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

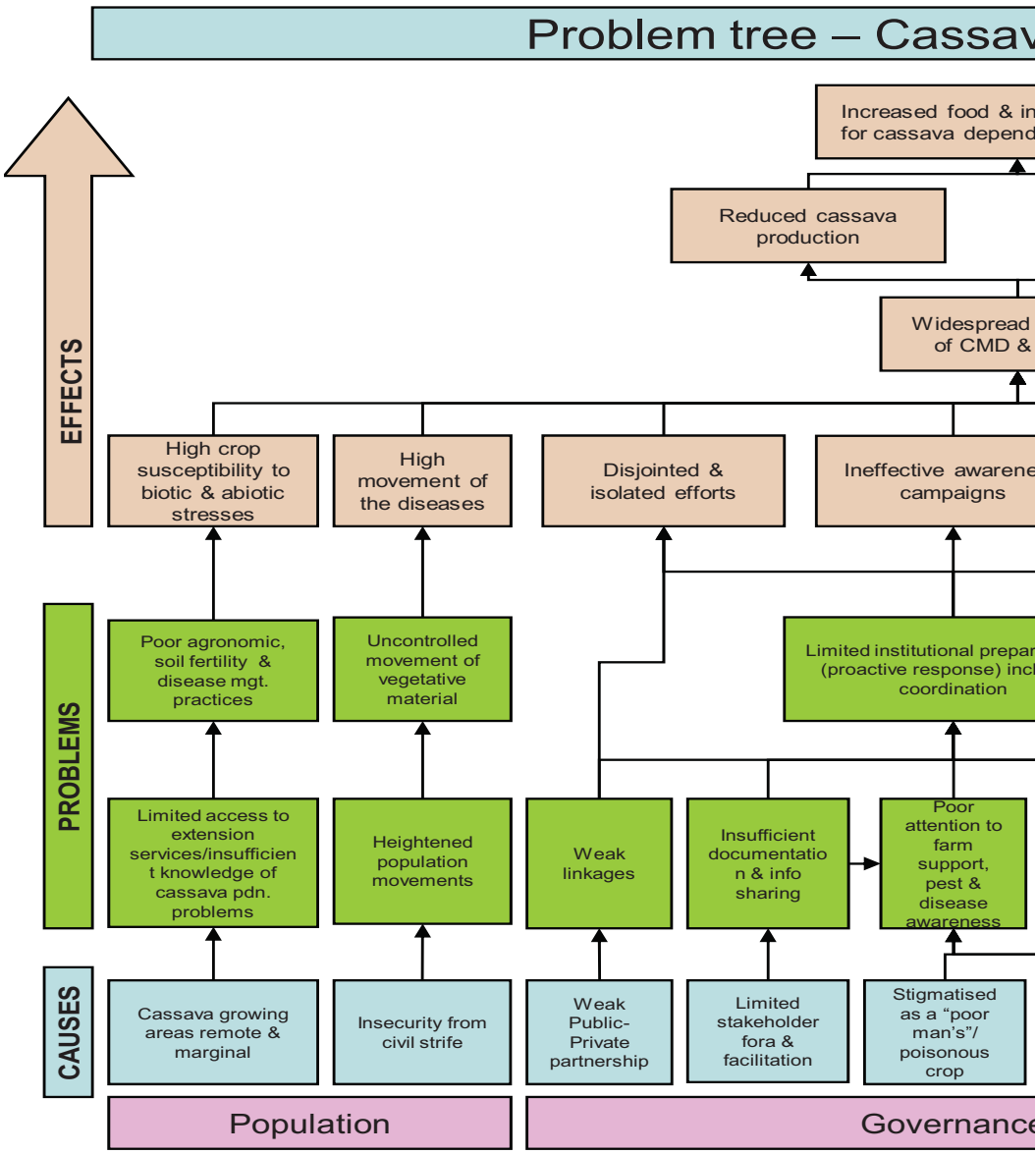
CMV affected parts (leaf), switching to other crops (usually millet), and ultimately migration. There is a pressing need for better understanding of the coping strategies within the overall context of the production system in the affected regions.

