Info Note

How are smallholder households coping with and adapting to climate-related shocks in Doyogena climate-smart landscapes, Ethiopia?

Preliminary results of the uptake of climate-smart agriculture

Osana Bonilla-Findji, Angelly Ortega, Anton Eitzinger, John Recha, Gebermedihin Ambaw, Wuletawu Abera, Luluseged Tamene, Getamesay Demeke, Mesfin Desalegn, Kindu Mekonnen, Maren Radeny, Dawit Solomon, Peter Läderach

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Key messages

- About 74% of households (HH) in Doyogena climate-smart landscapes had reduced agricultural income in the year 2019, mostly due to climate-related shocks (80%). Impacts were lower in female-headed HH (53%).
- About 41% of the HH made changes in their cropping activities. Male-headed HH made changes to crops twice more often than female-headed HH.
- Climate shocks were the main driver of change, particularly in female-headed HH (100% of the changes to crops). For male-headed HH, climate induced 87% of the changes to crops but also 73% of the changes to livestock. Autonomous changes were only reported by male-headed HH.
- Roughly 1/3 of farmers (but twice more male than female), accessed climate information services and the majority (>70%) used it in decision-making. Seasonal forecasts triggered cropping system changes on half of the farms.
- Adoption of the climate-smart agriculture (CSA) practices tested and promoted in Doyogena was reported by 135 male (99%) and 131 female (96%) farmers. It was lower in female-headed (82%) than in male-headed HH (100%).
- Of the 11 practices tested, five showed high adoption rates (>60%): *controlled grazing, cut and carry, terraces and Desho grass, and agroforestry*. Four practices registered medium levels of adoption (30-60%): *improved wheat and potato varieties, crop rotation, residue incorporation and manure*. The lower adoption (<10%) was associated with *improved beans and improved livestock breeds*, that was reported by only male-headed HH.
- On average between 73% and 98% of adopting farmers reported positive outcomes of the practices in all the CSA dimensions: additional income, enhanced food access and diversity, and improved climate resilience. For more than 50% of the farmers, these practices (except for terraces) did not entail additional labor time.
- Most male and female farmers agreed that they jointly decided on the implementation of the high and medium-level adoption practices. They only disagreed about agroforestry and improved livestock breeds where about 50% of the male farmers reported that they decided alone but female farmers mentioned that it was done jointly.
- About 2/3 of male and female farmers reported equal contribution to the implementation of six of the practices. In the case of terraces, agroforestry and improved wheat, the male farmers reported doing most of the work while female farmers reported equal contribution.
- The level of participation and/or control of income generated by the practices was consistently high (above 80% of male and female farmers).

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

This synthesis presents an analysis of the results from the 2019 monitoring implemented as a contribution to Activity 1.2 Assessment of climate-smart agricultural options in the Doyogena Climate-Smart Village (CSV), in the context of the CCAFS-EU-IFAD grant reference 2000002575 for the research project "Building livelihoods and resilience to climate change in East & West Africa: Agricultural Research for Development (AR4D) for large-scale implementation of Climate-Smart Agriculture" led by the Alliance of Bioversity International and CIAT.

Background

In the context of the Climate-Smart Village (CSV) approach developed by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and its learning platform on "Participatory evaluation of CSA practices and technologies," farmers in Doyogena district (Ethiopia) have been implementing climate-smart land management options that can build sustainable livelihoods and increase their resilience to climate shocks. The climate-related risks the farmers face include increasing rainfall intensity and variability, water stress, soil erosion, deforestation, severe land degradation and fragmentation, declining soil fertility, shortage of livestock feed, and increased incidence of crop and livestock diseases and pests (Tadesse et al. 2018). To support a standard and robust evaluation of these technological options and build context-specific evidence on their adoption drivers and related outcomes at household level, CCAFS developed the CSA monitoring framework. The framework is associated with an information and communications technology (ICT)-based data collection App (Geofarmer) that helps researchers and practitioners to assess to what extent farmers' implementation of CSA options leads to positive socio-economic and biophysical changes. This study presents some of the results of the implementation of the CSA monitoring in Doyogena climate-smart landscapes (Bonilla-Findji et al 2019). It specifically focuses on assessing how household's agricultural incomes were affected by climate shocks in 2019, which responses they put in place and to which extent the access to CSA options (practices, technologies and climate information services) brought positive outcomes in terms of livelihoods, food security, and increased adaptive capacity.

Doyogena climate-smart landscapes

Doyogena district is located in Kembata Tembaro zone, Southern Nations, Nationalities, and People's Region (SNNPR) of Ethiopia, in a highland with altitude ranging from 2420 - 2740 meters above sea level. It has mean annual temperatures from 12.6°C to 20°C and a mean annual rainfall ranging from 1,000 – 1,400 mm. The two rainfall seasons in the area include Belg (the short rainy season from January to March) and Meher (the main rainy season from June to October). Agriculture is the main means of livelihood for the community and it involves mixed farming systems with enset - cereal - livestock production. The majority are subsistence farmers with an average land size of 0.5 ha, getting their income from the sale of wheat, beans, potatoes, livestock and livestock products, and rural/urban laboring. Major challenges faced in the area relate to soil erosion and loss of soil fertility coupled with climate change.

