

Utilizing Paddy Field Bunds for Redgram Cultivation: A Sustainable Approach for Additional Income Generation.

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Abstract

Paddy field bunds, typically underutilized, hold potential for enhancing farm income through the cultivation of short-duration, drought-tolerant crops such as redgram (*Cajanus cajan*). This review paper examines the viability, benefits, agronomic practices, and challenges associated with redgram cultivation on paddy bunds. Emphasis is placed on economic returns, soil health improvement, and integrated farming system benefits. Findings from various agro-climatic zones in India support the use of bund spaces for pulse cultivation, offering an eco-friendly and low-investment income opportunity for small and marginal farmers.

Introduction

Paddy field bunds, typically underutilized, hold potential for enhancing farm income through the cultivation of short-duration, drought-tolerant crops such as redgram (*Cajanus cajan*). Agricultural diversification and integrated land use are essential to enhance rural incomes, particularly for smallholder farmers. In regions dominated by rice cultivation, paddy bunds remain a significantly underutilized resource. Recent innovations in crop intensification have identified these spaces as suitable for leguminous crops such as redgram. This practice not only generates additional income but also contributes to soil fertility and food security.

The rice production in India has gone up almost consistently over the past years and here are the top 10 rice-producing states in India according to the government of India data. The area harvested for milled rice in 2024/25 was about 47.8 million hectares, up from 47.0 million hectares in 2023/24. India remains the world's second-largest producer and its largest exporter of rice, with cultivation primarily during the kharif (monsoon) season, but also during rabi and summer in regions with good irrigation. Owing to the large rice production area of the country, preferential soil, and climate conditions, India is the largest rice producing country in the world after China. Rice contributes more

than 40 per cent of the country's total food grain production. According to the data released by the government of India, the total rice production in India stands at 104.32 million for the year 2015-2016.

Importance of Redgram

Redgram (*Cajanus cajan*), commonly known as pigeonpea, is a major pulse crop grown in India. It is rich in protein (about 20-22%) and essential amino acids. It is drought-tolerant, requires minimal inputs, and is relatively pest-resistant, making it suitable for marginal environments like bunds.

Key Features

- Deep taproot system helps in drought resistance
- Nitrogen-fixing capability improves soil fertility
- Compatibility with rice ecosystem timing

Agronomic Practices for Bund Cultivation

- Variety Selection: Short-duration and compact varieties (e.g., ICPL 88039, Maruti) are ideal.
- Planting Time: Sowing can be done immediately after paddy transplanting or simultaneously, depending on water management.
- Spacing: 30–50 cm between plants on bunds
- Fertilizer: Minimal, mainly basal dose of FYM; biofertilizers (Rhizobium) are recommended
- Pest/Disease Management: Need-based sprays; pod borer is the main concern
- Irrigation: Rainfed or minimal supplemental irrigation

Economic Viability and Benefits

According to Indian statistical standards, when pulse crops are grown on paddy bunds, each bund-acre counts as 0.25 acres of pulse cultivation. Despite the small area, it's a high-value use of otherwise idle space. If we consider total paddy bunds of 47 million hectares of paddy area grown in India, we can imagine in millions of acres of rice bunds can be cultivated for pulses especially red gram as it is deep rooted.

Yield Estimates: Redgram on bunds yields 150–300 g per plant depending on variety and management.

Income Potential

On a 1-acre paddy field, bund cultivation can yield 10–15 kg of redgram, translating to ₹700–₹1,200 as additional income per acre (at ₹70–₹80/kg farmgate price). While modest per acre, this gain is significant when scaled across larger areas or combined with other bund crops.

Other Benefits

- Fodder from redgram haulms
- Additional bee flora from redgram flowers
- Soil conservation through root structure
- Enhanced cropping intensity
- Enhanced Soil fertility

Case Studies and Field Evidence

Andhra Pradesh & Telangana: Farmers in Krishna and Srikakulam districts have adopted redgram on bunds with positive outcomes in yield and household pulse availability.

Tamil Nadu: TNAU trials show 18% higher net returns for farms using bund cropping practices with pulses.

Odisha & Chhattisgarh: Integrated rice–pulse systems have improved sustainability and resilience in rainfed systems.

Challenges and Limitations

- Labour constraints during peak transplanting and harvesting
- Wild animal browsing (especially in redgram flowering stage)
- Limited awareness among farmers about economic viability
- Varietal constraints in narrow bund spaces
- Poor market linkages for small-scale produce

Recommendations

1. Promotion through KVKs and department of agriculture in respective states through various extension activities and schemes: Promotion of bund based redgram on paddy field bunds can be massively adopted by majority of the farmers in paddy growing states if more number of front extension activities like training programmes, group discussions, exposure visit to certain selected cases of successful farmers to gain credibility and confidence on the part of extension professionals as well as farmers, on farm trails with

suitable redgram varieties for seed and green pod purposes and front line demonstrations.

2. Seed kit distribution and bund-specific cultivation training including suitable varieties: Cultivation of bund based red gram can be strengthened by distributing suitable red gram variety for seed as well as green pod in small kits which is sufficient for one acre of paddy field bund.

3. Integration with government programs (e.g., NFSM, PM-AASHA)

4. Use of intercropping models with other bund crops (castor, cowpea)

5. On-farm demonstrations and farmer-led innovation models

8. Conclusion

Redgram cultivation on paddy field bunds presents a low-cost, high-return intervention for enhancing income and sustainability. It aligns well with the objectives of natural farming, climate resilience, and nutrient security. With appropriate extension support and policy backing, this practice can be scaled up across rice-growing belts in India. According to Indian statistical standards, when pulse crops are grown on paddy bunds, each bund-acre counts as 0.25 acres of pulse cultivation. Despite the small area, it's a high-value use of otherwise idle space. If we consider total paddy bunds of 47 million hectares of paddy area grown in India, we can enhance redgram cultivation in millions of acres rice bunds. Mary gold, beans and ridge gourd can also be grown on paddy field bunds. Bund based cultivation of redgram is need of the under-pulse area enhancement under food security.

References

1. ICAR-Indian Institute of Pulses Research (IIPR) Annual Reports
2. Singh et al., (2020). Bund Utilization for Pulse Production in Rice Ecosystems. Journal of Agronomy.
3. TNAU Agritech Portal
4. Department of Agriculture – Government of Andhra Pradesh
5. Reddy, B.V.S., et al. (2019). Agroecological Intensification through Bund Cropping. ICRISAT Reports.
