Healthy Soils, Strong Roots

Water Smart Agriculture, an approach that works for women farmers

EVIDENCE FROM THE FIELD

STRUCTURAL INEQUALITY IN CENTRAL AMERICA MAKES RURAL WOMEN THE MOST VULNERABLE AMONG THE VULNERABLE.

In a region of great inequality and growing vulnerability, Central American women, especially rural women, suffer the sharpest limitations resulting from structural challenges like patriarchal social norms, gendered overburden of care responsibilities and concentration of power and access to resources. Only 16% of smallholder farms are headed by women and those few women-headed farms are systematically smaller, on lower quality land, and less productive.[1] Women's yields are on average 25% lower than men's, and they are even less likely to have a formal title than their male counterparts.[2] They are also less likely to access extension services, technology and financing, and more likely to be food insecure. Climate change and land degradation, major factors threatening human development globally, have a disproportionate impact on women that is exacerbated by these pre-existing inequalities.[3]

Baseline data collected through the CRS Water Smart Agriculture Program for Mesoamerica, which operated from 2015 – 2021 in Nicaragua, Honduras, Guatemala, and El Salvador, reflected many of the above-described regional trends. The program recruited 421 women as demonstration farmers, comprising 17% of total demonstration farms. The program collected on-farm data on crop productivity, economic returns and soil health for every demonstration farm. Post-project competency evaluations were carried out with 142 women and 430 men to gauge the degree of adoption of practices and the farmers' perceptions of the practices and the impacts of implementing the practices on their lives and livelihoods.

[1] UNEP 2019. Women and the environment: a preliminary analysis of gaps and opportunities in Latin America and the Caribbean.
[2] IBID.
[3] ECLAC 2021. Implications of gender roles in natural resource governance in Latin America and the Caribbean

GENDER-RELATED PRODUCTION CONSTRAINTS ARE VISIBLE IN THE DATA, BUT DID NOT PREVENT WOMEN FROM ADOPTING AND SIGNIFICANTLY BENEFITTING FROM WSA PRACTICES

Post-project competency evaluations showed that large majorities (67 – 80%) of the WSA farmers, both women and men, perceived very positive benefits from WSA in terms of production, food availability, net income and diet diversity, although 6 – 9 % fewer women than men ranked benefits as very positive. Both female and male farmers expanded the WSA practices beyond the original WSA plot area, an indicator of practice adoption beyond the project intervention. Women farmers, both basic grains and coffee, were equally likely as men to adopt key WSA conservation agriculture practices like minimizing soil disturbance, avoiding burning residues or leaf litter, and keeping the soil permanently covered.

There is some evidence, however, that women face greater constraints in terms of access to cash, labor and land. While both women and men were less likely to save cover crop seed for next season (labor constraint) or establish crop rotation or intercrop (labor and land size), the result was significantly more pronounced for women vs. men. Also, significantly fewer women than men basic grains farmers continued to implement most Integrated Soil Fertility Management (ISFM) practices post-project. Survey data from Guatemala showed that women basic grains farmers were more reliant on contracted labor compared to men, and limited cash resources to purchase fertilizers and pay additional contracted labor for timely fertilizer applications may be a limitation for continued adoption by women. On the other hand, although women coffee farmers continued the ISFM practices on par with men, they spent significantly less time on their plots, probably reflecting women balancing household responsibilities with farming. Women farmers were slightly more likely than men to prioritize labor availability as a constraint to the implementation of practices, but overall identified a similar balance of limitations – labor availability, availability of cash resources and knowledge and abilities - with cash availability as the most significant limitation for both men and women.

While the above may indicate that women are balancing farming responsibilities with other household responsibilities and contracting labor to fill the gap, it is important to note that these factors did not result in significantly different results for women in terms of gains in yield and net income. The success of WSA in increasing the yields and incomes of women basic grains and coffee farmers demonstrates that WSA's soil-focused approach delivered through innovation plots and farmer field schools is an effective strategy for serving women farmers. It also supports the thesis that when women are given equal access to training and resources, they will farm just as successfully as men. Future projects should continue to explicitly recruit women farmers and pay attention to differences in the way that women manage the labor and cash requirements on their farms. Savings groups that improve financial management, cultivate women's leadership and cooperation, and facilitate access to informal and formal savings and credit mechanisms have shown promise in helping women farmers overcome some of these constraints.

FEMALE FARMERS FACE MORE SOIL-RELATED YIELD LIMITATIONS

In general, women in Central America farm on more marginal lands with more soil related productivity limitations.[4] Baseline soil analysis of the WSA demonstration plots showed that plots managed by women

[4] ECLAC 2021. Implications of gender roles in natural resource governance in Latin America and the Caribbean

were more likely to have soil fertility related yield limitations than plots managed by men. In basic grains systems, 61% of women's plots had soils with critically low phosphorus levels (compared to 43% of men's plots) and 44% had yield limiting acidic soil conditions (compared to only 36% of plots managed by men).

