WATER COLLECTIVES FOR AGROECOLOGICAL TRANSFORMATION

A Case Study of Pedgaruvu Tribal Village in ASR District, Andhra Pradesh

Pedagaruvu, a tribal hamlet in Kotnapalli Gram Panchayat of Hukumpeta Mandal, Alluri Seetharamaraju District, is home to 74 Tribal families. Agriculture is the primary source of livelihood of these tribal families, supplemented by wage income from MGNREGS and others. The village has 200 acres of rainfed land, primarily supporting Kharif crops such as Groundnut, Korra-sama (a short-duration variety of Little Millet), Turmeric, Ginger, Pippali (Piper longum), Ragi, and Paddy. Desi varieties of annual crops of Turmeric and Pippali are commonly cultivated in about 20% of area, specifically in plots that offer shade and retain moisture for extended periods.

The remaining 80% of the land i.e. approximately 160 acres, is left fallow from January to April after the kharif harvest season.

Lack of irrigation for rabi season and the practice of leaving livestock for open grazing post kharif harvest, are the twin reasons for poor rabi cultivation.

After the Kharif harvest, many families engage in construction work in the area as wage labour; a few of them with skills, work as masons. For lack of employment post-kharif, the village youth often migrate from January to May in search of alternative work opportunities. Eight landless families in the village sustain themselves by rearing goats as an additional livelihood to wage work.

CROPPING PATTERN IN THE PEDAGARUVU VILLAGE

About 20% of the area cultivate long duration (18 months) crops of Turmeric and Pippali. Rest of the area has a variety of crop mixes – groundnut, little millet, finger millet, pigeon pea, cow pea, maize, and vegetables such as raddish, beans, bendi and pumpkin.These plots are left fallow after kharif harvest i.e by December. Korra-sama, a local variety of short duration Little millet is sown in April with first rains; and a second crop (Rajma, Niger, Horsegram) is taken in these plots in September. The kharif crops being rain-dependent also are vulnerable to periodic dry-spells.