Climate-smart practices

A total of 11 CSA practices implemented by farmers were covered in the annual monitoring: (1) agroforestry (woody perennials and crops); (2) terraces and Desho grass (Pennisetum pedicellatum): soil and water conservation with biological measure; (3) residue incorporation for wheat or barley; (4) green manure (vetch and/or lupin during off-season); (5) crop rotation (cereal/potato); (6) improved wheat varieties (high yielding, disease resistance and early maturing); (7) improved beans (high yielding), (8) improved potato (high yielding, bigger tuber size); (9) controlled grazing; (10) cut and carry for animal feed; (11) improved breeds (small ruminants).

Methods

The CSA monitoring framework proposes 17 core indicators and an additional set of complementary extended indicators linked to specific survey questions gathered in different thematic modules and hosted in the Geofarmer App.

The core indicators include seven uptake indicators (to track CSA implementation and adoption drivers; CSA dis-adoption and drivers; access to climate information services and agro-advisories, capacity to use them and constraining factors) and 10 outcome indicators (they track farmers perceptions on the effects of CSA practices on their livelihoods, food security and adaptive capacity and gender dimensions. The outcome indicators focus on: CSA effect on yield/production, income, improved food access and food diversity, vulnerability to weather related shocks, and on changes in agricultural activities induced by access to climate information. The gender dimensions examined include: decision-making on CSA implementation or dis-adoption, participation in CSA implementation, CSA effect on labor, decision making and control on CSA generated income. Finally, the extended indicators provide an opportunity to determine and tackle changes in enabling conditions and farmers characteristics such as: livelihood security, financial enablers, food security, frequency of climate events, coping strategies, risk mitigation actions, access to financial services and training, CSA knowledge and learning.

Data collection associated with the CSA monitoring was done between November 2-10, 2019 (Ambaw et al. 2019). The main objective of this monitoring was to assess farmers' adoption/implementation of CSA practices and technologies over the last 12 months and the perceived effects of their implementation on: food security, crop productivity and income, adaptive capacity and gender aspects (labor, participation in decision making, access/control over generated resources). The monitoring survey targeted two persons of the opposite sex involved in on-farm activities from a sample of households located in seven villages within Doyogena climate-smart landscapes. Those included: Tula (01), Suticho (02), Gewada (03), Chololа2 (04), Tachignaw Genjo (05), Duna (06), Gatame1 (07). The households in the first six villages were direct beneficiaries of the CCAFS project whereas the ones visited in Gatame1 were non-beneficiaries or "additionals" (potentially non–adopters). All the core indicators determined for Doyogena were calculated using R-Scripts. The following section presents a synthesis of the key results.

Results

Livelihoods and food security in the context of climate variability

A total of 273 farmers were covered by the monitoring: 137 male and 136 females. They belong to 140 HH (12% female-headed) with average productive farm areas of 0.78 ha. A large majority depend on agricultural income (96% of males and 90% of females) largely generated on-farm (97% in male-headed and 100% in female-headed HH).

Consistent with the national land use traditions, nearly all HH (100% of female-headed and 81% of male-headed) own all the land they cultivate (Figure 1).

Effects of climate-shocks: In 2019, 74% of the HH reported reductions in their agricultural income, and around 80% of these cases were associated with climate shocks (Figure 2). Income for female-headed HH were less affected (60%) as were the impacts from climate events (53%). These events included heavy and irregular rains (84% and 38% respectively), and in much lower frequency (< 5%) frost, drought, and storms or strong winds.

Main food source: On-farm production was the main source of food for 93% of the HH. Only 4% of male-headed HH reported mainly purchasing it from the market. External support was the main source of food for 2% of male-headed and 6% of female-headed HH (Figure 3).

Food insecurity: In 2019, 62% of male-headed and 65% of female-headed HH suffered from some degree of food access insecurity.

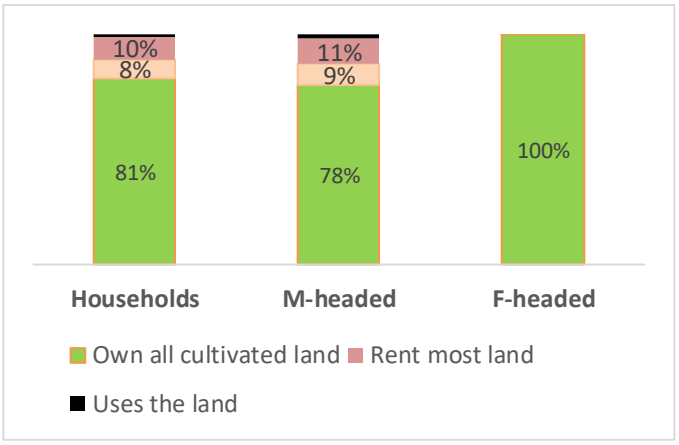

Figure 1. Household's land ownership in Doyogena

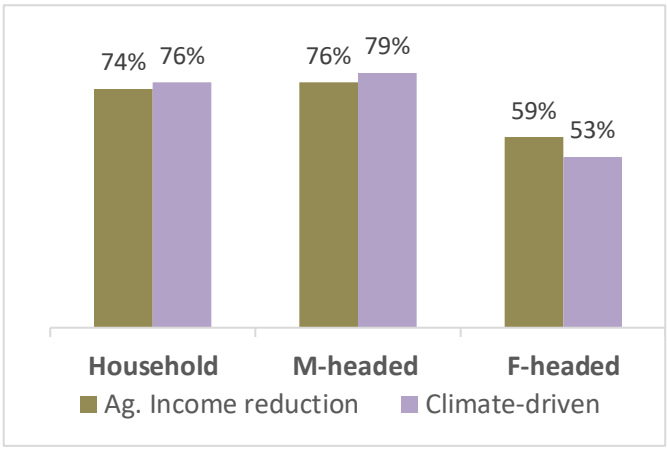

Figure 2. Frequency of reduction in household's agricultural income and climate-driven impacts.

