Flood tolerant rice variety in Lao PDR

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Summary

This technology describes the performance of flood-tolerant rice varieties in flood-prone areas of Lao PDR, including a comparison with local rice varieties monitored within the same farms. Details on local and improved varieties are provided as well as a step by step description on its usage. Additionally major costs and resources are highlighted as well as a cost-benefit analysis comprising of an overview of outcomes and the rice sale price.

Description

Flood-tolerant rice varieties were introduced in lowland paddy fields as part of the project Consolidating capacities for DRR in Agriculture in South East Asia. These varieties aim to reduce rice production losses faced by farmers in case of prolonged floods, thereby enhancing resilience of rural livelihoods and strengthening food security.

1. Rice varieties

1.1 Local varieties

In visited sites, the average yields of local rice varieties vary between 3 000 kg and 3 200 kg per hectare. These varieties are quite vulnerable to prolonged floods.

1.2 Improved variety

The flood-tolerant variety is Thadokkham No. 1, sub. 1. This variety has been tested, validated and promoted by the National Agricultural and Forestry Research Institute of Lao PDR in paddy fields that are exposed to prolonged floods.

2. Step-by-step description

2.1 First step: Land preparation

Land must be tilled and left to dry for 20 days, then tilled again. After the second tillage, organic fertilizer should be applied to improve the soil structure. Finally, the land must be levelled.

2.2 Second step: Planting seeds and transplanting of seedlings

The average amount of seeds used is 100 mg per m². When the seedlings have an age of 25 to 30 days, they can be used for transplanting, but they should not be transplanted over the age of 30 days. Seedlings should be transplanted by maintaining a distance of about 25 cm x 25 cm between them.

2.3 Third step: Fertilization

Table 1 provides guidance on fertilizer use. Weeds must be killed before using fertilizers, and fertilization should not be conducted during or just after rain.

Table 1: Fertilizers' type, amount and mode of application

Types of fertilizer	Amount Kg/ha	Procedure
Fertilizer formula 46-00-00	78 kg	Equally use the urea fertilizer 3 times at 20, 35 and 50 days after planting
Fertilizer formula 16-20-00	150 kg	Use 70% for enhancement and 30% 20 days after plating
Fertilizer formula 00-00-60	50 kg	Use 70% for enhancement and 30% 20 days after plating
Boron Fertilizer	1 kg	Mix with the 1st formula urea fertilizer
Manure and Compost	10 000 kg	Use 100% for enhancement

Source: FAO 2017

2.4 Fourth step: Maintenance

Maintain plots by watering and removing weeds from the plots and the areas surrounding the plots. If any damage from pests is seen, consult with an agriculture official or an official of the Agriculture and Forestry Department from the district.

2.5 Fifth step: Harvesting

Harvesting can be done 30 days after the start of flowering, counting from when 50 percent of the plants are flowering.

3. Major costs and resources needed to cultivate flood-tolerant rice (at the time of writing)

- Rice seed: 5 500 kip per kg
- Fertilizer Formula 46-00-00: 4 750 kip per kg
- Fertilizer Formula 16-20-00: 4 900 kip per kg
- Fertilizer Formula 00-00-60: 5 750 kip per kg
- Labour: about 78 days per season (including all agricultural activities for growing rice)

4. Cost-benefit analysis of the practice

The performance of flood-tolerant rice variety was monitored in 41 farms in Savannakhet (28), Khammouane (11), and Champasak (2) Provinces. The net benefits obtained from the resistant variety were measured through a cost-benefit analysis (CBA), and compared to the net benefits of the local rice varieties.

The CBA calculates the cumulative net benefits obtained from 1 hectare of rice over a period of 11 years, as well as the benefit-cost ratio (BCR), which is the ratio between total discounted benefits and total discounted costs over the appraisal period.

A 10 percent discount rate is applied to express the future value of costs and benefits in present terms.

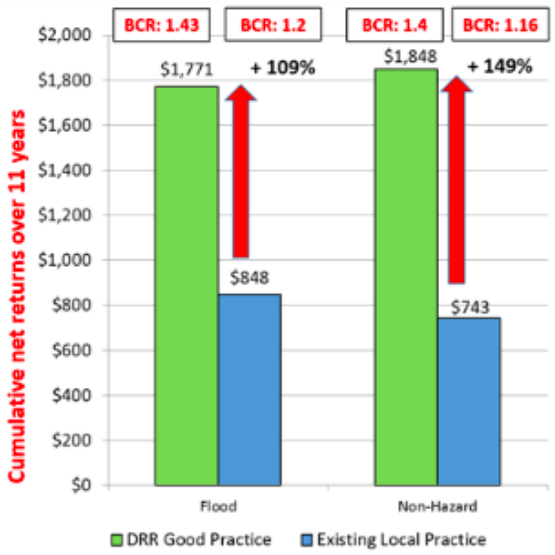
4.1 An overview of the outcomes of the CBA (Figure 1)

- In farms affected by floods, the cumulative net benefits of flood-tolerant rice are more than two times higher than those of the local rice varieties.
- In farms not affected by floods, the cumulative net benefits of flood-tolerant rice are 2.5 times higher than those of the local rice varieties.
- The BCR of flood-tolerant rice is higher than the BCR of the local rice varieties both in flood and non-flood conditions, meaning that the improved variety brings greater benefits relative to costs, as compared to the local variety.

4.2 Rice sale price

In 2015 wet season, average farm-gate price of rice in local markets fluctuated between 2 000 and 2 100 kip per kg.

Figure 1. Cumulative Net Benefits and Benefit Cost Ratios of Good Practice (flood-tolerant rice variety) and Local Practice (local rice varieties) - USD per hectare per season in Flood and in Non-hazard conditions. 2015 Wet season



Source: FAO 2017

5. Validation of the practice

5.1 Geographical area of practice validation

The performance of flood-tolerant rice variety was monitored in 41 farms in Savannakhet (28), Khammouane (11), and Champasak (2) Provinces.

5.2 Context of implementation

Flood-tolerant rice varieties were introduced in lowland paddy fields as part of the project Consolidating capacities for DRR in Agriculture in South East Asia. These varieties aim to reduce the rice production losses faced by farmers in case of prolonged floods, thereby enhancing resilience of rural livelihoods and strengthening food security.

5.2.1 Environmental and climatic (period/ season) context

The performance of flood-tolerant rice variety was monitored during the 2015 wet season. Out of the 41 monitored farms, four (4) farms experienced floods during the monitoring period, while the remaining were not affected by floods. All the monitored farms were affected by a delay in the rainy season.

5.2.2 Social-target group

The DRR good practice was tested with smallholder farmers.

5.3 Farmers' perceptions

Farmers from all 41 monitored farms were interviewed. All of them said they would like to continue planting the flood-tolerant variety in the next seasons as it brought higher yields. Farmers assigned a score of 4.9 out of 5 to the resistance of the improved variety to floods. Several farmers said they would like to test also other improved rice varieties.

6. Agro-ecological zones

- Tropics, warm

7. Objectives fulfilled by the project

7.1 Pro-poor technology

The technology reduces rice production losses in the face of prolonged floods. It enhances resilience of rural livelihoods and strengthens food security.