



# KRISHAK SAMACHAR

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*Jaya*



*Padma*



Bharat Krishak Samaj  
pays reverence and  
greet New President of  
India Shri V. V. Giri.

# Agriculture & Fourth Plan

In agriculture, the Fourth Plan has two main objectives. The first to provide the funds necessary for a sustained increase in production of about 5 per cent per annum over the next decade. The second is to enable a large section of the rural cultivator and the farmer in dry areas to participate in development and its benefits. The developmental programmes in a agriculture have accordingly been drawn up in two categories, namely those which aim at maximising production and those which aim at remedying imbalances.

The strategy in realising the production targets in agriculture is primarily dependent on intensive agriculture. It consists of five key elements. These are :

(1) Continued expansion of irrigation facilities and re-orientation of irrigation practices.

(2) Expansion in the supply of fertilisers, plant protection materials, farm machinery and credit.

(3) Full exploitation of high-yielding varieties of cereals.

(4) Intensive effort in selected areas to raise the yield of major commercial crops.

(5) Improvement in the agricultural marketing system in the interests of the producer and assurance of minimum prices for major agriculture commodities.

Success in the achievement of foodgrains target is mainly linked with the success of the high-yielding variety and multiple-cropping pro-

grammes. Schemes of irrigation, including energisation of pump-sets supply of inputs and of machinery credit, strengthening of the infrastructure in villages, will all support the high-yielding variety and multiple cropping programmes.

To enable the small farmers to participate in agricultural development and share its benefits, the general loaning policies and procedures of co-operative credit will be re-oriented in favour of the small farmers. The problems of small farmers will be identified and input services and credit will be assured to them in 20 selected districts through a Small Farmers' Development Agency to be set up in each of these districts.

The operation of Land Development Banks, the Agricultural Refinance Corporation and the Agro-Industries Corporation will be considerably expanded. In States where cooperative credit societies are weak, Agricultural Credit Corporations are proposed to be set up. A new Credit Guarantee Corporation will be set up to facilitate the flow of finance for distribution of fertilisers and allied inputs.

Research will play a very significant role in the Fourth Plan agricultural programmes. The Indian Council of Agricultural Research the apex organisation in agricultural research and education in the country will be further strengthened and provided with adequate funds. The Council's projects would cover all important food and commercial crops.

In agricultural education, the nine Agricultural Universities already set up will be strengthened. Four more universities will be set up during the Fourth Plan.

Farmers' education and training programmes will include demonstrations organised by agricultural scientists, organisation of agricultural information, and formation of farmers discussion groups. A special Central scheme on these lines will, cover 100 districts.

To ensure adequate and timely availability of agricultural inputs, indigenous products will be supplemented by imports. A widespread network of distributors will be set up to enable the farmer to get his inputs within easy reach. Fertiliser Credit Guarantee Corporation will be set up to guarantee and re-finance distribution credit for fertilisers and other inputs.

Adequate production and distribution of seed of high genetic quality will be ensured by producing breeder stock and foundation seed with the help of ICAR and the National Seeds Corporation. A large seed multiplication farm will be set up in the Terai area.

Almost a three-fold expansion is visualised in the consumption of chemical fertilisers. At the end of the Plan, the requirements of chemical fertilisers will be 3.70 million tonnes of "N", 1.80 million tonnes of P<sub>2</sub>O<sub>5</sub> and 1.10 million tonnes of K<sub>2</sub>O.

Good quality organic manure will be manufactured out of urban waste by mechanical compost plants under a new programme.

Eighty million hectares will be covered under various plant protection programmes.

The Agro-Industries Corporations will supply agricultural machinery on hire—purchase and provide technical and other services. The tractor manufacturing industry has been de-licensed to meet the demand for tractors that would go up to 90,000 by the end of the Plan.

Surplus and ground water resources will be used through wells, tube-wells and pump-sets.

Soil conservation measures will be enlarged with a higher priority given to critically eroded areas.

Out of an area of 2.2 million hectares available for reclamation and cultivation, one million will be reclaimed during the Plan.

#### **High-yielding Programme**

A very considerable expansion of the high-yielding variety programme is envisaged. It is proposed to extend this programme to 24.1 million hectares, which is expected to provide nearly two-thirds of the additional production of foodgrains.

The multiple-cropping programme will be extended to cover an area of nine million hectares.

Programmes of problem—oriented research will be given priority in

### **Better Jowar Yields**

Studies conducted at the Agricultural Research Station, Deesa in Gujrat have given clues on the correct spacing, seed rate and fertilization to get profitable yields from jowar.

According to the studies, a wider spacing of 45.7 centimeters between rows was found more suited than narrower spacings. Seed rate of 18 kilograms per hectare and application of calcium ammonium nitrate and superphosphate each at 11.2 kilograms per hectare also led to the highest yields at the lowest cost.

achieving the targets in commercial crops like cotton, jute, oilseeds, sugarcane and potato. Efforts will be made to produce high-yielding and early maturing varieties of these crops.

Fruit cultivation will be extended to cover 440,000 hectares.

Agricultural financing will be institutionalised to the maximum extent possible and direct loans by the Government will be reduced to the minimum. In line with this objective, co-operatives will be strengthened to ensure the disbursement of short and medium term credit amounting to Rs. 750 crore at the end of the Plan.

Efforts will be made to strengthen the Food Corporation, the State Trading Corporation and the Co-operative Marketing Organisation in order to ensure that the purchase operations benefit primary producers.

Storage and warehousing facilities will be expanded. An outlay of Rs. 45 crore has been included for providing an additional capacity of 3 million tonnes of foodgrains.