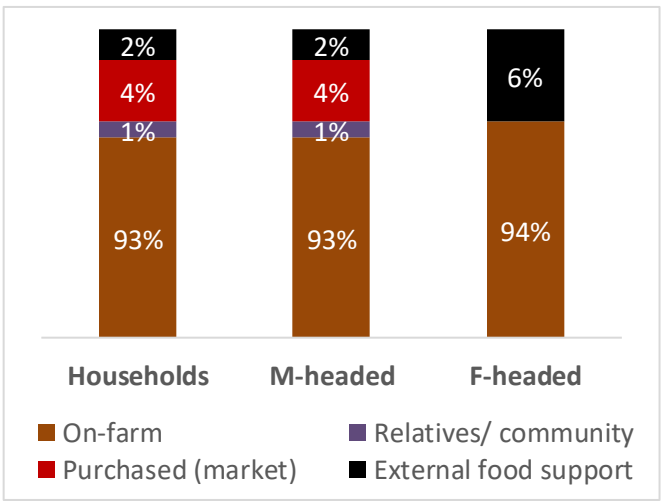

Figure 3. Main household's food source in 2019.

Household Food Insecurity Access Scale (HFIAS): During the most difficult months (October and November) 39% of the HH were food secure[1], another 39% moderately food insecure[2] and 20% severely[3] food insecure. Female-headed HH reported lower levels of both food security (35%) and severe food insecurity (18%) conditions; a larger proportion accounted for moderate food insecurity compared to male-headed HH (Figure 4).

Access to financial services: Nearly two-thirds (67%) of Doyogena's farmers were able to make savings from their agricultural income, although this capacity was higher in males (75%) than in females (55%). On-farm investments were frequent (above 80%) and in about 50% of the cases they were driven by the intention to recover from or prevent the negative impacts of climate shocks. Gender differences were registered in access to agricultural credit (26% of male and 18% of female) and 43% and 41% of them, respectively, were "climate-driven" (Figure 5). The main source of credit for both male (69%) and female (64%) farmers were the cooperatives or micro-credit institutions. About 22% of males accessed community saving groups while females looked at both the saving groups and the family and friends support (14%). A small proportion of farmers (9%) got their credits from private lenders.

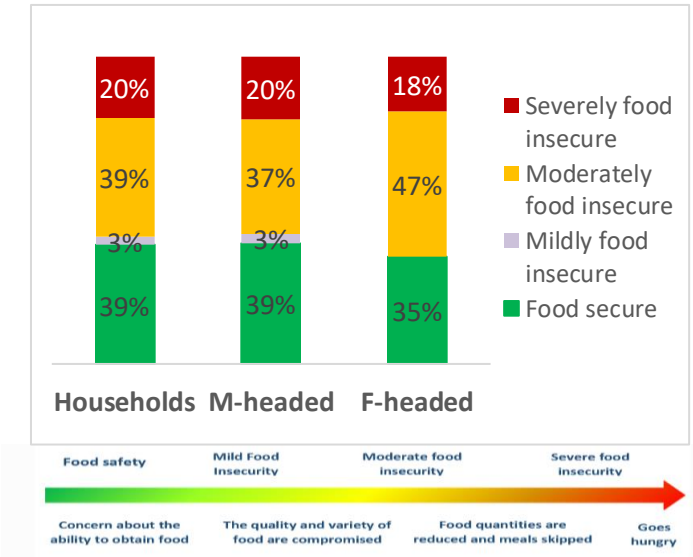

Figure 4. HFIAS during the most difficult period of 2019.

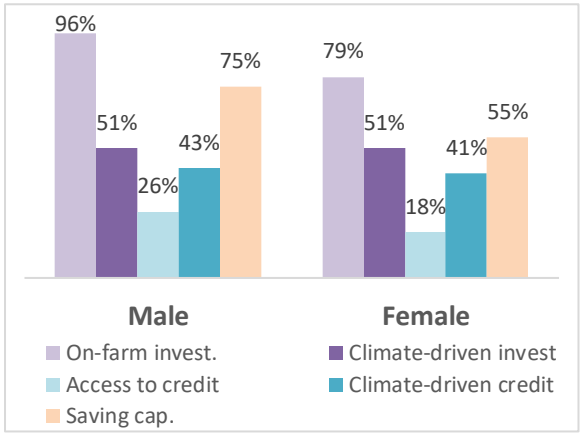

Figure 5. Farmers access to financial services and frequency of climate-driven "intention".

How are households coping with climate shocks?

Coping strategies: The most frequent response from the HH to overcome the negative economic impacts caused by climate shocks included the use of savings (83%), reducing expenditures (47%) and selling assets (23%), with higher frequencies observed in female-headed than in male-headed HH (Figure 6). Male-headed HH, used other strategies although in a lower degree, such as borrowing money (12%), looking for new income sources and skipping meals (8%), using loans and saving or shifting from on-farm to off-farm work (6%).

