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**POLICY FRAMEWORK FOR UTILIZATION AND CONSERVATION OF
BELOW-GROUND BIODIVERSITY IN KENYA**

[ESTRATEGIAS PARA LA UTILIZACION Y CONSERVACION DE LA
BIODIVERSIDAD DEL SUBSUELO EN KENIA]

C. Achieng^{1,2}, P. Okoth³, A. Macharia^{1,2} and S. Otor^{1,2}

¹*Department of environmental sciences*

²*School of environmental studies and human sciences,
Kenyatta University, P.O.Box 43844 Nairobi, Kenya,*

**E-mail: cellineoduor@yahoo.com Tel +254 20 722821171*

³*Tropical Soil Biology Fertility Institute - CIAT,
P.O. Box 30667-00100 Nairobi, Kenya.*

**Corresponding author*

SUMMARY

The reasons for the lack of inclusion of below-ground biodiversity in the Kenyan policy and legal framework were sought. Gaps were identified in the relevant sectoral policies and laws in regard to the domestication of the Convention on Biological Diversity (CBD). Below-ground biodiversity had no specific schedule in any of the sectoral laws. Most sectoral laws were particular about the larger biodiversity and soils but had no mention of below-ground biodiversity. Material Transfer Agreements and Material Acquisition Agreements that are regarded as tools of domestication of the CBD to guide transfers, exchanges and acquisition of soil organisms lacked a regulating policy. The lack of regulating policy could be attributed to the delay in approval of draft regulations by the Ministry of Environment while the lack of inclusion of below-ground biodiversity in Kenya's legal and policy framework could be as a result of lack of awareness and appreciation among stakeholders.

Keywords: Policy framework; below-ground biodiversity; Convention on Biological Diversity; Material Transfer Agreement; Material Acquisition Agreement.

INTRODUCTION

Concerns about the loss of soil biodiversity related with land use change have been raised in many studies. Even as agricultural intensification becomes a real occurrence, it has received relatively little attention in Kenya. The reduction of below-ground biodiversity (BGBD) decreases agricultural productivity (resulting in a higher number of hectares having to be used to get the same yield) and also decrease the resilience of agricultural ecosystems so

that they are more vulnerable to erosion, pests, diseases, and the general degradation of the land.

There is a need to keep agricultural ecosystems as healthy and sustainable as possible so that the biodiversity loss, which is usually so high in agricultural systems, is lessened. Nevertheless, if higher priority is to be given to the conservation and management of the soil and its associated biota, then policy makers need a better understanding of the soil-based ecosystems' services and of their commercial values. In many countries, enacting of laws formulated to protect the soil has not kept pace with measures intended to protect other natural resources such as air and water. The same case applies to Kenya where there is no specific policy or legislation to guard soil organisms and yet they are affected by land use change and agricultural intensification. What exist are sectoral laws which are not encompassing.

A policy framework that stipulates appropriate land use systems, provides guidelines on transfer, exchange, acquisition, commercialization, utilization and conservation of BGBD is needed. Such a policy framework would ensure abundance and diversity which would in turn increase BGBD functions in the soil. Increased activities result in adequate nutrient supply for crop growth hence increased food production. Increased food production ensures enough food for subsistence and commercial purposes thus helping to alleviate poverty. The objective of this study is to propose an improved policy framework for the enhancement of biological diversity and sustained utilization of its components.

MATERIALS AND METHODS

Several methods were used in the data collection ranging from reports and publications; survey data from field visits to Gatondori and Kibugu sub-

locations of Embu District. Use of meta-data to relate land to below-ground biodiversity was done. A survey was carried out with 120 farmers in the two sub-locations; interviews were conducted with 30 scientists handling BGBD and 12 institutions dealing with the same in Nairobi and Embu. Key informants were also interviewed to get specific information about different aspects of BGBD.

Use of meta-data to relate land to below-ground biodiversity

The use of Meta data in this research was to obtain general information on the effects of land use systems and intensities on the diversity and abundance of soil organisms in Embu. Such data is found in literature, published papers and in grey literature existing in institutions. In the case of this study, current information was obtained from work done by an ongoing project (the conservation and sustainable management of below-ground biodiversity) in Kenya and in six other tropical countries (Indonesia, Brazil, Mexico, Uganda, India and Code Ivoire).

Farmer interviews and focus group discussions

Another method employed was a survey of farmers' perceptions and current knowledge on BGBD through interviews and focus group discussions. 120 farmers from both Gatondori and Kibugu villages were interviewed and the purpose of the questionnaires was to generate perceptions of the farmers on the effect of agricultural intensification on the abundance and diversity of BGBD. The questionnaires were intended to find out if farmers had any knowledge on management and their view of such undertakings in future. A total of three focus group discussions were held. The groups were organized based on gender with the first group constituted mainly by women, the second by men and the third by both men and women. Each group had a membership of 10 persons where the last group consisted of 5 women and 5 men. The purpose of the focus group discussions was to further analyze and understand the previously obtained results from individual farmer interviews. The groups comprised farmers of all ages including the youth, middle-age and the elderly farmers.

