

# Climate Resilient Cultivation for Sustainable Livelihood Practices ensured with collaborative hands of Government and NGO Partnership

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## **Abstract**

Climate resilient cultivation (CRC) integrates an adaptive intervention to mitigate climate variability and extremes with secure livelihood patterns. This paper tries to cover such practices at the grassroots level to enhance productivity through GO NGO participation. Drought-tolerant crop varieties, soil health management, water use efficiency, agroforestry, and diversified farming systems that enhance resilience. The paper examines the role of indigenous knowledge, digital agro-advisories, and community institutions in reducing the vulnerability of smallholder farmers. Evidence shows such practices improve yield stability, livelihoods, and ecosystem services while lowering greenhouse gas emissions.

**Keywords:** Climate Resilient Cultivation, food security, Indigenous knowledge

## **Introduction:**

Agriculture today faces unprecedented stress from climate change. Rising temperatures, erratic rainfall, prolonged droughts, flash floods, and shifting pest disease patterns directly threaten crop yields, soil health, and farmer livelihoods in the western part of Odisha, India. Smallholders and rain fed farmers are the most vulnerable, as they depend heavily on weather and have limited adaptive capacity. Climate resilient cultivation is a technology that farmers can adopt to mitigate and adapt to changing climate, enhance plant productivity, increase food security and resilience in farm profitability (Adimassu et al. 2025).

## **Review of Literature:**

Low and erratic rainfall has been recently noted by smallholder farmers, and this contributed immensely towards food insecurity (Mutengwa et al. 2023; Paul Jr et al. 2023). In many countries they are shifting from traditional farming methods to new technologies that have a potential to increase food systems. New farming systems that farmers can adopt must be climate resilient agriculture (CRA) that mitigate and adapt to extreme climate change so that communal farming can be improved (Abou Hadid 2025; Adimassu et al. 2025), Soil fertility has also been affected due to climate change, because heavy storms received in dry regions due to high temperatures cause surface runoff and soil erosion that washes away topsoil and exposes sub soils that are nutrient deficient (Guo et al. 2024; Mesele et al. 2025). There is a need to adopt CRA technologies that induce resilience in agriculture and promote crop productivity as well as food security, especially in dry regions that receive low and erratic rainfall (Azadi et al. 2021; Victory et al. 2022; Bo et al. 2023; Zhao et al. 2023; Hussain et al. 2025).

## **Major Objective:**

- To document the impact of climate resilient efforts taken up through GO NGO and Community partnership.

**Theoretical framework and methodology:**

A holistic framework for Climate resilient cultivation approach was the base of the study. It integrates smart agricultural practices adaptive to the climate. The study is the result of an impact evaluation study of the project areas of ADARSA, a Non-Government Organization working in collaboration with government, funding agencies and community participation in the districts of Sambalpur and Bargarh. Both primary and secondary data collected and compiled for the report.

**Discussion:**

In recent years, climate-resilient cultivation has emerged as a crucial strategy of the organization, ADARSA for safeguarding agricultural productivity in the face of unpredictable weather patterns. Farmers are increasingly shifting towards crops that can withstand droughts, floods, and other extreme conditions, while adopting innovative practices like rainwater harvesting and soil conservation. This shift is not just about protecting yields; it’s about securing livelihoods and food supplies for future generations. By blending traditional knowledge with modern technology, climate-resilient cultivation fosters a more sustainable relationship with the environment, ensuring that communities remain resilient amidst the growing challenges of climate change. Let us have a look at the key initiative during the year:

ADARSA is spreading the system of Millet intensification to ensure nutritional food security of the small and marginal farmers in rain fed areas of Bargarh and Sambalpur District with support of Millet Mission and collaboration of Govt.of Odisha. 1200 farmers adopting **system of millet intensification** in 1000 hectares of land have got average production of 2.5 quintal per acre. The awareness campaigns and food festivals have contributed to increase household consumption of millets. 150 farmers have marketed --- quintal of surplus millets with average price of 25000per ton.