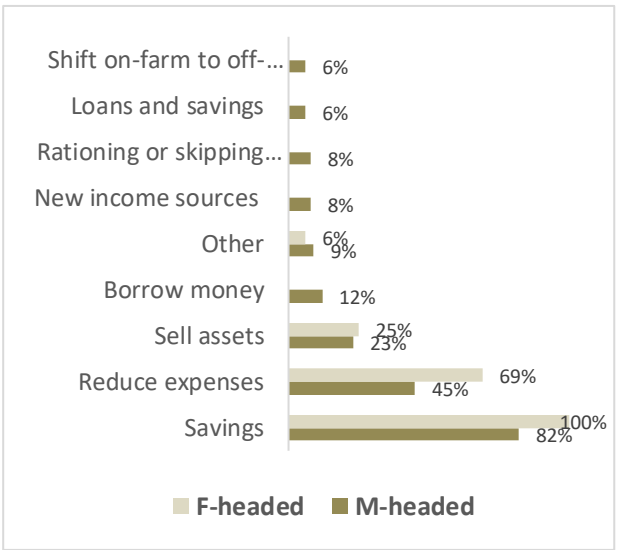

Figure 6. Households coping strategies in response to the negative impacts of climate shocks.

1 A household that experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely.

2 A household that sacrifices quality more frequently, eating a monotonous diet or undesirable foods sometimes or often, and/or has started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes. It does not experience any of the three most severe conditions.

3 A household that experiences one of these three most severe conditions: running out of food, going to bed hungry, or going a whole day and night without eating, even as infrequently as rarely.

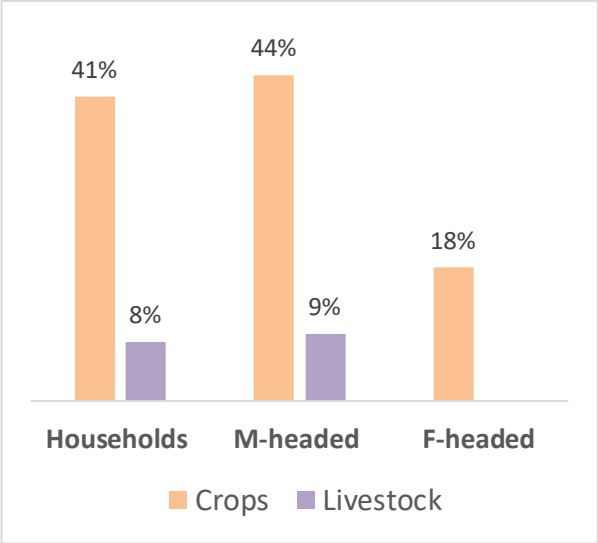

Figure 7. Frequency of changes made by households in their crops and livestock related activities.

How are households adapting to climate shocks?

Risk mitigation actions: About 41% of the HH reported having made changes in their cropping activities. Male-headed HH reported twice more changes related to crop production (44%) than female-headed HH (18%) and were the only ones making changes to a less extent (9%) in their livestock (Figure 7).

Innovative changes: About 10% of the HH reported innovative changes (never undertaken before in their farms), 9% in male-headed and 1% in female-headed HH.

Drivers of change in farming activities: Climate-related stocks were the main driver. In female-headed HH, they induced 100% of the changes made in their crop production activities. In male-headed HH they accounted for 87% of the changes made to crop and 73% of the changes made to livestock production activities (Figure 8).

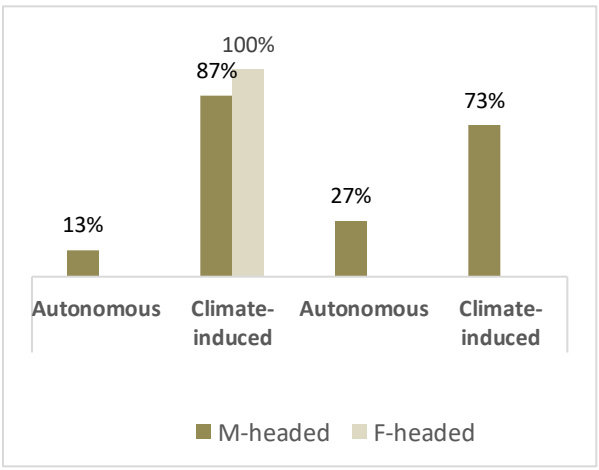

Figure 8. Drivers of changes made by male and female-headed households to their cropping activities.

***Types of climate-induced changes*:** In male-headed HH, the climate-induced changes were mainly associated with pasture/feed (88%) and crop (51%) management practices. In 26% and 21% of the cases, they substituted varieties or crops, and to a lower extent (12%), they diversified their animals. On the other hand, climate induced changes led to female-headed HH making changes in crop management practices (75%) and the substitution of crops (25%). The female-headed HH made more frequent crop related changes than male-headed HH (Figure 9).

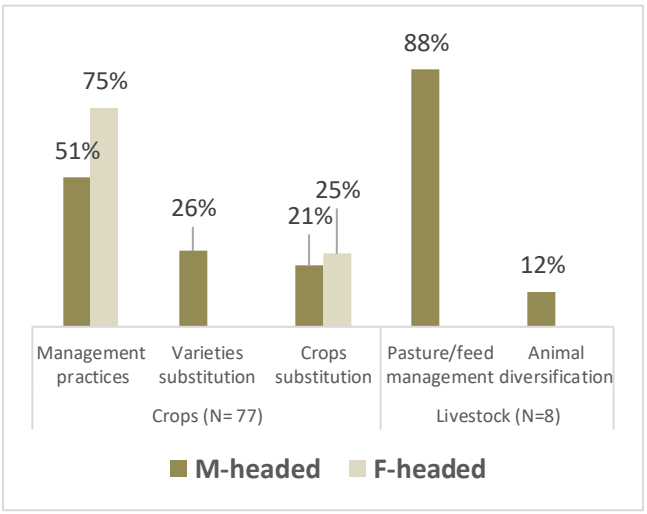

Figure 9. Types of changes made by male and female-headed households to their crops and livestock activities.

