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INVENTORY OF CASSAVA PLANT PROTECTION AND DEVELOPMENT PROJECTS IN AFRICA

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ABSTRACT

The need to inventory cassava plant protection and development projects in Africa arose during the planning phase of the CTA/NARO/NRI seminar on *"Integrating the Management of Pests, Diseases and Weeds of Cassava in Africa"*. The purpose of the inventory was to assemble information on what has already been done on the protection and development of cassava that could serve as reference for future activities and to facilitate communication between institutions working towards the same goal. Questionnaires in French and English were sent to national and international organizations involved in cassava research and development. The questionnaires sought the title of the project, the location, the executing agency, the biodata of the contact person, project address and collaborators, duration of the project, funding agency, project description, objectives and expected outputs. Additional information was assembled from documentation obtained from various organizations and the IITA/PHMD database on similar activities. A total of 303 cassava protection and development projects were identified of which about half are plant protection-oriented. Most activities on cassava protection have been centred on biological control and host plant resistance. The least activity has been on chemical control. The applicability of the collected database is discussed and recommendations are made on the conversion of the database into a catalogue.

Key Words: Database, *Manihot esculenta*, pest management, questionnaire survey

RÉSUMÉ

Le besoin d'inventorier des projets de protection et de développement du manioc en Afrique s'est manifesté au cours de la phase préparatoire du séminaire sur *"L'Intégration de la Gestion des Ravageurs, Maladies et Mauvaises Herbes du Manioc en Afrique"*. Le but de l'inventaire était de rassembler des informations sur ce qui a été déjà fait en la protection et développement du manioc qui pourrait servir de référence pour des activités futures et pour faciliter la communication entre institutions visant le même but. Des questionnaires développés en français et en anglais ont été envoyés aux organisations nationales et internationales ayant des activités dans le domaine de la protection et du développement du manioc en Afrique. Les questionnaires contenaient le titre du projet, la localisation, l'agence d'exécution, les informations sur la personne de contact du projet, l'adresse du projet et des collaborateurs, la durée du projet, l'agence de financement, la description du projet, les objectifs et les résultats obtenus/attendus. Des informations supplémentaires été rassemblées à partir de la documentation sur des activités similaires obtenue de différentes institutions et des données de base de la division de phytiatrie de l'Institut International d'Agriculture Tropicale (IIAT). Au total 303 projets ont été identifiés. Près de la moitié de tous ces projets étaient sur la protection du manioc. La plupart des activités sur la protection se sont concentrées sur la lutte biologique et la résistance des plantes. Les projets sur la lutte chimique sont les moins nombreux. L'application des informations recueillies est discutée et une recommandation est faite sur la possibilité de convertir les

données de base rassemblées en un catalogue d'activités sur la protection et le développement du manioc en Afrique.

***Mots Clés*: Bas de données, *Manihot esculenta*, gestion des ravageurs, enquéte par questionnaire**

BACKGROUND

The rapidly expanding rural and urban populations in many parts of Africa rely largely on starchy foods for carbohydrate intake. Consequently, cassava is becoming increasingly important as a major food source on the continent. It is easy to grow and it thrives even under harsh agronomic conditions that do not permit cultivation of other crops. The tuberous roots and leaves are eaten in various forms by more than 200 million people, including many of the poorest in Africa.

The status of cassava as a food security crop to most subsistence farmers is, however, threatened by increasing production demands coupled with finite agricultural resources. Additional threats to the sustainability of cassava agroecosystems on the continent arise from pests, diseases and weeds which together reduce yields by an estimated 50% (IITA, 1993). Numerous programmes operating within national and international agencies are concerned with the need to prevent these losses as a means of safeguarding national and regional food security. However, the activities of many agencies and programmes appear to be unknown to each other, even when operating in the same country. Also, in plant protection, there is now a new move to assemble multidisciplinary teams (e.g. plant protectionists, productionists and socioeconomists) working together to develop ecologically sustainable plant protection strategies (see Yaninek *et al.*, 1994). To achieve a truly integrated approach, the activities and expertise in the various agencies and programs need to be known to each other and by others.