#### **Animal Husbandry**

The main objectives are :

(1) To increase and supply of protective foods, such as milk, milk products, meat and eggs.

(2) To improve the output of certain animal products, like wool, hides and skins, hair, bristles and bones.

(3) To enable small farmer and the landless labourer to undertake animal husbandry activities.

Co-operative credit will be made available on an increasing scale to farmers to buy milch cattle.

The number of Intensive Cattle Development (I.C.D.) Projects in areas of dairy plants with a capacity of 20,000 litres or more will be raised from 31 to 46. In the areas of dairy plants with a capacity of 15,000 litres, 20 I.C.D. Projects will be set up.

The number of key village Blocks will go up from 490 to 550.

Three Central Cattle Breeding Farms and eight bull rearing farms will be set up.

*Milk Production is likely to rise to 25 million tonnes by the end of the Plan.* Available grass will be harvested and conserved in five fodder banks.

Eight large sheep breeding farms with flock strength of 5,000 to 15,000 sheep will be set up. It is also proposed to set up farms for Pashmina, Angora and dairy goats.

A co-ordinated poultry breeding programme will be undertaken at three Central and ten State farms to evolve superior lines. One hundred intensive egg and poultry production and marketing centres will be set up. Poultry production will be substantially increased and a large automatic poultry plant will be set up at Calcutta.

Pigs will be distributed at subsidised rate to 10,000 families, Four bacon factories—two in the public sector and two in the private will be set up. Twenty-five piggery development blocks will be established.

Two hundred new veterinary hospitals, 1,000 dispensaries, 2,000 stockman centres and 60 mobile dispensaries will be organised. Five hundred existing dispensaries will be developed into hospitals.

Modern management practices will be introduced in the dairy projects.

Small producers will be linked with the public sector milk plants through co-operatives.

#### **Fisheries**

The value of fish exports rose from Rs. 4 crore to about 18 crore in 1967-68. Fish production increased from 0.96 million tonnes in 1961 to 1.4 million tonnes in 1968.

At present there are over 7,800 mechanised fishing boats in operation.

The main target in the Fourth Plan would be to increase fish production to meet protein requirements and further develop the export. It is proposed to increase marine fish production by about 0.44 million tonnes and inland fish production by about 33,000 tonnes.

Fish seed production will be increased by 500 million of additional fry and fingerlines for stocking of

inland waters. As against an area of about 550 hectares of nursery fisheries at the end of the Third Plan, an additional area of about 900 hectares is proposed to be constructed.

An area of 33,300 hectares is proposed to be brought under intensive fish culture. An area of 6,000 hectares of brackish water would be stocked with suitable species of fish.

The Indian ocean, with an area of 72.52 million sq. kms, is the least-exploited of oceans. In the Fourth Plan there will be increased stress on marine fisheries, especially deep-sea fishing. Five thousand five hundred more mechanised boats will be added to the fleet of 7,800 for the deep-sea fishing programme. Three hundred medium size trawlers will be introduced mainly in the private sector.

The role of the Central and State Fisheries Corporations will be enlarged and fish markets will be regulated. Co-operative fishermen's federations will be strengthened. At present, only 3 per cent of the total fish landings is handled by co-operatives.

#### Forests

Special emphasis will be laid on measures to meet immediate and long-term agricultural and industrial requirements from forests. To increase forest production large-scale plantations of valuable quick-growing species and species of economic and industrial importance will be intensively exploited and rationally used.

The major objective is to achieve self-sufficiency in forest products as early as possible, especially in major forest-based industries such as pulp, paper, newsprint, wood panel products and matches.

#### Co-operation

Agricultural co-operatives and consumer co-operatives will occupy a central position in co-operatives will be helped to equip themselves in important aspects like finance, organisation and trade personnel.

One of the most important tasks before the co-operative credit movement is the re-organisation and rationalisation of the structure at primary level. It is proposed to devise

measures whereby the primary societies with the jurisdiction of District Central Co-operative Banks may be financed directly by the concerned apex co-operative banks.

Co-operative banks will be assisted to open more branches in rural areas.

The aim will be to disburse short and medium term credit of the order of Rs. 750 crore in 1973-74.

It is proposed to expand considerably land development banking.

One of the main endeavours in the Fourth plan will be to re-orient the policies and procedures of credit cooperatives and land development banks in favour of the small farmers.

Steps will be taken to strengthen the co-operative marketing structure especially at the primary level. The Marketing Federations at the State and national levels will also be strengthened.

A fertiliser co-operative factory is being set up at a capital cost of over Rs. 90 crore and another factory is being set up in Maharashtra.

#### Credit to help Small Farmer

By 1973-74, co-operatives are expected to handle fertilisers worth Rs. 650 crore, improved seeds Rs. 50 crores, pesticides Rs. 50 crore and implements Rs. 15 crore.

Stress will be laid on consolidation of the existing 355 Central Consumer Co-operative Societies and 7,400 primary co-operatives.

Pilot rural electric co-operatives are to be set up in five States with the objectives of supplying electricity for agricultural and agro-industrial purposes.

The programme of co-operative training and education will be intensified.

## New Standards Framed

### Edible Soya Flour

The Government of India has launched upon a big programme for enrichment of foods. In this direction utilization of edible proteins obtainable from oilseed flour is likely to receive great impetus. With increasing acreage being brought under Soyabean cultivation, large quantities of Soya bean oilcake, both expeller pressed and solvent extracted, are expected to become available and this entire quantity could be successfully utilized for converting into edible soya flour. This flour can be used as a protein supplement in blended and processed foods. Edible soya flour is exceptionally rich in lysine.

