THE IMPACT OF AGRICULTURAL DEVELOPMENT POLICES ON PLANT GENETIC RESOURCES CONSERVATION IN NIGERIA - THE WAY OUT.

ODOEMENA C. S. I. AND AKPABIO K. I DEPARTMENT OF BOTANY, BORTICULIURE & MICROBIOLOGY, UNIVERSITY OF BYOLD ST

ABSTRACT

A detailed examination of the Federal povernment policies on accelerated food production programmes in Figuria revealed that these policies are key contributors the decline in genetic pool. Modern agricultural practices and social, economic developmental projects have been identified as the major causes of the gradual crossion and extinction of Nigeria's most indigenous crope genetic resources. This paper therefore articulates so no possal I conservation strategies that will facilitate effective preservation and utilization of plant genetic materials for sustainable plant food and forest resources.

INTRODUCTION

It should be recalled that important for the rops in the world have their parental origins from the African and South American wild species. Soffice it to say that most developed countries that have attained self sufficiency in plant food resources succeed they collecting and preserving wild relatives of their agricultural crops, that were to be endangered. This still helps them to retrieve those rare genetic qualities in the wild parental species for cross fertilization with the new agricultural crops. It behaves every nation to preserve its heritage for posterity in addition to the internation statuary obligations to do so.

In Nigeria, several other factors that facilitate plant genetic resources crosson are developmental projects such as urbanization, road construction, industrial establishments and induscriminate burning of environmental impacts on the ecosystem base enring been highlighted by some scholars (Okonswo), 1981, Odoemen, 1990)

One of the consequences of plant penetic erosion in developing countries is the inability of crop breeders to obtain sufficient and wild sources of penetic variation to draw upon, when needed for breeding works. This is very serious handicap for enhanced stable crop multiplication and propagation in agricultural research projects

This paper therefore articulates the need for Nigerian breeders to embark on intensive alternative methods of prevention of loss in crop yields, resulting from pests and microbial pathogens. This involves hybridization of modern agricultural crops with their related wild varieties.

GENETIC EROSION

What was regarded as abundant gene pool in Nigeria's natural forests and fields about 3 - 5 decades ago, are now disappearing. If an immediate action to arrest the situation is not taken, it will lead to a national disaster in terms of famine in the next 15 - 20 years The catastrophic experience due to genetic resources erosion led to the great Irish potato famme which caused the death of about 2.5 million people desperate emigration of more than two million sub-reacross the Atlantic and Irish sea in 1846. This most traumatic example of famine caused by less in genetic diversity in a food crop (Okonkwo 1981) The reason was that the genetic base on the frish potential been eroded and narrowed to the point where little resistance to the blight fungus Anothe was the African Rice Gall midge (ARGM) pest attack

that wifed out all rice crop farms in Abakaliki in 1988, resulting to carcity of rice and higher purchasing price of the available ones. The wheat stem rust of 1954 and coun blight of 1970 all in United State of America are other cata trophic examples. The narrowness of the genet base was responsible for these crops failures.

Vilkes, (1983) associated crop failures to high concentration of crop cultivation using widespread mone ultites of proven high yeilding lines grown in dense uniform stands of thousands of genetically similar plants. The insects and pathogenic fungly bacteris, viruses, nematodes, etc. are constantly changing their genetic make up as natural selection operates. The inswer may be the introduction of a new timescription of a new disease resistant crop varieties. Thuskes (1989) attributed genetic erosion to the folling.

paradoxically too much success in breeding technology. This is a case where the new varieties established by breeders have in fact been so successful to have replaced the extremely variable land races from one country to another

Hetter farming practices have also climinated the weedy races on a selfields that form part of the geopool.

Extension workers and act ultural advisory officers also discourage farmers not to grow the highly diverse mixtures of land races, which has been their tradition to select one sort only or to use only selected seed provided by the government

And finally the related wild species of forest and savanna regions, are being eliminated by forest clearings for timber production or by reseeding the land with pasture grasses for grazing of cattle, sheep and goats

ESTABLISHMENT OF GENETIC DIVERSITY CONSERVATION MACHINERY IN NIGERIA.

has corber 1 or observed by the Food and Agriculure

Organisation (I Albin time) can be considered. with deliberations on the scientific best for one of each situation and subsequent information to in imber necessity in 1981. Subsequently Nigeria became aware of and called for the feasibility study on the estabilishment of a National Bureau of Conservation of plant genetic resources and the vegetation. In 1983, the Lederal Ministry of Science and Technology, Lagus awarded a contract for the study to III MMAS Development Company Limited, Frague, an Agro-Husmess Services. Company which completed the job in 1981

The actual establishment of a conservation machinery in Nigeria became effective in 1991 when the Federal Government Promulgated a decree establishing the Natural Resources Conservation Council (SRCC) Abuja under the Presidency. The question now arises, how effective is the council in perioplasm conservation".

