SOUTHERN AFRICA ROOT CROPS RESEARCH NETWORK
(IITA/SARRNET)
Chitedze Research Station, P.O. Box 30258, Lilongwe 3, Malawi
Tel: (265) 1 707014 Fax: (265) 1 707026:
E-mail: j.mkumbira@cgiar.org; or jmkumbira@iitamw.org

Cassava Transformation in Southern Africa (CATISA) Project
Malawi Report - 2007

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Lund University
Department of Social and Economic Geography
Sölvegatan 12, 223 62 LUND,
Sweden

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Contact persons

Administrative
Alexander Schöning
Contracts and Grants Officer
ITA-Ibadan, Nigeria
Email: a.schoening@cgiar.org
Tel. +234-2-241 2626

Technical
J. Mkumbira
IITA/SARRNET
Lilongwe, Malawi
Email: j.mkumbira@cgiar.org
Tel. + 265 1 707 014/22

Introduction

Southern Africa is very heterogeneous in terms of climate, natural resources, labour skills, economic prosperity and growth potential. However, for the most part, agriculture is the dominant sector of economic activity and employment in most countries of the region with rural communities depending upon agriculture for their livelihoods. Much of the agricultural production is based on the surpluses of millions of small-scale farmers using low input, rain-fed farming systems.

Success in the agricultural sector has to date been mixed. Despite the high agricultural potential of the region, considerable funds are routinely required to address the chronic food relief situation which has dogged the region for the past 20 years. This relief syndrome has been caused by a combination of poor governance, crop failure through severe droughts, poorly managed food reserves and civil unrest.

Agriculture in Malawi

As it is the case with other countries in Southern Africa, the backbone of Malawi's economy is agriculture, which employs about 90% of the population. Agriculture contributes more than 35% of GDP and accounts for almost 85% of the export earnings. The main staple crop is maize while cassava is second, and main cash crops include tobacco, tea, sugar and coffee. A variety of other crops are grown in the country and these contribute to some extent on food and cash earnings. The country's agricultural production sector is divided into smallholder (with small land holdings - average of 0.4 ha) and estate farming. The smallholder agriculture accounts for over 85% of production, which meets the country's demand for food staples and provides some export surplus. The estates contribute about 12% of total agricultural production but account for nearly 70% of all agricultural exports. It is estimated that the total land under cultivation in the smallholder agricultural sector is 1,374852 ha with other 646,976 ha of unused good arable land, which still remains uncultivated (Malawi Government, 1999).

Cassava is the most important root crop in Malawi and it is grown in most parts of the country. It is a staple food crop for about 30% of the 10 million people in Malawi, especially those in the five districts (Karonga, Rumphi, Nkhata Bay, Nkhotakota, and Salima) along the shores of lake Malawi, where the soils are generally poor (Moyo *et al.*, 1998). It is grown as a food reserve or cash crop in the other parts of the country where the staple crop is maize. Cassava is now gaining more importance in Malawi due to the recurrence of drought and the increase of farm inputs prices as a result of the removal of subsidies (Minde *et al.*, 1998).

Small-scale cassava farming systems in Malawi

Small-scale farmers produce almost all cassava in Malawi. Intensive cassava production is done in marginal areas along the western coast of lake Malawi where cassava is the staple food. A majority of the fields are planted to a mix of cassava cultivars with no or little intercropping since the soils are generally poor and other crops perform dismally.

Bitter cultivars are predominant in the lakeshore areas. Cassava is also grown in the rest of the country where sweet/cool cultivars are predominant (Mkumbira et al 2003). Unlike the lakeshores, most of the cassava is often intercropped with a varying number of different other crops. However, in areas where cassava is grown for sell, fields are often planted to a sole crop with one or two varieties that have demand on the market. All farmers grow their cassava using inherent soil fertility. Thus, the diverse agro-ecologies and farmers' cultural and socio-economic status that exists in the country causes a high variation in agricultural production systems. The variations in crop species, varieties and cultural practices occur over short distances and over seasons

Materials and methods

Malawi national crop production data was obtained from Famine Early Warning Systems Network (FewsNet). In order to verify the production estimates for the current year, cassava yield estimates were conducted in farmers' fields from nine (9) districts in Malawi in April and May, 2007. The survey team included scientists and research technicians from various stations of the Department of Agricultural Research and Technical Services (Bvumbwe, Chitedze & Mkondezi Research Stations), Malawi Gene