Correcting these soil fertility limitations can be considered low hanging fruit for closing the yield gap for women farmers. However, women need better access to fertilizer and soil acidity management recommendations and agronomic inputs such as fertilizer and lime.

Access to cash resources may limit women's ability to fully invest in the fertilizers and paid supplemental labor required to continue to fully implement the WSA practices and achieve equal yield results over the long-term. Competency evaluations showed that while women and men equally adopted conservation and regenerative agriculture practices like minimizing soil disturbance, permanent soil cover, residue management and elimination of agricultural burning, they were less likely to continue cash and information-dependent practices post-project. New WSA programs are addressing this constraint through integrating WSA approaches with CRS' highly successful SILC methodology that supports access to savings and micro credit, especially for women.

WOMEN FARM SMALLER PLOTS SO SIGNIFICANT INCREASES IN YIELD AND NET INCOME ARE ESPECIALLY IMPACTFUL

Women farmers in Central America have access to less land area than men.[5] Of the farmers participating in WSA field trials, the total basic grains production area managed by women was significantly smaller than areas managed by men. On average, women managed 0.86 ha of basic grains production area whereas men managed an average area of 1.3 ha. The differences were even more pronounced in Guatemala where women's basic grains plots were only half the size of men's plots (0.5 ha compared to 1 ha on average). Small land holdings coupled with low yields, especially in years of drought and climate shocks, make households depending on women's food production even more susceptible to food insecurity. The significant increases in yield and return on investment (net income per land area) achieved through WSA become especially important when plot sizes are small.

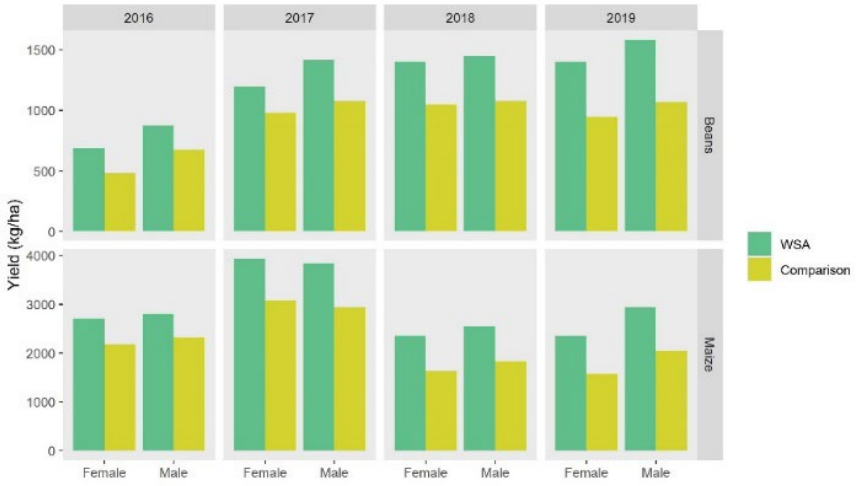

Fig. 1. Maize and bean yields (kg/ha) from 2016-2020 in WSA and comparison plots managed by female and male farmers.

DESPITE LAND AND RESOURCE LIMITATIONS, WOMEN BENEFIT FROM WSA ON PAR WITH MEN

WSA program results serve as further proof that when women have access to extension services and agricultural inputs to manage their soils, they can improve basic grains yields by over 30%. This increase in yield for women farmers would have significant impacts on food security in the region. WSA practices increase yields in both women's and men's basic grain

[5] Ibid.

systems - the regional average yields in WSA plots were similar for both genders except for 2018 and 2019 when women's maize yields were slightly lower. This may be related to women's increased exposure to drought conditions because they are cultivating more marginal soils. However, on average over the 4 years of the program, maize and bean yield increases with WSA were similar for plots managed by men and women. Maize yields increased 33% (724 kg/ha) in woman managed plots and 32% (747kg/ha) for men. Women increased bean yields by 32% (270kg/ha) and men by 33% (326 kg/ha).

WSA PRACTICES INCREASE YIELDS AND IMPROVE DROUGHT RESILIENCE, WHICH IS EVEN MORE PRONOUNCED FOR WOMEN COMPARED TO MEN

Basic grains yields were severely affected in the drought of 2018. The minimum production level for maize sufficiency for the average farm family in Central America is considered 1t/ha. During the 2018 drought, 70% of women's conventionally managed comparison plots fell below this threshold level compared to only 34% of men's conventional plots. WSA practices buffered this impact of drought on women's production. In stark contrast, only 27% of the women's plots managed with WSA practices fell below the critical threshold. Men also made gains with WSA practices with only 22% falling below the critical threshold. The implementation of WSA practices under drought conditions significantly reduced the yield gap between women and men.

