

# Participatory Small-Scale Irrigation Development Program Phase II (PASIDP-II)

## Case Studies

### Farmers' Perspectives on Overcoming Production Challenges



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## Case study on Wheat production

The case study was conducted at the Shappa small-scale irrigation scheme, Hawora Kebele, in the West Badewacho district, Hadiya administrative zone, Southern Central Ethiopia. Agriculture is the main livelihood in the Shappa small-scale irrigation scheme and is one of the small-scale irrigation schemes that the PASIDP II of the Ministry of Agriculture established across the country. The scheme has benefited 227 households of smallholder farmers with a total of 118 hectares.

**The Situation:** Erratic rainfall in Shappa limited the land's production potential, with only one production season per year. Farmers depended on maize and teff production. Food insecurity and family conflict resulted in our migration to search for labor elsewhere. After the completion of the irrigation scheme in 2019, the situation development increased markedly. PASIDP II improved irrigation efficiency using farmer-friendly irrigation tools. The project aimed to minimize the risk of drought and erratic rainfall and to allow for two cropping seasons per year.

### Drivers of Change:

- Establishment of a Small-Scale Irrigation Scheme
- Climate variability, frequent and unpredicted drought occurrence
- Out-migration of labor women dependent farming
- Skill training through farmers' research groups and improved crop varieties
- Introduction of improved drought-resistant wheat variety

### Task and actions

ICRISAT implemented a project to scale improved wheat varieties for the community-managed small-scale irrigation scheme. Two farmer research and extension groups with 25 (21 male and four female household heads) were established to promote the technologies. In addition, agricultural experts, extension agents, and farmers' research group members were trained in site selection, land preparation, furrow construction, planting methods, fertilizer application and management, irrigation scheduling, and disease and pest control measures. ICRISAT, in collaboration with Areka Agricultural Research Center, provided certified wheat seed at a rate of 125kg/ha. Hadia Seed Quality Control and Assurance Authority conducted the quality control. At sowing, NPS was applied at 100 kg/ha, and 100 kg Urea/ha was applied at the beginning of

tillering. All partners, including the farmer's research group members, jointly monitored and evaluated the activity. Farmers' resistance to adopting wheat was high at the beginning of the project because they did not produce wheat until 2021. Through farmer's research groups, continuous discussion and awareness creation effectively overcame this obstacle.

## Results

Expanding cultivated areas, demonstrating improved irrigation tools, promoting high-yielding crop varieties, improved agronomy, water management, and plant protection practices increased agricultural production and productivity in the Shappa small-scale irrigation scheme.

### Mr. Abrham Petros

Mr. Abrham Petros, 35, and his wife, Mulunesh Baza, 34, have four sons and one daughter. He holds a diploma. Mr. Abrham is one of the farmers benefiting from the Shappa small-scale irrigation scheme.



The PASIDP II project provided him with best-fit technologies (improved wheat variety and irrigation tools), practical training, and on-farm technical support. In the 2023 irrigation season, he received 31 kg improved wheat seed, 25 kg NPS, and 25 kg Urea, covering 0.25 ha of land. He planted the Kingbird wheat variety. Abrham's farming methods have changed since he received training from the PASIDP II project through the farmer's research group. Two years ago, his family planted only local maize and teff. He defied traditional practices and

embraced the PASIDP II project's call to farmers to embrace new technologies, such as improved varieties, irrigation, and agronomic practices.

"I have been a farmer since 2000, but my life started transforming economically in 2022. So, I have made strides through improved irrigation and crop diversification since 2022. He understands

that the only way to counter these effects of rainfall variability and drought on crop production is to utilize modern irrigation technologies by moving away from one to two cropping seasons to ensure good production and income.

“I grow wheat on 0.25 ha of land. I made over 25,000-birr net income from the sale of wheat grain in one irrigation season only and 21,000-birr income from maize crops in the second cropping season on the same plot of land,” explains Abraham. Abraham adds, “I built a house of 26 corrugated iron sheets from the sales.” Today, Abraham, who is happily married with five grown-up children, considers his new status a miracle.



Before interacting with the PASIDP II project, he needed to gain knowledge or experience of improved agricultural technologies and practices. He says that, like his forefathers, he waited for rains, routinely planted teff, weeded, and harvested it. However, because of the PASIDP II project, Mr. Abrham's attitude toward irrigation agriculture has dramatically changed.

Mr. Abrham wants to continue improving the irrigation farming system in a contemporary situation where the loss in one rainfall cropping season can be substituted with the irrigation cropping season. He has good contact with extension workers and researchers to exchange information, new skills, and knowledge. According to him, two cropping seasons annually generate more income for farmers. He says improved irrigation farming gives him self-confidence and a considerable income to run his family and maintain a comfortable living standard. He is confident that if he has access to farming machines (small tractors), he can considerably increase his farm area and production, productivity, and income. Abrham's profits have risen from 10,000.00 birr to 46,000 birr for one year and from none to 25,000 birr for one irrigation season of wheat production.