1. Survey team training: cassava yield assessment plot demarcation


2. Survey team digging cassava roots


3. Observing cassava roots symptoms


4. Survey team final briefing

Bank, University of Malawi (Chancellor College), and the International Institute of Tropical Agriculture (IITA/SARRNET). A two day field training workshop was conducted, at Chitala Agricultural Research Station in Salima, to harmonize the survey protocols and data collection (Photographs 1-4). Total Land Care (TLC) provided technical training on use of Geo-positioning system (GPS). Cassava yield was assessed using the FAO guidelines on cassava field assessment (Appendix 1). Cassava varieties grown by farmers were collected from fourteen (14) districts. CMD severity was assessed

using the standard CMD scoring scale of 1 to 5 where 1= no visible symptom; 2 = a mild chlorotic pattern over the entire leaf while the latter appears green and healthy; 3 = a moderate mosaic pattern throughout the leaf, narrowing and distortion in the lower one-third of the leaflets; 4 = severe mosaic, distortion in two-thirds of the leaflets and general reduction in leaf size; and 5= very severe symptoms - severe mosaic and distortion in the entire leaf (Hahn et al., 1989; Njock, 1994). A similar scoring scale was used for CGM. Disease/pest severity was based on the percentage of plants affected in each field.

Results and discussions

Cassava production trends

Despite the erratic rainfall which has had an effect on maize productivity in most parts of Malawi, cassava production has steadily been increasing over the years (Figure 1). This in part may be due to its drought tolerance, and the rapidly increasing market demand. The increase in cassava productivity in Malawi is most likely due to a combination of increase in area grown to cassava (Figure 2) and also improved yield per unit area (Figure 3). Cassava yields have increased by 4.6% during the past decade (1997 to 2007). Area under cassava cultivation has increased by 1.4% during the same period, while, cassava yields per unit area has increased by 3.3%. The increase of cassava yield per unit area may be attributed to the use of improved cassava varieties which were first released in 1998 and also in 2000, and the expansion from marginal areas to new non traditional cassava growing areas with better soil fertility, as cassava commercialization and/or industrialization is generally increasing in Malawi.

