RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CGIAR CCAFS

Info Note

Social Seed Networks for Climate Change Adaptation in Uganda: Strategies to Improve Access to Genetic Diversity and Information

Results from a study to better understand farmers' primary sources of seed and information in the Hoima Climate-Smart Villages

Gloria Otieno, Hannah Lacasse, Joyce Adokorach, John W. Mulumba, John W. Recha, Travis W. Reynolds, Carlo Fadda

JUNE 2018

Key messages

- Farmers' most common sources of seed were 'own seed' (78%) and local markets (48%), while main sources of seed information were radio talks (71%), agricultural research stations (54%), and agricultural shows (49%).
- A wide range of diversity exists within the community—5 varieties of sorghum, 5 of finger-millet, and 15 of common beans were identified. Four varieties of beans have been lost due to climate change. Only two varieties of sorghum, four of common beans, and three of finger millet are currently being used by farmers to respond to climate change-related risks
- Farmers' networks are fragmented, with poor connections with each other; this is mainly because farmers rely mostly (78%) on their own seed. Women have more connections among themselves and with other farmers than men.

Introduction

Climate change poses serious threats to smallholder farmers in Uganda. For instance, rains often start late in the season and end early, reducing the growing season. Increasing and maintaining genetic diversity is one way of combatting these climatic change-related threats (IPCC, 2014). Farmers often manage, select, and conserve genetic diversity according to their needs, but climate change is quickly eroding this genetic diversity. Accessing genetic resources and related information is therefore paramount to farmers' ability to cope with the effects of climate change.

Farmers' seed networks are a crucial element of access to seed because they are resilient and help to maintain and conserve crop genetic diversity (Pautasso et al. 2013). In Uganda, 85% of the seed is from 'informal' sources consisting of seed saved from own farm as well as seed obtained from neighbours and other local sources. Research in East Africa has suggested that community-generated information sharing might support more effective farmer response to the changing seasonal and weather patterns associated with climate change (Adhikari et al. 2015). However, the influence of Ugandan farmers' social networks in supporting adaptation to climate change is not well known.

Methods

To better understand farmers' primary sources of information, survey data was analysed by Bioversity International in July through September 2016. The data was from three focus group discussions with about 120 farmers and a household survey consisting of 301 households in Hoima District, Uganda. Surveys collected various farm- and individual-level data on household demographics, sources of bean, millet, and sorghum seeds, sources of information on climate change adaptation, and relationships between information sources.

Findings

Respondents most commonly reported 'own seed' as their seed source (78%), followed by local markets (48%) and neighbour (12%). The most common sources of seed information were radio talks (71%), agricultural research stations (54%), and agricultural shows (49%).

Approximately 45% of the respondents were involved in an agriculture-related organisation. Bagonza Kukora Farmers' Group was the most commonly named organisation by the respondents, although they did not receive or exchange seed through this group's activities. Only 8 individuals were identified with betweenness greater than or equal to 20 within the social seed networks by village, an indication of fragmented networks.

Ninety percent of the respondents reported having experienced climate-related challenges, which included shifting seasons (84%), shorter rainfall seasons (88%), heavier rainfall (75%), erratic rainfall (78%), flooding (40%), drought (90%), increased temperatures (89%), increased pests and diseases (86%), and stronger winds (82%).

A wide range of diversity exists within the community—15 varieties of beans, 5 of millet, and 4 of sorghum were identified during focus group discussions. However, due to climate change and related challenges, this diversity is decreasing over time and so far, four varieties of beans have been lost. The remaining diversity is threatened because in times of climate uncertainties, farmers can only rely on four varieties of beans, two of sorghum, and two of millet, which can withstand drought and erratic rainfall.

The network of seed exchange among farmers revealed that networks of female farmers were stronger than those of male farmers (Figure 1). The higher total mean betweenness in networks of female workers (0.26) compared to that in networks of male farmers (0.21) indicate that more women are connecting actors with each other and with other actors, creating longer chains of seed exchange.