Diversifying agricultural production improves production and diversifies products by integrating livestock with crop production. Thus, the family could benefit from improved nutrition, a sure way of income generation and risk management.

### Benefits:

- The family job opportunity has been improved.
- The farmers ensured the land productivity/crop yield/ improvement.
- Household income and food improved.
- Feed supply for animals increased during the dry season.
- Experience in transitioning to improved agricultural practices
- Confidence in planning and implementing irrigation agriculture with crop schedule.

### Mr. Yonas Feltamo

Thirty-eight-year-old Yonas Feltamo and his wife Amarech Lema, 37, are members of the Shappa small-scale irrigation scheme water user association. They understand that the only way to counter food and feed shortages and unemployment is to utilize modern irrigation technologies by shifting from one to two cropping seasons to ensure increased crop production and income. So, they have made strides forward through irrigation farming and crop diversification since 2021.



He owns 0.25 hectares of land, and he also owns 0.3 hectares of rental land for both dryland and irrigation agriculture. He received 62 kg of improved Kingbird wheat seed, 50 kg NPS, and 50 kg Urea, which covered 0.5 ha of land. He planted the kingbird wheat variety with his family in their irrigation land. Yonas' farming method has changed since he received training from the PASIDP II project through the farmer's research group.

### Results

The primary purpose of the PASIDP II project is to disseminate timely information to farmers and test, introduce, and demonstrate best-fit technologies, hence improving crop productivity and income of the farming community. Farming

is Mr. Yonas's main livelihood. He has been a farmer since 1999, but his life transformed economically in early 2022. Many years ago, Mr. Yonas could not get enough food to eat and suffered great hardship. Mr. Yonas faced many challenges in his farming when remembering his journey. He earned only 150 birr per month.

After shifting from dry-land agriculture to irrigation agriculture, he started thinking of producing more food for the market. He started growing an improved wheat variety using improved irrigation agronomic practices under the technical guidance of ICRISAT in collaboration with MoA-PASIDP II and the Areka agricultural research center. The reasons for focusing on improved wheat production are the emergence of risks such as low crop production, unemployment during the dry period, and malnutrition. Considering all these factors, Mr. Yonas managed to get a good yield from the Kingbird Wheat variety with proper management practices at the right time.

By switching to an improved wheat variety, Mr. Yonas could dramatically increase his yields and livelihoods. “PASIDP II also empowers our farmers by shifting from subsistence to commercial-minded farmers and training farmers in aspects that will equip them to operate and maintain their irrigation schemes sustainably and connect them to partners that will help them grow to a higher level. For instance, institutions that can help them form cooperatives for better marketing of their produce,” he explains. Therefore, Yona's farming methods have changed since he received training from the PASIDP II project through the farmers’ research group.

“I grow wheat; we made over 35,000 birr net income from the sale of wheat grain in the last irrigation season and also 85,000 birrs from the sales of haricot bean and vegetables on the second cropping,” explains Yonas. Yonas adds: “from my small plot of land, I bought a plowing ox and managed to build a house, buy a motorbike and livestock, and improve my children’s welfare from the sales of farm surplus products, I have fed my family three times meals per day with improved nutrition and avoiding exposure to malnutrition.”

Yonas's profits increased from 15,000 birr to 120,000 birr for one year. Therefore, in 2023, Yonas purchased construction materials to build a better house with 62 corrugated iron sheets. He also saves money for his children’s future by sending them to college.



Yonas adds, “My family graduated from being food insecure to having extra food, and now I am not just a subsistence farmer but a surplus producer.” His family planted only low-productive maize and teff two years ago to lead their subsistence life. At the time of the study, the revenue was just enough to pay for his family’s daily needs.

Today, Yonas and his wife, Ms. Amarech Lema, with their five grown-up children, consider their new status of life a miracle. These changes came because “ICRISAT, in collaboration with Areka Agricultural Research Center, trained me and others and then distributed high quality improved wheat and fruit seedlings,” he recalls.

### **Case study on nutrition intervention**

This project aimed to improve food security and nutrition among smallholders and poor rural farmers through interventions that can improve the supply and demand for this valuable food source. Vitamin A deficiency is a crucial contributor to child malnutrition; it limits growth, weakens immunity, affects eyesight, and increases mortality. Food biofortification is an appropriate solution to improve nutrition and health in southern Ethiopia. Therefore, eight demonstration and multiplication sites were set up by disseminating planting material (vines of Orange Flesh Sweet Potato) with awareness and technical support.

### **W/ro Ofayise Geta**

W/ro Ofayise Geta, 35, is from Chana village of Mancha small-scale irrigation scheme in the Offa district of Wolayta zone in the southern part of Ethiopia. She owns 2.5 hectares (0.5ha irrigable and 2ha non irrigable) of land and used to grow chickpeas, maize, coffee, and bananas for household consumption. She is a hard worker who was self-motivated to take up a new initiative for profitable agriculture.