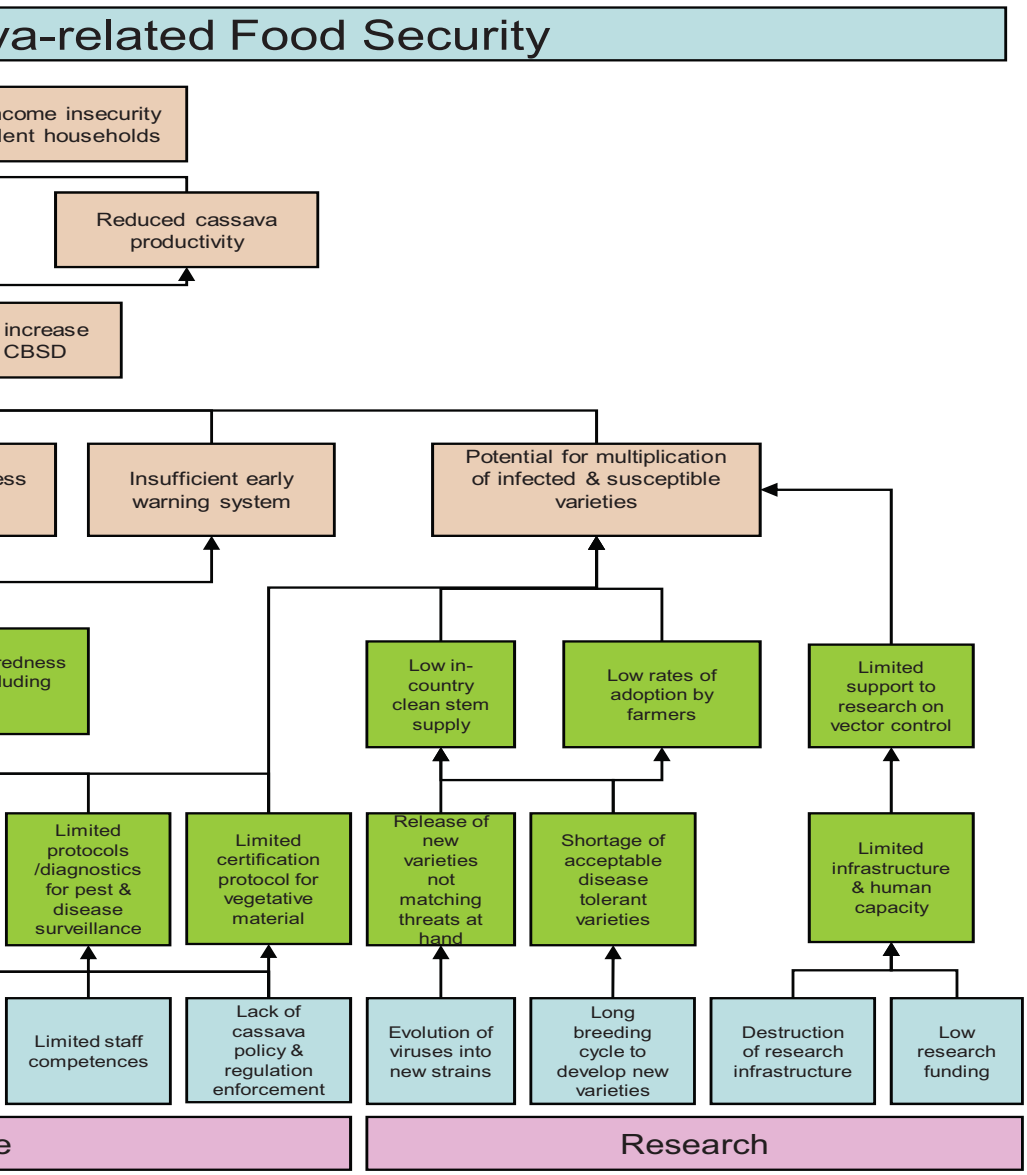
- ***Lack of systematic surveillance of multiplication sites:*** surveillance of multiplication sites is essential to ensure that only "clean" (disease-free) planting material is distributed. Where surveys are being done these are infrequent and they tend not to sample by variety but use a composite 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 under-funded 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

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Insufficient early warning system
Potential for multiplication of infected & susceptible varieties
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Low in-country clean stem supply
Low rates of adoption by farmers
Limited support to research on vector control
Limited protocols /diagnostics for pest & disease surveillance
Limited certification protocol for vegetative material
Release of new varieties not matching threats at hand
Shortage of acceptable disease tolerant varieties
Limited infrastructure & human capacity
Limited staff competences
Lack of cassava policy & regulation enforcement
Evolution of viruses into new strains
Long breeding cycle to develop new varieties
Destruction of research infrastructure
Low research funding
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Research

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.

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.

Cassava cuttings being transported by bicycle in Burundi
Credit: FAO/G. Napolitano

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.

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.

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

FOOD CHAIN CRISIS
Management Framework
Plant Protection

Malawi – farmer hoeing cassava plants

Credit: FAO/J. Spaull