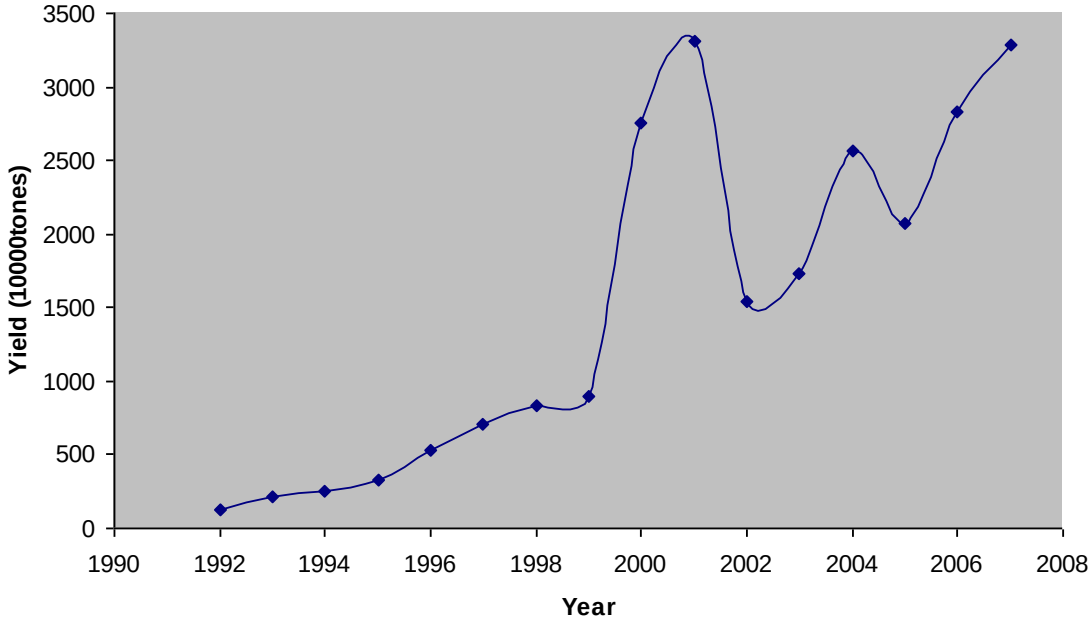


Figure 1 Cassava root yield production trends (1000 tones) in Malawi

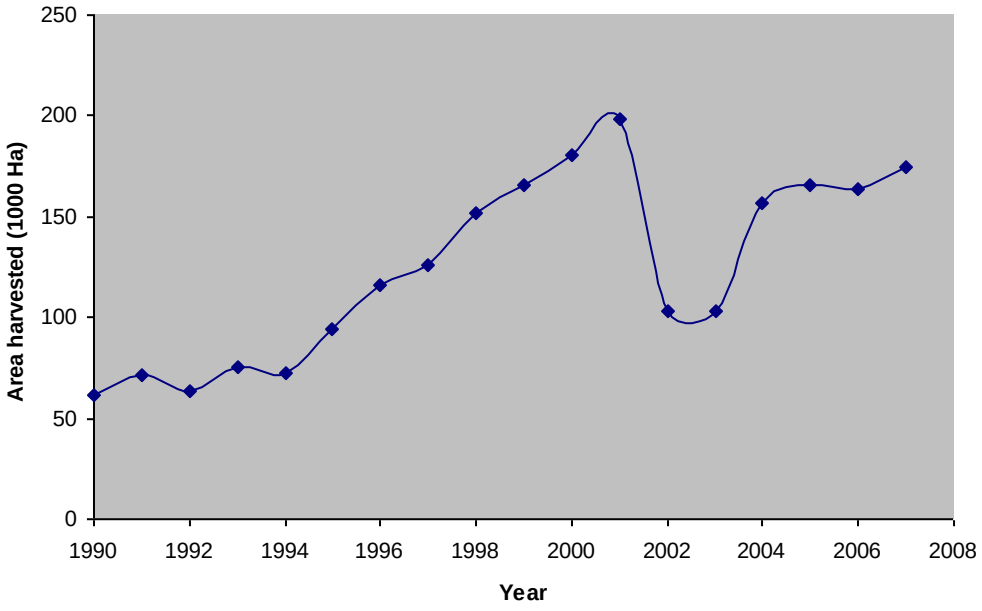


Figure 2 Area where cassava was harvested (1000 Ha) in Malawi

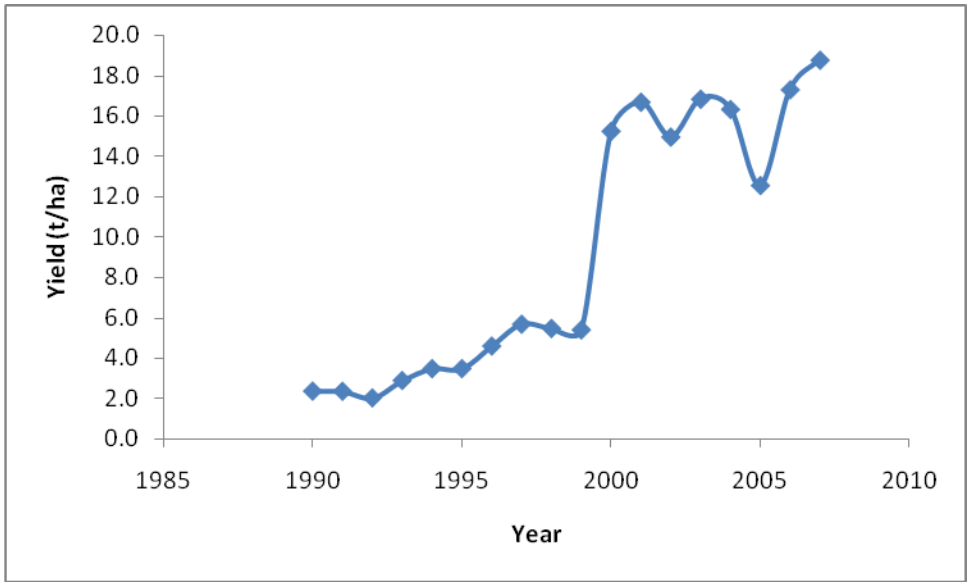


Figure 3 Cassava root yield per hectare (t/ha) in Malawi

Cassava yield assessment for 2007

The cassava yield assessment results obtained from farmers' fields from the nine (9) districts in Malawi are presented in figure 4 below. The mean cassava root yield per unit area (tons/ha) in farmers' fields in Malawi was 19 tons per hectare, with a minimum of 8 and a maximum of 39 tons per hectare. Highest cassava yields were obtained from Karonga followed by Zomba districts while the lowest yields were from Rumphi district. Soil/climatic factors, types of cassava varieties grown and cultural practices may cause the variations observed between districts in cassava root yields, but this requires further investigation.