### Mango Grafts

Several methods of propagation

like veneer-grafting, budding inarching (approach graft) are being utilized for the propagation of mango. However, inarching (approach graft) method is the only practice which is followed commercially. Inarching (approach graft) method makes use of vigorously growing, healthy seedlings plants on which young, healthy shoots of the mother tree are united by the approach graft technique.

### Egg Powder

The demand for egg powder is increasing considerably both from the civilian population and from the defence personnel. Moreover the technological details pertaining to its manufacture have been worked out fully at the Central Food Technological Research Institute, Mysore.

# Report of

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## American

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## Farm

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## Leaders'

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## Delegation

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The importance of the following story lies not in the fact that we, the tour group of 1969, have visited India, but that India is important to the free world. It is the most populous of the world's democracies. Therefore, its success or failure can influence significantly the events of the future. Likewise, the importance of agriculture to India can hardly be over-emphasized because 75% of its people live in small villages, and own or operate farms or directly serve the farmer. Unless this large mass of people can experience a better standard of living, the prospect of industrialization will be dim. This is true because farmers need additional income to buy the products that the industries would produce. It is also true in the financial sense. This is due to the balance of payments problem, much of which is caused by the inefficient agricultural industry. India, with proper utilization of its resources

can feed itself. Obviously, however, the problem of changing the farmers from the centuries-old traditional methods to the more modern scientific methods is indeed a huge and staggering one. We think, though, that the break-through has occurred and that the so-called Green Revolution will succeed.

One of the first and lasting impressions of our group of nine farm people who toured India is the whole-hearted and genuine friendliness shown to us by the Indian people whether in high or low station in life. We believe this shows a bond of friendship between our peoples. This is due in part to their mutual interest in the free institutions common to both nations. And we also believe it is due to their appreciation for the aid our nation has sent. Yes, we found a commendable feeling that they, the Indian nation, should more and more stand on their own and not rely as heavily on aid as in the past. Yet we point to the fact that aid programs have been and will continue to provide needed assistance (some people call it seed money) in various fields, particularly in the agricultural research and educational fields.

### General Consciousness

Everywhere we went, we were conscious of people, even in the countryside. If we'd stop, some people were in sight. So we got the statistics. India in mid-1968 had an estimated 524 million people—more people than live in all the countries of South and North America. Of these, 60 million families depend on farming for a living. Eighty-two percent of the total population live in the 600,000 villages. Now the population is increasing by 2½% a year. The birth rate is about two times greater than in our country. The average rural household has 5.2 persons. In 1951 the average life expectancy was 32½ years. Now the average life expectancy is estimated to be 50 years. Because of this tremendous population, the Indian government is now undertaking a vast government family planning program. Everywhere we went we saw the red triangle—the symbol for family planning. We think this population growth is India's number

one problem. The government said that it would take 600 additional schools per day to keep up with the population increase alone. Comparable to this is its agricultural problem which can be said to be a joint problem. In fact, our host, the Indian farm organization, Farmers Forum, has a joint educational programme, in cooperation with FWA, that is designed to increase the yield of crops and reduce the population growth. Its slogan: "Less in Homes—More in Fields—Lesser Children—Higher Yields."

The group toured a number of farms and visited with the farmers. What we saw on the farms was a genuine thrill. We saw the keen interest in using new varieties of crops and in new agricultural practices. This seems to indicate that the necessary technology for increasing India's food production is being adopted and will continue to be adopted by more farmers throughout the country. It was obvious to us that Punjab was leading in the rate of the adoption of new and more productive practices in farming. We saw other areas which also had made considerable progress in this regard. Specifically, we saw some very good wheat (estimated yield 65-80 bushels per acre). We saw some rice in Madras State where the owner used the new IR8 rice and said his yield was nearly four tons per acre. This points to the potential of the new high yielding varieties when coupled with wise use of fertilizer and irrigation water.

### Higher yields

Historically, however, India has had one of the least productive agricultural industries in the world. For most crops, her yields vary from one-fifth to one-half that achieved by farmers in the U.S. For instance, the yield on 12 million acres of corn the past three years averaged 18 bushels; milo, the average was 436 per acre; in wheat, 14 bushels; in rice, their most important crop, the average was 920 per acre. However, the average yields are going up due to new and improved varieties. The most dramatic is the use of Mexican dwarf wheats. These were developed jointly by the Mexican government and the Rockefeller Foundation.

These wheats, when adapted to Indian conditions, have given yield increases that often double or triple the yields of the old varieties. But they demand more fertilizer and more water. In the past two years, high yielding varieties of rice from the Philippines have been used. These varieties, when coupled with adequate fertilizer, also often increase the yield by two or three times. The Rockefeller Foundation is also working with the Indian Research Institute the past few years to develop a hybrid corn that would suit the Indians. Currently seven hybrids are in use and have given yields four to five times that of the local varieties.

### Commendable Researches

We visited the above mentioned Indian Agricultural Research Institute near Delhi. We felt we sensed a high degree of competence in conducting research here. We noted with particular interest the double and triple cropping program advocated here and used by some of the better farmers throughout India. Here we saw the rotary cropping programs being developed which had grown four harvested crops per year. These intensive programs point the way to the development of the full potential of Indian agriculture. We actually visited farms where two and three crops were grown in a calendar year. This can be done only when adequate water and fertilizer are available. We saw other examples of good research work being done by many of the State agricultural colleges. Generally, we felt that most of the researchers showed a good comprehension of their subjects and did creditable work. (It seems obvious to us that the aid programs have been of value to the fairly new Land Grant College system being developed in India.) Most of their work was centered around crop production which is most important to them. But we saw some experimental work on dairy cattle, trying to find ways to make cow or buffalo more productive in milk production. Selection and cross breeding were being tried. Incidentally, we saw one herd of Jerseys from the Heifer, Inc., Project, and one herd of Holstein cows. These were around Bangalore where

the climate is moderated by altitude.

