POTENTIAL FOR GRAIN LEGUMES IN PADDY LANDS AFTER THE RICE CROP

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INTRODUCTION:

Increased paddy production indicate that Sri Lanka will soon be self-sufficient in rice. For better nutrition, the protein requirements of the nation should be fulfilled simultaneously. Price of animal protein foods goes up daily causing it to go beyond the reach of the low income groups. It is now essential to increase the production of substitutes. Grain legume s are cheap sources of protein. The annual national production of grain legumes in 1983 recorded 72,000 tons, which should be increased up to 130,000 tons by 1986 to meet the national needs leaving a short fall of 58,600 tons per year

Approximately 100,000 ha. of land will be required to produce the additional 58,000 tons with the current crop yields. Grain legumes are confined to the rainfed uplands of the dry zone, and has to compete for land with other cash crops. More often they are confined to the marginal lands. Soil depletion and reforestation programmes shrink the extents of cultivable arable uplands. Eratic rainfall very often cause either excessive or inadequate soil moisture to sustain profitable crop production. Crop improvement and development of new technologies to increase production/unit area will need additional experties and inputs at a price. Therefore, it is essential to seek low cost low input technologies to meet the farmer's capabilities. It is time to look for opportunties of utilizing other land resources to grow grain legumes.

Potential areas:

During maha 1982/1983 land area under irrigated and rainfed rice production in Sri Lanka was 557,540 Ha. of which 338,554 ha. were left fallow during yala. The yala rice grown area lie fallow for a period of

three or more months after the maha harvest. Such lands prevail throughout the wet and the dry zone of the Island. A considerable extent of these lands fall in the upper terrain of a sloping topography, and are adequately drained and aerated for the successful establishment of grain legume crops immediately after the rice harvest. Proper soil and moisture management should produce satisfactory crop yields.

Results from other countries:

On going research and traditional farming practices in other countries reveal that pulse crops can successfully grown with the utilization of residual soil moisture in paddy lands after rice harvest.

Yegnanarayanan Aiyar (1962) and Randhva (1968) in India showed successful cultivation of mungbean with the use of residual soil moisture after rice harvest in paddy fields. In Thailand mungbean is grown before rice with very little inputs given in terms of land preparation and cultivation. IARI (1978) reported the need to shift grain legume crops to better lands. Residual soil moisture after rice harvest remain adequate for 6-8 weeks of crop growth. Mungbean is one such crop that can grow. In the Phillippines Gomez and Zandstra (1976) stated that mungbean possess characteristics that make it an ideal crop to follow rice. Herrera (1977) reported of its low water requirements enable it to tolerate 2-3 weeks of moisture stress with minimal effort. In Taiwan AVRDC (1975) (1976) obtained 1.6 tons of mungbean/ha when planted after rice harvest under zero tillage. Godilano and Carangal (1983) reported that mungbean as an alternate crop to corn after rice. Godilano et al (1980) evaluated 10 early maturing cultivars for intensive cropping before wetland rice and obtained 1.7 tons grain/ha from CESID-21. Meelu and Rekhi 1983 showed a grain yield of .8 tons/ha and 7.5 tons of haulms/ha supplied 100 kg N/ha when incorporated.

Some efforts of mungbean and other grain legume crop production after rainfed rice harvest had been successfully done in Chavakachcheri and Kodikamam area in Jaffna, in Iranamadu Scheme after irrigated wetland rice. Mungbean is traditionally grown by farmers

of Mediliya village in Kegalle district in between the maha and yala rice crops. (Rice-Mungbean-rice). However research information in this field is yet scarce in Sri Lanka.

Except for the wet agroeccological regions in all other areas the sloping rice lands are adequately drained and consist 2½-6 months of fallow period after rice harvest. Timely cultivation of rice can always avail a suitable season for grain legume crops. Available residual soil moisture in many instances specially in the wet and intermediate zones should be adequate for successful crop growth for a period of 60-70 days. Supplementary irrigation at stress times can be available in the dry zone for better yields. April intermonsoon showers also can be beneficial for longer duration, crops such as cowpea, soybean and thur dhal.

Crops:

Selection of crops must suit the available time gap in between the two rice crops, available soil moisture, weather conditions at crop maturity and to avoid the pest problems in the area. Short duration crops such as mungbean and blackgram will fit in between two rice crops while soybean, cowpea and thur dhal will suit in the rice fallow areas. Yet it is advisable to concentrate on short duration crops and varieties until research information develop.

Need for zero tillage:

Any tillage operations immediately after rice harvest in many instances are not practical due to excessive moisture and soft soil conditions. If tillage operations are needed the soil has to be allowed to dry to near field capacity which will require at least one to four weeks depending on the soil type. During such time the residual soil moisture will rapidly evaporate and further enhanced by tillage operations. The results will be that available moisture for crop growth.

Zero tillage will enable to plant the successive crop immediately after rice harvest leaving no turn around time. In case of weed growth it could be controlled by a total contact herbicide before planting the successive crop.

Crop establishment:

Crop establishment can commence from the time just before rice harvest. The field should be drained off one to two weeks before rice harvest in case there is standing water. Mungbean or black gram should be broadcast sown a few days before rice harvest. Seeds will imbibe and emergence may commence by the time of rice harvest. The crop will establish well within a few days of rice harvest. Planting can also be done just after rice harvest while the soil is somewhat soft but not muddy. At harvesting the stubble could be allowed 10-15 cm. tall. Planting in the stubble has been a precaution against the bean fly damage. Research work at many instances has shown plant populations above 250,000 plant/ha has no effect on yield increase in mungbean. However, this vary with soil moisture season crop and the cultivars.

Need for mulching:

Mulching zero tilled mungbean showed promising results. On a ratoon the stubble be cut to ground level and spread as a mulch. Straw mulch of 3-5 tons/ha has conserved soil moisture, controlled weeds prevent soil crusting better root modulation and increase yields. Incorporation of rice straw in rice fields is recommended by the Department of Agriculture. Adding it as a mulch to a grain legume crop will allow sufficient time to decompose to make the nutrients available to the succeeding rice crop serving two crops.

Pest control measures will enable to assure better yields. Two sprays of a systemic insecticide at the onset of flowering to control pod borers. Yellow mosaic virus resistant or tolerant varieties will help to avoid insecticidal sprays to control vectors.

Research information from many locations show yield records from 600-1700 kg/ha in case of mungbean. Crop yields will depnd upon the available soil moisture crop variety and the efficiency of pest management. A successful crop will yield 1000 kg/ha of dry mungbean seeds. 4-7 tons /ha of fresh haulms had been obtained by Meelu and Rekhi (1983) contributing 60-100 kg N/ha when incorporated. It also adds other plant nutrients

and improve soil fertility. Other grain legumes should also yield similarly or better under these conditions. Growing grain legume crops on the above context at a moderate level of management with minimum inputs will enable an additional income to the farmer during the fallow period while enriching the soil with nitrogen and other nutrients from the crop residue as well as from the mulch. Better management practices will produce increased yields and generate an income during lean periods.

However, in Sri Lanka this vast resource is not yet tapped to meet the requirements due to lack of adequate research information. Resourceful immediate potential areas has to be identified for research requirements.

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