Stepping Up Food Production in Kerala—Problems, Perspectives and Strategies

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A DISTURBING factor of the agricultural scenario in Kerala is that in spite of significant developments in agricultural technology, the productivity of rice has remained stagnant during the past over two decades. The annual rice production in the State has been stagnant at about 1.3 million tonnes for nearly a decade as against the present requirement of 2.8 million tonnes per year, while the population has been growing at an annual rate of 1.79 per cent, resulting in a progressively widening gap between internal production and requirements. By the turn of the century, the population in the State is expected to cross 3.50 crores and the projected food requirement in cereal equivalents will then be about four million tonnes per year at the present consumption level of 274 gm per day per person. On the basis of State Nutrition Bureau's recommendation of a minimum of 400 gm per capita per day, the requirement will then be over 5.5 million tonnes per annum.

At present the deficit is being met by imports through Central allotment and trade channels. The worst food shortage in the State during 1963-64 to 1967-68 caused by sharp dwindling of the imports of rice should be an eye opener to all concerned to take drastic action for augmenting production and productivity of rice. There is another school of thought that since cash crops dominate the agricultural scenario of the State, such crops and aquaculture should alone receive all attention. Careful analysis of the whole situation shows that it is very prudent to maximise rice production and at the same time aim at a more intensive land utilisation and income generation through integrated farming systems involving crops, livestock and aquaculture.

AREA AND PRODUCTIVITY OF RICE IN KERALA—POTENTIALS AND TARGETS

From 1971-72 to 1985-86 the gross area under rice has registered a fall from 8.75 to 6.78 lakh hectares, the decline being sharpest during the years 1984-85 to 1985-86. The fall in rice area is mainly due to massive conversion of traditional paddy lands for planting coconuts and also for putting up residential and other buildings. There is an urgent need in the State to put a halt to any further conversion of the traditional paddy lands for alternative purposes. The maintenance of traditional wet lands for rice production is needed both for sustaining rice production at augmented levels and also for ensuring percolation of rain water for recharging ground water resources. The conversion of rice fields can be prevented only by an awareness of the dangerous consequences rather than legislative measures. The productivity of rice in the State showed slight variations in the past decade within the range of 1,468 to 1,729 kg. per hectare. A production potential of five tonnes of rice per hectare can be normally expected from most of the high-yielding varieties and this brings into focus the large quantum of untapped yield potential. In the Aliyar belt in Coimbatore district of Tamil Nadu, it has recently been possible to harvest a record yield of about 15 tonnes per hectare of paddy (IR-50) during the Kharif season 1988-89.

The food requirements of the country by 2040 AD are projected at about 400 million. The targeted food production for the country is fixed at 166 million tonnes during the current year (1988-89), the production of rice, wheat, coarse grains and pulses being of the order of 66, 54, 33 and 13 million tonnes, respectively. It is to be noted that in the context of the national target of 66 million tonnes of rice for the year, Kerala's contribution is a mere 1.3 million tonnes despite of considerable potential. Maximisation of rice production is, therefore, a matter of great priority for the State in the context of national goals.

Stabilisation of population within a reasonable period and food production to meet the requirements of this level of population should be the ideal objective for the State. By 2001 AD, a population of 3.5 crores can be reasonably projected. Even though production to meet the full

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requirement of 5.5 million tonnes of rice cannot be expected at this stage, a target of four million tonnes per annum is certainly realisable even at the current level of technology, provided that there is a vigorous and concerted production drive under strong organisational and Governmental support.

Among the short term measures for increasing rice production to the targeted level of four million tonnes, increasing the spread of high yielding varieties in a phased manner deserves maximum priority. Every additional hectare brought under HYV can be expected to contribute additional yield of 0.75 tonne of rice. The current level of season-wise spread of the HYVs, possible targets and expected increase in production are given in Table 1.

TABLE 1—CURRENT LEVEL OF COVERAGE BY HYVs (1985-86) AND REALISTIC TARGETS FOR AUGMENTING PRODUCTION THROUGH SPREAD OF HYVs

Season	Gross area under rice with season-wise percentage values in parentheses	Area under HYV (lakh/ha.)	Present coverage (%)	Targeted area coverage by HYVs by 2001 AD (lakh/ha.)	Expected increase in production by 2001 AD in lakh tonnes at 0.75 t/ha.
Autumn .. .. (April-May to September-October) ..	2.80 (41.24)	0.84	30.0	2.00	0.87
Winter .. .. (September-October to December-January)	3.13 (46.21)	0.40	12.4	1.50	0.82
Summer .. .. (December-January to March-April)	0.85 (12.55)	0.39	45.8	1.00*	0.11
Gross	6.78	1.63	—	4.50	1.80**

* Increase in area under summer crop by 0.15 ha. is anticipated through additional coverage under irrigation.