The soil, too, is often lacking in fertility and particularly organic matter. One soils specialist said that the organic matter tests usually ran below 1%. This is understandable because the climate is very warm, and because most of the straw, stalks and crop residue are either used directly as fuel or feed for live-stock. Seldom is anything returned to the soil. Therefore the soil often is low in fertility, even though much of it is level alluvial soil. This, then, immediately suggests the importance of the use of fertilizers for increased crop production.

### Three Ingredients

The country's fertilizer programme is really beginning to catch on and demand is soaring. Production here is still less than the demand, but new plants are being built. We saw one such plant in northern India where ammonia was being made by electrolysis. It was neat and appeared to be well managed.

We visited several seed production farms who made a business of furnishing good viable and productive seeds to the Indian farmer. One that we all remember is near Delhi, where K. M. Singh had reclaimed some salt land and made it very productive. Here he grew seed wheats and sold them. His brochure had a brief explanation of how to get the best yield from the new high-yielding seed wheat. He suggested how to fertilize and how to control weeds and insects. These seed farms may be a stimulus in getting broad adoption of the newer technology in agriculture.

The two requirements for increased crop yields—better seeds, more fertilizer—need to be complemented with the third ingredient, irrigation. In most of India the growing season extends the year around—at least temperature wise. This makes two, three, and even four crops a year on the same land possible. It is being adopted more and will be a significant factor in increasing India's agricultural production. But rainfall is adequate in most of India only through the period of the middle of June to the middle of September. So to take full

advantage of the full growing season, additional water for irrigation is required. Fortunately, India has an ample supply of water, but only about one-third of the usable flow from the rivers has been utilized. Irrigation water from canals supplies 42% of the irrigation water, 30% is from wells, and 18% from ponds. Often a farmer will invest in a tube well and use electricity here for the first time in his life. We saw these, as well as traditional irrigation methods like the Persian water wheel pulled by oxen or camels, goatskin dumps, and various hand methods.

The three ingredients for increased crop production have been combined in a package called the "High Yielding Varieties Program." This is a highly ambitious program designed to make it possible for India to increase its food grain production from an average of 80 million tons in 1961-66 to 120 million tons in 1970-71. This program is a combination of modern practices which include the use of new high yielding seeds on more acres, these acres to use ample quantities of fertilizer and of irrigation water. When this package of practices is used, substantially higher yields are harvested. Naturally new problems arise. Among these is the high cost of purchased inputs like fertilizers and insecticides and the need for more irrigation.

Without doubt, those farmers who have adopted these modern methods are the leaders in their villages and are reaping broad benefits. The progress to date gives hope to Indian farmers that the prospects are bright for increasing production and improving their economic position.

We really believe we saw this hope particularly among some of the younger farmers. But our concern was really the small village farmer: Will he be able and willing to change his traditional ways? We got various answers to this question but here are some of the things that indicate some incentives are present for even the small farmer to respond.

1. The high yielding varieties are a dramatic proof of the profit available to the use of the new seed and new technology.

2. The educational activities of the Extension Service. The use of the radio for broadcasting farm information—the village may have only one radio which they will amplify—and the efforts of seed farms to sell their seeds.

3. The rather recent development of credit by cooperatives and banks seems to offer reasonable credit even to the small farmer who had often been paying usurious interest rates in the past—50% and more.

Wherever we went we saw cattle of various kinds and for different uses in the street or courtyard. Cattle furnish most of the motive power for the field and for rural transport. Some cows were used for milk, some for meat (Moslems use beef), but all contribute to an abundant and cheap source of fuel, dried cow dung. Most of these cattle as well as sheep and goats serve as scavengers, so even though the production is low, the cash cost is often nothing.

Although most of the red meat comes from goats and sheep, chicken meat is also widely used, and this use will continue to increase. We saw several flocks of well-bred hens from Hyline and other American blood lines. The farmers were getting very good production from them.

At best, however, animals will continue to supply a small portion of the human diet.

The milk supply comes from three sources: from the cow (average production 400), the buffalo (average production 1100 per year), and goats (average production 130). Cows and buffaloes owned by small farmers produce 90% of the nation's milk. Total milk production in 1967 was estimated at 24.3 million metric tons, which is less than one-half of the average minimum daily requirement established by the Nutrition Advisory Committee of India. The milk products are consumed in liquid form, in ghee—clarified butter in liquid form, butter, curds, evaporated milk, and ice cream.

The feed even for milk cows is usually just waste of one sort or another. However, around the big cities farmers bring various kinds of

straw and some green feed to sell to the city dairy man. In Bangalore, we were told that house dairies had 40,000 animals within the city limits (city has two million people). These dairymen often were business or professional people who keep a few milk cows in their courtyard. These dairies are neat and one doesn't expect to find them just driving down the street.

One of the outstanding changes in attitude we noticed during our trip was that farmers now felt some prestige in their occupation. Some people were going back to the farms from the cities. We visited a number of farms that were owned by businessmen and which they were developing into productive units. Probably foremost in this respect were the bountiful grape gardens near Hyderabad. They were really spectacular! An important factor here is the favorable tax position the farming section now enjoys.

The cooperative movement in India varies greatly from area to area. We saw some good cooperatives in banana marketing and cotton ginning near Jalgaon, and in credit like the well-managed Land Mortgage Bank near Madras. But in many places the cooperatives were in the embryonic stages, like in Madhya Pradesh where we visited with the Minister (Secretary) for Cooperation. We agree with him on the importance of the cooperative movement to the farmer. But we did not understand very well why the cooperative movement hasn't gotten off the ground in more of the country.