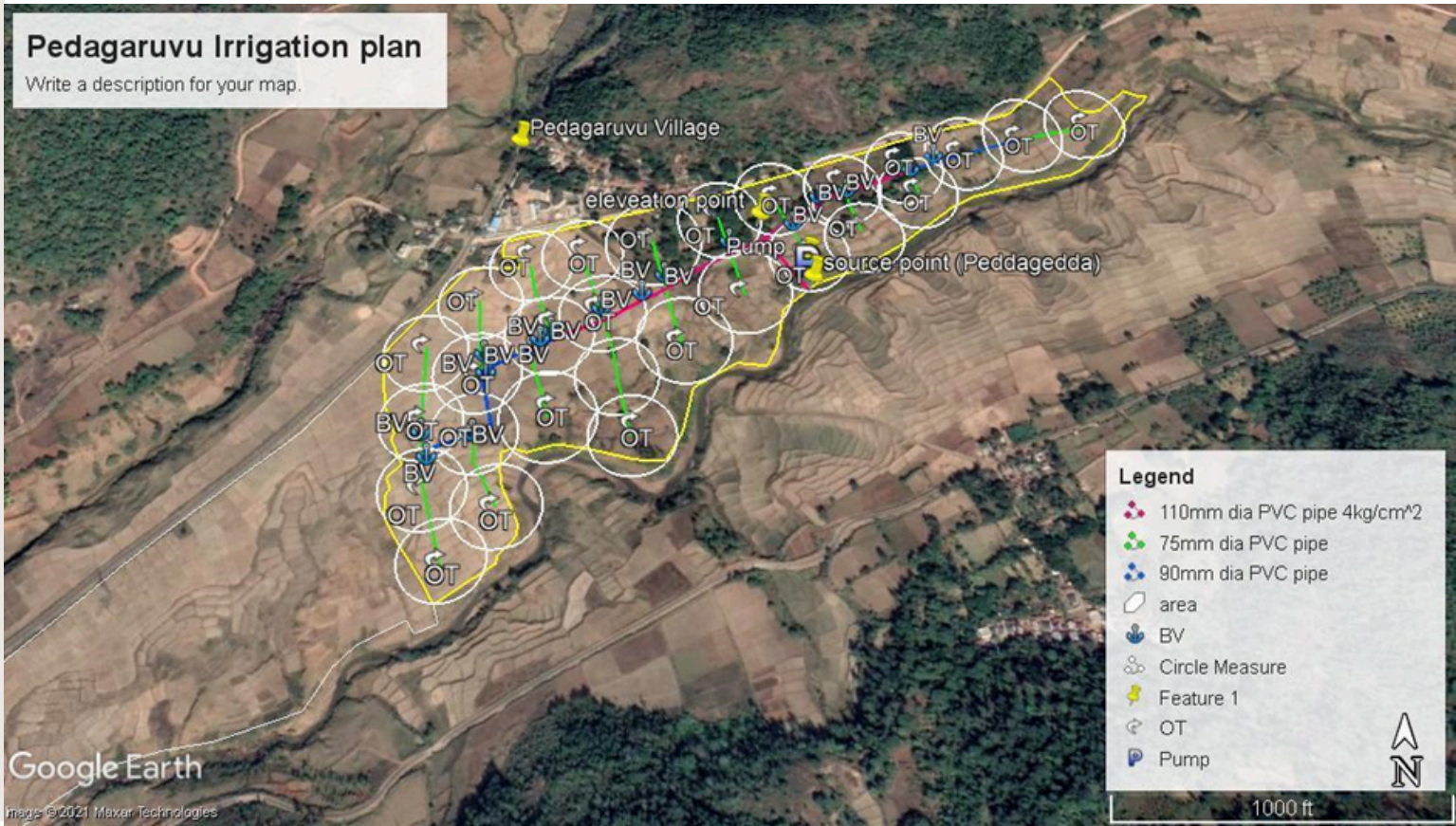
WATER RESOURCES

Peddavadugur village is in a high rainfall zone with annual rainfall of 1500 mm. The village has a perennial stream, locally known as Pedda Gadda, flowing below the rainfed lands at a depth of 15 meters. Absence of three-phase electricity in the village restricts the use of electric pump sets for irrigation. While a few farmers attempted to utilize diesel engines to draw water, the high cost of fuel made this approach unsustainable.

Consequently, over 80% of the agricultural land remained unused from January to May, leaving the people dependent on single crop and look for alternative employment for rest of the seasons.

EVOLUTION OF THE WATER COLLECTIVES

Participatory planning exercises were conducted with farmers to explore solutions for securing crops during the kharif season and extending access to water for irrigation for the 2nd crop – upto April-May. An ePRA exercise using Google Earth Maps and transect walks with farmers helped in identifying a suitable water source point in the steam and lands were mapped for potential irrigation. The technical team prepared the design and estimate of Solar Lift Irrigation Facility to cover 39 acres of rainfed land through a grid of pipelines. The design includes a 10 KV solar panels with a pump to lift water to uplands and distribute through an underground pipeline network. Using Google Earth mapping, farmers identified and marked the outlets for irrigation. In the proposed block, 22 farmers with 39 acres of land collectively agreed to invest in the solar equipment.



Series of meetings resulted in formulation of the charter the 'Water Collective'. Farmers in the Collective shared 20% of the total cost estimated at Rs.13 lakhs; taken responsibility of all the labour – including getting the pipelines/ solar equipment to the site, complete earth work related to laying out the pipelines estimated at Rs.1.20 lakhs (9%). In 2020, the COVID pandemic left youth without jobs and cash resources, making it challenging to invest in the proposed project. The community pooled 0.72Lakhs and they also took a loan of Rs.0.85 lakhs from the Gurrampanuku BRC Enterprise, a subgroup of the KODIKI FPO for their cost sharing; they have repaid this amount over two harvests. Azim Premji Foundation supported rest of the project cost as a part of the COVID relief program implemented by WASSAN.