CONSERVATION COUNCIL AND THE. THE TASK AHEAD

It is expected that the council charged with the conservation of genetic resources diversity will realize the task ahead of them by sourcing and conserving endangered wild plant species. It is therefore necessars to highlight certain essential conservation strategies to be adopted by the council and all other nongovernmental organizations (NGO) it a sustainable food production in Nigeria is to be achieved

GENETIC CONSERVATION STRATEGIES Exporation and Collection.

Frankel (1973) pointed out that, the first step in genetic conservation technique, is to establish through a survey, the baseline of the genetic resources of crops in the ecosystem. This is preceded by the identification. of the following facts -

The extent of genetic crosson that is actually taking place

The urgent needs of breeders for particular 61 materials. The needs would arise from the knowledge derived from screening or plant breeding work on the materials alreads existing in the stock collected

The need for plant scientists to study genetic ci materials known to exist in a particular region which, because of their relationship to other genes or their occurrence in that same region, might prove to be useful to breeders.

CONSERVATION.

Proper conservation of collected genetic materials is the major objectives for genetic sourcing Therefore, this actually involves the establishment of standard gene banks, Frankel (1975) supposted the need is for genetic resources centres with one or two kinds of seed collections, such as

a) Base collection, and (b) Active Collection

The former consisting of seed materials dried to 5- 7% moisture content, sealed and stored at between -10 and -20°C for long-term storage and regeneration. and the latter consisting of seed materials kept under less than ideal storage conditions for medium-term storage, multiplication, evaluation and documentation and already quarantized for immediate distribution. The

Sind storage is not the only nighted of perre purces conservation. However, it is centary's the best for the storage of maximum genetic divergity in the minimum amount of space, apart from large-sec (ed materials such as coconuts. Seed materials that may be kept for very long periods (20-50 years) without regeneration at about 5% humidity and -20°C are referred to as "Orthodox seeds" (Roberts 1975). All seeds of field crop species belong to this group and are expected to undergo periodic regeneration test as ascertain their viability from time to time. All other and crops that are susceptible to the same storage conas the orthodox seeds are known as "Recalertran » Lew examples are rubber, oil palm, coffee, coc and cola nut seeds

The transfer of the second of

Globalty, more than 100 countries have embarked on the conservation programme of germplasm (Hanson, 1984), Morel (1975) and Henshaw (1975) advocated a new genetic conservation strategy which is through meristem culture. In view of the general concernand desire to widen the genetic base of agricultural crossfor genetic diversity, the techniques of tissue culture involves germplasm storage through growing tiny fragments of plant tissues in nutrient media from which plants can be regenerated after long periods of storage.

In Nigeria, modest efforts are in progress for germplasm conservation and gene pool establishment, though to a non - significant level. Non-significant in the sense that the administrative bottleneck and lack 22 sufficient financial resources from the Ferri government to research institutes and universintensify the work on conservation projects it - - for efforts made by the International Institute of a opical Appropriate (III A) Ibadan, National Root Crop Research Institute Umudike, Umuahia, National Institute of Horticulture (NHORI) Ibadan and Institute of Agriculture Research, Ahmadu Bello University, Zaria, breeding works in Nigeria could have been paralysed, However, these Institutions have their lapses towards this goal, that is, they pay little or no attention to the sourcing and conservation of wild relatives of their crop varieties from which improved hybrid varieties could have been established Most importantly is the protection of natural tropical forests which habour penetic materials of the wild fruits, timber trees and medicinal plants which are of Nigeria origin.

TEST RUN EVALUATION OF COLLECTED SEEDS.

There is an absolute need to screen the collected genetic materials before proper storage. This will avail the plant breeders the opportunity to know; the nature and type of characters in the genes. Data on the highly agronomic characters and on resistance to 4 a specific pests and diseases are of great interest to a breeders and this will guide them to use collection for a breeding purpose.

10.10

COMPUTER DOCUMENTATION GENETIC INFORMATION.

The amount of genetic information anticipated from the test run evaluation will be vast and useful, therefore computerization of information storage and retrieval systems will be necessary to assist point. breeders. This enhances a rapid and reliable collection of

genetic information available from genetic stact with necessary.