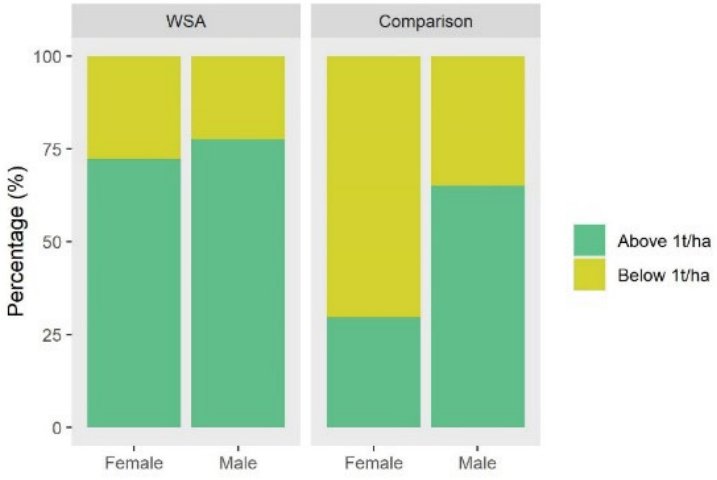

Fig. 2. The percentage of maize yields from male and female managed maize plots above and below the 1t/ha threshold in WSA and comparison plots in Honduras during the 2018 drought.

In coffee systems, WSA practices improved yields by the same relative amount in both female and male managed plots. WSA increased coffee production by an average of 17% (138 kg/ha) in female managed plots and 15% (184 kg/ha) in male managed plots. However, female managed farms had consistently lower coffee yields compared to the male managed plots across all years of the program. This may be related to the lower investments in inputs, plantation renovation and women's labor constraints in the female managed plots. Baseline survey data on labor in coffee in Guatemala, showed that men spend significantly more days working in their coffee plots compared to women. This is likely an effect of women balancing their labor burden with other household responsibilities.

DESPITE CONSISTENTLY LOWER COFFEE YIELDS FOR WOMEN, WSA PRACTICES HELPED CLOSE A PROFITABILITY GAP BETWEEN MEN AND WOMEN

At the beginning of the WSA program, women's coffee net income per area was significantly lower than men. After 3 years (2018), however, net income per area in female managed WSA plots were comparable to male managed plots despite overall lower yields. Women tend to be more likely to follow the coffee production strategy of "low cost – low productivity" which is a smallholder adaptation to the current low price, high-production cost environment for coffee and limited access to inputs. However, due to the small coffee production area, this strategy still leads to low income, especially for women. Improving women's access to preferential coffee price premiums could increase the net profit per area and allow for more investment in production.

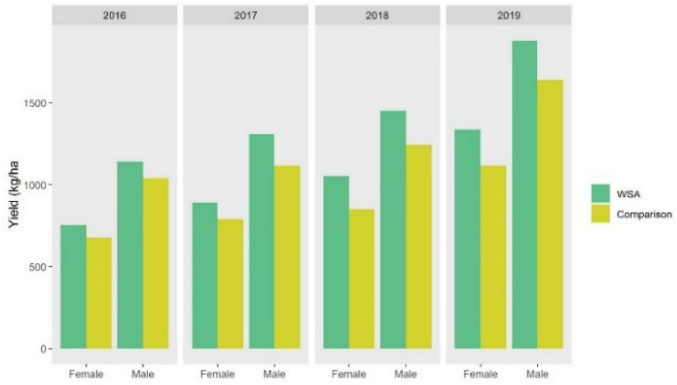

Fig. 3. Coffee yields (kg/ha) from 2016-2020 in WSA and comparison plots managed by female and male famers.

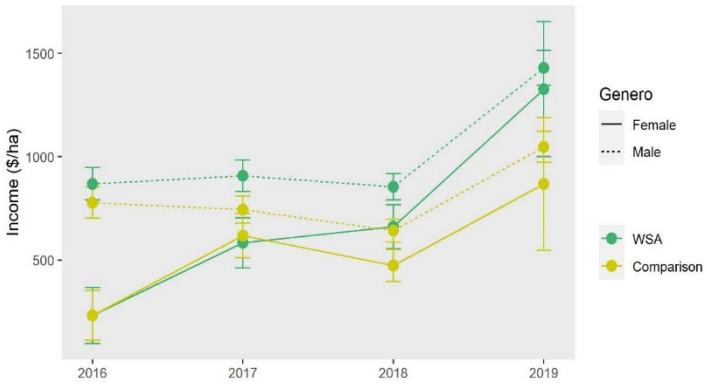

Fig. 4. Coffee Net Income ($/ha) from 2016-2020 in WSA and comparison plots managed by female and male famers.