To manage the water sharing system, two farmers, Korra Shyamsundar and Killo Krishna, were entrusted with responsibilities like overseeing water distribution, motor operation, maintenance tasks, and organizing panel cleaning and fencing activities. These roles will rotate annually, with new farmers taking charge each year.

All the farmers enrolled as members of Kodiki FPO and are part of their collective marketing of vegetables. More importantly, an agreement was made among the farmers to adopt Natural Farming practices and collaborate on collective marketing efforts. They also agreed for controlled grazing to enable post-kharif cultivation.

The Conception of WASSAN's 'Water Collectives'

Water Collective is a system that promotes collective development, sharing and responsible management of water resources through strong governance and mutual cooperation. The process makes water accessed a 'common property resource' for the collective of farmers vesting its sustainable, efficient and equitable management a responsibility of the collective.

Moving further, WASSAN evolved the concept to include farmers' collective resolve to move towards agroecological/ natural farming practices (soil health improvement, crop systems intensification and diversification, usage of local bio-inputs), binding agreements on controlled grazing and membership into a farmers' collective (FPO).

This can be effectively achieved through a community led planning process, crop water budgeting, and a gradual transition towards Natural Farming practices, supported by well-established institutional and technical support systems and investments. In such a framework, access to **'Water will be a game changer!**

Together, these efforts help ensure sustainable water use, improved crop productivity, and strengthened community cohesion charting sustainable development pathways.

NATURAL FARMING / SHIFT TO AGROECOLOGY

Agroecological intensification requires having crop cover across the year. Traditionally, farmers in the area release their animals for grazing after harvesting Kharif crops, typically around the Sankranti festival. This has become a major hurdle for crop intensification. The Collective established norms to regulate grazing and brought into practice.

In 2022, nine farmers owning 80 cattle renovated their cattle sheds, adding floor lining to facilitate the collection of cow urine. With a steady supply of cow urine assured in the village, a **Bio-input Resource Centre (BRC)** was established in October 2022 to support Natural Farming practices.

Korra Chakrapani manages the BRC unit. He has entered into a Memorandum of Understanding (MoU) with 22 farmers for the supply of Jeevamruth, sold at ₹3 per litre. The requirement for Natural Farming (NF) inputs was assessed based on the crop systems practiced by farmers in the village during both Kharif and Rabi seasons. Demand for bio-inputs such as Neemastra, Tutikada Kashayam, Dasaparni Kashayam, Agnastra, Brahmastra and neem cake is higher in the rabi season. Most farmers preferred to pay in grains after harvest instead of cash, fostering a barter system within the community.

Among the 22 farmers, Korra Navgana Murthy emerged as a pivotal figure, organizing monthly meetings to streamline Natural Farming practices as a Community Resource Person. These sessions focus on assessing the situation of the crops and identifying the needs, ensuring timely availability of bio-inputs for pest and disease management, and managing the rental of farm tools from the Custom Hiring Centre established. His proactive coordination has played a significant role in the efficient operation of the Bio-input Resource Centre (BRC) and related farming initiatives in the village.

Livestock farmers also benefited from improved fodder availability. Cattle farmers planted Napier grass on field bunds, ensuring a steady supply of green fodder. Three farmers extended this initiative by supplying planting materials to others villages. Similarly, eight goat farmers planted Sesbania fodder trees on their homesteads and field bunds to secure green fodder for young goats. Two women farmers Buridi Kamsula and Korra Puspavathi were established two Desi Poultry Breeding Farm Enterprises. These efforts underscore the community's collective push toward sustainable farming and livestock management practices. Controlled grazing agreed upon by all has opened up these possibilities of land use. This shift significantly enhanced agricultural productivity and contributed to better utilization of the land.

IMPROVING SOIL HEALTH FOR IMPROVING IRRIGATION EFFICIENCY

In May 2025, a total of 20 farmers implemented Pre-monsoon Dry Sowing (PMDS) practices across 20 acres of land. They cultivated a diverse set of 12 seed varieties, including cereals, pulses, leafy vegetables, and oilseeds. Based on crop cutting experiments, the estimated average biomass production was 4.5 tons per acre. The PMDS fields recorded significantly better germination. Farmers also provided critical irrigation during May and June to support the crop growth. The biomass generated was mulched back into the soil, enhancing soil fertility and moisture retention, and subsequently contributed to improved land preparation for the Kharif season crops.

