be underfunded to deal with a crisis of such magnitude. Farmers seemed unaware of the risks of uncontrolled movement of cassava stem/cuttings across borders. In some cases the diseases were not recognized as such by farmers, particularly CBSV, which was referred to as general “rotting” (similar to normal cassava post harvest deterioration).
- **Low government priority for cassava:** maize is the chief food crop in several countries of the region. While cassava contributes a significant share of food calories, it has tended to enjoy relatively little official (government) support. Cassava has not been a priority in national programmes of research or multiplication and distribution of planting material. Nor does cassava enjoy any subsidy on inputs for its production (unlike maize). Even the variety release and plant protection mechanisms of the Ministries of Agriculture are not aligned to the speed or expediency of the issues they seek to tackle. In some countries, crop variety release arrangements are very slow, forcing farmers to adopt whatever variety they prefer after the on-farm trial stage, usually many seasons before government approval for release comes.
- **A food emergency situation requiring both immediate and longer-term response:** some of the projects addressing cassava diseases in the region have been implemented based on short-term, emergency or humanitarian funding, often with a 12-month time horizon. Increasing resilience of the cassava sector – directly linked to mitigating future emergencies – actually requires both immediate action and longer-term, coordinated activities.

### 2.3 Problem analysis

It is possible to organize this very diverse set of findings into a problem tree (Figure 4), presenting observed effects and drawing out the underlying causes (to varying degrees). In this analysis the focus is mainly on cause and effects associated with immediate production constraints, which affect food availability, and ultimately food security.

Figure 4: Problem tree analysis of cassava dependent vulnerable population



**Effect 1: High crop susceptibility due to a range of poor field practices.** Evidence of poor field practices was found in each of the countries studied – including the use of premature cuttings and poor field sanitation among others – and in most cases the farmers could not relate this to their expected yields. Extension services are under-resourced and tend to focus on ‘high potential’ crops other than cassava. Farmer adoption rates of new varieties are low with the result that disease spread is unchecked. Adoption rates are linked to farmer involvement in selecting varieties for multiplication. Good crop planting techniques were not practiced on the sandy soils of lakeside region of Malawi. Spacing of plants in a cassava plot was the same as for maize, the crop on which extension agents were most active.

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Cassava growing districts tend to be the more remote ones which may heighten a sense of isolation; infrastructure investments would solve part of the problem of remoteness (beyond the scope of the programme), but redesign and introduction of incentives for delivery of good quality cassava-related extension services in these areas should also be considered by the appropriate authorities.

**Effect 2: High levels of movement of diseases:** The free movement of vegetative material within the countries and across borders accelerates the spread of cassava diseases. Though often carried in small quantities which do not attract attention of the authorities, the numerous movements are sufficient load to create nuclei of disease spread. This was specifically observed on the Democratic Republic of the Congo-Burundi-Rwanda border. More conscious local movement included the deliberate introduction of preferred varieties found elsewhere, without realising the risk such movements pose (seen in Tanzania from the coast to the lake zone; also the specific introduction of the variety Mbundumali from Malawi to Zambia).

In Burundi advanced refugees scout out locations to settle, and then others arrive with planting materials, equipment, operating outside the official resettlement programme. Reducing risky informal movement of materials requires better awareness of the risk, coupled with increased availability of improved planting material to avoid the necessity to transport informally. Countries have also attempted to apply internal quarantine measures but these have had limited success.

**Effect 3: Disjointed and isolated efforts:** Many development partners, research organizations, NGOs and national authorities are currently involved in efforts to control EACMV and CBSV, but this is often not well-coordinated. In practical terms, the lack of coordination shows up in terms of (i) gaps and overlaps in the location of multiplication sites; (ii) multiplication of wrong varieties; (iii) contradictory technical messages being given to farmers; and (iv) conflicting targeting criteria, etc. The problem is both communication and planning/ensuring the technical quality of the work of many different actors.

In the case of CBSV, the current geographical range of disease spread already reaches beyond the scope of the FAO/ECHO and GLCI projects. For instance, the neighbouring countries known to be affected include Angola, Malawi, Mozambique and Zambia, none of which are currently covered by a programme, although local NGOs are engaged in the promotion of the crop in the southern part of Zambia.

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**Effect 4: Poor or lacking campaigns on awareness of cassava diseases:** It was clear that a number of the farmers encountered were unaware of the diseases; particularly CBSV, due to the absence of symptoms on leaves and stem. There were few signs of leaflets, posters or the other items commonly associated with public awareness campaigns. This situation of low awareness is partly the result of long-term under-investment in extension, lack of documentation and sharing of practices, and lack of a strong coordinated lead by the authorities. The fact that researchers but not farmers are aware of the threat of CBSV may be a symptom of weak research-extension linkages in some of the countries in the region.

**Effect 5: Absence of early warning or monitoring systems:** Facilities and structures for collecting, collating, analysing and interpreting disease-related information do not appear to be functional in the countries covered so far. Without data, early warning of impending risks cannot be provided to the concerned groups of farmers and communities growing cassava, and there is no scope for preventive action in terms of planting and/or choice of variety.

To date there has been little systematized record keeping on disease occurrence or information transmission to a central point for collation, analysis and interpretation. Further, the associated sufficient logistical support – bicycle, motorcycles, fuel for frontline agents to cover their respective zones of supervision – are usually not available. Consequently, the intention (or mandate) to monitor disease situation may exist but, in practice, inadequate resources undermine this objective. In the absence of effective data collection, effective channels for the transmission of early warning messages locally, based on data analysis, are also missing.



Cassava cuttings being transported by bicycle in Burundi

Credit: FAO/G. Napolitano

**Effect 6: Potential for multiplication of infected and susceptible varieties:**

The very low multiplication rate of the crop (8–10 cuttings per plant per year), bulkiness, and high perishability of cassava planting materials make their multiplication and distribution more expensive than conventional (grain-based) seed services. Consequently, farmers do not care to specifically multiply stems but use the stems that come as a secondary product from a normal cassava root production field. Thus, the stem is not targeted and as such any variety cultivated for their use is the source of their stems. In an IITA study in southern Sudan, about 85 percent of all cassava stems come from the field of the farmers themselves, their neighbour or relatives (Ntawuruhunga et al. 2007).



Cutting stems at a cassava multiplication site Credit: FAO/C. Ferrand

At the same time subsistence farmers usually do not have the means to pay for planting material. The private sector has not participated in the multiplication and supply of cassava for these reasons. There is a need to encourage the development of a limited local private sector. Encouraging the involvement of progressive farmers or former field school participants in the local production and distribution of cassava planting materials could be a means of insuring the cassava production system (against future disease threats) and serve as a local form of agricultural extension/self-help service.

There is an absolute need to extend the geographical coverage of existing plans for multiplication of cassava planting material beyond that covered by the two ongoing large programmes by FAO and CRS. The current spread of the disease far exceeds the capacity of existing mitigation plans.

Field action is limited to a few districts where the available resources are used according to donor-approved budgets; not all areas of the countries involved are covered. The presence of cross border movement of stem and products (referred to above) is an indicator of local shortages of planting materials. Projects and programmes should aim to intensify local stem supply.



Cassava cuttings packed for distribution Credit: FAO/C. Ferrand



Distribution of cassava cuttings Credit: FAO/C. Ferrand



Malawi – farmer hoeing cassava plants

Credit: FAO/J. Spaull

## PART III – PROGRAMME FRAMEWORK

The CaCESA programme framework suggests how the countries involved can design their national programme based on the nature of the cassava pest and disease situation they face, and the food security and vulnerability situation.

CaCESA is set out in five main sections:

- 3.1 Vision
- 3.2 Goals
- 3.3 Outcomes
- 3.4 Outputs
- 3.5 Programme activities

### 3.1 Vision

The CaCESA programme framework aims to support and enhance the livelihood of vulnerable farming households through better and timely cassava food security interventions in order to mitigate hunger.

In the longer term, the cassava production system in central, eastern and southern Africa should be characterized by the following:

- farmers generating more income out of their cassava production, producing more root, and added-value products;
- farmers developing, adopting and sharing good production and pest management practices;
- a national and regional pest and disease early warning system in place minimizing the impact of pests and diseases (in terms of fewer farming households affected, less badly or for shorter periods);
- resilience at local level with farmers able to withstand shocks to production of cassava caused by new pests or diseases, with conscious and planned coping strategies; and
- coordination involving all stakeholders seeking to find new palatable disease-resistant and high-yielding varieties.

This represents a vision for the longer-term development of the sector; some items are relevant for immediate food security, but significant progress towards these longer-term ends may require 3–5 years or longer.

### 3.2 Goal

The overall goal of the CaCESA programme framework is to assure food and income security for cassava-dependent vulnerable populations through better control and management of pests and diseases in central, eastern and southern regions of Africa.