Our group was privileged also to visit many of the historic shrines of India to better understand the pride the people felt in their heritage. The city of temples, Bhubaneswar, had many examples of the carved work done on their ancient Hindu temples. The Moslem mosques and tombs were also marvels of architecture, foremost, of course, being the Taj Mahal. When the Nagarjunakonda Dam was built, the waters from this would have covered the valley where all the early Buddhist beginnings were. Many of these early monuments were removed to the top of a mountain which is now an island in the

huge lake. It was a real privilege to take a look at history that had been so well preserved. The Red Fort in Delhi and its production, "Sights and Sounds," made India's history come alive. The Ajanta caves are a marvel of skill and workmanship. The palaces we saw, with their display of wealth, were a very great contrast to the mud huts of the farm workers. Yet to understand the thinking and philosophy of the Indian people, it was necessary to view both. We were indeed pleased to note how the great majority of the leaders of the country and those with great wealth would aid and assist those of the lower castes. We evidenced a beginning of the breakdown of this caste system.

The schools of the nation were of special interest to the group. How desperately schools for the lower ages are needed! The villagers would point with pride to their new school rooms, built by their "prosperity brigades"—usually with matching funds from the government. The children seemed very bright and eager to learn. This could be India's greatest natural resource—if properly developed. The trade schools and tractor training schools also will help this nation in its development, by giving pride to those who work with their hands.

We visited India at a very exciting time in its history. It has the challenge of controlling its population so that it can raise its standard of living at the very time when it has reached a break-through in agricultural technology as evidenced in their "Green Revolution." The challenge is to educate their masses, not only so far as literacy is concerned, but also in living more productive lives, working together regardless of caste or position. All this while building a strong nation by democratic means. They have a justifiable pride in the progress they have made since their independence.

We left India feeling that this most populous democracy could develop into one of the greatest agricultural producing nations in the world and be a strong influence in the free world. We sincerely wish them well in their efforts to bring this about.

*Krishak Samachar*

# Jaya and Padma

## The Promising New Rice Varieties

The two new rice varieties are named Jaya and Padma.

Sweet names those. The All India Co-ordinated Rice Improvement Project (AICRIP) to whose credit these new rice varieties largely belong, feels that Jaya and Padma will soon win many a farmer's heart.

Both these varieties, besides their ability to give high yields possess other qualities, not found in Taichung Native-I, or for that matter in the now popular IR-8.

Trials conducted by the AICRIP reveal that Jaya is able to produce ten percent more grain than IR-8. A distinct advantage of this variety is its earliness by 7 to 10 days over IR-8 which counts much for kharif planting in the north and rabi planting in the south. Jaya and IR-8 look alike till their ears come out. However, unlike IR-8 or Taichung Native I, the ears of Jaya are not hidden by the leaves.

According to the AICRIP, Jaya will be suitable for the country, either in *kharif* or *rabi* season. Like IR-8, this variety is not able to stand low temperatures. Therefore, it cannot be grown in such areas as Kashmir Valley, Himachal Pradesh and the hilly regions of U.P., Bengal and Assam. It will also not grow well in deep water or the flood-affected regions of the eastern part of the country.

Jaya's one drawback is its susceptibility to gallmidge attack. So, the planting of this variety should be so adjusted that the crop finishes tillering before the season when gallmidge attack is at its worst,

The grain quality of Jaya is almost similar to that of IR-8. There is nothing exceptional in it, but all the same, it is quite suitable to use as raw rice.

If grain quality is the consideration Jaya's sister, Padma is the

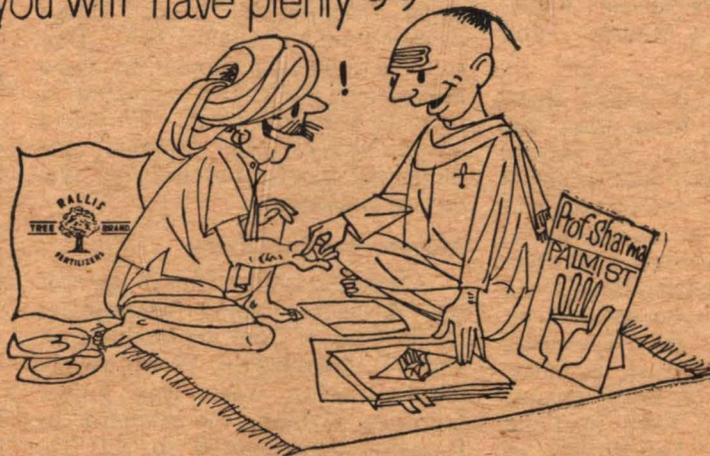
variety for it. Padma doesn't yield as much as IR-8 does, its yield being 10 to 20 per cent less than IR-8. But the loss in yield is amply made up by the quality of rice. It is a slender-grained variety with superior grain type setto meet with better consumer acceptance.

Padma, like Jaya, has 7 to 10 days earliness than Taichung Native-I.

Padma will be ideally suited for summer planting in Bihar and also as a *boro* crop of West Bengal and Assam. Semi-low lands of east India where early kharif crop is to be followed by wheat or potato, Padma, due to its earliness can find a place. Other likely areas for this variety are coastal Andhra Pradesh during rabi and Thanjavur district in Tamilnadu as *Kuruvai* crop.

The release of Jaya and Padma marks the rising tempo of rice breeding work in our country.

