Female farmer associations as adaptation strategies to climate variability in Ouagadougou's peri-urban agriculture

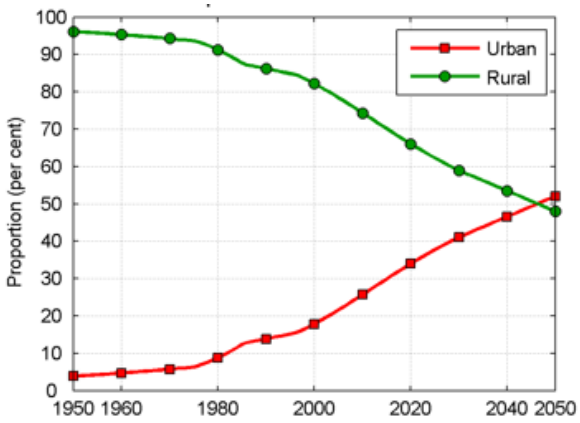
Introduction

Burkinabe farmers experience the impacts of climate variability in their daily farm activities. The main natural risks for agriculture are droughts and floods, which undermine food security. However, climate variability also induces farmers to adapt by building upon their collective strengths. This policy brief describes the adaptive strategies of small-scale female farmers through a collective alliance with nature in peri-urban Ouagadougou, Burkina Faso.

Burkina Faso and Ouagadougou

Burkina Faso is one of the poorest countries in the world, 82.8 % of the population is multidimensionally poor (UNDP, 2015). The urbanization process (see Figure 1) is challenging the capacity of cities to provide wellbeing to population. Of greatest concern are food insecurity and land scarcity reinforcing environmental degradation.

Figure 1. Proportion of urban and rural population. Burkina Faso



Source: UN, 2014

Food production and nature in Burkina Faso

In Sub-Saharan Africa, agriculture activity relies exclusively on rainfall (World Bank, 2016). Burkina Faso is an agriculture-dependent country, 90% of population works in agriculture (OECD, 2013). At the same time, it is classified as a "low income food-deficit country" (FAO, 2016). The underlying causes of food insecurity are multiple, ranging from economic and political to environmental.

Burkina Faso is prone to drought, floods, temperature variability, wind storms and disease outbreaks. These phenomena affect agriculture in multiple ways: soil erosion, vegetation cover degradation, deficiency in ground water replenishment, and surface water evaporation. Consequently, growing seasons become more irregular, the risk of crops losses increases, infrastructure is destroyed, yield and income decline, and farmers feel tired and enter into despair.

Climate variability, adaptation and resilience

Sharp temperatures fluctuations and seasons alterations make small-scale agriculture a **challenging reality for sustainable food production**. Along with unpredictability of the climate, poverty is another source of vulnerability for female farmers. They experience: i) difficulties to plan planting and harvesting; ii) a reduction of yields and quality of the crops; and iii) high physical and emotional impacts due to food insecurity and higher stress to provide food for the family.

Adapting to climate variability through a collective alliance

In Ouagadougou, opportunities for small-scale female farmers to successfully grow in a challenging environment improve significantly when they form groups and associations. First, groups succeed in **organising more effectively** to make their voices heard and legitimizing messages than individual female farmers. Second, groups are deemed by local and international organisations (e.g. FAO) to be high-impact-makers, therefore, prone to **get funding and trainings**. The trainings aim to provide knowledge in climate change, urban agriculture and adaptation strategies. Third, these trainings lead to **an acknowledgment of the need to adapt to climate variability in the region**. Fourth, "no one has the right to be happy alone". Bonds built on solidarity, empathy, proud, trust and joint responsibility enable female farmers to **rely on each other**. Fifth, feelings of **empowerment** and safety emerge as a result of production and income generation. And sixth, a **forward-looking vision** is strengthened by a shared group vision.

By becoming member of a group or association, female farmers can:

- **access** to agro-ecological practices and strategies,
- **manage** the technologies,
- **save and invest** in new equipment and technology,
- **strength their resilience** to climate variability and irregular weather events.

Agroecology in Ouagadougou: locations, groups and practices

According to the agroecology vision, there is a **close connection between farmers and nature.** This relationship is based on a deep understanding of, awareness and respect towards nature. Certainly**, agroecology and endogenous knowledge are closely entwined**. Agro-ecological practices range from agricultural improvements in a natural way (e.g. using organic pest control, and compost) to the reassertion of local food values as being core to the cultural diet and food sovereignty. By consuming organic products that are locally provided, health conditions of human beings also improve. In Ouagadougou, some successful agro-ecological practices carried out by female farmers groups were identified (see Table 1). The associations are diverse, but they have some points in common. All members are aware of climate change and most of the groups are committed to practice agro-ecology and spread the knowledge to escape from poverty, improve their quality of life, and achieve food security.