** Increase over the current level of production, *i.e.*, 1.3 million tonnes/year.

Source : Economic Review 1986, State Planning Board, Trivandrum.

By such a calculated spread of the high-yielding varieties as indicated in the Table, a production level of 3.10 (1.30+1.80) million tonnes of rice can be reasonably expected by 2001 AD. Accentuation in the use of irrigation potential and drastic increase in fertiliser consumption under cover of a pesticide umbrella can contribute over one million tonne.

STRATEGY FOR BRIDGING THE YIELD GAP IN RICE

The success in the endeavours to bridge the yield gap in rice very much depends on micro-level decentralised planning down to individual farmers who are ultimately to produce spectacular results.

Irrigation is a crucial input in rice production. It not only increases production per unit of land and time by enabling better utilisation of other inputs, but also stabilises production. In areas within the State such as in Kuttanad during the summer crop season and elsewhere where the new technology has succeeded, it is to be noted that water control was easily possible under a low rainfall situation. As water links rice fields within homogeneous units, such as, 'Padasekharoms' into an integrated production system, individual fields in the unit are not independent of each other.

A collective area-wise approach involving the co-operation of all farmers in homogeneous rice field units and the application of a systems approach to rice farming based on HYV-technology, integrated nutrient management and integrated pest/disease management are, therefore, indispensable for making break-through in rice production.

A realistic and rational price support policy linked to the soaring wage rates and overall cost of cultivation trends is a major requirement to motivate rice farmers in Kerala to take up rice cultivation on a scientific basis.

Special care and attention are needed to improve soil health of the rice soils in the State by setting up soil health clinics at the Panchayat level to promote balanced application of macro nutrients in conjunction with soil ameliorants on the basis of meaningful soil test data.

ACTION PLANS FOR DIFFERENT AGRO-CLIMATIC ZONES

Rather than spreading the efforts and resources thinly over the entire landscape involved in rice production, it is desirable to concentrate on selected pockets with maximum potential and resources.

Instead of following a blanket strategy for the whole State, it should be ensured that appropriate package of practices are formulated for diverse agro-eco-systems. For securing maximum benefits of new technology, agricultural region with a demonstrated capacity to achieve higher outputs and productivity should be in the vanguard.

Kuttanad & Kole Lands—Intensive efforts are necessary for stepping up rice production in the Kuttanad area of Alleppey and Kottayam districts covering an area of 53,000 hectares. The Kuttanad tract is unique in that it is a deltaic formation of four river systems which is about one metre below sea level. In this region, Kayal lands comprise an area of about 8,000 hectares, while the Karappadams occupy an area of 40,000 hectares, The Kari lands characterised by peaty soils occupy an area of over 5,000 hectares. In the Kayal and the Karappadams lands, the major constraints are soil acidity and heavy infestation by pests and diseases. In the Kari lands, accumulation of toxic salts in the root zone of the rice crop and the resultant toxicity form the major constraint. The production and productivity of rice in the Kari lands can be increased by a margin of about 1.5 tonnes per hectare by laying out subsurface drainage system using tile drains at a depth of about one metre from the ground level. Adoption of this technology over extensive areas will result in considerable increase in production from the Kari soils.

In the Karappadams and the Kayal lands of Kuttanad, the current level of adoption of high yielding varieties is almost 100 per cent. Therefore, in this unique agro-eco-system, it is necessary to carefully plan the varietal spectrum to reduce infestation by pest and diseases.

In the Kole lands of Malappuram and Trichur districts, there is tremendous potential for increasing rice production, provided the right short-duration dwarf varieties are cultivated under a strong crop-protection umbrella.

Palghat District—In the Palghat district which is endowed with irrigation projects, such as, Malampuzha, special attention is needed to implement intensive productive drive. This is particularly important in the Palghat, Alathur and Chittoor taluks.

Irrigation Command Areas—The command area of the irrigation projects of Neyyar, Chalakudy, Peechi, Vazhani, Pothundi, Mangalam, Gayathri, Valayar, Malampuzha, Pamba and Cheerakuzhi (97,792 ha.) should receive special attention in the rice production drive. In these areas, water management has to be rationalised to make best use of available water and to ensure that the productivity is stepped up to the maximum extent by collective efforts.

By following the correct irrigation schedules in the command areas of irrigation projects, it would be possible to bring 20 to 30 per cent more area under the fold of irrigation. Uniform levelling of land to bring about perfect level conditions will help to economise water by ensuring proper coverage with limited quantity of water.

Onattukara Tract—The Onattukara region comprises parts of Karunagappally, Karthikappally and Mavelikkara taluks. Out of the total area of 68,340 hectares of this region, the area under rice is 28,340 hectares. Special attention is needed to increase rice production and productivity in this area. The constraints in the production of rice in the Onattukara region are : poor organic matter content of the soil, drought during the early phase of the dry sown crop, lack of drainage during the rainy season and infestation by the stem borer, leaf folder and blast disease. The rice production in this area can be suitably increased through enrichment of the soil with organics deserves special attention. Adoption of the recommended varieties of paddy and balanced NPK fertilisation are also to be considered as of great importance.

STRATEGY FOR SPREAD OF HIGH YIELDING VARIETIES

Extending the coverage under high yielding varieties should be the major strategy for augmenting production of rice in Kerala. It has to be noted that during the Virippu crop season (April-May to August-September) which accounts for about 41 per cent of the gross cultivated area under rice in the State, the pest and disease problems are relatively much lower due to climatic constraints which operate against them. Therefore, a large scale shift to high yielding varieties will bring about a spectacular increase in rice production during the Virippu season due to maximum realisation of the production potential in the absence of abiotic stresses.

A rapid shift to the high yielding varieties is not desirable during the Mundakan season (September-October to December-January), which accounts for 46 per cent of the gross area under rice in view of the heavy build up of pests and occurrence of several diseases during this season. Therefore, for the Mandakan season, the ideal strategy will be to cultivate high yielding varieties possessing moderate to strong level of resistance to major pests and diseases.

There is tremendous scope for increasing the area under rice cultivation during the Puncha season (December-January to March-April) which represents only about 13 per cent of the gross area under rice. The major constraints to bringing additional areas under Puncha crop is the lack of assured irrigation facilities. Optimum utilisation of the irrigation potential created in the command areas of the irrigation projects has to be given high priority in planning for increased coverage during this season.

Realistic targets for coverage under HYVs have been set mainly in the light of the magnitude of biotic stresses from pests and diseases that tend to restrict productivity in autumn, winter and summer seasons (Table 1). The details about the high yielding varieties suitable for different regions are given in Table 2.

TABLE 2—HIGH YIELDING AND OTHER PROMISING VARIETIES OF RICE RECOMMENDED FOR CULTIVATION IN DIFFERENT REGIONS OF THE STATE

Region	Season	Varieties recommended	
		Medium duration (about 125 days)	Short duration (100-110 days)
(1)	(2)	(3)	(4)
I. *Southern Region*	(Gross area approximate 1.35 lakh ha.)		
1. Double crop wet lands	First crop (April-May to August-September)	Jaya, Sabari, Bharathi, Aswathi, Mashoori, Karthika, PTB-23 and PTB-26.	Annapoorna, Triveni, Jyothi and Swarnaprabha
	Second crop (September-October to December-January)	Jaya, Aswathi, Sabari, Bharathi, Mashoori, Pavizhom, PTB-20 and Lekshmi.	—
	Third crop (December-January to March-April)	Jaya, Sabari and Bharathi	Annapoorna, Triveni, Jyothi and Swarnaprabha
2. Uplands	First crop	PTB-28, PTB-29, PTB-30, Suvarnamodan, Triveni and Swarnaprabha	
II. *Central Region*	(Gross area approximately 2.49 lakh ha.)		
1. Uplands ('Modan') (Purely rainfed)	First crop	PTB-28, PTB-29, PTB-30 and Suvarnamodan.	
2. Uplands ('Palliyals') (Single crop — terraced uplands)	First crop	Aswathi, Jaya, Bharathi, IR-8, Mashoori, Karthika	Triveni, Annapoorna and Jyothi
3. Double crop wet lands (Broadcasting or Dibbling)	First crop	Aswathi, Sabari, Jaya, Bharathi, Mashoori, Karthika, (MO-7), IR-8 and Swarnaprabha	—
"	Second crop	"	
4. Double crop wet lands (Transplanted crop)	First crop	Jaya, IR-8, Sabari, Bharathi, Aswathi and Mashoori	Annapoorna, Triveni, Jyothi and Swarnaprabha
"	Second crop	Jaya, IR-8, Aswathi, Sabari, Bharathi, Mashoori and Resmi	"
"	Third crop	—	"
5. Low rainfall areas of Chittoor (Palghat District)	First Crop (Direct seeded or dibbled)	Jaya, Mashoori and IR-20	Triveni and Jyothi
"	Second crop (Transplanted)	Mashoori and IR-20	Jyothi and Triveni
"	Second crop in Poonthalpadom	BR-51-315-4	—