“This year the heavens  
will shower blessings on you.  
Your fields will be full of crops  
and you will have plenty”



**RALLIS INDIA LIMITED** Fertilizers & Pesticides Division  
21, Ravelin Street, Bombay-1.

# Soybean The Miracle Crop of Today

**R. C. PANDE**

Lecturer in Agronomy

and

**B. S. TIWARI**

Lecturer in Botany

College of Agriculture, Rewa (M.P.)

Soybean (*Glycine max*) is an excellent crop which has got immense potentialities for giving economical yields. It contains 40% of protein 19.5 percent fat and 20.9 percent Carbohydrates, Vitamin A, B and D and when sprouted it contains Vitamin C.

Soybean was grown in China, Korea and Japan for about 2000 years and it is called 'meat of the field'. It was introduced in U.S.A. in the end of 19th century and now it is the third important crop, being next to maize and wheat. It is also being grown in U.S.S.R., Germany, Rumania, Bulgaria, Czechoslovakia and Yugoslavia. It is grown throughout Africa, Asia mainly in Australia. It is not definite when this crop was introduced in India but since 1882 a small seeded variety was cultivated in Nagpur. In India it is grown in the hill tracts of Assam, Bengal, Manipur, Khasi and Naga Hills and it is being popularized in Kashmir, Punjab, Haryana, U.P., Bihar, Orissa, Madhya Pradesh, Maharashtra, Gujarat, Madras and Mysore.

Soybean which is called Bhat, Bhatwar, Bhetmas, Ramkurthi, etc. has got manifold uses and various preparations are made such as foods for diabetic patients and infants, and soyflour which can be mixed up to 25% with wheat flour or any other cereal flour for preparing breads. In India the seeds may be splitted up and can be used as dal. The seeds may be parched and used as Sattu. It possess a nutty or beany flavour which is not much liked in India (Anonymous 1956. The Wealth of India. Raw Materials 4: F-G, pp. 142-50 CSIR, New Delhi). Dr. R.N. Matsuura an expert from Illionis

University at Pantnager stated that one pound of soybean yields one gallon of milk comparable with cow-milk in nutritive value and the only drawback to this liquid is its slight oily flavour. Soybean milk flavoured with fruit juice makes a delicious drink (Anonymous 1969. Soybean likely to obviate seahunt for protein. *The Times of India News Service March. 21. p.p. 5*).

## Climatic Requirement

The Plant is better suited to hilly areas and is susceptible to severe winter and severe heat. It is a short day plant and each type has a critical length of day under which it flowers and fruits. High temperature over 39°C has an adverse effect on nodulation. It can resist drought to a certain extent.

## Soil and Soil Preparation :

Soybean can be grown on a variety of soil, ranging from Sandy loam to clay loam, provided the soil is well drained and has got a gentle slope. It grows well in rich sandy or clay loam and alluvial soil. Two to three ploughing should be done followed by one or two planking in order to break the clods. In places where *bukhers* are available one ploughing may be followed by one or two *bukhering*.

## Manures and Fertilizers:

Manuring is an essential part of the Soybean crop. Matiramani (1968. Proc. of Conf. on Soybean at JNKVV, Jabalpur pp. 10-14) reported that when wheat was grown following soybean, the response to P was obtained from 0 to 320 lb. per acre and the yields increased from 20 to 34.9 q. per ha. when only 60 lb. N per acre was used.

Jethmalani and Tiwari (1968. Proc. of Conf. on Soybean JNKVV Jabalpur pp. 32-34) stated that good inoculum is essential, although 15-20 kg. N per ha. would be required as a starter, and 80 kg. P per ha. Lal, Jethmalani and Singh (1968- Package of practices for Soybean ; Soybean research Technical bulletin No. 10) stated that when seed inoculation with rhizobium culture is done, application of 20 kg. N, 80 kg. P, and 20 kg. K per ha. should be done and where seeds are not inoculated application of 100 kg. N, 80 kg. P, and 20 kg. K per ha. should be done. All the fertilisers should be applied 5 cm. deep and 5 cm. away the seeding row to be broadcast and mixed thoroughly with soil before sowing.

It may be stated that 10 to 12 tons per ha. of farm yard manure should be added at the time of sowing and in addition to this an application of 20-25 kg. N, 80 kg. P, and 20 kg. K, per ha. and the seeds should be drilled 5 cm deep and 5 cm. away from the seeding row.

## Rotations and Mixed Cropping :

Soybean can be raised as a pure crop or sown as a mixed crop with maize and in some parts of Assam it is grown along with aus Paddy. It can also be cultivated with potato as in Assam and with sugarcane in Bihar and it can be taken as green manure crop in tea estate (Anonymous 1956. The Wealth of India Raw Materials; 4: F-G, pp. 142-150. CSIR, New Delhi). It is a leguminous crop and can be suitably fitted in intensive cropping rotations as follows (New intensive cropping rotations in Tarai, UPAU experiment station Publication, February,

1968. C.F. Shah and Jain. 1968. Cost and returns and market potential of Soybean Proc. of Conf. of Soybean JNKVV, Jabalpur)

1. Soybean—wheat—cheena—1 year
2. Soybean—sugarcane—Wheat—spring maize—2 years.

The returns from the above rotations were Rs. 9860.00 per ha. and Rs. 9241.00 per ha. respectively.

Soybean can be grown as a mixed crop with maize in hills and with maize and cotton in plains Kang (1968. Proc. of Conf. on Soybean at JNKVV, Jabalpur pp. 20-23) stated that Soybean can be grown as a companion crop or in mix cropping with cotton or along with crops like maize, Juar etc.

#### Varieties :

M.S. Lat *et al* (1968 Soybean research Technical bulletin No. 10 JNKVV, Jabalpur) have reported the past experimental work on varieties as follows :

#### 1. Maharashtra :

In Baroda state two fodder types and one grain type varieties were developed.