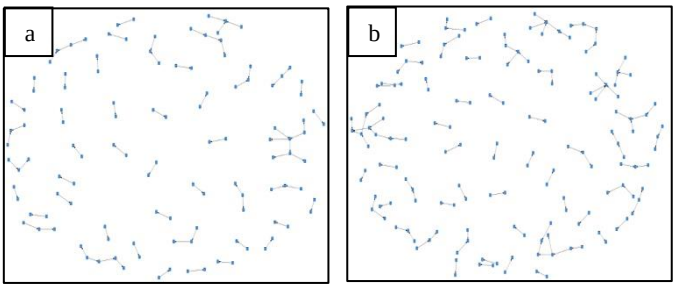

Figure 1: Seed exchange among male (a) versus female (b) farmers in Uganda.

The network of bean farmers had the highest mean centrality (0.689), meaning the highest amount of connections (Figure 2). There were very few millet and sorghum farmers, which aligns with crops grown by respondents

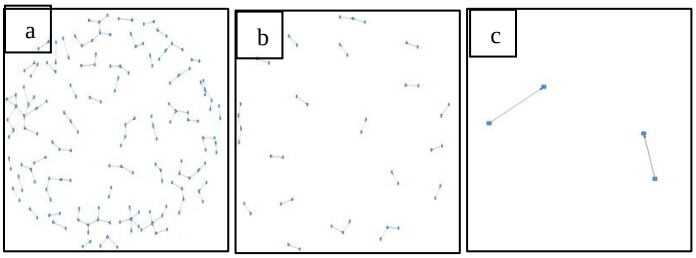

Figure 2: Seed exchange among bean (a), millet (b), and sorghum (c) farmers.

Networks were analysed by village. Kyamongi had the highest mean centrality (0.939), indicating high numbers of connections (Figure 3d). The highest total mean betweenness were found in Kyamongi (4.5) and Kasinina (0.9), meaning greater instances of connections between respondents. The data generated from the villages were similar to those found in Kyabigambire sub-county (0.778), indicating that, individually, most farmers are disjointed.

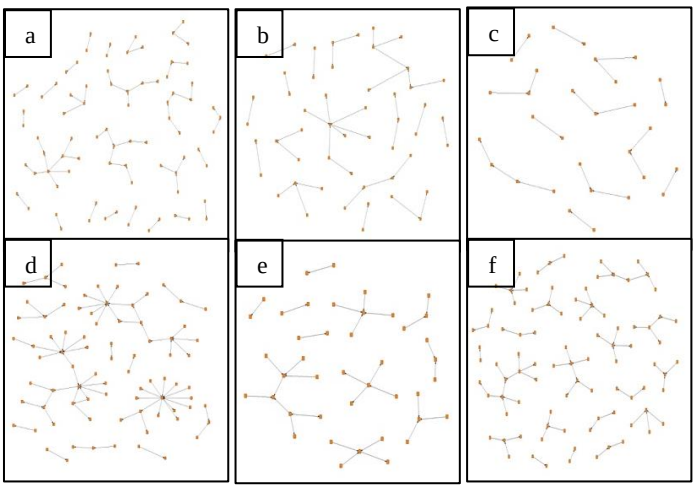

Figure 3: Seed exchange among Ugandan respondents by village. Kasinina (a), Kibaire (b), Kiranga (c), Kyamongi (d), Mparangasi (e), and Nyakakonge (f).

Policy Implications

Based on the analyses, climate-related challenges such as drought, erratic rainfall, and shifting seasons have not only led to genetic erosion but have also led to a narrowing of choices farmers can make for adaptation to climate change. The reliance of farmers on 'own seed' and the networks that are relatively disjointed make it difficult for famers to access more seed. Management and conservation of genetic resources are often based on collective decisions; the disjointed networks display a lack of collective decisions in the management of these resources. Establishing a community seed bank in this site would help to improve the collective decisions in the management and conservation of genetic diversity for adaptation to climate change. Community seed banks are repositories of local genetic diversity that is often adapted to prevailing climate conditions, including biotic stresses. They may be useful in contributing to community-based strategies for adaptation to climate change.