Access to climate information services (CIS): About 36% of the farmers reported having accessed CIS in 2019. Gender wise, this access, however, was twice higher for males (48%) than females (24%). It consisted mainly of weather and seasonal forecast information. None of the females and only a small fraction (14%) of males who accessed seasonal forecasts also received associated agro-advisories (on crop, livestock, and pest and diseases management).

Besides the relatively low access to CIS, the majority of the farmers (> 70%) accessing CIS and slightly more males than females, reported having the capacity to use this information in decision-making (Figure 10). For about 50% of the farmers that accessed seasonal forecasts, this triggered changes in their cropping activities and in their livestock activities (17%). Those changes were largely related to crop and pasture management.

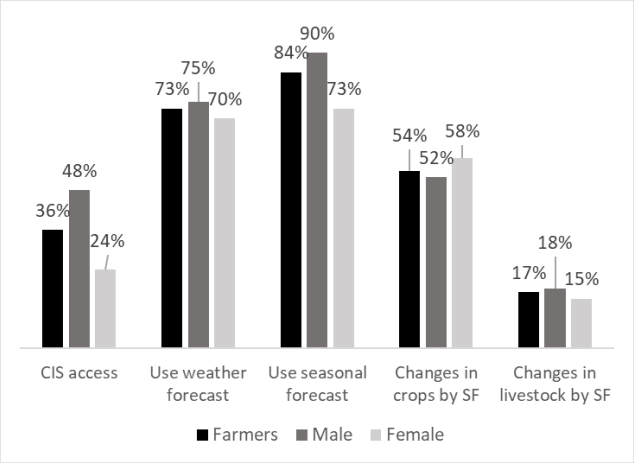

Figure 10. Frequency of access and capacity to use climate information services.

Constraints: The specific constraints to the use of CIS differed between males and females and among the type of information service. The main constraint to use weather forecasts was the lack of trust (43% in males and 75% in females) and resources to act (36% of males, 12% of females) after making decisions. For the seasonal forecast, the major challenges for males were understanding and trust (40%) as well as the ability to translate it into action (20%). The females clearly reported that the main constraint was understanding the forecast (43%). Trust and translation into action were also reported by females but in a lower extent than males (29% and 14% respectively). Those clear gender differences might be explained, in part, by the fact that none of the females reported having access to any type of training of CIS against 50% of males.

Adoption of CSA practices: This study showed that in 2019, the level of CSA adoption was very high both at the individual and household level: 266 farmers (97%) and 132 households (98%) from the seven villages surveyed were implementing one or more of the 11 promoted practices. In terms of gender, adoption was lower in female-headed HH (82%) compared to 100% in male-headed HH (Figure 11).

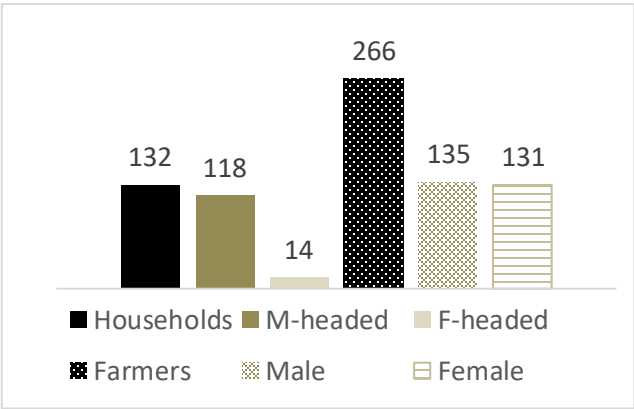

Figure 11. Adoption of CSA practices at individual and household level

Specific CSA practices: Overall, except for cut and carry, adoption was lower in female-headed than in male-headed HH. Of the 11 practices tested, the top five that showed high adoption (>60%) were controlled grazing, cut and carry, terraces and Desho grass, and agroforestry. The four practices that registered medium-levels of adoption (30-60%) were improved wheat and potato varieties, crop rotation, residue incorporation, and manure use. Those practices were much more often implemented in male-headed than in female-headed HH. The lower adoption (<10%) was associated with improved beans and improved livestock breeds, and only reported by male-headed HH (Table 1).

Table 1. Frequency of adoption of the specific CSA practices promoted in Doyogena, at the individual and household level.