(1) Poona greenish white, (2) Poona yellowish white, (3) Mamoth yellow.

#### 2. Bihar :

(1) No. 1 yellow Soybean, (2) No. 2 Chocolate soybean, (3) No. 3 Black soybean, (4) Delhi (IARI) Monetta

5. Madras :—Bermese varieties (1) Behrum and (2) Pengypi

6. Punjab :—Punjab Soy No. 1 (Yellow seeded strain)

7. U.P. :—T33, T49, T1 (T.29). T2.

8. M.P. :—(a) Central Provinces No. 41, No. 42, No. 49, EB53 and EB59.

(b) Vidarbha (Maharashtra) Mamotan, Acadian, Improved Pelican.

(c) Central India and Rajputana : Oootan.

9. West Bengal :—Soyamax, K. 30, and Baramali (S.C. Sur, K. Sen Gupta and S. Sen 1965. Many faces of Soybean. *Indian Fmg.* 15(6) : 13-15).

Several strains have been imported from USA and it has been found that varieties like Bragg, Hardee, Hampton 226, Semmes and Clark 63, did well on Indian conditions, Clark 63, an early maturing variety can be grown where the rainfall ceases early (Anonymous 1969. Soybean likely to obviate seahunt for protein. The times of India, News Service, March 21, pp. 5). The Clark 63 matures in 100 days and Bragg 110 days. Verma (1968. Proc. of Conf. on Soybean at JNKVV Jabalpur pp. 35-40) reported that Bragg and Clark 63 are best suited for the tract and the Seoni local appeared to be better for fodder purpose because of its leafy growth.

#### Time and Method of Sowing :

The results of the thesis of Shri S.R. Mally (1967) have been reported by Kashiv (1968. Economics of production of soybean, soybean Research, Technical bulletin No. 10 JNKVV, Jabalpure) have indicated that among the varieties Clark 63, Shelby, Wagone, Haroly, and local the Clark 63 when sown on 15th June gave 20.27 q. per ha. and when sown on 25th June gave 16.9 q. per ha. and the income from the crop sown on 15th June and 25th June were Rs. 1710.00 and 1225.00 per ha. respectively. Saxena and Pandey (1968 ; proc. of Conf. on Soybean at JNKVV, Jabalpur pp. 41-43) stated that planting in the end of June and beginning of July was better than planting late in the season for a variety like Bragg. Verma (1968. Influence of Climatic factors on growth of Soybean and its yield-Cyclostyled notes distributed at Soybean Conf. at Jabalpur) recorded the maximum yield in case of 15th June sowing and it gave 31.6 and 25.1 percent more yield over 1st June and 1st July sown crop respectively. Gopani (1968. Proc. of Conf. on Soybean at JNKVV, Jabalpur pp. 87-90) stated that Soybean can be sown as a Rabi crop, and can replace the *Lang (Lathyrus sativum)*. Patel (1968. Proc. of Conf. on Soybean at Jabalpur pp. 92-94) reported that the variety Clark 63 can be grown in semi-arid Rabi season and the best period of sowing would be the third week of September. The results have revealed that

Soybean can be grown as a second crop to transplanted paddy in *Kyari* land as well as to *Kharif bajari* crop in sandy loam soil. The crop can also be taken as a summer crop and sowing should be done in the third week of February and the first week of March appeared to be suitable. Hampton—266 would be better for seed development and yield in the summer. Seed inoculation with rhizobium culture is essential ; for this purpose 10 percent gur solution is prepared by dissolving 100 gram of gur in 1 litre of water and boil it and then cool it to room temperature. The seeds should be moistened with gur solution and innoculum should be thoroughly mixed in sugar solution treated seeds. It requires about 60-70 kg. per ha. of seed. The seeds may be sown by broadcast or drilled. The seeds are broadcast when it is raised or sown in line, a spacing of 60 cm. may be followed for a variety like Bragg and plant to plant spacing may be about 4-5 cm. and when planting is delayed a spacing of 45 cm. may be followed, The planting should be done at a depth of 3.75 cm. to 7.5 cm.

#### Interculture :

Weeding of soybean crop should be done right from initial stages of crop growth, and it should be done at an interval of 12-15 days. Along with weeding one interculture with any suitable interculture impliment  
(Contd. on page 12)

### Foliar Spray of Urea gives better cotton yield

Foliar application of urea along with insecticides was found to give higher yield in cotton, according to trials conducted at Sriganganagar Agricultural Research Station, Rajasthan.

The foliar treatment gave 400 kilograms more seed cotton per hectare compared to fertilizers applied in the soil.

Spraying 40 kilograms nitrogen per hectare gave better results than 20 kilograms. However, the yield difference between 30 and 40 kilograms per hectare was not much.

# Nine Laws of Family Planning

by DR. S. CHANDRASEKHAR

Minister of State in the Ministry of Health, Family Planning and Works  
Housing and Urban Development

It is true that after all, we have achieved a breakthrough in agricultural production and that in the years to come our dependence either on rains or on assistance from abroad may virtually come to an end, but, let not this development make us complacent for it is not the only index for making progress in the overall economic and social fields.

Man today lives not by food alone and one of the very important considerations which makes a nation strong is the advancement in the fields of education, of industry and of social welfare services. And progress not as indicated by percentage increases in agricultural or industrial output but in terms of what more people get, of the prospects that open up before them for developing their personalities and prospects in order to make positive direct contributions to national economy. Actually speaking, it is the capacity, the ingenuity and the resourcefulness of individual citizens that is the real index of the progress and strength of a nation. And these qualities we can ensure by adjusting our population or, in other words by modifying our reproductive behaviour so as to ensure the optimum per capita allocation of resources.