Agroecology is, on the one hand, **ecologic science** applied to sustainable agro-ecosystems. And on the other, is a **set of practices** seeking to optimize agro-ecosystems by imitating natural processes, fostering beneficial biological interactions and synergies between their components). (Inter-Réseaux & SOS Faim, 2011).

Table 1. Farmer associations and agro-ecological practices

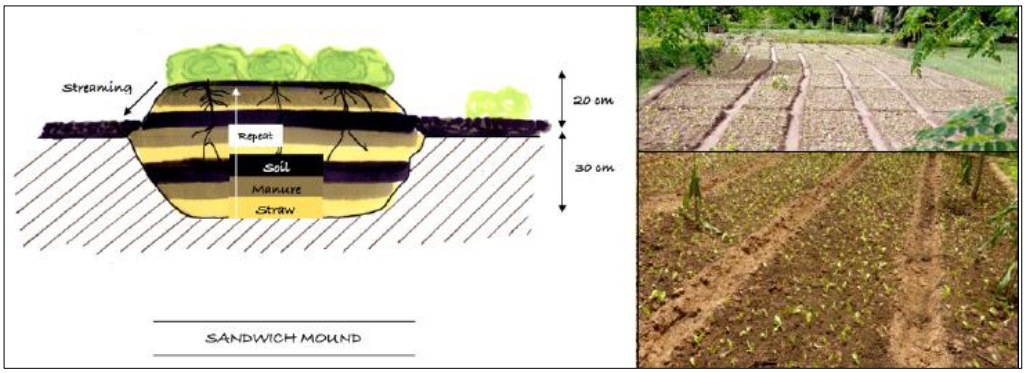
Organisation /group	Location	Description	Agro-ecologial practice
Association de Léon and Namab Sanga	Ougadougou, Tanghin, close to the dam	two big associations	- conventional agriculture - Biological pesticides
Béo Néeré	Ougadougou, Tanghin, close to the dam	mixed group of 24 persons applying the principles of a sustainable and resilient agriculture.The land is threatened by road constructions.	- Compost - Biological pesticides - Crop rotation: leaves, fruits, roots and then legumes
Nabons-Wende	Ougadougou, Tampouy	63 women farmers applying agroecology on 4 hectares. The field was given by the city hall	- Compost - Goutte à Goutte (Dripping systems) - Adapted seed and seed production - Off-ground cultivations
Yelemani	Loumbila, 22 kilometers away from Ouagadougou	8 women promoting food sovereignty and genuinely follow the principles of agroecology	- Compost - Paillage (Straw-mulching) - Bricks - Off-ground cultivations
La Saisonnière	Ougadougou, Secteur 42	50 women selected based on their vulnerability. The association is now well-known in the organic sector	- Compost - Butte Sandwich (Sandwich Mound) used to avoid flooding - Goutte à Goutte (Dripping systems) - Adapted seed and seed production - Off-ground cultivations -Drills and solar panels - Agroforestry
Riimpogb-Noonma	Ougadougou, Kieryaoghin (Boulbi), 16 kilometers away from Ouagadougou. No urban area	practice conventional agriculture close to a dam	rural conventional agriculture used to compare with urban agriculture practices, perceptions and strategies.

Source: Humblot, 2017

The agroecological practices: more than good agricultural practices

The agroecological farming practices show respect for nature and proactively adapt to climate variability. Their design, development and purpose vary according to context and needs. For example, in areas where the water is scarce, **sandwich mound** – made of layers of straw, manure and soil (see Figure 2) – or **bricks technique** (see Figure 3) are used to retain humidity. In contrast, in rainy seasons, the mound's height prevents the crop to be destroyed while in brick structure, removing a brick is enough to drain the water excess.