A PREPARATORY STUDY

In planning the Technical Centre for Agricultural and Rural Co-operation (CTA)/National Agriculture Research Organization (NARO)/ Natural Resources Institute (NRI) seminar on *"Integrating the Management of Pests, Diseases and Weeds of Cassava in Africa"* (Kampala, Uganda, 27 June - 1 July 1994), the need for a catalogue of cassava plant protection projects in Africa was expressed. The CTA of the European Union supported the proposed preparatory study to compile a list of the most important cassava plant protection activities being undertaken in Africa. The study would form the basis for a catalogue of cassava plant protection programmes. The Plant Health Management Division (PHMD) of the International Institute of Tropical Agriculture (IITA), Benin Station, was contracted by CTA to undertake the study. The objectives of the study were to: (i) identify appropriate government agencies, universities, Non-Governmental Organisations (NGOs), regional and international organisations that are or could be involved in cassava plant protection research and development in Africa; (ii) prepare a questionnaire for identifying and characterising cassava plant protection activities; (iii) disseminate the questionnaires for completion to national programmes, universities, NGOs, regional networks and international organisations involved in cassava research; (iv) review the plant protection projects database of IITA PHMD for cassava-specific projects; (v) visit key national, regional and international programmes to compile a preliminary list of cassava plant protection activities; (vi) collect and compile completed questionnaires that were returned by participants attending the CTA/NARO/NRI seminar.

This report summarises the findings of the study which lasted 100 days, from 16 March 1994, and covered 25 cassava producing countries in West, East and Southern Africa (Table 1).

DATA COLLECTION

A two-page questionnaire in English and French requesting information from national, regional and international scientists on cassava research and development projects and activities in their country/region/continent was developed with inputs from IITA Divisions, Programmes, Units

and Special projects. Additional inputs were from reference materials from Centro Internacional de Agricultura Tropical (CIAT) and national programmes, and from discussions with individual scientists with prior and/or on-going experience of data collection. The data fields included project title, discipline focus of the project, host country/region, executing agency, biodata of contact person/project leader, collaborating institutions and persons, project duration, budget and sponsoring agency, research and development objectives and activities, and expected outputs.

The questionnaire (Table 2) was disseminated to national programmes (e.g. scientists/ extensionists identified above), international research institutes (e.g. IITA root crop research scientists), national and regional projects, (e.g. Ecological Sustainable Cassava Plant Protection (ESCaPP) and Collaborative Study of Cassava in Africa (COSCA)) and to cassava research and development networks (e.g. the Southern Africa Root Crop Research Network (SARRNET), the East African Root Crops Research Network (EARRNET), Conference des Responsables de

TABLE 1. Country/regional/international research and development institutions

Countries	
Angola	Ministry of Agriculture
Benin	SPV, Institut National de la Recherche Agronomique du Benin (INRAB)/Niaouli, Université Nationale du Benin (UNB), IITA/Benin, Global 2000, INRAB/Ina
Botswana	Ministry of Agriculture
Burundi	Institut des Sciences Agronomiques du Burundi (ISABU)/Institut de Recherche Agronomique et Zotechnique (IRAZ)
Cameroon	ESCaPP/University of Dschang/Institut de Recherche Agronomique (IRA)
Central Africa Republic.	Ministry of Agriculture
Congo	CORAF/Ministére de l'Agriculture. Office de Recherche Scientifique et Technique d'Outre-Mer (ORSTOM)
Gabon	Université du Gabon
Gambia	Ministry of Agriculture
Ghana	ESCaPP/PPRSD/University of Ghana
Guinea-Conakry	Ministère de l'Agriculture et des Ressources Animales
Ivory Coast	Institut des Savanes (IDESSA), Ministry of Agriculture
Kenya	Kenya Agriculture Research Institute (KARI), Kenya National Biological Control
Lesotho	Ministry of Agriculture
Madagascar	Ministère de l'Agriculture
Malawi	Ministry of Agriculture/SARRNET
Mozambique	Ministry of Agriculture
Nigeria	National Root Crop Research Institute (NRCRI)
Rwanda	Institut des Sci. Agron. du Rwanda (ISAR)
Sierra Leone	Ministry of Agriculture/Njala Univ. College
Tanzania	EARRNET/Min. of Agric./Univ. Makerere
Uganda	EARRNET, National Cassava Project
Zaire	Programme National Manioc (PRONAM)
Zambia	Ministry of Agriculture, National Biological Control Programme (NBCP)
Zimbabwe	University of Zimbabwe
Regional organisations	
SARRNET	Southern Africa Root Crops Research Network
EARRNET	East African Root Crops Research Network
ESCaPP	Ecologically Sustainable Cassava Plant Protection (Benin, Ghana, Camerron, Nigeria)
CORAF	Conference des Responsables de Recherche Agronomique Africains
International organisations	
IITA	International Institute of Tropical Agriculture
CIAT	Centro Internacional de Agriculture Tropical

