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Certified and peasant seeds: which network for millet seed supply? sfécologie 2018

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I. Background

n West Africa, government policies has placed particular emphasis on strengthening the seed sector to enhance agricultural productivity, food security and rural well-being of 33 million smallholder farming households. Thus, they support quality-improved seed certified by national seed agencies and released it through private sector such as seed cooperative¹. However, in small-scale farming societies, farmers usually produce their seed on their own farm (range between 58-99%)². Among the sources of supply, farmer-to-farmer seed circulation is the major channel^{2,3}. Once inserted, certified seed evolves among peasant seed, outcomes from ancestral crop populations maintained by farmers.

II. Methods

Data collection: we investigated pearl millet (Pennisetum glaucum (L.) R.Br.) seed circulation networks, which is a major cereal for food security and scarred by a strong sociocultural anchorage. Data were collected in Koungheul Department (Senegal) from an ethnographic fieldwork carried out between march and june 2018 in three muslim villages. A sociometric survey using a snowball-sampling





technique was employed with 79 farmers. Initial sample of respondents came from COORDEC (Coopérative Rurale pour le Développement Concerté de Koungheul) database, a cooperative specialized in certified seed production. After asking which pearl millet varieties they grow, farmers were asked for any seed lot sown between 2010 and 2017 1) from whom did they received it to know if it was a certified and / or peasant seed lot, and 2) to whom did they gave a seed lot of their harvest.

The aim of this study is to characterize farmer seed supply according to the certified or peasant origin of seed and to highlight coexistence modalities of seed supply.

Analyzing coexistence modalities of seed supply between certified and peasant seed through farmer seed networks is a key asset for the development of an innovative governance of plant genetic resources³.

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Keur Samba women preparing pearl millet for the Tiéré (couscous in Wolof). Tiéré is an ancestral dish, consumed every morning and evening by the smallholder farming household.

Data analysis: pearl millet seed supply was represented using network formalism. Farmer seed networks were splitted according to the certified or peasant origin of the seed and biclustering (stochastic block model (SBM)) were performed to group structurally equivalent nodes⁴. Results from the network representation and the bi-clustering are interpreted and discussed in light of qualitative data.

III. Results & discussion

Seed origin shapes farmer seed networks





In all, 229 seed acquisition events were recorded. Seed, whether certified or peasant origin, shapes farmer seed networks (Fig A and B) and modalities of acquisition (Fig **C 1:3) are significantly different**⁵. On-farm production rates vary according to the certified (36%) or peasant (86%) origin of seed.

gifting) under the tutelage of kinship (68%) from an individual to another (88%).

Certified seed acquisition is also poorly Peasant seed acquisition network is connected (Fig, B ; d=0.026). The SBM extremely poorly connected (Fig A ; distinguishes farmers (in green and beige) d=0.008). With only one group of nodes, from the cooperative (in blue), which provides the SBM does not distinguish farmers mainly (90%) certified seed. They are based on their seed access behavior purchased (85%) outside the village (77%) probably due to the low connectedness of and involves a customer relationship (66%) the network. Peasant seeds are obtained which means that seed's provider is an within the village (78%), by a non- unknown person. Farmer-to-farmer seed purchased way (90% ; i.e, inheritence, circulation are anecdotal. Certified seeds are **socially isolated** due to risk taking (purchase) -> indebtedness) and seed cooperative's working methodology.

Peasant (A) and certified (B) seed acquisition networks. Actors are nodes and edges represent seed flows. Networks are directed, *i.e.*, each directed link corresponds to at least one acquisition event from a seed provider to a seed recipient according to interviewed's declaration. Interviewed farmers are circles, triangles are seed cooperative (one node for each village-based structure). The colors of the nodes represent SBM's result. The size of the node is proportional to the number of the connection between the nodes. The histograms represent the percentage of seed acquisition events (n=229) according to C.1) localisation ; C.2) nature and C.3) social ties between transacting partners.

2 After the harvest, seed origin doesn't matter: pearl millet is pearl millet

After the harvest, pearl millet from certified seed circulates for the same reasons as peasant seed⁵.

For instance, **Zakat**, which is a form of alms-giving, is a religious obligation for all Muslims. It consists to redistribute about 10% of the harvest to those who **deserve it** (*i.e.*, poor, needy, old or sick person).

In rare cases (5% in our study), pearl millet received under zakat **is used as seed**⁵. However, no information relating to the origin of seeds is communicated through this practise⁵.

The reasons for the spread of pearl millet (n=538). Circles are proportional to the spread percentages of exchanges



IV. Conclusion

Pearl millet seed supply seems to be shaped by his certified or peasant origin, both in modalities and networks mobilized by farmers⁵.

Nonetheless, after the harvest, certified and peasant seed are commingled and embedded into an open and complex social network⁵.



3 One variety hides another



Over time, certified seed changes status and loses its identity. The perception of the origin of the seed from which the variety is derived differs according to the interlocutor for the same name variety^{5,6}. Varieties bred by research whose seeds have been certified (i.e, Thialack 2) introduced into a community can be requalified of peasant or even traditional (i.e, Thialack, Tiossan) by farmers if it has adapted well in the locality. As a result, certified seeds saved on-farm by farmers are regarded as peasant seeds for some of them.



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Certified and peasant seeds: a coexistence life circuit coming from the harvest. Adapted from Almekinders and Louwaars (1999)

Our results provide a **better understanding of farmer seed** networks. This study highlights a gap between agricultural policies and **local seed management** by farmers, results that could feed into the reflection on the **governance** of plant genetic resources.

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