Figure 2. *Butte Sandwich* - Sandwich mound



Source: Humblot, 2017, p. 69

Figure 3. Bricks

Source: Humblot, 2017, p. 71

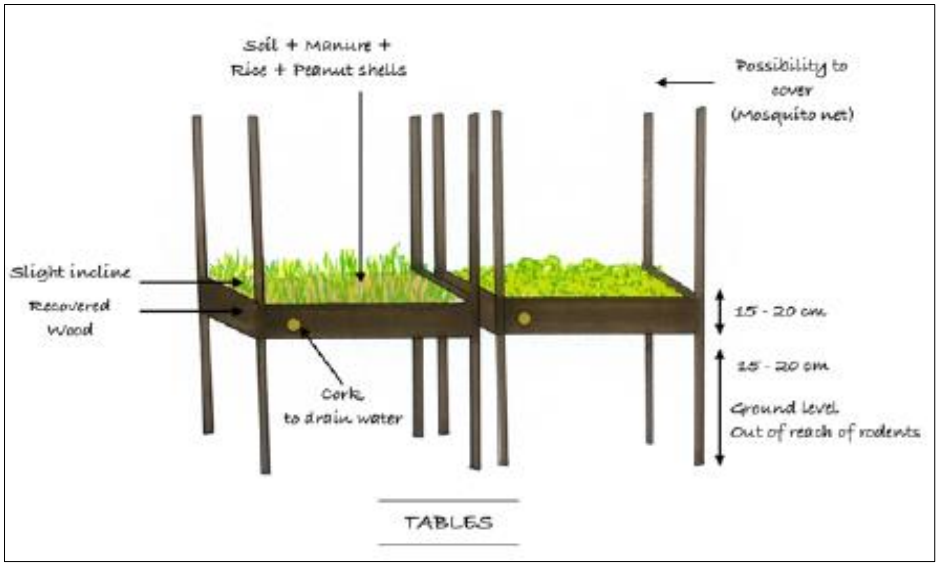
Other techniques like **straw-mulching** and off-ground cultivation are based upon experiments and self-learning. The first one consists in covering the soil with straws, leaves and branches and its function during rainy seasons is preventing soil erosion and retaining humidity. When the soil is exposed to high temperatures straw mulching keeps the soil cool.

Figure 4. Off-ground cultivation. Sacks

Source: Humblot, 2017, p. 73

Off-ground cultivation technique was learnt and adapted in Burkina and now it is an ingenious alternative for growing in the scenario of land scarcity and population growth. Sacks of rice, tires and homemade tables (see Figure 4 and 5) are the tools needed to create a fertile and apt environment for sowing, in terms of soil quality, water, and animal and insects control (see down-left picture in Figure 5). Other advantages are associated to affordability and income generation when tables are sold.

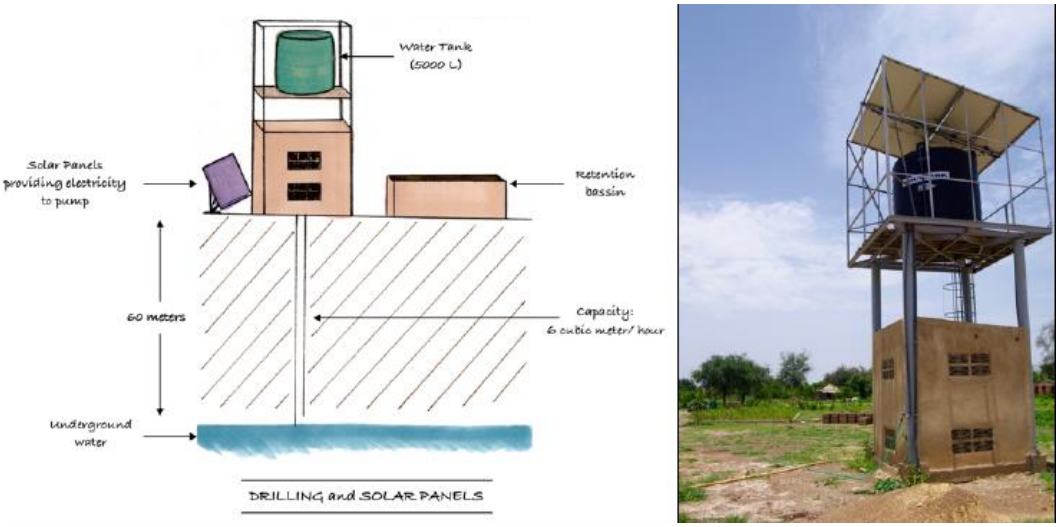
Figure 5. Off-ground cultivation. Tables



Up: table design. Down left: Woman taking care of the plants. Down right: mosquito net protecting leaves from insects.
Source: Humblot, 2017, p. 73

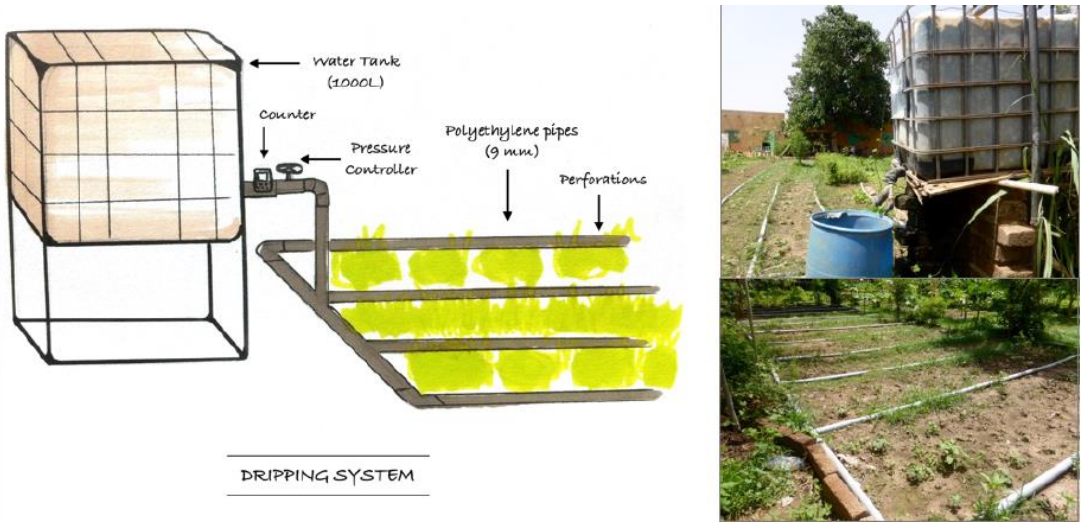
Innovative strategies put into operation by use of technologically advanced equipment, such as **drills and solar panels** (see Figure 6) and **dripping systems** (see Figure 7), These techniques require external funding and strategic choices.