TABLE 2. Questionnaire Sample

Research/development projects undertaken on cassava protection by different institutions.
Give details of your on-going or completed research projects on cassava plant protection and development within the past 10 years. Attach additional sheets for additional research projects

1. Research Project Title: _____
2. Discipline focus(see key _____
3. Name the country in which the research activity is conducted: _____
4. If the activity is regional, name the participating countries, institutions: _____
5. Name the executing agency (ies) of the research activity: _____
   a. Division/Department _____
   b. Programme _____
   c. Unit _____
6. Who is the contact individual for the research/development activity?
   a. Name, Surname and other Names _____
   b. Nationality
   c. Title (tick) Prof_____Dr._____Mr_____Mrs_____Ms_____Other_____
   d. Language: English__French__Portuguese__Arabic__Spanish__German__other_____
   e. Training background (see key)
   f. Mailing address _____

City/Town/State/Province/County _____
Telephone_____Telefax_____Telex_____E-mail_____

7. Who is/are the participating individual(s)? Give their name(s)/surname(s)/address(es)
   a. _____
   b. _____
   c. _____
   d. _____

8. What year the project activity started _____ ended _____
9. Budget of the project activity _____
10. Name the sponsoring body(ies) _____
    National _____
    International _____
    Other _____
11. Give a brief description of the research/development activity

_____
_____
_____

12. What is/are the research/development activity objective(s)?
    a. _____
    _____
    b. _____
    _____
    c. _____

13. What is/are the expected output (s)?

_____
_____

14. Comments/Additional information

_____
_____

(a) Disciplines focus: insert the corresponding numbers: 1 = biological control, 2 = host plant resistance, 3 = cultural control, 4 = chemical control, 5 = habitat management, 6 = IPM, 7 = agronomy, 8 = breeding, 9 = weed management, 10 = soil management, 11 = physiology, 12 = sociology, 13 = economics, 14 = anthropology, 15 = other.
(b) Training background: insert the corresponding numbers: 1 = Entomology, 2 = pathology, 3 = weed science, 4 = breeding improvement, 5 = agronomy, 6 = socioeconomics, 7 = soil science, 8 = other.

Recherche Agronomique Africains (CORAF)-Réseau Manioc. Questionnaires were sent either directly to individual scientists identified within these organisations/agencies or indirectly through project leaders and coordinators. Distribution was by mail, DHL, fax and by person-to-person distribution at national and international scientific meetings. A total of 200 questionnaires were distributed to individuals, projects and networks in the 25 countries, before and during the CTA/ NARO/NRI/ seminar.

Additional to the questionnaire, information on cassava-based projects was extracted from IITA databases (e.g. the IITA-PHMD cassava plant protection projects database, and the IITA-International Cooperation Division's (ICD) *"Compendium of Research Projects"*), station annual reports, CTA documents (e.g. *"Development Projects in Cassava"*), national databases (e.g. the Ghana projects database) and other relevant documents.

Furthermore, key institutions were visited to verify previous reports, collect additional material, gather the views of national scientists and NGOs on plant protection activities and increase the spread of questionnaires. For example:-

IITA-Ibadan. Contacts were made with plant breeders, biochemists, physiologists and agronomists of the Root and Tuber Improvement Programme (TRIPP), the PHMD virologist and with ICD personnel. These contacts provided reference material on cassava plant protection projects, including those executed by the institute in collaboration with national cassava programmes.

Republic of Benin. Visits were made to the Station de Recherche sur les Cultures Vivrières (SRCV) at Ina Borgou province, Projet Songhai in Porto-Novo Ouémé province, Service de Protection des Végétaux (SPV) in Porto-Novo Ouémé province, Projet Centre de Recherche et de Développement pour la Santé (CREDESA)/ Pahou and "Global 2000" in the Atlantique province and to the Department of Agronomy of the Université Nationale du Benin. SRCV and SPV are government agencies involved in research whereas Projet Songhai, CREDESA, and Global 2000 are NGO development projects.

Malawi: SARRNET. The visit to Malawi coincided with the inaugural meeting of the Steering committee of SARRNET in Lilongwe. Country representatives to the meeting from Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia, and Zimbabwe were briefed on the importance of the questionnaires which had not been completed and returned by the time of the visit. Discussions were also held with the participants on general plant protection activities in the network. Plant protection activities of the network were presented and discussed as part of the workshop agenda for presentation of workplans by national and regional scientists. These presentations were also used in compiling the findings of this preparatory study.