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In targeting this goal, CaCESA addresses the human dimension, considering the consequences of population movement, as well as issues of coordination dealing with governance and policy, and of harmonization of the activities of the various actors in the cassava development sector (ministry, extension, NGO, farmers and others). It also includes longer-term crop-related activities from the research domain which can support emergency operations as need arises, for instance in providing new cassava varieties or techniques to deal with specific pests or diseases.

Ongoing projects and activities already contribute to the framework. The framework will be used to identify gaps in provision and can help in the design of more complete interventions in successive phases, if required.

### 3.3 Outcome

The outcome of the CaCESA programme is to increase cassava productivity and production by reinforcing the capacity of the most food insecurity prone subsistence farmers to prevent, mitigate, prepare for and respond to cassava-related diseases in the region.

The outcome of CaCESA will be achieved through a five-pronged strategy which intends to create a conducive environment for sustained food security in disaster-prone areas. First, the programme will address the high demand for healthy cassava vegetative material, both for resettling populations and for farmers affected by cassava diseases. Second, by increasing awareness on cassava-related diseases at all level, the programme will contribute to reducing risky behaviour particularly in the supply of planting material. Third, mechanisms for national and regional coordination are meant to increase knowledge sharing between all stakeholders and institutions, thus leading to highly cost-effective and technically-sound interventions. Fourth, harnessing existing indigenous knowledge on cassava production through participatory exercises will strengthen community-owned management strategies for diseases. Finally, surveillance and early warning networks will be the key to reducing disease progression within and between countries.

Such a strategy should lead to five outputs:

Output 1: Mechanisms for quick multiplication and distribution of clean and tolerant cassava varieties enhanced

Output 2: Awareness and publicity of the impact of cassava diseases, appropriate responses and possible coping strategies at all levels strengthened

Output 3: National and regional coordination strengthened

Output 4: Farmer knowledge and skills on cassava production including pest and disease management aspects strengthened

Output 5: Wide-area disease management improved

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Farmer harvesting cassava

Credit: FAO/G. Napolitano

### 3.4 Outputs

The outputs of CaCESA are designed to have a rapid impact, building on existing and successfully implemented approaches and systems. They draw upon the lessons learned since 2006 from the various regional initiatives (see section 1.4 for description of key projects). Building on what already exists provides a rapid start-up of activities and is an important asset in designing a disease mitigation response.

#### Output 1: Mechanism for quick multiplication and distribution of clean and tolerant cassava varieties enhanced

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Any plan to multiply varieties of cassava would engage only varieties that farmers can access (released varieties). Such varieties should be tolerant to the two major diseases (CMV and CBSV). Where CBSV has not been reported or areas with low incidence (suggested less than 20 percent), stems may be multiplied and distributed in ways that preserve the wholeness of the stems or cuttings when they reach the grower. Each country must make an explicit choice of what is in the best interest of its vulnerable people, which implies the creation of effective national coordination (see Output 3). However, if nothing is done, farmers will do something to survive, even if it risks worsening the situation.



Villagers peeling cassava. Each person in Africa eats around 80 kg of cassava per year

Credit: FAO/G. Napolitano

#### Output 2: Awareness and publicity of the impact of cassava diseases, appropriate responses and possible coping strategies at all levels strengthened

Farmers, frontline extension agents and policy makers in the related ministries need to understand the impact of CMV and CBSV infection, and the strategies to be adopted to sustain cassava production. The means of communication will be different for each group of stakeholders in the cassava production system.

#### Output 3: Regional and national coordination strengthened

Each country differs in their level of central arrangements for discussion of cassava challenges and how to tackle them. Some structures exist but may not function as regularly as expected due to funding problems. This lack of funding is itself the result of lack of priority assigned to the issue by government, hence the need for a major advocacy effort principally by FAO. Regional coordination will involve FAO, CRS, IITA, ASARECA, COMESA, the Central African Economic and Monetary Community (CEMAC) and any other institution or agency with significant stake in the cassava sector in the region.

#### Output 4: Farmer knowledge and skills on cassava production including pest and disease management aspects strengthened

Most of the ongoing efforts have been concentrating on multiplication and distribution of disease-tolerant varieties; relatively little attention has been given to the broader and basic aspects of integrated crop management. However, the impact of the diseases seems to be amplified by the poor husbandry practices. Farmers do not recognize that crop nutrition and field sanitation are also factors in the plant's ability to tolerate disease and improving these areas is also a valid coping strategy in the absence of tolerant or resistant cassava varieties.

#### Output 5: Wide-area disease management improved

The management of disease in this framework relates to two key activities. First there is the need to reduce the spread of cassava diseases, by reducing the movement of stem across different agroecological zones, between countries and within districts of the same country. The second aspect relates to the need for an operational early warning system to be established to gather cassava disease data locally and ensure high quality local advice to all stakeholders particularly to farmers on the appearance, incidence, severity and coping strategies

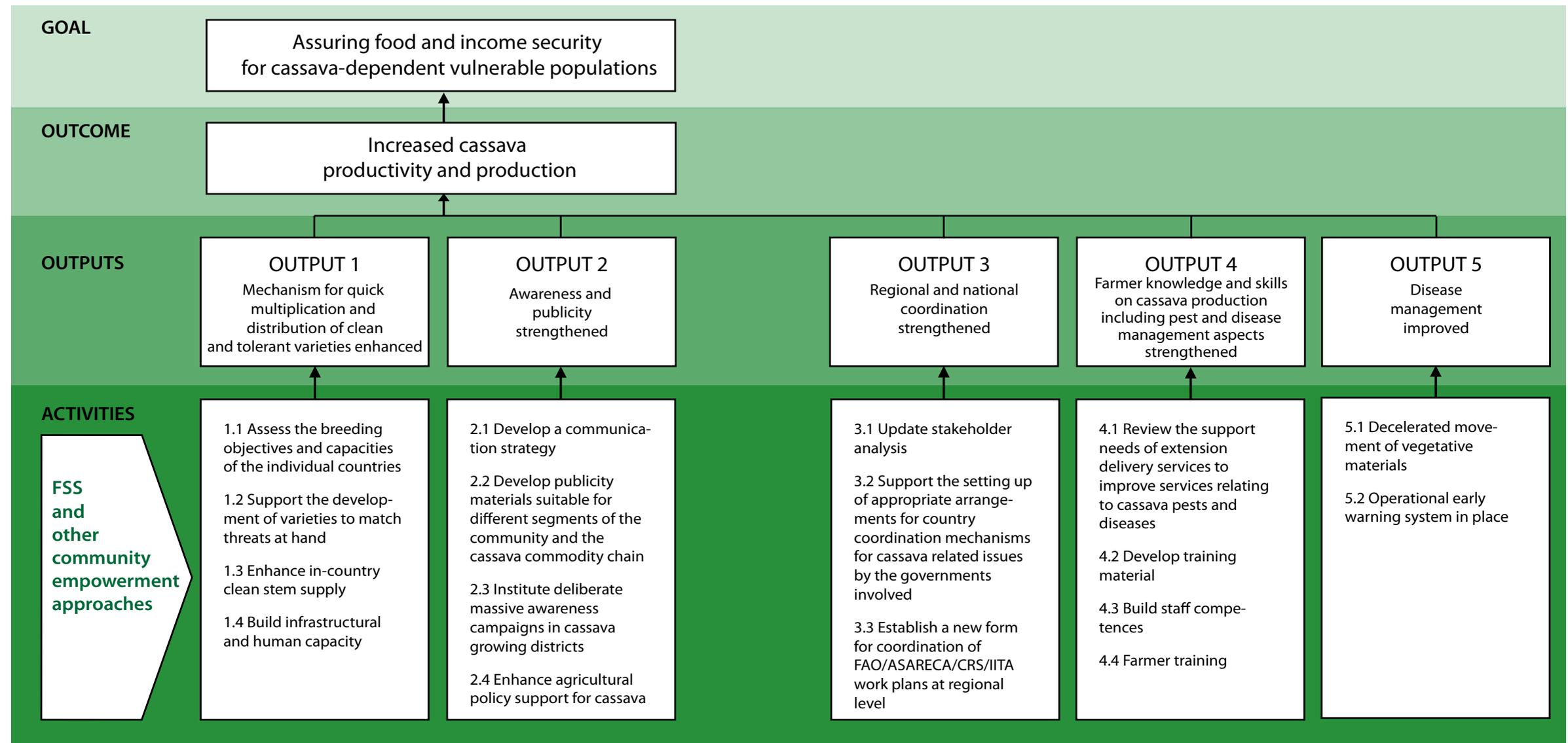
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### 3.5 Programme activities

Each of the five outputs is achieved through activities that can be incorporated in programmes designed under this framework. As stated above, these should be considered a menu of options or even a checklist to review ongoing projects and programmes.

The 15 countries being targeted should consider how each activity may apply to the specific challenges they face. Both the challenges faced and the capacity to face them differ from country to country. Consequently, each participating country should select the activities it can handle to achieve the expected programme outcomes.

Figure 5: Programme objective hierarchy – Cassava-based food security



## **Output 1: Mechanism for quick multiplication and distribution of clean and tolerant cassava varieties enhanced**

In order to improve the in-country multiplication and distribution of clean and tolerant cassava varieties, the following activities will be carried out:

### **Activity 1.1: Assess the cassava breeding objectives and capacities, varietal registration and areas for improvement of the individual countries**

To address scarcity of acceptable tolerant varieties, a broad review of the cassava breeding objectives and capacities, will form a basis for the type of support to the national programmes in order for the release of new varieties to match threats at hand and enhance in-country clean stem supply. Such a review is required immediately, even if the benefit – through subsequent investment in cassava breeding – will be in the long term.

### **Activity 1.2: Support the development of cassava varieties to match threats at hand**

To enhance adoption of new cassava varieties, increased support to on-farm trials and participatory variety selection is needed. This will be coupled with adoption studies to improve understanding of social and economic factors affecting the process.

### **Activity 1.3: Enhance in-country clean stems supply**

Multiplication activities will continue to be supported while stressing the importance of ensuring that material distribution is clean. In close collaboration with implementing partners in the affected communities, the programme will help identify needs for primary, secondary and tertiary multiplication sites based on geospatial considerations to minimize distribution distances.

In cases where disease infection is already present, disease tolerant varieties could be multiplied; where the diseases are not present this should be avoided. To hasten the cleaning and multiplication of identified superior varieties tailored support to the Kenya Plant Health Inspectorate Service (KEPHIS) or any equivalent facilities in the region should be provided on request.

### **Activity 1.4: Build infrastructural and human capacity**

#### **Activity 1.4.1 Publish authoritative guidelines for cassava stem multiplication**

The programme will collate, harmonize and operationalize existing quality management protocols (QMP) and finalize technical guidelines on quality standards for vegetatively propagated crops.

#### **Activity 1.4.2: Conduct annual census and certify quality of material issued at nursery level**

Primary, secondary, tertiary and community level multiplication sites developed with the support of NGOs represent over 70 percent of all multiplication sites at the moment in the targeted communities. There is a need for a mechanism for regular monitoring of multiplication sites.

With the introduction of the certification and quality standard tool, the programme will be able to certify all cassava nurseries or take remedial action where disease incidence, plant density and/or variety result in sub-standard planting material. It should be recognized in the latter case that removal of certification will not necessarily remove the site from the local production system, so the emphasis must be on encouraging producers to comply

rather than punitive sanctions, and that any pressure to comply should be through the intervention of local (village) authorities.

### **Activity 1.4.3: Build capacity for tissue culture**

To meet the demands for clean planting material, the programme will seek to formalize public-private sector partnership in the vegetative seed system. In particular, a review of existing tissue culture laboratories to identify capacity gaps that can be addressed by the programme will be urgently carried out. Tailored capacity building will be carried out for researchers and technicians in plant breeding and plant health.

## **Output 2: Awareness of the impact of cassava diseases, appropriate responses and possible coping strategies at all levels strengthened**

### **Activity 2.1: Develop a communication strategy**

Associated with national contingency planning and early warning is the need to communicate potential threats to producers in a timely manner. The development of national communication strategies – as an element of national coordination (Output 3) – will be supported to ensure consistent and timely information is provided to all key stakeholders.

### **Activity 2.2: Develop publicity materials suitable for different segments of the community and the cassava commodity chain**

To support the diffusion of cassava-related information at all levels, an assortment of awareness and publicity materials suitable for different segments of the community will be needed. The best starting point will be the initial materials developed by ASARECA with the Centre for Agriculture and Biosciences International (CABI).

### **Activity 2.3: Institute deliberate massive awareness campaigns in cassava growing districts**

A deliberate massive awareness campaign is envisaged to provide communities with the basic working knowledge for identifying cassava diseases, preventing the spread of stems from such infected plants and distribution of coping strategies assembled from other locations that have been known to work, as well as preparedness against the use of susceptible cassava varieties and the ready adoption of tolerant varieties. For credibility, such communication should be allied with that of the existing rural development and agricultural extension services, use media accessible to the end user, and focus on what they can practically do either in reporting to a specified pest or disease threat, or measures they can take to safeguard their own crop.

### **Activity 2.4: Enhance agricultural policy support for cassava**

Collate technical, scientific and experiential information from farmers to provide such evidence for policy decision-making, supported by advocacy such as can be provided by FAO. The programme framework will specifically support the preparation of evidence based position document(s) on the contribution of cassava to the national/district food basket. In the longer term there will be a need for value chain analysis for the cassava sector and the development of strategies for investment in post harvest.

### **Output 3: Regional and national coordination strengthened**

#### **Activity 3.1: Update stakeholder analysis**

There is an urgent need to identify and map all projects, programmes, agencies and key staff engaged in cassava programme implementation across the region, including description of their roles and strengths. This has begun through the regional meetings held by the FAO/ECHO project and should be extended and published for the benefit of all working on cassava disease management in the region.

This would require a one-off stakeholder meeting covering the identification of stakeholder analysis, as well as the disease situation, contingency planning and coordination mechanisms for the 15 countries. The meeting should involve from each country at least one person from the research organization with an interest in cassava production systems, and one from the Ministry of Agriculture.

#### **Activity 3.2: Support the setting up of appropriate arrangements for country coordination mechanisms for cassava related issues by the governments involved**

The creation of a national commission for crop pest and disease control in Burundi in 2006 was a major breakthrough in term of coordination efforts to tackle cassava related disease. However, the commission is heavily dependent on external resources. Similar models could be considered in countries threatened or affected by the diseases, in the interests of preparedness and the sustainability of disease management efforts. Advocacy by FAO at the highest levels could help ensure such activities are prioritized when allocating resources. Once the principle of funding for national committees or commissions is endorsed and lead persons/institutions identified, FAO can provide support, training and assistance for such bodies for the initial duration of the project and/or until a full autonomy can be reached.

Where the Ministry of Agriculture is the convening agency, there is need to support their ability to host a national meeting every six months.

Work on preparedness and contingency planning will depend on the collaboration of Ministry of Agriculture plant protection as well as crop production and extension units. Their operations would need support over and above the usual government budget to cope with new responsibilities for coordinating a large-scale disease management effort.

The role of secretariat to the national coordination mechanism includes gathering, analysing and disseminating needed information to national mailing lists of key workers and stakeholders in the cassava sector. Creating a common knowledge base is the pre-requisite for focused discussion (and resolution) of the cross-cutting issues affecting the sector.

The need to work together indicates that government cannot be expected in the least to act alone. The private sector should be notified of ongoing challenges and be encouraged to participate in key decision-making exercises that relate to food supply to the people that work for them as staff or as a social responsibility to other citizens of the nation. The collation of experience and input demands as well as varied levels of funding and other resources will ensure that there is local capacity to catalyse and activate the common interests in the community.

#### **Activity 3.3 Establish a new form for coordination of FAO/ASARECA/CRS/IITA work plans at regional level**

The programme will support regular regional workshops convened by FAO, ASARECA, CRS and IITA (and other partners) and attended by national and regional research institutes, Ministries of Agriculture and international and national NGOs. Topics will be defined in consultation with national coordinating commissions.

### **Output 4: Farmer knowledge and skills on cassava production including pest and disease management aspects strengthened**

In order to enhance farmer knowledge and skills on cassava production including pest and disease management aspects through participatory methodology, the following activities will be carried out:

#### **Activity 4.1: Review the support needs of extension delivery services to improve services relating to cassava pests and diseases**

The programme framework will be used to take stock of civil society presence and capacities, and identify potential implementing institutions based on set criteria to undertake specified interventions aimed at improving farmer knowledge and skills on cassava production. Where possible, and upon request, the programme framework will identify needs to bolster the existing extension services by providing necessary tools and approaches capacities; the cassava requirement will be a means of building more general capacity in cassava producing districts. Innovative means of improving access to extension services like the use of community based facilitators and selected members of farmers' groups to facilitate group learning will be explored.

#### **Activity 4.2: Develop training material**

To address the critical absence of appropriate training material especially for the frontline extension service providers and farmers, comprehensive integrated crop management training materials will be urgently needed. A rapid baseline survey of practices should be conducted to document sound coping strategies, over and above those already noted. Existing training material will be collated, review and adapted to a comprehensive cassava integrated crop management curricula from which assortments of training material tailored to different target groups (extensions workers, farmer facilitators, farmer groups, and civic leaders among others) will be developed.

#### **Activity 4.3: Build staff competence**

To build a critical mass of competent facilitators, both within the extension services (if requested) and with civil society, mobile teams of core experts will be established to conduct facilitator training at national and district levels. The programme framework will also put in place some form of facilitator support mechanism.

#### **Activity 4.4: Empower farmers through large-scale Farmer Field School programme**

The framework will help identify areas where specific programmes should support season-long training in affected catchments following group specific curriculum adapted to the local situation. Here, the approach needed is to target critical districts and run an initial set of field schools to train both a critical mass of facilitators specifically for leading groups on cassava-related decision-making (variety selection, disease management and mitigation), and a significant number of farmers. Given the long duration of the cassava growing season, it is likely that field schools could meet over a 1–3 week cycle, up to 20 times over the first year, allowing each facilitator to run several field school groups in parallel. Annex 2 describes field school approaches and their benefits over more traditional extension and education activities.

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The approach would initially be to take trained facilitator from existing networks and projects in the affected districts (including large-scale, ongoing exercises such as GLCI, through GLCI farmers groups) and provide them with foundation material. They would develop their own local content suitable to the farming systems and disease situation locally, with the support of facilitation team leaders. The first year would also be used to generate a large knowledge base on effective cassava field practices in the region, reviewed by the facilitation team, to help share local practices and coping strategies.

### **Output 5: Wide-area disease management improved**

#### **Activity 5.1: Discourage movement of vegetative material**

The proposed national coordination mechanisms will ensure the broadcast of material on risks of transmission of the diseases, sources of improved cassava vegetative material, focal points, certification, etc., all adapted to local media. Awareness would help farmers understand the losses that would incur when they use diseased stems for planting purposes. There would also be a need to provide clean planting materials as this would reduce the demand for illicit material.

#### **Activity 5.2: Support to disease surveillance activities**

An effective and sustainable national surveillance system for cassava disease monitoring, including pathotyping is needed. It should be based on the use of diagnostic kits, which need to be developed for use at field level to identify and monitor infected and non-infected multiplication sites, and undertake field surveillance for both CMD and CBSV. The purpose would be to quickly provide information on the ground to enable management decisions to be taken on stem distribution, and on targeting of awareness material. In the case of positive results, observations can be confirmed by taking samples for laboratory confirmation.

As noted above, surveillance requires sustained funding to ensure the required logistical support. There is also a need to train those involved and ensure that consistent surveillance protocols and operating procedures are followed.

Finally, in most cases there is a need to build data analysis and management capacity, and to ensure feedback mechanisms are in place so that surveillance is not an extractive one way process, but that it returns useful data to those involved in local disease management (which in turn will motivate those involved in data collection).



Villager cooking cassava in preparation of a meal - cassava is a staple food in the Burundian diet

Credit: FAO/G. Napolitano

### 3.6 Logical framework matrix

| Project goal           | To assure food and income security for cassava-dependent vulnerable populations through better control and management of pests and diseases in central, eastern and southern regions of Africa  |  |   |   |
|------------------------|---|--|---|---|
|                        | Intervention logic  | Objectively verifiable indicators  | Sources of verification   | Risks and assumptions   |
| <b>Project outcome</b> | Increased cassava productivity and production by reinforcing the capacity of the most food insecurity prone subsistence farmers to prevent, mitigate, prepare for and respond to cassava-related diseases in the region   | Cassava yields are restored to pre-CMD and CBSD level at household level by 2012.<br>NB.: Country-wide pre-yield levels will not be achievable by 2012   | Baseline survey<br>Routine stakeholder status report<br>Alerts bulletins issued<br>Disease maps                                   | <i>Risk:</i> Evolution of the viruses into new strains and diseases progress faster than the release and dissemination of tolerant varieties  |
| <b>Output 1</b>        | <i>Mechanism for quick multiplication and distribution of clean and tolerant varieties enhanced</i>   | Number of certified cuttings redistributed and number of beneficiary households by 2010<br>Survey on funds allocated to breeding programmes<br>Major seed producers (public, private or farmers) trained<br>Tolerant cassava varieties represent a minimum of 30 percent of total cassava planted in targeted areas by 2012<br>100 percent of cassava multiplication sites have been surveyed, certified or declassified.<br>100 percent of certified multiplication sites are in conformity with quality standards accepted by countries<br>Recommendation of review of tissue culture capacity building needs funded | Reports on the annual census of multiplication nurseries<br>Training reports<br>Dynamic Maps data warehouse<br>Project evaluation | <i>Assumption:</i><br>Well supported breeding process to develop new varieties<br>Funds are available to other partners such as CRS/IITA under GLCI to co-finance disease incidence surveys until 2011<br>Farmers are willing to adopt improved cassava varieties.<br>The FAO "quality standards for vegetatively propagated crops" manual is published in 2009.<br><i>Risk:</i><br>MoAs might refuse to accept the FAO quality standard but fail to offer alternative standards.<br>New disease strain emerges |
| <b>Output 2</b>        | <i>Awareness of the impact of cassava diseases, appropriate responses and possible coping strategies at all levels strengthened</i>   | A communication strategy operationalized by end of 2009<br>Publicity materials catering for different segments of the community and cassava commodity chain developed by end of 2009<br>Awareness campaigns instituted in 100% of the cassava growing districts 2010   | Communication strategy<br>Assortment of communication materials<br>Number of awareness campaigns and workshops carried out        | <i>Assumption:</i> Awareness material being prepared by ASERECA will be made  |
| <b>Output 3</b>        | <i>Regional and national coordination strengthened</i>  | Resources committed to cassava disease management at official levels   | Workshop proceedings<br>Dynamic Maps release  | <i>Assumption:</i><br>Respective MoA are willing to lead a coordination mechanism on cassava related issues.<br>ASARECA and others want to play an active role in regional coordination<br><i>Risk:</i> ASARECA capacity  |
| <b>Output 4</b>        | <i>Farmer knowledge and skills on cassava production including pest and disease management aspects strengthened</i>   | Appropriate training materials developed for frontline staff within the framework of a comprehensive integrated crop management curriculum with CMD and CBSD control as entry point<br>At least 50 core facilitators trained per country<br>Minimum network of 100 Farmer Field School is established in each country with capacity to report on CBSD and CMD  | Materials developed<br>Training reports   | <i>Assumption:</i><br>Facilitators can be identified for initial phase<br>Quality of Farmer Field School and education programme is sustained   |
| <b>Output 5</b>        | <i>Disease management at field level improved through better awareness on the risk of moving planting infected vegetative material and an operational early warning system providing timely cassava-disease surveillance information to Government authorities, NGOs and donors</i> | Harmonized surveillance system established and funded<br>An in depth disease survey is conducted in 2009 and 2010<br>National surveillance teams established trained and equipped in each programme country<br>At least 50 community based sentinel sites for early detection of cassava pests and disease in place<br>A minimum of 100 persons per country are able to report suspected cassava-related diseases to relevant authorities by 2011  | Dynamic Maps<br>Programme evaluation  | <i>Risk:</i> Farmer Field School member leaders are not willing to act as field focal points for disease detection  |

### 3.7 Risk analysis

#### Risk monitoring

- Lack of commitment of stakeholders at regional level: the regional cassava-related workshops will allow FAO monitoring the commitment of all regional partners through tracking of attendance, commitment to co-organize events and information sharing.
- Lack of cooperation between national local stakeholders: this will be monitored through the engagement of stakeholders with national cassava coordination platforms.
- Collection and dissemination of information is hampered: will be monitored through the process of updating of the Cassava Dynamic Atlas.
- Security: is constantly monitored by the United Nations Department of Safety and Security (UNDSS).

#### Steps proposed within the project to address these risks

- Lack of commitment of stakeholders at regional level: regular individual meetings and workshops will contribute to create a momentum from all stakeholders. If time or human resource capacity is a prime constraints for partners (ASARECA, CRS, IITA and CEMAC), FAO could use part of the funds foreseen under “contract” budget line to increase that capacity.
- Lack of cooperation between national local stakeholders: the full involvement of the FAO Decentralized Offices network is meant to guarantee a strong commitment from local authorities.
- Collection and dissemination of information is hampered: The creation or strengthening of national cassava coordination platform in each country should prevent gap in information collection and dissemination.
- Security: provision of fund is included in the project to ensure timely implementation of UNDSS security recommendations and requirements.

Table 3: Summary of main risks and assumptions

| Key risks   | Potential impact  | Probability  | Mitigation strategy   | Assumption   |
|---|---|--|---|--|
| <i>Lack of commitment of stakeholders at regional level toward a needs based approach</i> | <b>Medium:</b><br>The direct impact will be an increased risk in intervention overlapping and gaps in coverage. Inability to address the problem at a regional level                        | <b>Low:</b><br>The stakeholders have already demonstrated their willingness to actively contribute to a coordinated approach to respond to assessed humanitarian needs in the region | Engaging regional stakeholders in dialogue and provision of transparent information for decision-making | Adoption and application of consensual need based approach is not outweighed by other factors (for example budgetary constraints; political pressures) |
| <i>National local stakeholders non cooperating</i>  | <b>High:</b><br>The impact will be important as country activity is essential   | <b>Low:</b><br>The probability is low as in general government, local authorities and organizations are cooperating. However in some instances in the region                         | Using participatory approach in situation analysis, response planning and advocacy                      | Buy in and support of national/local authorities and other stakeholders<br><br>Consensual response plans are produced                                  |
| <i>Collection and dissemination of information is hampered</i>                            | <b>High:</b><br>The impact will be high as lack of reliable information makes situation analysis and response planning extremely difficult  | <b>Medium:</b><br>The risk is medium as some countries in the region have raised objection to dissemination of information   | Establishing of partnerships and networks for information collection and dissemination                  | Strategic dissemination of information is possible   |
| <i>Security</i>   | <b>High:</b><br>A deterioration of the security situation would:<br><br>Reduce access to vulnerable population for humanitarian workers<br><br>Hamper circulation of people and information | <b>Medium:</b><br>The security situation in the region remains volatile and security incidents have a high probability to happen in several countries                                | Security is constantly monitored by UNDSS and UN security rules applied<br><br>Advocacy                 | External factors not hampering humanitarian interventions  |



### 3.8 Implementation plan

| Output/Activity   | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|--------|--------|--------|--------|--------|
| <b>Output 1: Mechanism for quick multiplication and distribution of clean and tolerant varieties enhanced</b>   |        |        |        |        |        |
| Activity 1.1 Assess the cassava breeding objectives and capacities, varietal registration and areas for improvement of the individual countries             |        |        |        |        |        |
| Activity 1.2 Support the development of varieties to match threats at hand  |        |        |        |        |        |
| 1.2.1 Support on-farm Trials and Participatory Variety Selection  |        |        |        |        |        |
| 1.2.2 Support adoption mechanism studies  |        |        |        |        |        |
| Activity 1.3 Enhance in-country clean stem supply   |        |        |        |        |        |
| 1.3.1 Support KEPHIS or any equivalent facility to hasten the cleaning and multiplication of identified superior varieties                                  |        |        |        |        |        |
| 1.3.2 Establish a clearly defined seed system for cassava with a pathological focus   |        |        |        |        |        |
| 1.3.3 Strategic sighting of primary, secondary and tertiary multiplication sites based on geospatial considerations to minimize distribution distances      |        |        |        |        |        |
| Activity 1.4 Build infrastructural and human capacity   |        |        |        |        |        |
| Activity 1.4.1 Publish authoritative guidelines for cassava stem multiplication   |        |        |        |        |        |
| 1.4.1.1 Collate, harmonize and operationalize existing QMP  |        |        |        |        |        |
| 1.4.1.2 Support training on multiplication techniques   |        |        |        |        |        |
| Activity 1.4.2 Conduct annual census and certify quality of material issued at nursery level  |        |        |        |        |        |
| Activity 1.4.3 Build capacity for tissue culture  |        |        |        |        |        |
| 1.4.3.1 Establish and strengthen tissue culture laboratories  |        |        |        |        |        |
| 1.4.3.2 Capacity building for researchers and technicians in plant breeding and plant health  |        |        |        |        |        |
| <b>Output 2. Awareness and publicity of the impact of cassava diseases, appropriate responses and possible coping strategies at all levels strengthened</b> |        |        |        |        |        |
| Activity 2.1 Develop a communication strategy   |        |        |        |        |        |
| Activity 2.2 Develop publicity materials suitable for different segments of the community and cassava commodity chain                                       |        |        |        |        |        |
| Activity 2.3 Institute deliberate massive awareness campaigns in cassava growing districts  |        |        |        |        |        |
| Activity 2.4 Enhance agricultural policy support for cassava  |        |        |        |        |        |
| 2.4.1 Prepare evidence based position document(s) on contribution of cassava to the national/district food basket   |        |        |        |        |        |
| 2.4.2 Conduct value chain analysis for the cassava sector   |        |        |        |        |        |
| 2.4.3 Develop strategies for investment in post harvest   |        |        |        |        |        |
| 2.4.4 Carry out advocacy and raising awareness for policy-makers  |        |        |        |        |        |

### 3.8 Implementation plan (cont.)

| Output/Activity  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|--|--------|--------|--------|--------|--------|
| <b>Output 3. Regional and national coordination strengthened</b>   |        |        |        |        |        |
| Activity 3.1 Update stakeholder analysis   | ■      | ■      |        |        |        |
| 3.1.1 Organize a stand-off stakeholder meeting   |        |        |        |        |        |
| Activity 3.2 Support the setting up of appropriate arrangements for country coordination mechanisms for cassava related issues by the governments involved |        | ■      |        |        |        |
| Activity 3.3 Establish a new form for coordination of FAO/ASARECA/CRS/IITA work plans at regional level  |        | ■      | ■      |        |        |
| <b>Output 4. Farmer knowledge and skills on cassava production including pest and disease management aspects strengthened</b>                              |        |        |        |        |        |
| Activity 4.1 Review the support needs of extension delivery services to improve services relating to cassava pests and diseases                            |        |        |        |        |        |
| 4.1.1 Equipping existing extension staff with necessary tools, capacities and facilitation   | ■      | ■      | ■      |        |        |
| 4.1.2 Take stock of civil society presence and capacities and identify potential implementing institutions based on set criteria                           | ■      | ■      |        |        |        |
| 4.1.3 Identification of community based facilitators   | ■      |        | ■      | ■      | ■      |
| 4.1.4 Review of practices to build synergies   |        |        | ■      | ■      | ■      |
| Activity 4.2 Develop training material   |        |        |        |        |        |
| 4.2.1 Establish a baseline survey of practices and document sound coping strategies  | ■      | ■      |        |        |        |
| 4.2.2 Collate existing training material for review and adaptation to a comprehensive cassava integrated crop management curriculum                        | ■      | ■      |        |        |        |
| 4.2.3 Develop assortments of training material tailored to different target groups   | ■      | ■      |        |        |        |
| Activity 4.3 Build staff competence  |        |        |        |        |        |
| 4.3.1 Establishment of mobile teams of core experts that will conduct training at National and district levels   |        | ■      | ■      |        |        |
| 4.3.2 Train an adequate critical mass of facilitators and strengthen backstopping through tailored training of trainers' courses                           |        | ■      | ■      | ■      |        |
| Activity 4.4 Empower farmers through large-scale rapid Farmer Field School programme   |        |        |        |        |        |
| 4.4.1 Establish and formalize identified farmer groups / Farmers Field Schools   |        | ■      | ■      | ■      | ■      |
| 4.4.2 Conduct season-long training in affected catchments  |        |        | ■      | ■      | ■      |
| <b>Output 5. Disease management improved</b>   |        |        |        |        |        |
| Activity 5.1 Discourage movement of vegetative material  |        |        |        |        |        |
| 5.1.1 Identify phytosanitary risks related to CBSD, CMD, etc.  | ■      | ■      | ■      | ■      | ■      |
| 5.1.2 Strengthen plant quarantine and inspection services  |        | ■      | ■      | ■      | ■      |
| 5.1.3 Set up mechanisms at border posts to exchange material from uncertified sources for clean ones   |        | ■      | ■      | ■      | ■      |
| Activity 5.2 Support to disease surveillance activities  |        |        |        |        |        |



A tarpaulin with peeled cassava drying under the sun in the Democratic Republic of the Congo

Credit: FAO/A. Proto

## PART IV – IMPLEMENTATION STRATEGY

### 4.1 Partners and partnership

CaCESA has been designed in full consultation with the institutions listed below in order to build synergies and complement existing initiatives aiming at reducing food insecurity in the region by combating cassava-related diseases.

**ASARECA** is a non-political organization of the National Agricultural Research Systems (NARS) of ten countries: Burundi, Democratic Republic of the Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania and Uganda. It aims at increasing the efficiency of agricultural research in the region so as to facilitate economic growth, food security and export competitiveness through productive and sustainable agriculture. ASARECA was established, following the approval of the “Framework for Action for Agricultural Research in Eastern and Central Africa”, by a meeting of stakeholders held in Kampala, Uganda, in November 1993. This stakeholders’ meeting was attended by leaders of the NARS and faculties of agricultural research, as well as representatives of development agencies that are active in agricultural research in the region.

**CEMAC** has been created in 1994 by Cameroon, Central African Republic, Congo, Gabon, Equatorial Guinea and Chad. Since 2005, FAO provided support to CEMAC to develop a common agricultural strategy (SAC) and cassava crop has been identified as one of the most important crop in the sub-region.

**The International Center for Tropical Agriculture (CIAT)** is a member of the Consultative Group on International Agricultural Research. CIAT has conducted cassava improvement research since the mid-1970s. The main goal of this work has been to help increase and stabilize cassava production in diverse environments and for different markets by developing improved gene pools in cooperation with national programmes. In collaboration with many national and international partners, CIAT is working to combat whitefly and other such problems through research on disease (including field diagnosis) and pest ecology.