	CSA practices	Farmers (N=273)	Male (N= 137)	Female (N=136)	Households (N=135)	Male-headed (N= 118)	Female-headed (N=17)
Hight adoption (>60%)	Controlled grazing	78%	81%	74%	77%	81%	53%
	Cut & Carry	73%	73%	72%	76%	77%	65%
	Terrace + Desho	70%	77%	62%	73%	75%	65%
	Agroforestry fallow	67%	72%	62%	64%	68%	35%
	Improved wheat	55%	64%	46%	73%	75%	65%
Mid-adoption (30-60%)	Improved potato	46%	49%	43%	41%	43%	24%
	Crop rotation	38%	42%	34%	41%	45%	12%
	Residue incorporation	33%	42%	24%	50%	53%	29%
	Green Manure	24%	27%	21%	27%	30%	12%
Low adoption (<10%)	Improved beans	6%	8%	4%	10%	12%	0%
	Improved breeds	8%	10%	7%	8%	9%	0%

Average CSA area/practice: In the Doyogena site covered by the monitoring, the total productive area dedicated to CSA practices accounted for 113 ha and it mostly corresponded to controlled grazing (27 ha), terraces (20 ha), cut and carry (19 ha), improved wheat (13 ha), crop rotation (12 ha) and agroforestry (11 ha). At farm level, the share of area dedicated to CSA practices was different. The biggest share was dedicated, on average, to improved breeds (1 Ha) and terraces (0.67 ha) and in similar proportions to controlled grazing, cut and carry, agroforestry, improved wheat and crop rotation (Figure 12). Farmers used about 0.5 ha for implementing residue incorporation, manure, improved potato and beans.

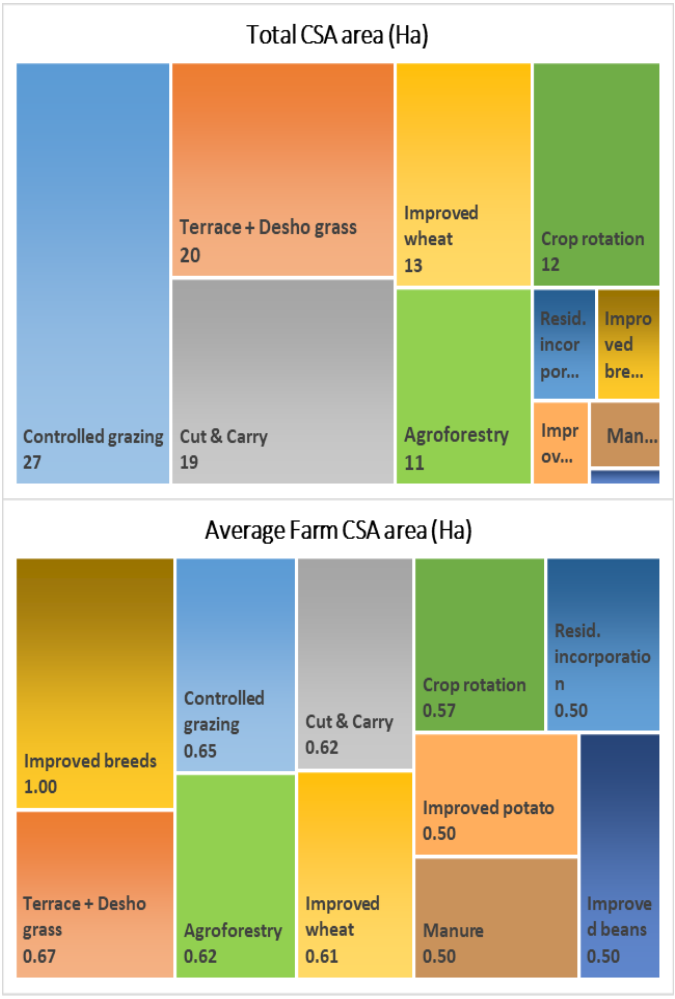

Figure 12. Area dedicated to CSA practices across the CSV site and at the farm level.

Adoption drivers: The main factor stimulating adoption of the 11 practices was *learning and access to training* (53%-78% in males and 41%-79% in females). The second key driver (except for agroforestry) was the intention to *respond to climate impacts* and this was systematically more frequently cited by female farmers, e.g. 48% of females adopting crop rotation versus 35% of males (Table 2). Market opportunities were only a driver associated with the adoption of improved potato (10%) and wheat varieties (6% in males and 3% in females). Farmers reported that it was also an important driver for improved breeds (21%-33%), although this was the practice less adopted according to the monitoring results.

Table 2. Practice specific adoption drivers in male and female farmers.

	CSA practices		Learning or training	Response to climate	Other	Market opportunity	To adapt to future climate	N
Hight adoption (>60%)	Controlled grazing	Female	62%	22%	14%	2%		101
		Male	76%	19%	4%	2%		111
	Cut & Carry	Female	67%	19%	10%		3%	98
		Male	72%	17%	8%	1%	2%	100
	Terrace + Desho grass	Female	55%	35%	7%	2%	1%	84
		Male	64%	28%	7%	1%		106
	Agroforestry	Female	56%	8%	33%	2%		84
		Male	65%	4%	27%	4%		98
Mid-adoption (25-65%)	Improved wheat	Female	65%	29%	3%	3%		62
		Male	69%	21%	3%	6%	1%	87
	Crop rotation	Female	41%	48%	9%		2%	46
		Male	53%	35%	11%		2%	57
	Improved potato	Female	53%	33%	3%	10%		58
		Male	60%	27%	3%	10%		67
	Residue incorporation	Female	55%	39%	3%		3%	33
		Male	70%	19%	7%		4%	57
	Green Manure	Female	79%	14%		3%	3%	29
		Male	78%	11%	8%		3%	37
Low adoption (<10%)	Improved beans	Female	83%		17%			6
		Male	73%	9%	18%			11
	Improved breeds (small ruminants)	Female	56%	11%		33%		9
		Male	50%	14%	7%	21%	7%	14

Dis-adoption: Despite a very high adoption rate, 44% of the farmers and 49% of HH reported that in 2019 they stopped implementing some CSA practices. Looking at the specific practices, however, the data suggest that most of the dis-adoptions (about 1/3) were for improved beans (also only adopted by 6% of the farmers and 10% of the HH). Improved potato was the second CSA option that had been dis-adopted but at a very low rate (10% of farmers and 13% of households). All the other practices had dis-adoption rates below 10%. Female-headed households, however, did show higher dis-adoption at about 35% for improved beans, 24% for improved potato and cut and carry and 12% for improved wheat, controlled grazing and agroforestry (Table 3).