TABLE 2—HIGH YIELDING AND OTHER PROMISING VARIETIES OF RICE RECOMMENDED FOR CULTIVATION IN DIFFERENT REGIONS OF THE STATE—*Contd.*

(1)	(2)	(3)	(4)
III. *Northern Region*	(Gross area approximately. 1.47 lakh ha.)		
1. Uplands	First crop	PTB-28, PTB-29, Suvarnamodan and Swarnaprabha	—
'Palliyals' .. .. (Single crop—First cropped terraced uplands)	First crop	Aswathi, Jaya, Bharathi, IR-8, Mashoori and Karthika	Triveni, Annapoorna and Jyothi
2. Double crop wet lands ..	First Crop	Aswathi, IR-8, Sabari, Jaya, Bharathi, Mashoori, Karthika (MO-7) and Pavizhom (MO-6)	Triveni, Annapoorna, Jyothi and Swarnaprabha
"	Second crop	"	—
3. Double crop areas .. .. (Transplanted)	First crop	Jaya, Sabari, Bharathi, Aswathi, Mashoori, Karthika, and Pavizhom (MO-6)	Annapoorna, Triveni Jyothi and Swarnaprabha.
"	Second crop	Jaya, IR-8, Aswathi, Sabari, Bharathi, Mashoori and Pavizhom	Annapoorna, Triveni and Jyothi
"	Third crop	—	"
IV. *High Altitude Region**	(Gross area approximately 0.39 lakh ha.)		
1. Single crop wet lands ..	First crop	WND-1, WND-2, IR-8, Aswathi, Jaya, Sabari and Mashoori	—
2. Double crop wet lands ..	First crop	IR-8, Jaya, Aswathi, Sabari and Bharathi	—
"	Second crop	IR-8, Aswathi, Jaya and Bharathi	—
V. *Region of Problem Areas*	(Gross area approximately 1.08 lakh ha.)		
1. Onattukara and coastal sandy areas	First crop	Jaya, Jyothi, Triveni, Bharathi, Aswathi and Karthika	—
(*a*) Areas where high yielding varieties can be cultivated	Second crop	Jaya, IR-8, Aswathi, Sabari, Bharathi, IR-20 and Karthika	—
(*b*) Areas where high yielding varieties do not perform well	First crop	PTB-23	—
	Second crop	PTB-20	—
2. Kuttanad			
(*a*) Main season	Puncha (September to February)	Bharathi, Bhadra (MO-4), Asha (MO-5) Pavizhom (MO-6) and Karthika (MO-7)	Triveni and Jyothi
	Addl. crop (March-April to September-October)	Asha, Karthika and Pavizhom	Triveni and Jyothi
3. Kole lands of Trichur and Malappuram	Puncha (September-February)	Jaya, Aswathi, Sabari, Bharathi and Karthika	Triveni, Jyothi and Annapoorna
	Addl. crop	—	Triveni, Jyothi and Annapoorna
4. Pokkali areas of Ernakulam and Alleppey districts	First crop	Vyttila-1, Vyttila-2 and Vyttila-3	—

*Elevation approximately 700-1000 m above MSL).

CONTINGENCY PLANS FOR DROUGHT

The severity of seasonal droughts is mainly felt in the summer rice crop (Puncha) and hence raising of extra short and short duration varieties, such as, Triveni and Annapoorna will be of considerable value. The tall indica varieties PTB-29 and 33 are much suited for growing in the modan lands during the Kharif season.

Long term measures are needed to augment irrigation potential. Conservation of rain water to the maximum extent in basins and even in underground cellars, construction of small barriers and check dams across streams and rivers at appropriate places, better upkeep of existing ponds and tanks, renovation and maintenance of the vast net work of the existing wells are some of the important measures that are needed to conserve water. Biological barriers such as raising of soil binding grasses like Vetiveria along the contour bunds, self terracing trenches and staggered trenches, prevention of deforestation coupled with massive afforestation schemes are valuable long term measures for water conservation.