**COMESA** traces its genesis to the mid 1960s. In particular, COMESA, of which 9 of the 15 countries under CaCESA are members, is implementing the Comprehensive Africa Agricultural Development Programme (CAADP). CAADP is a programme of the African Union. The objective of Pillar of the CAADP aims to promote food and nutrition security and dealing with the challenges of the vulnerable and food insecure populations.

**CRS** was founded in 1943 by the Catholic Bishops of the United Countries to serve World War II survivors in Europe. Since then, the organization expanded in size to reach more than 80 million people in more than 100 countries on five continents. As the official international humanitarian agency of the United Countries Catholic community, CRS is governed by a Board of Directors made up of clergy, most of them bishops, religious and Catholic lay men and women.

**IITA** is an international non-profit research for development organization since 1967, governed by a Board of Trustees, and supported primarily by the CGIAR. IITA and partners have delivered the bulk (70 percent) of the international research impact in Sub-Saharan Africa in the last three decades. The R4D model is unique in that (i) it focuses on long-term development needs to guide our research design and choice of partners; and (ii) it incorporates two critical elements absent in traditional models: a mid-process initial research-outcome and an explicit EXIT-strategy for IITA.

Partnerships will be developed on the basis of established comparative advantages and complementarities between the partners. Clear responsibilities (lead role) will be allocated to specific partners in connection with the programme framework based on comparative advantage. The number of partners and partnerships should be specific and sufficient for the working of the programme. General communication with all stakeholders will be encouraged, but this should not confuse the allocation of core responsibilities, to maximize productive time and avoiding unnecessary meetings and other unproductive activities.

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## 4.2 FAO comparative advantage

The main partners (listed in section 4.1) each bring a primary comparative advantage:

- ASARECA is best placed to facilitate technology and agricultural research transfer across national boundaries.
- CEMAC plays a federating role in market regulation in Central Africa Region.
- CIAT has valuable experience in developing and deploying varieties of cassava resistant to whitefly which is both a cassava pest and a vector for cassava diseases.
- COMESA has a recognized mandate on policy across eastern and southern Africa.
- CRS has an extended network of national partners through churches and parishes.
- IITA is the lead technical institution for research in root and tuber crops.

The main comparative advantage of FAO is that it acts as a neutral forum where all partners meet as equals to negotiate agreements and debate strategies. In that sense, FAO contributes strengthening partners' role and strategies in a harmonised and technically sound way. Furthermore, this strategic programme is the appropriate reflection of a true partnership approach which differs profoundly from the traditional view where partnership is seen as an alliance of organizations working together toward a common goal. True partnership is a mindset that shapes how we relate to others, how we speak and how we listen, and how we approach conflicts and disagreements.



Harvesting healthy cassava

Credit: FAO/G. Napolitano

## 4.3 Budget

The total indicated cost of the implementing activities under the programme framework is estimated in the region of USD 112.5 million. The following table provide the summary budget by output.

CaCESA summary indicative budget by component (output)

| Description   | USD                | %          |
|---|--------------------|------------|
| Output 1: multiplication and distribution of material | 45 020 000         | 40         |
| Output 2: awareness creation                          | 13 500 000         | 12         |
| Output 3: coordination                                | 11 260 000         | 10         |
| Output 4: farmer field school activities              | 25 890 000         | 23         |
| Output 5: wide-area disease management                | 16 880 000         | 15         |
| <b>Total</b>  | <b>112 550 000</b> | <b>100</b> |

A summary of the indicative budget by item is provided in Annex 2. Detailed information on the budget breakdown by country, region and by year is available on request.



FAO staff at work in the field demonstrating healthy cassava plant

Credit: FAO/G. Napolitano



Malawian cassava farmer

Credit: FAO/J. Spaul

#### 4.4 Programme management

CaCESA will be implemented through the FAO Food Chain Crisis Management Framework (FCC). The FCC is FAO's primary instrument for action in support of member countries and for institutional collaboration in the global governance of threats to the human food chain at all stages from production to consumption. Such action and collaboration focuses on the response to potential or verified substantial emergencies threatening the food chain and on necessary steps for rehabilitation. The FCC facilitates horizon scanning for improving forecasting, preparedness and prevention of emerging threats to the food chain. The FCC also undertakes and promotes risk communication.

The Food Chain Crisis – Emergency Management Unit (FCC-EMU) is the operational arm of the FCC. It provides the core operational capacity for the rapid-, medium- and longer-term response to potential or verified substantial emergencies threatening the food chain (animal diseases, plant pests and food safety) and for the related medium-term rehabilitation.

The FCC reflects FAO's determination to address the risks to the human food chain in their assessment, management and communication dimensions in a comprehensive, systematic, interdisciplinary, institutions-wide collaborative approach. Recent external evaluations of FAO have highlighted the Organization's comparative advantage in this domain.

The FCC-EMU builds on the experience and operational capacity of TCE in managing large-scale, emergency programmes with multidisciplinary components, by consolidating the present capacity for responding to transboundary pests and animal diseases.

Whenever possible the FCC-EMU delivers its mandate through the concerned Emergency Coordinators who benefit from the Unit's support to strengthen their operational capacities in the related areas. For food chain emergency related activities, the concerned Emergency Coordinators operate within the FCC framework, line of command and reporting arrangements.

For Plant Pests related activities, the FCC-EMU operates under the overall policy and technical guidance of the head of the FAO Plant Protection Service and head of the Plant Pest Emergency Response Programme, the general supervision of the Director TCE and the direct supervision of the Chief Emergency Operations Service - Asia Europe and Special Emergencies, TCE.

The different FAO services involved in the FCC and relevant to the implementation of CaCESA are shortly described below:

- **Plant Protection Service:** The Plant Protection Service of FAO addresses international aspects of plant protection and closely cooperates with regional and national plant protection organizations and programmes. The programme addresses plant quarantine in the Secretariat to the International Plant Protection Convention, setting standards, exchanging information and fostering cooperation. Through the Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES), the Service assists in early warning, early reaction and research on pests and diseases of a transboundary nature.
- **Plant Production Service:** The Service provides technical advice to FAO member countries on increasing sustainable crop and grassland production through plant improvement, application of plant biotechnology techniques, development of integrated production systems and rational grassland management.
- **Emergency Operations Service - Asia Europe and Special Emergencies:** The Service plays a leading role in helping countries prevent, mitigate, prepare for and respond to emergencies.

## 4.5 Strategic path

### *The phase-in process (initial 12 months)*

#### *Staff deployment*

The programme will not require a massive deployment of staff. In most countries, it will build on existing teams and capacities, particularly on the Emergency Coordination Units in Burundi, Central African Republic, the Democratic Republic of the Congo, Kenya, Malawi, Sudan, Uganda, Zambia and Zimbabwe. In countries with no Emergency Coordination Unit, namely Angola, Gabon, Mozambique, Rwanda and Tanzania, the FAO Representation will implement the programme. The regional Emergency Office for Africa (Kenya) and subregional offices (Ethiopia, Gabon and Zimbabwe) will be instrumental to assure a smooth but prompt phase-in process.

#### *Activities*

As demand for quality vegetative material is high, multiplication activities will constitute an important part of the first year while the Farmer Field School approach will be progressively introduced.

Regarding coordination, each country is at a different stage. In the most advanced countries, such as Burundi, the Democratic Republic of the Congo and Uganda, to a lesser extent the first year will contribute to consolidate what is already in place. In other countries, the first year will be used to make a complete review of stakeholders, leadership, and conduct baseline surveys as appropriate.

The development of tools and protocols for disease surveillance will also be introduced from the first year with the bulk of expenditures occurring during that period.

### *The phasing-out strategy (last 12 months)*

The first four years of the programme should have contributed to build enough capacity and systems for national authorities to play an active and efficient leadership in the cassava sector. Similarly, the Farmer Field School approach will contribute significantly to build community's capacity and leave a legacy at field level for good agricultural practices.

Therefore, the last year of the programme should be mainly dedicated to ensuring that all transfer processes have gone smoothly and remove potential bottlenecks to sustainability.



Cassava roots can be harvested whenever there is a need, or left in the ground when farmers are driven from their land

Credit: FAO/C. Ferrand

## ANNEXES

### Annex 1: Cassava productivity and production in 2007

| Cassava productivity and production in 2007 |                   |                    |                    |
|---|-------------------|--------------------|--------------------|
| Countries                                   | Hectares          | Root yield (Mt/Ha) | Metric tonnes      |
| Angola                                      | 760 000           | 11.58              | 8 800 000          |
| Burundi                                     | 82 000            | 8.66               | 710 000            |
| Central African Republic                    | 188 000           | 3.01               | 565 000            |
| Congo                                       | 100 000           | 9.15               | 915 000            |
| Democratic Republic of the Congo            | 1 850 000         | 8.11               | 15 000 000         |
| Gabon                                       | 45 000            | 5.33               | 240 000            |
| Kenya                                       | 80 000            | 10.63              | 850 000            |
| Malawi                                      | 130 000           | 16.54              | 2 150 000          |
| Mozambique                                  | 990 000           | 7.42               | 7 350 000          |
| Rwanda                                      | 127 000           | 6.54               | 830 000            |
| Sudan                                       | 6 000             | 1.67               | 10 000             |
| Tanzania                                    | 675 000           | 9.78               | 6 600 000          |
| Uganda                                      | 371 000           | 12.01              | 4 456 000          |
| Zambia                                      | 175 000           | 5.37               | 940 000            |
| Zimbabwe                                    | 44 500            | 4.31               | 192 000            |
| <b>15 countries totals/average</b>          | <b>5 623 500</b>  | <b>8.82</b>        | <b>49 608 000</b>  |
| <b>Global cassava data</b>                  | <b>18 664 658</b> | <b>12.22</b>       | <b>228 138 068</b> |
| <b>Africa</b>                               | <b>11 904 418</b> | <b>9.90</b>        | <b>117 887 143</b> |

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### Annex 2: Budget description

| CaCESA summary indicative budget by item       |                    |
|--|--------------------|
| Description                                    | USD                |
| Professional staff                             | 7 760 000          |
| General service staff and temporary assistance | 830 000            |
| Consultants                                    | 2 770 000          |
| Contracts                                      | 27 370 000         |
| Training                                       | 9 750 000          |
| Travel   | 3 880 000          |
| Expendable procurement                         | 20 250 000         |
| Non-expendable procurement                     | 15 430 000         |
| Technical support services                     | 5 780 000          |
| General operating expenses                     | 8 500 000          |
| Support cost                                   | 10 230 000         |
| <b>Total</b>                                   | <b>112 550 000</b> |

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#### Budget item description

##### Professional staff

##### Headquarter level

- Backstopping from technical services based at headquarters
- Operation officer cost-shared based at headquarters in charge of project follow-up and liaison with Donors

##### Regional level

- Senior Team Leader, based in Nairobi, in charge of the overall technical management of the programme
- Deputy Team Leader, based in Nairobi, in charge of the operational management of the programme
- Farmer Field School Expert, based in Nairobi, in charge of the technical supervision and implementation of the Farmer Field School component of the programme, particularly under Output 4
- Liaison and Communication Officer, based in Nairobi, in charge of supporting the development of regional communication modalities and tools as well as providing briefing documents to donors, partners and FAO services

- Plant Protection and Production Officers, based in Addis Ababa (Subregional Office for Eastern Africa), Libreville (Subregional Office for Central Africa) and Harare (Subregional Office for Southern Africa), on a cost-sharing basis, in charge of technical backstopping and liaison with regional institutions
- National Geographic Information System (GIS) Officer, based in Nairobi, in charge of the consolidation of regional databases and mapping and training of regional partners
- National GIS Experts, based in Addis Ababa (Subregional Office for Eastern Africa), Libreville (Subregional Office for Central Africa) and Harare (Subregional Office for Southern Africa) on a cost-sharing basis (three months per year) in charge of technical support to countries and subregional information management

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#### Country level

- National Project Officer, one per country, in charge of the field implementation of the programme, including technical and operational issues
- National Farmer Field School Officer, one per country, in charge of the technical implementation of activities foreseen under output 4 in particular
- National GIS Officer, one per country, in charge of data management and mapping of activities, partners, disease risk, etc.

#### *General service staff and temporary assistance*

##### Regional level

- Administrator, based in Nairobi, in charge of the overall administration of the programme and consolidation of financial tracking, follow-up, and report
- Administrator, based in each of the subregional offices and on a cost-shared basis, to manage field budget authorizations addressed to subregional offices
- Finance assistant, based in Nairobi, in charge of project disbursement tracking and procurement issues
- Finance assistant, based in each of the subregional offices and on a cost-shared basis, to follow financial disbursement
- Driver based in Nairobi
- Driver based in each of the subregional offices and on a cost-shared
- Overtime, to cover the cost of support personnel based in Nairobi and at subregional office level (secretary, messenger, data entry clerk) on a cost-shared basis

##### Country level

- Administrator, based in each country and on a cost-shared basis, to manage field budget authorizations

- Finance assistant, based in each country and on a cost-shared basis, to follow financial disbursement, local procurement and contracts
- Driver based in each country and on a cost-shared basis
- Overtime: to cover the cost of support personnel based at country level (secretary, messenger, data entry)

#### *Consultants*

To cover the cost of various ad-hoc and outsourced consultancies on specific expertise at regional and country level. Type of studies and consultant profiles will be determined with all partners as needs arise.

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#### *Contracts*

FAO, through its Regional Emergency Office for Africa based in Kenya, its Subregional Offices (Eastern Africa based in Addis Ababa, Central Africa based in Libreville and Southern Africa based in Harare), its country-based Emergency Coordination Units and/or FAO Representations, will be responsible for the overall implementation of the project. However, some activities will be carried out by implementing partners through Letters of Agreement (LoA).

The procedures applying to the use of LoAs is laid down in FAO Manual Section 507. A LoA is an instrument setting forth the terms of agreement between FAO and a non-profit organization (implementing partner) for carrying out some of the activities included in the project, for the production of specified outputs, which will contribute to the achievements of specific objectives through the supply of services and/or other work product(s). The LoA consists of a standard agreement and an annex to the agreement, which outlines the terms and conditions and clearly describes the output (services and/or work products) to be provided under the agreement. LoAs are not used for cases such as employment contracts, purchase order/commercial contracts, or contracts for printing, writing, editing or translation. For these cases, separate procedures and contracting instrument exist. Implementing partners will be selected by FAO together with the respective Ministries of Agriculture and coordination groups on the basis of their technical expertise and proven records in similar activities in the targeted regions/districts. A note for the file is systematically developed specifying the process and reasons for the selection of the implementing partner instead of other potential partners, based on their suitability, technical competence and risks associated.

NGOs are FAO's main partners. However, under this project additional partners are foreseen, including national research institutes. The relationship between FAO and its implementing partners is purely on a non-profit base.

### *Training*

This includes the cost of national and regional coordination workshops and publications as well as in-country training of partners (farmers and institutions). Awareness campaign material is also included.

### *Travel*

This budget component includes estimated in-country transportation costs and daily subsistence allowance applicable to international and national project personnel travelling within the country, according to standard UN rates; international travel by technical and operational FAO staff on backstopping missions; study tours and other travel by government officials; travel by trainees for participation in courses organized by the project. Hazard pay and rest and recuperation travels are applicable to international personnel working in insecure areas (i.e. countries with security phase III and above) and according to UN rules. Air-tickets and terminals are also provided for international travel departure and arrival related costs.

### *Expendable procurement*

All procurement contracts will be awarded and implemented in accordance with the procedures and standard documents laid down and published FAO). The list and quantity of material to procure will be fine-tuned for each country at project inception. However, this will include cassava vegetative material adapted for each country, fertilizer (not in every country) and tools as required. Furthermore, this budget line includes the cost for Farmer Field School activities.

### *Non-expendable procurement*

Each country will receive funds for the procurement of equipment such as computers, printers, Global Positioning System and vehicles (cars or motorcycles), either in replacement of obsolete equipment or to equip sub-offices at field level. Some equipment will also support the regional level coordination role (replacement of copy-machine and laser colour printer). At the end of the project, the equipment will be either transferred to the next phase of the project, if applicable, or will be transferred to the local authorities, governments or local partners, according to FAO rules.

### *Technical support services*

- Reporting: relates to the reporting services deriving from the legal obligations of the project.
- Technical support services: covers the costs of technical support and expertise to ensure the proper implementation and monitoring of the project achievements according to FAO standards and in line with the recipient government policy for responsible and sustainable management of natural resources. It provides for technical backstopping (site visits and missions) and technical support from FAO relevant lead technical divisions, responsible for the technical clearance of project documents (including reports, terms of reference of project staff, reports, LoA, quotations from potential suppliers, etc.), clearance of technical specifications of inputs to be procured, and clearance of the résumé of candidates for the recruitment of technical staff to be assigned to the project implementation.
- Evaluation: covers project evaluation costs.

### *General operating expenses*

General operating expenses cover the operational costs directly related to the various field activities and field offices of the project, including communications (telephone and internet connection on a cost sharing basis of field offices), maintenance and repair of vehicles used for project implementation (including fuel and insurance), electricity, water and other utilities costs, rental of office space, storage and transportation of inputs, both at country and regional level in Nairobi. In addition, some funds under this budget line will be used to ensure project visibility (caps, banners, T-shirts, press releases, etc.). All the costs included under this line are itemized costs, necessary to carry out the project activities and are therefore directly linked to the project, in particular to cover running costs at field level, usually on a cost-sharing basis with other projects. As such, it is different from the support costs (overheads costs, a lump sum provision of 10 percent to contribute to the functioning of the organization).