Table 3. Practice specific dis-adoption by male and female farmers.

CSA dis-adoption	Farmers (N= 273)	Male (N=137)	Female (N=136)	HH (N=135)	Male-headed (N=118)	Female-headed (N=17)
Improved beans	28%	30%	26%	32%	31%	35%
Improved potato	10%	12%	9%	13%	11%	24%
Cop rotation	8%	9%	7%	9%	9%	6%
Terrace + Desho grass	6%	7%	5%	6%	7%	
Cut & Carry	5%	4%	6%	7%	5%	24%
Green Manure	3%	5%	1%	5%	6%	
Improved breeds (small	3%	3%	3%	4%	3%	6%
Improved wheat	3%	2%	3%	4%	3%	12%
Agroforestry	3%	1%	4%	2%	1%	12%
Controlled grazing	3%	1%	4%	2%	1%	12%
Residue incorporation	2%	1%	2%	1%		6%

Dis-adoption drivers: For *improved beans*, the most abandoned practice (about 1/3 of farmers), about 50% of male and 60% of female farmers reported that the main reason for stopping was related to the workload required. For *improved potato,* the primary cause of dis-adoption was that it did not generated economic benefits (50% of male and 67% of female). In the case of c*rop rotation,* 75% of males and 67% of females reported *other causes*, although for 33% of females another driver was the high labor effort required. Although *terraces and Desho grass*

were dis-adopted at a low rate (<10%), 75% of females and 33% of males that stopped using them argued that the reason was the high cost of constructing them (Figure 13).

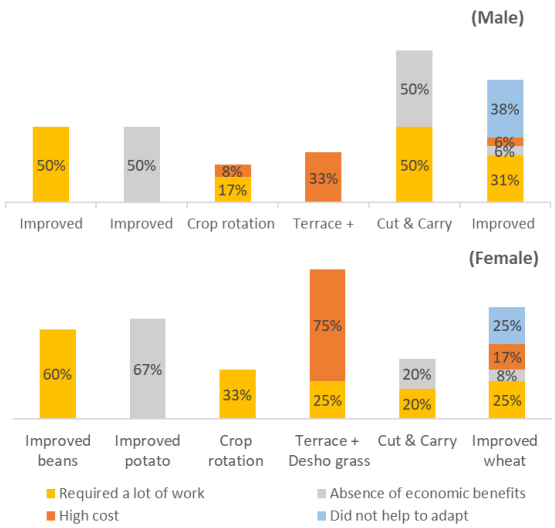

Figure 13. Practice specific dis-adoption drivers reported by male and female farmers.

What is the effect of adoption of CSA practices at the household level?

The participatory testing and evaluation of context-specific CSA practices has been at the core of the CCAFS Climate-Smart Village research for development (CSV AR4D) approach. It has been promoted as one of the elements of suitable technical interventions, that combined with CIS, capacity building and training, and access to financial services, can improve smallholders' farmers' abilities to cope and adapt to the negative impacts of climate variability and change.

Together with the testing of institutional options for dealing with climate change in agriculture, the CSV AR4D approach aims to gather evidence for scaling up and out appropriate options drawing lessons for policy makers from local to global levels.

The results of the 2019 monitoring showed that farmers had positive perceptions regarding the effects of CSA practices on improving yield, generating additional income, enhancing food access and diversity and climate resilience (Table 4).

Table 4. Farmers' perception of the outcomes of CSA practices on: improving yields, generating additional incomes, enhancing food access and diversity, capacity to respond to or recover from climate related shocks and labor time.

		Improved Yields	Additional Income	Food Access	Food Diversity	Resilience to climate shocks	Same/ Less labor
Hight adoption (>60%)	Controlled grazing	92%	92%	94%	89%	96%	67%
	Cut & Carry	91%	93%	94%	92%	95%	54%
	Terrace + Desho grass	95%	91%	92%	90%	98%	41%
	Agroforestry	82%	92%	92%	94%	83%	54%
Mid-adoption (25-65%)	Improved wheat	91%	97%	97%	96%	81%	74%
	Improved potato	96%	100%	98%	97%	77%	87%
	Crop rotation	95%	99%	100%	100%	95%	72%
	Residue incorporation	99%	93%	97%	90%	92%	96%
Low adoption (<10%)	Green Manure	98%	98%	98%	95%	100%	66%
	Improved beans	100%	94%	88%	94%	59%	60%
	Improved breeds	61%	100%	79%	71%	71%	81%

- In the case of the practices with high adoption rates (controlled grazing, cut and carry, terraces and agroforestry), the positive perceived effects on the CSA dimensions were above 90%: On average, 93% of the farmers reported enhancement in terms of climate resilience and food access, 92% reported that they generated additional income and around 90% improvements in food diversity and yields. For more than 50% of the farmers, these practices (except for terraces), did not entail additional labor time.