Coincidentally, the national average cassava yield computed from the 2007 figures obtained from FewsNet (Figure 3) is also 19 tons per hectare (as obtained from the cassava yield assessment exercise). Which is an indication that the 2007 national cassava production figures in Malawi are very close to the reality in farmers' fields, hence can be relied on.

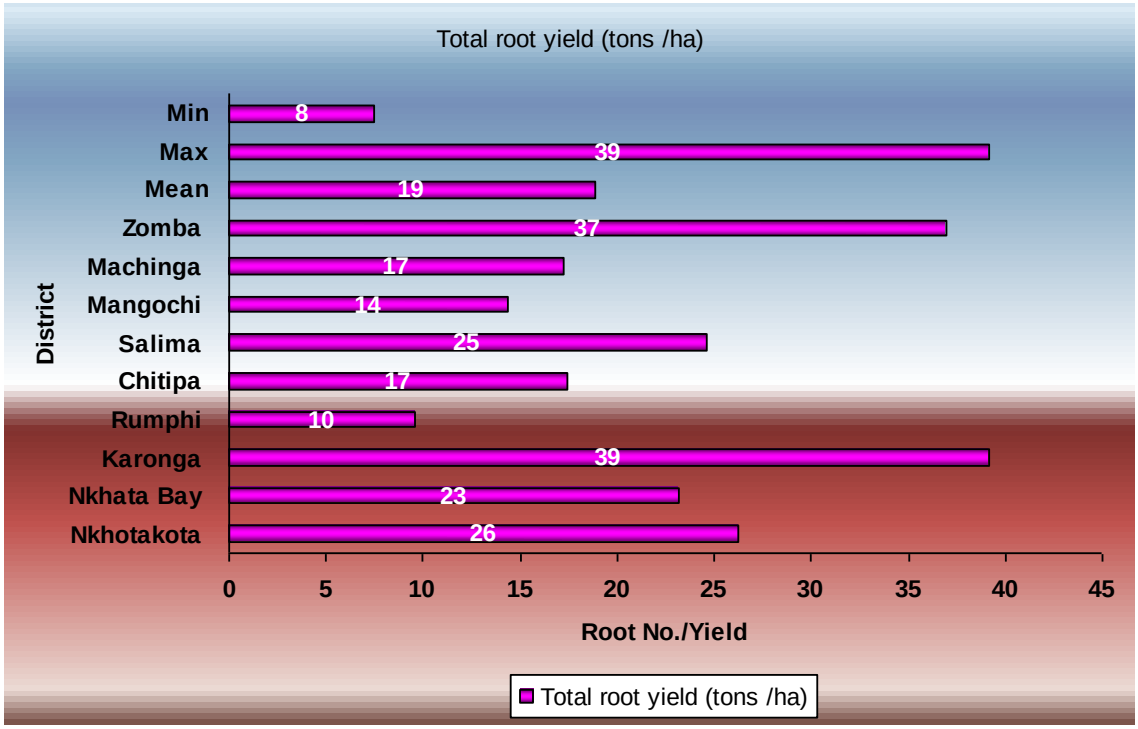


Figure 4 Average cassava root yield per hectare (tons/Ha) obtained from a survey conducted in farmers' fields from nine (9) districts in March & April, 2007 in Malawi

Major production constraints - Cassava diseases

The outcome of the survey indicates that both cassava mosaic virus disease (CMD) and cassava brown streak virus disease (CBSD) are widely distributed in Malawi (Figure 5). The incidence and severity of the diseases was observed to be generally high in farmers' fields except for Mulanje and Nkhotakota districts, which had moderately low levels of CBSD (Figures 6 & 7). This indicates that CMD and CBSD may reach an epidemic level in Malawi unless there is an immediate and deliberate effort to reverse the situation.