### *Support costs*

This budget component covers the standard overheads costs of the Emergency Operations and Rehabilitation Division (TCE) at FAO headquarters for the overall management of the project as well as the central services including personnel, administration, finance, procurement, etc.

## Annex 3: Note on Farmer Field Schools

### Introduction

In highly diverse smallholder farming systems conventional extension approaches that have for long been characterized with crop specific blue print messages have been inadequate in addressing complex concepts like pest and disease management. This is even worse once shocks to livelihoods like pests or disease epidemics set in marginal areas and communities affected by civil strife where access to extension services is limited. It therefore calls for appropriate and holistic approaches that will empower the affected communities to recover from the shocks and re-engage in sustainable livelihood options in a shorter time. The Farmer Field School approach has lately proved to be an excellent viable alternative in such a situation by empowering farmers to make logical crop management decisions and adapt new technologies to changing situations.

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### Approach

Farmer Field Schools provide a forum for farmers to meet and discuss real issues affecting their livelihood and experiment together on possible solutions that they can implement. As an extension approach, it is a community based and participatory discovery learning process built upon the principles of adult education. It is a practically oriented field study process involving groups of farmers with a common interest who get together on a regular basis (ranging from weekly for early maturing crops to monthly for perennial ones) to study the “how and why” of a situation in a given context under the guidance of a facilitator.



Farmer Field School

Credit: FAO/C. Ferrand

A typical Farmer Field School consists of 20-30 participants working in small groups of five to enhance the participatory learning process. The approach is particularly adapted to field learning activities that require specific practical hands-on management skills and conceptual understanding and is a season-long training, generally one to two agricultural production cycles. The learning process is systematic and guided by situation specific but holistic curriculum that follow natural cycles of the subject, such as crop, animal, natural resource, commercial enterprise or a community problem that requires collective action, for example, “seed to seed”, “kid to kid” or “egg to egg”.

In developing the curriculum, learning topics and activities are directly related to the specific crop growth stage and related observation parameters including, among others:

- Insect populations (pests, natural enemies, other like pollinators, decomposers, etc.);
- Crop health-vigour, disease symptoms and nutrient deficiency symptoms;
- Physical damage and possible cause(s) (pests, disease, stress condition, etc.);
- Morphological characteristics of the plant related to the crop growth stages;
- Overall field conditions (weed status, soil condition, uniformity of the crop development); and
- Weather.



Cassava Farmer Field School

Credit: FAO/C. Ferrand

They relate their observations to the ecosystem and apply their previous experience and any new information to make a crop/livestock/enterprise management decision. This hands-on training following a crop phenology and frequent agro-ecosystem analysis equips farmers with the necessary requisite skills to manage their own fields with confidence. They recognize the different factors in the agro-ecosystem, understand their interaction and relate to the plants' development stage. Beside that, farmers learn the population dynamics of pests and natural enemies across the season and come to appreciate plant attributes like the compensatory behaviours in some crops, response on crops to moisture or nutrient stresses in a holistic manner.

Each Farmer Field School has a field study site convenient to all the farmers where they conduct different comparative/validation studies and experiments of their own to reinforce the underlying basic science and indigenous knowledge. In addition to the study sites, each of the participants is encouraged try out the practices learned at the study site in their own gardens or similar enterprises where applicable at household level. In all training activities, strong emphasis is placed on food security and self-reliance through better entrepreneurial skills, income generation for either short- and long-term enterprises or collective marketing in order to ensure economic empowerment of the participating farmers and give the approach livelihood relevance.

The season-long learning activity based on a comprehensive curriculum provides opportunity for various partners to build synergy. Whereas the technical content maybe developed around a selected entry point which forms basis for the core learning activities, farmers' priorities that have a direct bearing on their livelihoods are holistically incorporated into the action plan and curriculum. Farming as a business and internal savings mobilization have become popular integrations as core modules in all Farmer Field School as deliberate endeavour to build the groups' financial capital. Other common important inclusions have been HIV/AIDS, gender based violence, conflict resolution, basic principles of nutrition, reproductive and family health care, malaria control, immunisation, basic principles of environmental management, water and soil conservation and basic financial management skills. This responsiveness to farmers' needs has been a fundamental factor in enhancing the farmers' ability to articulate their community needs and make more realistic demands for services or come up with their own solutions, thus determining their destiny.

The inherent attributes of the Farmer Field School approach to cultivate willingness among farmers and self-confidence (particularly for women), to learn together while solving problems that affect their community, builds their social capital as individuals. As a precursor to transformation, the level of empowerment and organization developed in a Farmer Field School is critical and can have significant impact on the marginal returns in any subsistence-based farming system. Subsequently, the strong intra- and inter-group cohesion within and among Farmer Field School groups leads to the emergence of higher level associations like the Farmer Field School networks engaging in a range of collective commercial activities.

## Guiding principles

**Communication:** Communication must take place at the field level, dealing with field issues in a dialogue with learners. The field school deals not only with the practices that farmers want to learn about but with farmers as farmers. Farmer Field Schools are conducted for the purpose of helping farmers to master and apply field management skills. The farmer implements his or her own decisions in his or her own field.

**Problem-posing/problem-solving:** Within this form of training, problems are seen as challenges, not constraints. Farmer groups are taught numerous analytical methods. Problems are posed to groups in a graduated manner such that trainees can build confidence in their ability to identify and tackle any problem they might encounter in the field.



Farmer Field School

Credit: FAO/C. Ferrand

**Field based education:** Putting the classroom in the field allows the field to be the learning material and the farmer to learn from real live examples. Putting the classroom in the field means that the educator (extension worker) must come to terms with the farmer in the farmer's domain.

**Principles, not packages:** The Farmer Field Schools teaches principles, any activity encompasses several principles, principles bring out cause and effect relationships, principles help farmers discover and learn, principles help farmers learn to learn so that they can continue to learn. Packages have nothing to do with learning and do not encourage learning in the long run they are neither cost effective nor effective at improving the quality of farmers' management skills. Skilled farmers can optimize yields independently of others. Packaged approaches increase the dependence of farmers on central planners.

**Training driven research:** Research must be responsive to field needs. By and large researchers have got it backwards. Research programmes in agriculture drive the extension or education programme that the research should actually be serving. What farmers need to know to be able to operate sustainably, both environmentally and economically, should drive the research programme. In the Farmer Field School approach, all research is based on training needs or is an adjunct of training. Farmers have become a part of the research network supporting educational programmes.

## Generic activities

Below are some of the generic activities followed in Farmer Field School programmes:

- a) Identification of competent and interested implementing partners in the targeted communities
- b) Identification of resident facilitators in the targeted communities
- c) Conducting a 2–3 week training of facilitators' course introducing them to the Farmer Field School methodology which is subsequently followed by backstopping on the specific technical content depending of the enterprises selected by the respective communities
- d) Ground working which involves a series of preliminary activities including community gap analysis, resource mapping, sensitization and action planning
- e) Group formalization that involves constitution making, coming up with group leadership in place, registration of the group with the community development office, opening up of Farmer Field School savings bank accounts, putting a savings mechanism in place, enterprise selection among others
- f) Adapt Farmer Field School curriculum and season-long study schedule to the selected enterprise and the groups' priorities to be addressed
- g) Conducting a season-long Farmer Field School learning process where the group meets on a regular basis at a study field where basic science concepts are blended with practical exercise following a crop phenology
- h) Conduct monthly review and end of season evaluation workshops
- i) Hold field days as an outreach by the Farmer Field School to the immediate neighbouring communities
- j) Conduct exchange visits to enhance faster diffusion of innovations among the farmers
- k) Establish commercial activities for income generation alongside the study enterprise
- l) Graduation of the farmers upon completion of two study cycles
- m) Establishment of Farmer Field School Networks as an exit strategy to carry on the activities that the groups in a given community have started. Often these are supported to manage capital assets like grinding mills or linked to large-scale agro-processing entrepreneurs



Healthy cassava plant

Credit: FAO/C. Ferrand





## **FOOD CHAIN CRISIS** Management Framework

The **Food Chain Crisis Management Framework (FCC)** is the Food and Agriculture Organization of the United Nations (FAO) primary instrument to address the risks to the human food chain in an integrated and interdisciplinary manner.

The FCC supports FAO Member Countries in the global governance of threats to the human food chain at all stages from production to consumption.

The **Cassava diseases in central, eastern and southern Africa (CaCESA)** strategic programme framework will be implemented through the FCC.

[www.fao.org/foodchain](http://www.fao.org/foodchain)