The low percentage of farmers growing sorghum and millet, which are resilient crops, also indicates that some measures to improve resilience are needed. One such measure is to introduce a diversity of sorghum and millet in the community. In order to improve seed distribution, government and organisational influences could redirect their efforts towards more localised and informal forms of seed exchange such as local markets and interactions with community seed banks. Access to information could be improved through increased accessibility to agricultural research stations, extension workers, and agricultural shows.

Agricultural extension services are a crucial source of information and seed for rural farmers, yet extension services were not taken into account in our analyses. Governments and local institutions could improve accessibility of extension services to farmers in order to enhance information and seed exchange. Alternatively, governments could shift resources from these services to more localised efforts such as those indicated above.

Women could also be targeted as avenues through which varieties and information can be accessed, taking advantage of their larger, more connected networks—they often retain ties in their parents' villages while creating new relationships after marriage in new villages.

Finally, strengthening informal seed networks and building the connections between the formal and informal sector such as community seed banks and breeding programmes and national gene banks can be crucial in providing farmers with a diversity of adapted seeds. Improving the dissemination of information on adaptation to climate change will enable farmers to increase the genetic diversity of their crops and be more resilient in the face of climatic challenges.

Seeds displayed in a farmer seed fair. Photo: P. Kimeli (CCAFS)

Further Reading

- Adhikari U, Nejadhashemi PA, Woznicki SA. 2015. Climate change and Eastern Africa: A review of the impact on major crops. *Food and Energy Security*, 4(2):110-132.
- IPCC. 2014. Impacts adaptation and vulnerability, IPCC report on climate change. Retrieved from http://www.ipcc.ch/pdf/assessment-report.
- Pautasso M, Aistara G, Barnaud A, Caillon S, Clouvel P, Coomes OT, … Tramontini S. 2013. Seed exchange networks for agro biodiversity conservation. A review. *Agronomy for Sustainable Development*, 33(1):151-175.

This Note presents results from a study to better understand farmers' primary sources of seed and information in the Hoima Climate-Smart Villages. The Info Note was prepared by the following authors:

Gloria Otieno, *(g.otieno@cgiar.org) is the Genetic Resources and Food Security Policy Specialist, Policy Unit, Bioversity International*

Hannah Lacasse, *(hlacasse@colby.edu) is a student, Department of environmental economics, Colby College, Waterville, Maine, USA*

Joyce Adokorach*, (joyceadokorach@gmail.com) is an officer at the Uganda National Gene Bank of the National Agricultural Research Organisation (NARO)*

John W. Mulumba, *(jwmulumba@yahoo.com) is Director of the Uganda National Gene Bank of the National Agricultural Research Organisation (NARO)*

John W. Recha, *(j.recha@cgiar.org) is the Participatory Action Research Specialist, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), East Africa*

Travis W. Reynolds, *(travis.reynolds@colby.edu) is an Assistant Professor of Environmental Economics at Colby College, Waterville, Maine, USA*

Carlo Fadda*, (c.fadda@cgiar.org) is Theme Leader, Productive Agricultural Ecosystems, Bioversity International*

Correct citation: Otieno G, Lacasse H, Adokorach J, Mulumba JW, Recha JW, Reynolds TW, Fadda C. 2018. Social Seed Networks for Climate Change Adaptation in Uganda: Strategies to Improve Access to Genetic Diversity and Information. CCAFS Info note. Wageningen, Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

Research led by

Bioversity International

CCAFS and Info Notes

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic partnership of CGIAR and Future Earth, led by the International Center for Tropical Agriculture (CIAT). CCAFS brings together some of the world's best researchers in agricultural science, development research, climate science and Earth System science, to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security.

CCAFS Info Notes are brief reports on interim research results. They are not necessarily peer reviewed. Please contact the author for additional information on their research.

www.ccafs.cgiar.org

CCAFS is supported by: