

NO-TILLAGE FOR THE DIVERSIFICATION OF RICE-BASED FARMING SYSTEMS IN CAMBODIA



Cambodian agriculture is largely dependent upon the cultivation of rice under conventional tillage systems.

Farming systems diversification is one of the goals of the Cambodian National Agricultural Policy, that is being implemented by the Ministry of Agriculture, through the Agricultural Productivity Improvement Project (APIP) financed by the World Bank. Under the structure of APIP, the Farming Systems and Agriculture Economics Subcomponent (FSAE) focus on the promotion of an agro-ecological approach for the development of sustainable farming systems. An Integrated Crop Management Project sponsored by the Norwegian Trust Fund was implemented into the context of the FSAE subcomponent with the purpose of mainstreaming agro-ecological approaches.

Under this institutional context, the FSAE subcomponent is implementing on-farm trials that aims to assess the technical and economical feasibility and social acceptance of some options for the diversification of rice-based farming systems.

Heng S.^{1,2}; Bevan³ L.; Chin¹ S.; Kanitha O.¹; Mara M.; Ribeiro M. F. S.⁴; Sathny, P.¹

APIP/Farming Systems and Agricultural Economics, Ministry of Agriculture, Forestry and Fisheries, Cambodia. 2: E-mail: hengsok1965@yahoo.com; 3: APIP/FSAE Consultant; 4: Researcher IAPAR/CIRAD and DMC Facilitator.

Materials and Methods

The technical option being tested is the cultivation of soybeans or mungbeans after harvesting of rice, under no-tillage into the rice residues. Twelve on-farm trials were established in irrigated lowland rice cropping systems located at the districts of Svay Rieng, Pray Veng, Kompong Thom and Kompong Cham. The average size of the farms is 2.1 hectares and the use of external inputs is very low. Pesticides are not used by these farmers.

The FSAE team provided the seeds for the farmers, but other inputs, as well labour, are provided by the farmers themselves. The decision whether to plow or not, whether to apply fertilizers, is made by the farmers. During the crop development, farmers were interviewed in order to get their evaluation of the trials.

Soybeans and mungbeans were sown under No-Tillage by the majority of the farmers (8 out of 12 trials for soybeans and 9 out of 12 trials for mungbeans). The seeds were placed manually into a hole opened by a stick. There was almost no weeds infestation by the planting time, thus no weed management was necessary.



NT of soybeans on rice residues at Mr. Sieng Sameth's farm, Svay Rieng District

Results and discussion



No-tillage of soybeans after rice cultivation

The data presented in Table 1 shows positive results for the cropping season 2002-2003. Sowing soybeans and mungbeans after rice, represents an additional income ranging from 1.0 to 1.6 USD/working day. In addition, this proposal fits other farmer's resources and needs (according to what was discussed with farmers during the interviews), if the following aspects are to be considered:

- The technical option is in line with farmers' objectives: with these trials, farmers want to find options for food, for cash, for improving soil fertility, for increasing rice productivity and as fodder for livestock.
- It will not compete with other crops for the land use: rice is the most important crop, but it is not possible to be grown during the dry season. The land remains unutilised during this period.
- It fits labour availability and use: labour is available during the dry season, and can be used to grow a crop and to keep the livestock away from the cropping areas near the household.
- It fits into the agrarian system: one particular concern discussed with the farmers was the issue of free grazing in the cropping areas during the dry season. It was clear that the farmers would not grow soybeans/mungbeans in all cropping area, but mainly in the areas near the household. In this case they can control the access of livestock (even those that belong to other farmers). Fodder availability could be increased in the dry season if the farmers cultivate some draught-resistant species such as sorghum, as fodder banks.

Table 1: Economic results of soybeans and mungbeans cultivation under NT into rice residues. Average of 12 on-farm trials in the districts of Svay Rieng, Pray Veng, Kompong Thom and Kompong Cham, Cropping season 2002-2003.

	Soybeans	Mungbeans
Gross margin (USD/ha)	113.7	151.5
Input costs (USD/ha)	30.0	38.0
Seeds (USD/ha)	15.0	23.0
Fertilizer (USD/ha)	15.0	15.0
Labor requirement (days/ha)	49.3	45.2
Return to labor (USD/day)	1.6	1.0

Despite the many options available to be used as cover crops, the team decided to work with species that are already known by farmers and that have additional value other than cover crops. In addition to soybeans and mungbeans, pigeon peas will be introduced in the trials for the next season, as another option to be cultivated after rice. In spite of the fact that this crop is not normally cultivated in the rice areas, pigeon pea is already known and used by some farmers in Svay Rieng and Pray Veng provinces. The team observed that pigeon pea was cultivated in the dikes, and when asked, farmers mentioned the many uses of this plant:

- 1) young leaves are used as ingredient for a traditional Cambodian soup and for a traditional cake;
- 2) grains are used as food, and some farmers also use as fodder for pigs;
- 3) roots and leaves are used as traditional medicine for humans, and roots are also used as medicine for livestock.. They also are easy to grow and are drought-resistant.

Conclusion

The results from the trials showed the technical and economic feasibility, as well as the social acceptance of cultivation on soybeans and mungbeans under no-tillage after rice. The main role of No-tillage was to allow the cultivation of a second crop after rice, thus taking advantage of the residual soil moisture. However, the system is not yet completely turned into No-tillage, because rice is still being cultivated under conventional system. It is necessary to know which could be the incentives for the farmers to change the system of rice cultivation.



World Bank

The World Bank
1818 H Street, N.W.
Washington,
DC 20433 U.S.A.



Design and production: Cirad/IciLaBas - July 2003 ©