Institutional studies

Institutional studies were carried out in Nairobi and Embu Districts. Among the institutions interviewed were government ministries, lead agencies, non-governmental organizations, universities and private

firms dealing with soil organisms. The use of open-ended questionnaires for this part of the study was to probe the institution for information that would otherwise be restricted as is the case with close-ended questionnaires. The use of questionnaires enabled the researcher to present questions in a uniform manner thus reducing bias.

Individual scientists' study

Individual scientists (n=30) were issued with questionnaires to understand their experiences with BGBD. Such experiences included management, transfers, exchanges, acquisition and commercialization of BGBD as guided by existing policies and regulations in Kenya.

Key informant interviews

Interviews with individuals with knowledge on specific issues on BGBD that the researcher sought to find were carried out. Such issues included: policies relevant to BGBD, revision and improvement of policies to incorporate BGBD issues, intellectual property rights and individual handling of BGBD.

RESULTS AND DISCUSSION

The role of policy in BGBD conservation, management, preservation, maintenance, acquisition, transfer, commercialization, benefit sharing and Intellectual Property Rights (IPR)

Farmers' perceptions

Farmers were asked if they knew if soil organisms can be used in trade if properly identified for type and function in the soil. The purpose of this question was to get insights on farmers' knowledge in commercialization with BGBD. The following responses were obtained: 31.7% (38 out of 120) said yes, 38.3% (46 of 120) said no while 30% (36 out of 120) said that they would be in a better position to answer this question when educated about such issues before hand. Out of the 120 farmers interviewed, a significant 70 had an idea of what transfer of soil organisms was. Out of the 70, a significant 36 said it was the removal from one farm to another while 40 said it was the movement of soil organisms from one farm to another. The remaining 50 farmers had no idea about transfers at all. This implies that farmers' lack knowledge in BGBD issues hence the need to educate them. These results are shown in table 1.

Table 1. Farmers' knowledge of various aspects of BGBD.

Knowledge		Percentages	
Commercialization	31.7% (38 out of 120) Said yes.	38.3% (46 of 120) said no.	30% (36 out of 120) needed education first.
Transfers	A significant 70 out of 120 knew about transfers.	50 did not know.	30 out of the 50 who did not know had witnessed soil samples being picked from their farms.
Exchanges	36.4% (44 out of 120) understood as exchange between farmers.	18.2% (22) understood as transfer of organisms and replacing with others.	65% (54) sought knowledge first.

From the last column of the row on transfers in table 1; more insights were obtained from farmers and the results are as shown in Box 1. The transfers that farmers were more familiar with were those in which soil organisms are carried in manure, for example the case of the dung worm-locally known as "marindi". Other organisms transferred in manure were enumerated as: small black ants, big beetles, millipedes, centipedes, termites, earthworms and nematodes. The other significant transfer was from their farms to the University of Nairobi and the Kenya Agricultural Research Institute (KARI), for research. One farmer shared his experience as in Box 1:

Box 1.

"We do not know where they were taken since people in a team came and took samples from our plots and never returned. They even put pegs which are still here up to now but did not explain what the pegs were for! Soil samples have been picked on a number of occasions but we have no idea what was extracted from such samples."

This is an outcry that transfers of BGBD occur mainly in form of soil samples being taken away from farmers' farms. When this is done the farmers are not made aware of what is obtained from such samples and whether they are beneficial or not. They therefore do not get any benefits in case such organisms are used for commercial purposes. This act is unethical because it overlooks the advice given by the CBD on prior informed consent when handling biological resources from one individual to another or one institution to another or one country to another. National regulations/guidelines on prior informed consent would guide such a process and serve all stakeholders equitably. Regulations on prior informed

consent have been formulated but are still in draft form and have not been approved by the Minister for Environment. They are found in schedule II of the (conservation of biological diversity and biological resources, access to genetic resources and benefit sharing and the protection of environmentally significant areas) regulations, 2003.

Also sought were farmers' opinions on future exchanges of BGBD. The purpose of this question was to gather information that would enable the inclusion of farmers as relevant stakeholders in exchanges of BGBD. Such information would also be useful when formulating guidelines on BGBD issues. The results obtained are shown in Figure 1.

Institutions' and scientists perceptions

Material transfer agreements (MTA) and material acquisition agreements (MAA)