**The Drivers:** “The main reasons for changing her lifestyle and decisions to work hard were poor land productivity, reliance on the market for home use, health problems (malaria), drought, low yield, and

insufficient food for the family. Moreover, chickpeas and maize were the only two significant crops before the intervention.” She replays.

**Approach:** The Farmers' Research Extension Group-based approach, which includes researchers, agricultural extensionists (development agents and other subject matter specialists), and quality control institutes, focuses on the recently introduced orange-fleshed sweet potato (OFSP) with improved agronomic practices.

She recalls, "The PASIDP project trained me and other neighbors and distributed high-quality, improved, orange-fleshed sweet potato vines."

**Result:** She earns 150–200 birr monthly from her garden, which she uses to provide for the home's needs without shortage. Thus, she has a solid plan to grow the business; the only obstacle is the lack of pesticides at a reasonable price in the surrounding market. "I can eat three times a day with better nutrition and support sustainable agriculture," she reiterated.





## Benefits

- Gardening can increase women's agricultural income; for example, a woman's income has risen from zero to 200 Birr monthly.
- Both women and men trained in nutrition and food cooking system.
- Improved household's food and nutrition status since the OFSP has Beta Carotene, which should be consumed up to three diets per day—as a result, it improves the health and function of the household, which can reduce the incidence of different illnesses, including malaria.
- Reduces the cost of household consumption.
- Reduces the cost of production and transportation to the market.
- Minimizes wastage of time and labor associated with marketing.
- Ensures a sustainable supply of nutrient-dense, fresh food.

The changes result from training on gender equality, experience-sharing visits, and food system reform. The mixed farming system that grows bananas, coffee, wheat, maize, tomatoes, and OFSP on her parcels of land has astonished her. She explains that "bananas and coffee can bear fruits three years after planting, but the OFSP can give tubers within 4-5 months after planting." Thus, she said, "I intend to share my experience and knowledge in OFSP gardening in addition to earning money." She remarks that changing five-follower farmers to adopt my improved farming practice will make them reasonably practical.

## Case study on the intervention livestock feed production

In Tebisa and Segele kebeles, feed shortages were a critical problem, especially during the year's dry season, and it took a lot of work to minimize feed strategies until 2019. The rain usually starts late and ends too early. Burka's small-scale irrigation scheme is located at Tebisa and Segele Kebele, Tehuledere district of the Amhara regional state. The construction of the irrigation scheme was started in March 2017 and has been operational since January 2019. Siltation has significantly reduced the irrigation potential. 118 (Male: 94 & Female: 24) farm households are organized for crop cultivation in the Burqa irrigation scheme. This has improved farmers' access to a secure irrigation production system.



Figure 1. Endris Farm before the intervention

Despite the considerable role of livestock in livelihoods and sustainable crop production systems, the need for more livestock feed has caused low productivity and a decline in the livestock population. In association with the introduction of small-scale irrigation techniques, smallholder farmers could not allow their livestock to graze freely during the dry season. Hence, many farmers reduced the number of their livestock. ICRISAT and Sirinka Agricultural Research Center (SARC) collaborated to design and demonstrate proper integration of appropriate irrigated fodder grasses and legumes in participatory processes at the Burka small-scale irrigation scheme. Therefore, the introduction and demonstrations of fodder followed three different modalities: 1) Growing legume fodder around the primary and secondary canals, 2) growing legumes and grasses at farm boundaries, and 3) growing grass and legume fodder in mixed intercropping with irrigated vegetables and around the home gardens.

**Farmer Mr. Endries Yimam** is from Burka, a small-scale irrigation scheme in the Tehuledere district in the Amhara regional state of Ethiopia. He is 43, and his wife, Zeneba Ibrahim, is 40. They have three children. Their livelihood relies on agriculture, but low and erratic rainfall negatively impacts their capacity to produce crops and raise livestock. He says, “We have erratic rainfall during the main farming season, and the construction of the small-scale irrigation scheme by PASIDP II is a great opportunity to increase livelihoods.”

He is one of the participants in promoting forage production activity. He planted forage species, especially Elephant grass and pigeon pea, on the canal's edges and around the fence, and he says now. These promoted fodder technologies became a means of livelihood /sources of income/ - he harvested grass on a canal area of 0.5 m width and 150 m length to get 3,135 Birr cut, which means he got 18,810 Birr per year from marginal land/edges of the canal/. In addition to elephant grass,

he used pigeon peas for animal feed, human food, and pigeon pea seed for a cash income; where during the study period, he sold 1kg of pigeon peas for 75 birr when teff was sold at 60 birr/kg. Endries says forage development changes the environment, and he now prays on his farm rather than at home. Endries Yimam is also now planting forages for ox fattening.



Figure 2. Endris Farm after intervention

**Technology expansion:** The technology promotion started through extension training and demonstration approach, and the planting materials were supplied with the participation of 16 farmers during the survey, and the number of farmers increased to 47.

### Further information

The PASIDP II Project has produced this success story: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

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