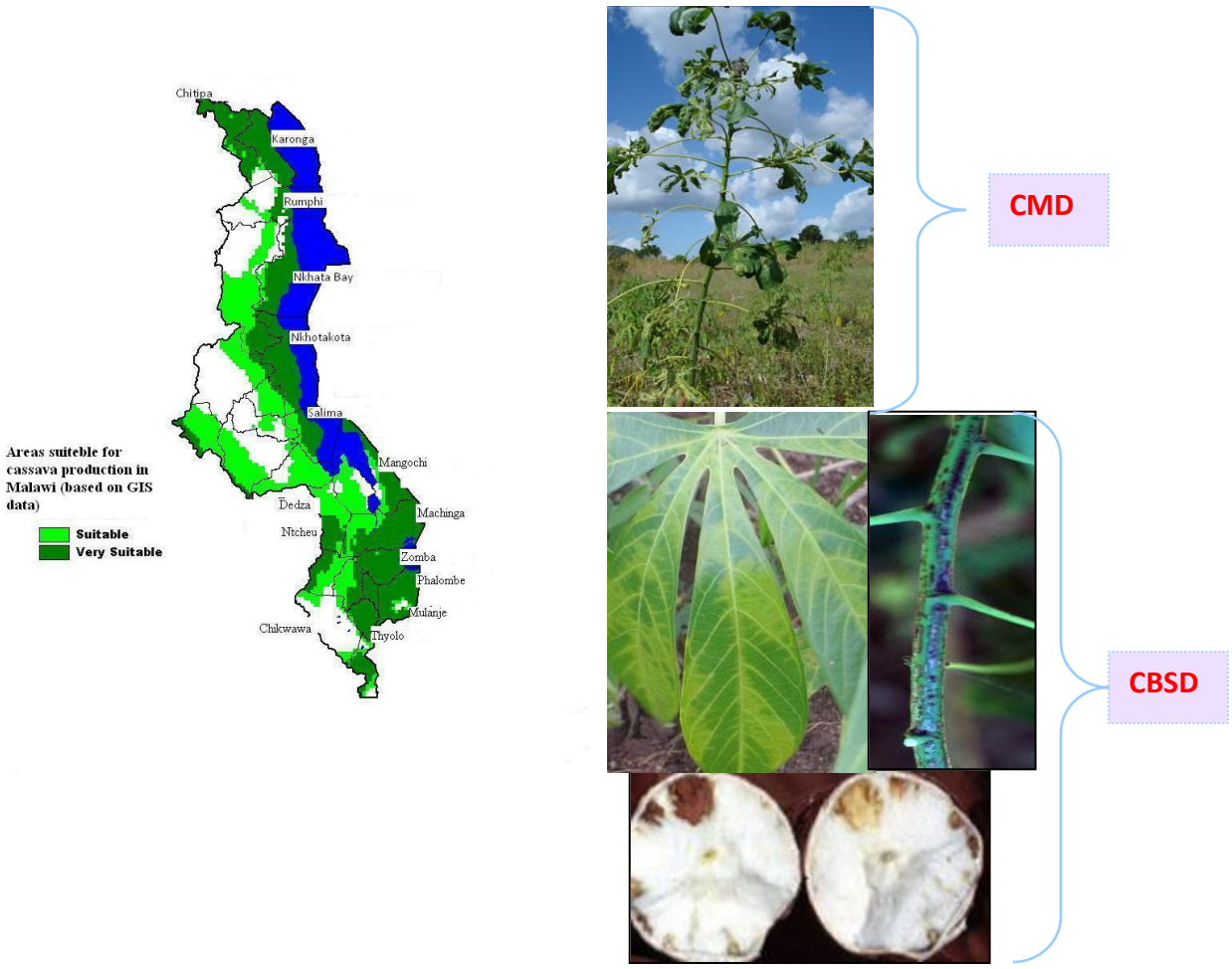


Figure 5: Distribution of CMD & CBSD in Malawi

Figure 6: Cassava mosaic virus incidence and severity scores in farmers' cassava fields in some districts in Malawi