GERMPLASM ENHANCEMENT.

Sequel to the information from the test renevaluation of the wild plant species collected for storage, the selection for the desired character will be cumbersome. This could make the breeders feel reluctant to use them in their crosses, because of the disadvantageous genes that would be transferred along with the one or two useful advantageous characters into their advanced breeding lines. This therefore required many years of backcrosses in order to eliminate the undesired characters from the wild primitive species.

STAFF DEVELOPEMENT PROGRAMME.

The Federal Government should encourage the staff of Natural Resources Conservation Council to underake further trainings in areas such as population genetics, exploration, ecology, taxonomy, cell and tissue culture physiology and information science

Nigeria University also should be encouraged to mount courses on conservation and utilization of plant genetic resources at the post-graduate levels, as obtained in Birmingham University, United Kingdom Refresher courses on genetic resources exploration and conservation for at least six months for scientists should be recommended for all conservators in agricultural research institutes.

A SEARCH FOR REMEDIES.

The success story of some developed countries like Inpan, Germany, United States, India, Pakistan, Sri-Lanka, Denmark, Norway, China and Soviet Union in agricultural production, reflects on their policy support for agricultural education and germplasm conservation. In most of the countries with major break through or food production, the goals of the povernments to meet the requirements of a developed agricultural economy facilitatated the enactment of appropriate government policies to support the effectiveness of genetic resources conservation. In general most of the governments undertook to

- Enacting specif 2 legislation for agicultural education on gone conservation where such did not exist already
- b) Incorporating genetic resources conservation as a componert of National development planning in agriculture
 - Setting up apprepriate mechanisms to initiate pre-service teacher training, conduct inservice, training develop and conduct long-term research in backcrosses of wild and primitive plant forms with related food crops.

 From the above expenses, the government may consider the following policy options.

W 21 24 1

Inclusion of a dynamic policy on genetic resources conservation in the National Agricultural development plan for training of technically skilled personnels in germplasm collection who will assist in implementation of the government plans for self reliance in food production.

policy on effect one or me or intermediate and proved personnel in generic modificants engineering in to earth mistituses and universities.

To formulate policy on environmental impact assessment to be carried out on the available genetic resources of wild and primitive plants in any virgin forest land to be used for industrial purposes. Such endangered gene materials should be retrieved to a such forests and fields for preservation and conservation.

for mandate all Univer is oid agricultural institutes to obush and maintain gene banks or pools of both wild, primitive and hybrid varieties in their institutions.

REFERENCES.

- Chan, J.T. (1972). Manual for field collectors of Rice IRRI, Los Bairos, Philippines.
- Frankel, O.H. (1973). Survey of crop genetic resources in their centres of diversity. First Report, FAO/IBP Rome
- Frankel O.H. (1975). Genetic resources centres a cooperative global network in thid. (Francis, O.F., and Hawkes, J.g. Eds.). Combining University press, Cambridge, 473 48.
- Hanson, J. (1984). Institutes conserving permplants. he HIPGR Global network of gene hard. Half GR Segretariat, Rome 25pp.
- Hawkes J G (1980) Our vanishing permit resources. In plants and society, Swarm than, MS and Kochhar S.L. Eds) Macmillan Publishers, 1st ED Hong Kong 1989 pg. 87 - 100
- Henshaw, G.G. (1975) Technical aspects of tissue culture storage for genetic conservation IN Frankel, O.H. and Hawkes, (1975) Can bridge University Press, Cambridge Pg. 349 358
- Morel, G. G. (1975). Meristem culture techniques for the long term storage of cultivated plants, IN: Francel O.H. and Hawkes, J.G. 1.ds). Can pridge University Press Pg. 327 - 32.
- Odoemena C.S. (1990). Crop Production Technology and ecological conflict. Transactors of Nigerian society for Biological conflicts on Vol. 1: 85 - 97.
- Okonkwo, S.N.C. (1984). Problems and prospects of enhanced plant productivity in the humid and semi-arid tropics: The Nigerian Ecosystem. A paper delivered at the 24th Ordinary meeting of the Nigerian Academy of Sciences, held at the University of Sokoto on 14th April, 1984.
- Roberts E.H. (1975) Problems of long tern storage of seeds and poolen for genetic resources conservation. In: Frankel, Co. N. and Rawkes J. G. Cambridge University Press, Cambridge 269 - 298
- Wilkes , G.H. (1983). Current status of crop plant germy lasm. CRC Critical Reviews in part science, CRC press, Florida I (2) 137-18.