- For the practices with mid-adoption rates (improved wheat and potato, crop rotation and residue incorporation), the highest benefits perceived were the generation of additional income and improved food access (98%) followed by improved yields and food diversity (96%) and to a slightly lower extent, the reduction of vulnerability to climate shocks (86%). For more than 70% of the farmers, the implementation of those practices represented the same level or less labor time.

- Finally, the CSA practices with the lowest adoption rates (green manure, improved beans and improved livestock breeds) were associated in 97% of the cases with the generation of additional income. To a lesser extent, about 86% of the cases were associated with improved yield, food access and diversity and lastly with improving resilience to climate shocks (77%). For most of these practices, implementation was associated with less or the same level of labor time, except for improved beans by females (only 25%) and green manure by males (62%).

Overall, the results of this analysis suggest that enhancing adaptive capacity does support the adoption of CSA practices, as does the possibility to increase food access and generate additional income.

Gender effects linked to CSA implementation

Decision making on implementing the practices: Most male and female farmers (average 60%) agreed that they jointly decided on the implementation of the high and mid-adoption practices. They only disagreed about agroforestry and improved livestock breeds where around 50% of males reported that they decided alone but the female farmers mentioned that it was done jointly (about 50% and 78%, respectively).

Decision making on dis-adoption: All dis-adopting male and female farmers reported participation in the decision to stop implementing *cut and carry* and *improved potato*. Only female farmers were involved in the decision to dis-adopt *controlled grazing, agroforestry*, *improved wheat* and *crop rotation*, while 50% of male farmers reported being involved in the decision to stop implementing *terraces.*

Participation in CSA implementation: About 2/3 of male and female farmers reported equal contribution to the implementation of six of the practices: *controlled grazing, cut and carry, improved potato, crop rotation, residue incorporation and green manure.* In the case of *terraces, agroforestry* and *improved wheat*, the male farmers reported being the ones doing most of the work while female farmers reported an equal contribution.

Participation/control of income generated through CSA: The level of participation and/or control over income generated by the practices was consistently high (above 80% of male and female farmers). There were no gender differences in the participation and/or control over finances generated from *improved breeds and beans*, *improved wheat, cut and carry and terraces*. Male farmers reported slightly more access (99%) than female farmers (95%) to the incomes associated to agroforestry and female farmers reported slightly more than male farmers accessing/controlling resources generated from *controlled grazing*, *improved potato*, *crop rotation* and *crop residues incorporation* (on average 94% vs 90%).

Conclusion

The implementation of the CSA monitoring framework provides a useful snapshot of climate related challenges facing smallholder farmers in Doyogena district. The challenges associated with climate variability (heavy and irregular rains) account for 80% of their agricultural income losses and 60% of food insecurity. The results indicate that climate is the key driver of risk mitigation actions undertaken by both male and female-headed HH that consist of on-farm investments, access to credit, changing crop/pasture management practices and to a lesser extent changing crop types and crop varieties.

Also, 50% of the farmers that accessed seasonal forecasts, made use of the information to make changes in their farming systems. Due to learning and training, as well as to be better able to increase their adaptive capacity, 100% of male-headed and 82% of female-headed HH implemented CSA practices and reported that they systematically improved yields, income, food access/diversity as well as resilience to climate shocks. Knowing specific information on factors determining adoption/dis-adoption and gender-related gaps provides valuable information for tailoring the design of future interventions aiming at scaling CSA as a path toward improved and “climate proofed” livelihoods.

Further reading

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Osana Bonilla-Findji (o.bonilla@cgiar.org) *is Science Officer at the Climate-Smart Technologies and Practices Flagship of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) at the Alliance of Bioversity International and the International Center for Tropical Agriculture.*

Angelly Ortega (a.ortega@cgiar.org) *is Statistical Data Analyst at the Alliance of Bioversity International and the International Center for Tropical Agriculture*.

Anton Eitzinger (a.eitzinger@cgiar.org) *is Climate Change Scientist at the Alliance of Bioversity International and the International Center for Tropical Agriculture*.

John Recha (j.recha@cgiar.org) *is Scientist, Climate-Smart Agriculture and Policy at the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), East Africa.*

Gebermedihin Ambaw (g.ambaw@cgiar.org) *is Research Associate at the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), East Africa.*

Wuletawu Abera (w.abera@cgiar.org) *is Post-Doctoral Research at the Alliance of Bioversity International and the International Center for Tropical Agriculture.*

Lulseged Tamene (l.t.desta@cgiar.org) *is Senior Scientist at the Alliance of Bioversity International and the International Center for Tropical Agriculture.*

Getamesay Demeke (getu.demeke@interaide.org) *is Agricultural Program Coordinator at Inter Aide Ethiopia*.

Mesfin Desalegn (mesfindslgn@gmail.com) *is Project Officer at Inter Aide Ethiopia.*

Kindu Mekonnen (k.mekonnen@cgiar.org) *is Senior Scientist and Coordinator of Africa RISING at the International Livestock Research Institute*.

Maren Radeny (m.radeny@cgiar.org) *is Science Officer at the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), East Africa.*

Dawit Solomon (d.solomon@cgiar.org) *is Regional Program Leader at the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), East Africa.*

Peter Läderach (p.laderach@cgiar.org) *is Climate-Smart Technologies and Practices Flagship Leader of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) at the Alliance of Bioversity International and the International Center for Tropical Agriculture.*

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