Figure 6. Drills and solar panels



Source: Humblot, 2017, p. 75

Figure 7. Dripping system



Source: Humblot, 2017, p. 70

Another practice well-spread in Ouaga is the use of b**iological pesticides** and **organic compost.** A conscious and informed rejection to using chemical products is evident within the groups, even in those where traditional agriculture is practiced. Evidence has demonstrated the effectiveness of using organic compost in degraded land. It boosts a dynamic interaction between natural elements: soil, food waste, animal excrement, branches and leaves, and the plant itself. Furthermore, it is a source of income when farmers sell to other farmers. In this way, they not only trade tables but also pass on the knowledge and experiences as well.

Strategic & policy recommendations

This policy brief draws policy recommendations at two levels: groups and association and urban policy.

Farmers grouping and associations

Grouping demonstrated to be a powerful strategy to expand agroecological practices, empower women and improve well-being of families involved in urban agriculture. Based on this evidence, the following recommendations have derived:

- Supporting current farmer groups to envision a long-term agricultural practices in the frame of climate variability adaptation and resilience
- Enhancing and spreading the current practices and knowledge in other locations and groups. New farmer groups involvement is necessary to achieve this aim (e.g. by paying guest visits to the existing sites and exchange knowledge and experience).
- Encouraging groups formation by convincing farmers of the advantages of agroecological farming by the interaction of local and external knowledge, technologies and trainings.
- Acknowledging the role of women in groups by promoting well-being as a result of their own empowerment, complicity and independence.

Urban policy design:

- Strengthening the strategic alliance between modern agroecology practices and practices based on local knowledge and farmers experience. This alliance is aimed to facilitate long-term implementation and continuity of sustainable agricultural practices.
- Involving farming communities to foster positive synergies articulating their own needs and formulate solutions collectively
- Promoting women participation in planning and implementation of any adaptive measures in order to generate a greater effect. The research has proved the women's willingness and enthusiasm to share knowledge.
- Encouraging off-ground farming as part of adaptation and resilience plans for agriculture as it seems to be the strategy that can mitigate the forthcoming lack of arable land in Ouagadougou.
- Developing a co-operative warning climate systems that involves climate forecasting and farmers' knowledge to complement meteorological information and evidence.
- Information campaign creation and circulation from Ouagadougou to rural areas to warn about climate variability and the viable alternative that agroecology represents to conventional farming.

References

African Development Bank Group (AFDB) (2016) Burkina Faso Economic Outlook. Available at: http://www.afdb.org/en/countries/west-africa/burkina-faso/burkina-faso-economic-outlook/

Food and Agriculture Organization to the United Nations (FAO) (2016). Low—income Food-deficit countries (LIFDC). Available in: http://www.fao.org/countryprofiles/lifdc/en/

Humblot, M. (2017) From risk to resilience. How do female farmers adapt to climate variability through associations and agroecology in peri-urban agriculture?

Ouagadougou - Burkina Faso (Master's Thesis). University of Amsterdam, The Netherlands.

Inter-Réseaux et SOS Faim (2011) Agroécologie: ou en est-on? Bulletin de synthèse Souveraineté Alimentaire.

OECD (2013) Policy Framework for investment in Agriculture in Burkina Faso. Éditions OCDE.

United Nations (UN) (2014) World Urbanization Prospects: The 2014 Revision. Department of Economic and Social Affairs, Population Division. Available in: https://esa.un.org/unpd/wup/country-profiles/

United Nations Development Program (UNDP) (2015) Work for human development. Briefing note for countries on the 2015 Human Development Report. Burkina Faso. Human Development Report 2015. Available at: http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/BFA.pdf (Accessed November 6th, 2016)

World Bank Group (2016) Climate variability Knowledge Portal - For Development Practitioners and Policy Makers. Climate variability Knowledge portal for development practitioners and policy makers. Available at: http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=Africa&ThisCCode=BFA