Information about familiarity with MTA and MAA was sought from institutions and scientists dealing with BGBD. The purpose of this question was to find out how many institutions know about MTA and MAA. Familiarity with MTA was at 83.3% (10 out of 12) while unfamiliarity was 16.7% (2). For the MAA it was 50% (6 out of 12) for familiarity against 50% (6 out of 12) for lack of familiarity. Most of the agreements termed as MTA and MAA were actually Memorandum of Understanding (MoU). This shows that transfers were more commonly taking place than acquisition and this explains the fact that soil organisms were mostly used for research between and among institutions rather than such institutions claiming to own the organisms through acquisition. The signatories to these agreements were given as: lead agencies and governments 66.7% (8) and lead agencies only 33.3% (4), the rest were as shown in Figure 2. The difference in the percentages explains

the fact that both agreements were considered at the same time without separating them. It can also be explained that a lead agency in a government would sign an agreement with a lead agency in another government or from the same government without the governments of such countries being party to such agreements. It was found out that there were a number of flaws in the existing MTA/MAA/MoU. Firstly, they were not strictly adhered to because there were no legislative appendages in such agreements. The draft regulations on access to genetic resources and benefit

sharing outline various forms of punishment to offenders who violate the draft MTA regulations (Draft regulations Part V section 35.1, 35.2,36 and 37). These regulations once approved by the Minister for Environment and gazetted will ensure proper adherence to MTA and MAA. Second, MTAs and MAAs accessed lacked an outline on benefit sharing hence it would be difficult for the stakeholders involved to claim any benefit accruing from the genetic material in question.

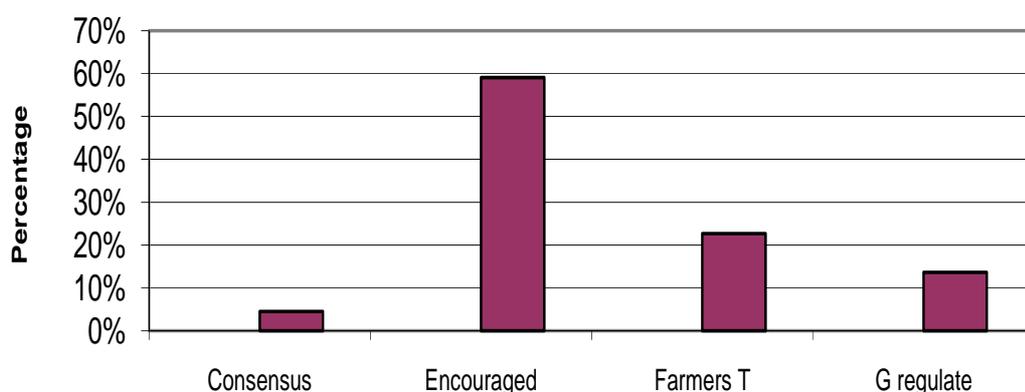


Figure 1. Farmers opinions on future exchanges of soil organisms among farmers and with institutions dealing with BGBD. Consensus: consensus needed with farmers; Encouraged-exchanges among farmers and with institutions should be encouraged in future, Farmers T-Farmers to be trained, G regulate-government to regulate.

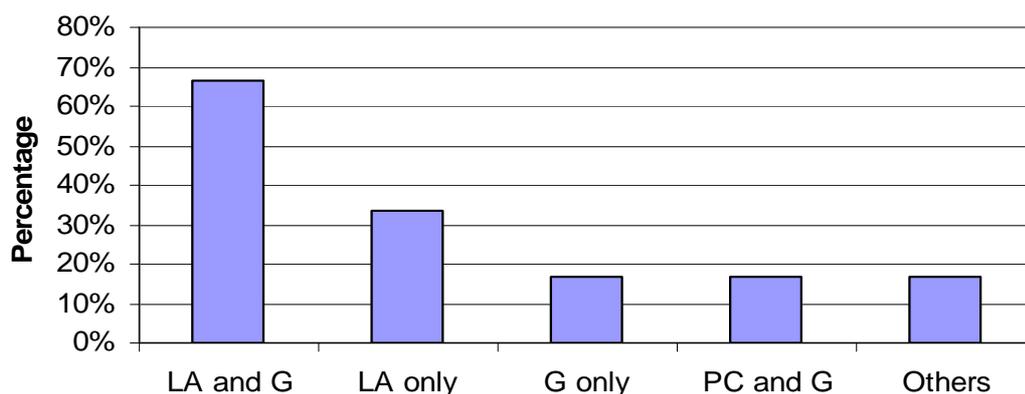


Figure 2. MoU signed between institutions dealing with biological resources in Kenya. Showing institutions that have signed MTA and MAA in form of MoU's. LA and G:-Lead agencies and government, LA:-Lead agencies, G only:-governments only; PC and G:-Private Companies and governments.

CONCLUSIONS

From the information obtained from the three groups of stakeholders (farmers, scientists and institutions dealing with genetic resources), it is clear that there is need to include all the key stakeholders in the process of BGBD policy formulation. This is because all have different and important stakes in BGBD issues. In this regard, the proposed ways and means include first, having prior informed consent of all the stakeholders involved when handling BGBD and in particular the farmers. Farmers also need to be educated on various aspects of BGBD. Secondly, is the consideration of having incentive measures to ensure proper utilization and conservation of BGBD. Such incentive measures need to be outlined in a national policy document or in regulations formulated by relevant authorities. Thirdly, is to have regulations specific to BGBD on equitable benefit sharing. Lastly, the guidelines stipulating the formulation of MTAs and MAAs should be approved sooner than later to guide institutional arrangements in relation to transfers, exchanges, acquisition and commercialization of BGBD in Kenya.

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