

# Stories of change

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## Fertilizer micro-dosing: a profitable innovation for Sahelian women

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### Key messages

- Localized application of small quantities of fertilizer (micro-dosing), combined with improved planting pits for rainwater harvesting, has generated greater profits and food security for women farmers in the Sahel.
- Women are 25% more likely to use combined applications, and have expanded areas of food crops (cowpea, millet, sorghum) under micro-dosing and water harvesting.
- Farmers' access to fertilizer has been improved by an innovative 'warrantage' credit scheme, that has enabled over 1,000 farmers (30% women), to purchase and use more fertilizer on food crops.

### Context

As highlighted during the most recent World Food Summit, the Sahel region of West Africa is one of a small number of areas, globally, where food production per capita is decreasing. This particularly affects poor rural households,

not only because of decreased income but also through a chronic shortage of cereals. For example, 2.5 million people in Niger needed food aid in 2005 due to severe drought (WFP, 2010). This situation recurred in 2010, when crop failure in the 2009 season led to the most severe famine in the country's history.

Frequent droughts and poor soil fertility are key factors behind food shortages. But innovative, low-input technologies that simultaneously replenish soil nutrients and organic matter, as well as improving soil water availability, can lead to significant increases in crop production and reduce acute food shortages.

Under conventional crop management, chemical fertilizers are applied at recommended rates to rapidly replenish soil fertility and thus improve crop yield. In West Africa, however, recommended fertilizer application rates are costly and, as a result, are often only used for male-controlled cash crops, such as cotton and maize. Fertilizer use on food crops grown by women (e.g. cowpea) is much more limited, and often restricted to those who are able to access 'spare' fertilizer from their husband's cotton production.

Fertilizer micro-dosing is the localized placement of small amounts of mineral fertilizer (4 grams of phosphorus) in the planting hole at sowing, or at the base of newly emerged plants, instead of spreading fertilizers evenly across the field. Use of improved planting pits (a rainwater harvesting technique that incorporates use of organic matter) instead of sowing seed in raised earth mounds encourages infiltration of rainwater and increases soil moisture levels.



Micro-dosing combined with rainwater harvesting can potentially triple women's profits

Building on previous successes with micro-dosing, the *Integrated Nutrients and Water Management (INuWaM)* project for food security in the Sahel is testing the combined use of micro-dosing with soil moisture management, in order to determine any increase in fertilizer use efficiency. In particular the project is targeting food crops managed by poor rural men and women.

indicate that fertilizer micro-dosing, combined with use of planting pits, substantially improves productivity in rain-fed crops. In Burkina Faso, for example, yields of sorghum, where both methods were applied, were about 700 kg per hectare, compared with only 200 and 350 kg when rainwater harvesting and micro-dosing were used alone.

## Emerging outcomes

### Increasing productivity for women

Results from three years of participatory research involving over 200 on-farm experiments with male and female farmers

Across the project countries, a baseline study has shown that women are 25% more likely to adopt a combination of micro-dosing and rainwater harvesting compared to men. In general in the Sahel, women cultivate crops on small plots of degraded land that suit the use of fertilizer micro-dosing and rainwater harvesting techniques. By adopting the combined approach, women increase their profits by at



Participatory research involved over 200 on-farm experiments with male and female farmers



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Micro-dosing is the localized placement of small amounts of fertilizer

least threefold; i.e. a woman investing US\$22 in both techniques would earn a profit of US\$80 (cost-benefit ratio 3.6:1).

## Warrantage provides finance for fertilizer

Across the four countries, the traditional, government-led fertilizer delivery system is currently being replaced by a multi-stakeholder system involving NGOs, agro-dealers, microfinance institutions and farmer organizations. Under this system, farmers are linked to both credit institutions and fertilizer suppliers, with their crop production serving as collateral for fertilizer purchases.

Known in West Africa as ‘warrantage’, the system involves farmers storing part of their cereal or legume harvest in a warehouse. The value of the stored crop serves

as collateral when applying for credit from microfinance institutions. Thus the system is adapted to the needs of small-scale farmers - particularly women - in providing affordable credit.

In the project countries, about 20 microfinance institutions are engaged in the warrantage system with smallholder farmers. Additionally, many projects have established input shops and more than 1,000 farmers living in the project area (30% of whom are women) have been trained by the project in the use of micro-dosing, warrantage and management of a community-based organization (CBO) input shop. In engaging with farmers, the project has deliberately targeted women-headed households in order to help address gender issues, such as low productivity of women’s plots.

Input shops involved in the warrantage system - which are owned by CBOs - are also offering subsidized fertilizer at lower prices. A 50 kg bag of fertilizer will typically cost around US\$28 from one of the shops, compared to around US\$36 from other retailers. Thus, buying fertilizer through the warrantage-input shop scheme reduces the cost by around 22%.

## Women expand fertilizer use to food crops

The warrantage scheme has improved women’s access to fertilizers. As a result, women are allocating more land to micro-dosing than men with similar levels of assets (Figure 1) across

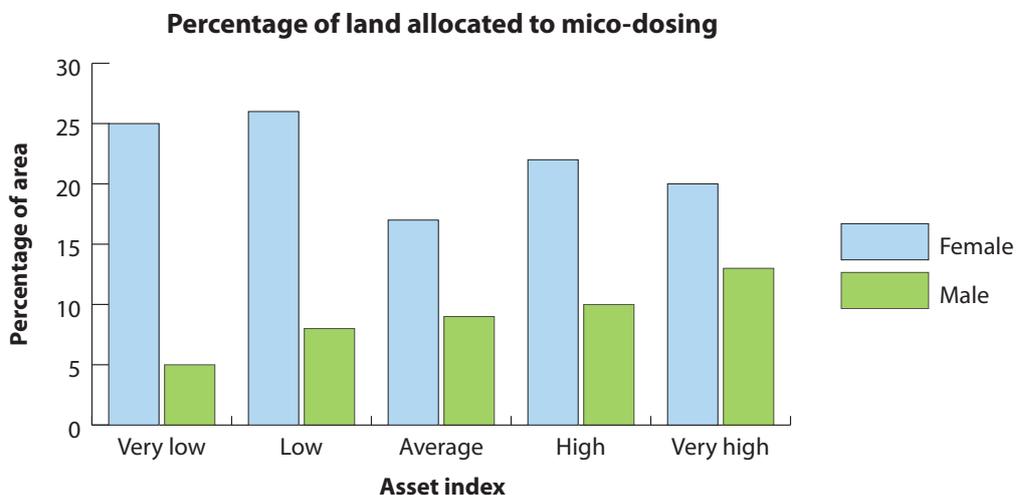


Figure 1: Percentage of land allocated to micro-dosing across all four countries



Women on an exchange visit share experiences of using rainwater harvesting and micro-dosing techniques

all four project countries, in order to boost production of food crops such as cowpea, sorghum and maize.

## Conclusion

Micro-dosing combined with rainwater harvesting is a good option for women in the Sahel, with the potential to substantially increase yields (by 25-50%) in rainfed legumes and cereals. Adopting the techniques in sorghum production has led to their application in other rainfed crops grown by women, such as cowpea and cereals. The technologies can potentially triple the profits of women adopters. Specific extension policies are therefore needed to ensure that all women in the Sahel can benefit.

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