WATER COLLECTIVE IN THE GROWTH PATHWAYS

Water Collective farmers have planted a total of 500 banana plants along their farm bunds. The crop growth has been excellent, and farmers have begun earning an additional seasonal income of ₹3500 to ₹6,000 through the sale of bananas, 13 famers collectively earned a total of Rs.65980 through sales of Banana in the month of Jan 2025.

Individual success stories further highlight the impact of these initiatives. Korra Navgan Murthy cultivated vegetables such as tomatoes, radish, beans, maize, and finger millet in a polycrop system on 30 cents of land, earning a gross income of ₹30,000. Bajja Rajarao utilized 20 cents of land to grow cabbage, tomatoes, radishes, and sweet corn, earning ₹35,000, with sweet corn fetching particularly good market prices. On average, each farmer in the collective earned an additional ₹15,000 to ₹35,000 through the water collective system, besides household consumption of chemical free and nutritive food.

Data collected and analysed from a sample of 20 water collective farmers showed significant incomes. Tomato, radish, beans, sweet potato, maize, cabbage, coriander, groundnut, and onions were cultivated in various combinations in the Collective. The 20 farmers cultivating a total of 13.4 acres for vegetable cultivation collectively earned ₹4.12 lakh gross income, with an average income of ₹30,743 per acre (during January to April 2025). During the Rabi season, farmers allocated between 0.3 to 1.3 acres each for vegetable cultivation, as per the availability of family labour.

WATER COLLECTIVE FARMERS-KHARIF INCOME DETAILS IN 2025

Twenty-two Water Collective farmers cultivated Ginger under the polycrop system in 14.45 acres and Turmeric in 6.4 acres during Kharif 2025; adopted line sowing method for Paddy in 12.7 acres and finger millet in 'Guli-ragi' method (a combination of SRI + Natural farming + Guli method) in 0.4 acres. Together, the farmers earned a total income of ₹14.27 lakh from both main crops and intercrops. This income is expected to increase further, as Turmeric had not yet been harvested at the time of data consolidation.