A large portion of land remains fallow after the kharif season due to lack of irrigation, lack of soil moisture for winter crops and socio-economic problems like open grazing. With a rain fed rice-based mono-cropping system, small & marginal farmers are forced to dwell in the vicious circle of poverty. However, the residual moisture left in the soil at the time of rice harvest is often sufficient to raise short duration crops like pulses and oilseeds which can augment the availability for household consumption and enhance farmers’ income. Besides, pulses being leguminous crops will also help restore soil health through nitrogenfixati on. ADARSA with support of ORISSA FOUNDATION Government of Odisha, Department of Agriculture and Farmers’ Empowerment has promoted pulses (chick pea and black gram) in 5000 hectares to catalyse the **intensification of rice fallows** during Rabi 2023-24. The farmers were provided quality seeds, trainings and handholding support to adopt better package of practices. Crop cuttings and field days were organised involving agriculture department officials and technical team of ORISSA FOUNDATION to disseminate the results among farmers. The farmers harvested an average of 5.8 quintals/ha of chick pea and 7.2 quintals/ha of black gram which could be used for household consumption and farmers have also earned additional income.



Village	383
Gen	081
Block	6
Area	30000
	HA

**OBJECTIVE**

1. Increased Crop Yields and Productivity
2. Increase of Income to the Farmers
3. Sustainable Farm of Management
4. Increased Employment Opportunities

ADARSA Sambalpur **promoting pulses** for the small and marginal farmers through quality seeds and better cropping practices. 12500 farmers of 334 villages have adopted Arhar in 2500 hectares in Sambalpur and Sundargarh District and got average yield of 7 qtl/per ha (almost 35% increase) with support of ICARDA through cluster demonstrations and varietal trials using modern technology. The farmers have harvested average of 5.8 qnt/ha which fetched additional income during lean season. The targeted households have started consumption of Arhar and selling the surplus for additional income.

**Achievements of Arhar :-**

District	No of Village	Blocks	Farmers	Area In Ha.
SAMBALPUR	156	8	5000	1000
SUNDARGARH	178	10	7500	1500



**Organic agriculture** is promoted by ADARSA for improving the livelihoods of the small and marginal farmers that are especially vulnerable to the adverse effects of climate change. However as organic manures are getting scarce and the knowledge of organic ways of pest and nutrient management are losing ground, ADARSA has developed 64 women organic entrepreneurs who prepare and sell different organic products like pot manure, vermi compost, jibamruta which not only fetches an additional income, but also reduces chemical farming practices.

THE CROP CAFETERIA PROGRAMME OF IRRI CONDUCTED BY ADARSA IN THE BLOCK OF MAJESWAR.



The **watershed project** initiated by ADARSA, with the support of NABARD (National Bank for Agriculture and Rural Development), in Tampargarh village of Jujumura block, Sambalpur district covering other two villages e.i. Beheramal and Laida, 273 families and 283 HA of land aims to address the critical challenges of water resource management, agricultural sustainability, and rural livelihood enhancement. The project recognizes the importance of watersheds as vital ecological units that play a crucial role in water conservation, soil health, and overall ecosystem balance.

Key Activities in this initiative includes:

- Watershed Development
- Infrastructure Implementation
- Capacity Building and Training
- Livelihood Diversification

### Concluding Remarks:

Changes in the climate minimize chances of better food systems and resilience in agriculture. To mitigate the effects of climate change, farmers can adopt practices such as water management, soil conservation, agro forestry, and drought-tolerant crops to boost food systems and resilience in agriculture. The interventions in the western part of Odisha with Go NGO partnership show a new hope for climate resilient sustainable agricultural practices ensuring socio economic empowerment and environment protection with peoples participation. The visible outcome can be as follows:

- Improved Water Availability
- Sustainable Livelihoods ensured
- Environmental Conservation practices adapted
- Community Empowerment towards holistic development is on the process

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