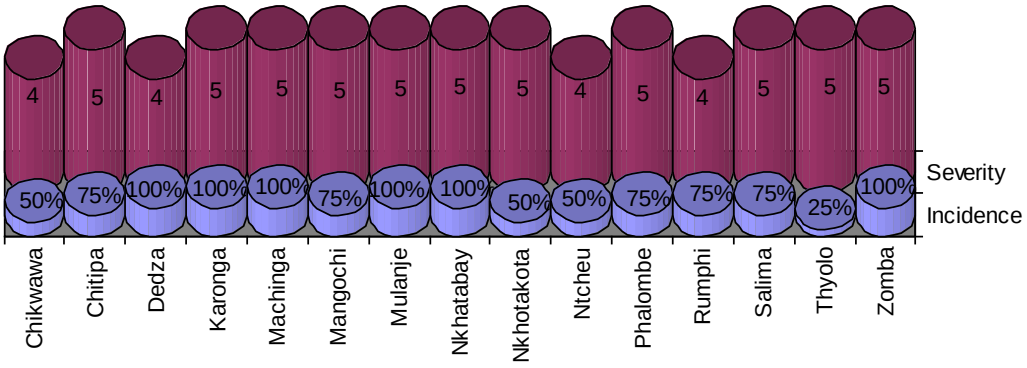
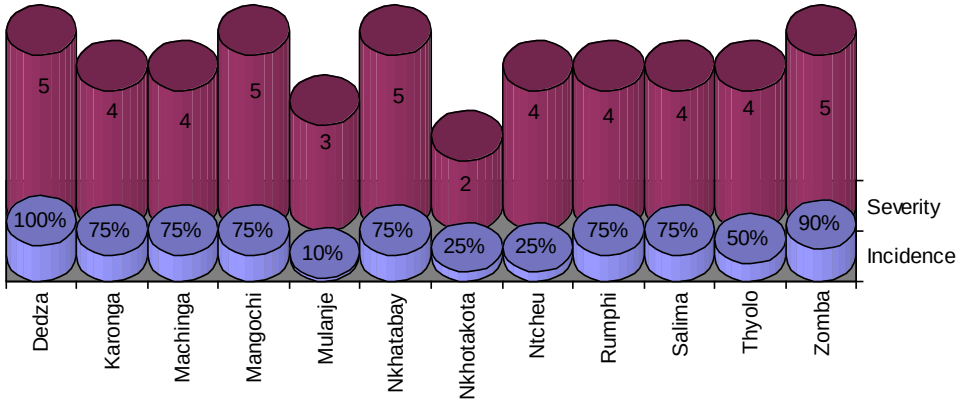


Figure 7: Cassava brown streak virus incidence and severity score in farmers' cassava fields in some districts in Malawi



Collection of local cassava varieties

Local cassava varieties grown by farmers in the various districts visited during the survey were also collected (Figure 8). A total of 197 cassava landraces were collected and planted at Chitedze Research Station in two separate fields. One field under the Malawi Gene Bank while the other jointly being managed by the Department of Agricultural Research Services (DARS) and IITA/SARRNET. Characterization using morphological and molecular markers will be done so as to identify and eliminate duplicates and also identify the predominant and most preferred genotypes in Malawi.

The cassava breeding program in Malawi released three waves of improved cassava varieties. Local best varieties (Chitembwere, Gomani, Mbundumali, and Nyasungwi) were released in 1980s; and locally bred and introduced improved varieties (Maunjiri, Mkondezi, Sauti, Silira & Yizaso) were released in twice in 1999 and 2002. Among these only three local best varieties (Chitembwere, Gomani & Mbundumali) were collected from fourteen (14) districts. Mbundumali, which is the most preferred sweet variety (by farmer, consumers and commercially) was available in all the fourteen (14) districts. This variety, along with Gomani, have been multiplied and distributed widely in the country by the Ministry of Agriculture and its local and international partners. However, Gomani, which is a bitter variety, is mostly grown in areas where cassava is the stable crop, since the bitter varieties are preferred. None of the locally bred and introduced improved varieties were collected. It is probable that farmers may have renamed them.

Figure 8: Number of farmer cassava varieties collected from each district in the major growing areas in Malawi

Appendix 1

FAO Cassava yield assessment guidelines
(PDF doc attached)