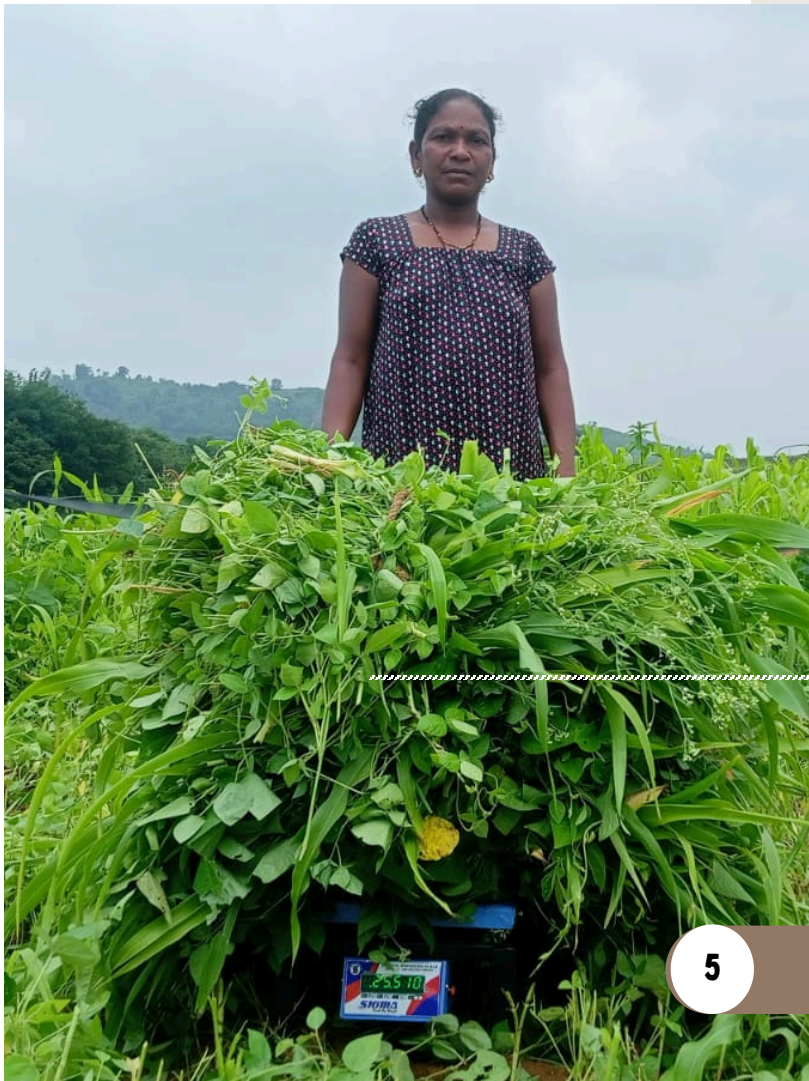


TABLE: FARMERS' INCOME IN THE WATER COLLECTIVE IN KHARIF 2025

Crop System	Total area-acres in acres	Income from main crop	Income from inter crops	Net income
Ginger under Poly crop systems	14.45	1492800	108375	1153335
Guli Ragi	0.4	16000	1250	15330
Paddy Line sowing with Bund crops	12.7	275000	Banana yet to harvest	242000
Turmeric under poly crop systems	6.4	Turmeric yet to harvest	16950	16950
GRAND TOTAL	**33.95**	**1783800**	**126575**	**1427615**

Crop systems intensification and diversification supported by natural farming practices and access to water when needed, helped the Water Collective to achieve such incomes. The aggregate net income realised in one season in the collective surpassed the total investment on the water collective infrastructure of Rs.13.00 lakhs; that includes community contribution.

SCALING UP PATHWAYS

Water Collective systems show great promise in high rainfall tribal areas with perennial streams flowing and lands fallow! These can be effectively scaled up through systematic and strategic investments.

Since 2022, several farmers from within the district and outside states like Assam and Meghalaya visited the village as part of the APCNF exposure program. These visits provided an opportunity for them to engage with the Water Collective and learn about their experiences with multi-cropping systems, agroecology, and the promotion of natural farming practices.

In October 2024, **Mr. Dinesh Kumar**, IAS, Collector of ASR District, visited the village and interacted with water collective farmers. He expressed admiration for their efforts in reclaiming rabi fallows and promoting natural farming practices. Encouraged by their progress, the Collector pledged support for collective organic vegetable marketing and requested WASSAN to propose innovative solutions to further benefit tribal farmers.

WASSAN has developed a cadre of 30 community resource persons, known as Jalamitras, in the district. They are trained to assess local water resources and evaluate their potential for reviving water infrastructure and establish Water Collectives. These Jalamitras are closely linked with their respective Gram Panchayats and actively support local Community-Based Organizations (CBOs) and Civil Society Organizations (CSOs) in planning and implementing water-related initiatives. Water resources assessment was taken up in 108 villages in the ASR district by the Jalmitras delineating the potential for scaling up Water Collectives. About eight such Water Collectives were already taken up for implementation under different programs. These experiences were shared with the District Administration and the potential for a district level program is being discussed.

CONCLUSION

Water collectives using renewable energy, year long crop cover, enhancement of soil health and using organic inputs, as the case study shows charts out a sustainable, community centric pathway for development of tribal areas.

Facilitation to form the collective and set out norms of collective water management, controlled grazing and crop systems diversification with natural farming; technical support in accessing the technology, community ownership and investment support are the critical elements for achieving the results. With appropriate financial mechanisms and institutional support, the Water Collective model can significantly enhance irrigation access, agricultural productivity and overall livelihood security for tribal communities.

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