Congo: CORAF. A compilation by CORAF-Réseau Manioc in Brazzaville on cassava projects in the region was obtained. During the visit, questionnaires were also distributed to staff of the Université de Brazzaville and discussions held on cassava plant protection activities in the network.

Findings. The identification of the institutions and personnel in cassava research and development in Africa was facilitated by the many IITA contacts established throughout the continent. Approximately 50% of the distributed questionnaires have been completed and returned (Table 3). The number and rate of recovery of the questionnaires are limited in part by communication difficulties and by relatively weak distribution within some networks.

The study identified 303 cassava plant protection and development projects/activities executed by national, regional and international agencies/ organisations, generally in collaboration with each other. The IITA-PHMD database records 109 cassava projects, approximately 55% of these are plant protection-oriented. Ninety nine cassava-based projects were extracted from IITA-ICD Compendium of Research Projects, IITA Annual Reports, and from national projects databases and other information sources. The number of plant protection projects identified through the questionnaire is 97. Many of the projects collated from existing documentation lack information on the budget, the project description, objectives and expected outputs. These gaps need to be filled in.

The discussions held with scientists and extensionists during the visits revealed that there is little exchange of information between cassava scientists/researchers and development workers. Even though research institutions are actively engaged in plant protection and generating information on such aspects as host plant resistance and biological control methods, such plant protection information is yet to be used in many development projects.

APPLICABILITY OF THE STUDY

Several previous databases have been established and so it may be asked why a new one is necessary or how it can be used in the context of the Kampala CTA/NARO/NRI/ seminar. Although many other aspects such as who finances research in Africa (national or international agencies?) can be analyzed from the present database, two examples are used to illustrate the importance of the information contained in the database in the context of the seminar. (1) A quick inventory of different projects on the database concerned with pests and diseases indicates that our present knowledge is more concerned with the cassava mealybug and cassava green mites than with other pests or diseases. There are about 150 projects on cassava mealybug and cassava green mites compared with only 39 on African cassava mosaic disease, 15 on cassava bacterial blight, 1 on cassava anthracnose, 9 on termites, 2 on nematodes and 6 on weeds. (2) On a discipline basis, the database indicates that most projects have been carried out on biological control and host plant resistance. There are 70 projects on biological control, 25 on host plant resistance, 12 projects on cultural methods, 1 on chemical control, and 16 on integrated pest management (Table 4).

From this short analysis of the database and in the context of the Kampala CTA/NARO/NRI seminar, several questions arise. Should scientists carry out more research on the various pests and

TABLE 3. Channels of dissemination, number of questionnaires distributed and the responses received

Channels of dissemination	Number of questionnaires returned / Number distributed	
EARRNET	17/30	(56.6%)
SARRNET	06/30	(20.0%)
CORAF	15/30	(50.0%)
IITA scientists	08/20	(40.0%)
CTA seminar participants	39/65	60.0%)
Other individuals	12/25	(48.0%)
Total	97/200	(48.5%)

TABLE 4. Number of cassava plant protection projects identified per discipline basis

Discipline	No of projects	Percentage of total projects
Biological control	70	23.1%
Host plant resistance	25	8.3%
Cultural methods	12	4.0%
Chemical control	01	<0.1%
Integrated pest management	16	5.4%
Other disciplines	179	59.1%
Total	303	100%

diseases of cassava before an integrated approach may start or should they go ahead and use the present knowledge as a basis for integration? Similarly, since most projects/activities on cassava plant protection have been centred on biological control (21%) and host plant resistance (7%), should there be more studies on other aspects of control such as cultural methods before integration can begin? These questions were considered by those attending the seminar.

RECOMMENDATIONS

Completion of the study should consider the following: (i) The pool of completed questionnaires should be increased beyond the present 50% of those issued. For example, those who have not replied could be stimulated by issuing a summary interim report of the study; (ii) Information gaps should be filled in order to increase the value of the database and catalogue; (iii) Following analysis of the data gathered from the questionnaires and from other information sources the catalogue of plant protection information programme activities should be formatted; (iv) The processed data should be put on an interactive electronic database, the value of which will be further increased if it is linked to related cassava databases to facilitate cross reference; (v) The catalogue and interactive database should be issued to potential users preferably in both English and French versions; the availability of these documents should be advertised through appropriate publication channels (e.g. the CTA "*Spore*" bulletin and national and international scientific and development news media); (vi) Provision should be made, especially at the level of international research and development organizations, to update the database.

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REFERENCE

International Institute of Tropical Agriculture (IITA), 1993. Plant Health Management Division. *Annual Report for 1992.*