If, therefore, we have to ensure progress, we have to take recourse to methods of family limitation which include not merely contraceptive practices but also socio-economic action. The first law, therefore, which would effect the prospects and relevance of family planning in economic, social and development terms is that *faster the pace of economic and agricultural production, the greater the necessity for family planning and more the per capita gain.*

Indeed, by keeping our numbers within the best limit of our resources,

we would be contributing to the progress of our country. But that is not all. Merely keeping the number of people down and making the per capita availability of resources greater would not achieve the end that we have in view—the progress of the nation. Technological competence is an important factor in national life and this competence comes through making available the facilities for education. By education, I do not mean literacy; what I mean is the capacity of an individual to take decisions relative to his or her personal life in the first instance, and then to that of the community of which he or she is a member. Fertility behaviour, as you know, is an important factor in economic and social progress; and behaviour is influenced and shaped by education. If, therefore, there is an induction of family life education and population dynamics in various stages of our educational system right from the primary and secondary stage to the post graduate levels, such behaviour change can be brought about. Thus by providing the necessary knowledge about the desirability of smaller families and by creating the climate wherein the small family norm is accepted as a way of life we can achieve our goal. From this follow the *second law of family planning which we could enunciate as the greater the proliferation of educational facilities the more the change of strengthening the decision-making capacity of individual reasons and more direct and effective the impact on the size of the family.*

Once we have ensured increased agricultural and industrial production and educational facilities to the people in the terms that I have just now described, we come to yet another aspect of our lives—an aspect which we cannot ignore: This aspect is the inevitable prospect of develop-

ment of agricultural technology leading to greater mechanisation of farms. Wisdom would lie in our realisation of the fact that once we have put our economy on a sounder footing made stronger by agricultural self-sufficiency, the mechanisation of agriculture is inevitable. We should, accordingly, begin to plan in advance so that we can deal better with the trauma that the introduction of scientific and labour saving devices generally brings about. The need is created more for technically qualified people than unskilled labourers. In other words, when the horse-power replaces manpower, man must be able to take up the challenge to adjust his behaviour and to guide his own future. From this evident fact we should learn a lesson for the future. And thus emerges the *third law that greater the desire to increase Industrial or agricultural output, more the need for mechanisation and, accordingly, the more the need for small families.* This is so true, because the advancement of technology affects human beings and human welfare in the sense that if a worker with a large family is displaced from his work then the resulting misery is the travail of the whole family in direct proportion to its size. The displacement of a worker with a small family means lesser trauma, and in any case, a capacity for absorbing this shock for a worker with a small family would have had better opportunity to train himself up for more responsible positions.

We have talked of agriculture, of industry, of advancement of technology and how the small family could be better off in our changing world. But let us now look at another aspect which is evident in a society like ours, which is experiencing a change firstly, in the agricultural practices and, second-

ly, in the inevitable adjustments involved in a process of increasing urbanisation. I refer here to the inevitability of the migration of population from the rural areas to the urban areas consequent upon the prospective mechanization of agriculture and the expansion of urban industrial complexes and their penetration towards rural areas. Now, as we, know, both of these create problems. First of all, the pattern of life in the rural areas would change and, secondly, the influx of the rural flock into the urban areas would create problems of adjustment. This has happened in all societies whom we consider today as in an economically developed stage.

While, therefore, we plan future, we have to improve the prospects for our own people by propagating the acceptance and practice of the small family norm for its universal practice will ensure lesser disruption of the rural life by adjusting the manpower for agricultural needs and enabling only the technically qualified people, capable of making a contribution to trade or industry, to migrate to the urban areas. The *fourth law* which we could state thus: *that the greater the prospect of agricultural and industrial development, the more the problems of urbanisation and the more easy the prospects of their solution by the acceptance of the small family norm universally.*

Now many of you might ask what is it that we mean by 'change'. To define change we could simply say that it is the transition from an existing state to another one and can be made possible by proper planning. I would further venture to suggest that change is a condition that generally creeps upon us and overpowers us without our knowledge but that as sensitive and educated persons we have got to be sensitive to it, to perceive it as it comes, to adjust to it, and, if we find that it is not taking place but is wanted, then we must have the capacity and the ability to bring it about. An example of the change which we witness today is the relegation of what we once thought of as luxuries as sheer necessities of life. In a middle class household, the existence of a chair or a sofa set was consider-

ed a luxury but today it is a necessity. This change, if we were to analyse, has come about because of the higher expectations of the people and the making available of resources to them. Inevitably the per capita income of our country is going to rise with industrial and economic development and things like refrigerators or television will become the necessities of life. The only question is how we are trying to bring about this change from our present standards. And our reply is that we hope to achieve it by propagating the acceptance and practice of the small family norm, by bringing nearer to the people these things that which they would like to have. From this indeed follows our *fifth law* which we could verbalise as: *the greater the desire for luxuries or necessities of life made available by Higher technology and production, the greater the possibility of achieving them through the practice and acceptance of the small family norm.* Family Planning in other words, can really serve as the shock absorber for meeting the needs of the people in the very visible near future.

We have talked of the needs and necessities of the people. Now let us say a word about their aspirations. All of us know very well that a major reason for the stagnation of our rural life was the great stress under which the farmers lived during centuries of foreign rule. The very spirit of the farmer was crushed, he just lived in utter poverty and having struggled all his life without any gain, he even gave up expectation of a better life. How, then could he aspire for it? Another reason which contributed to this state of demoralisation was the existence of large families which were an order of the day influenced also by factors like high morbidity and mortality rates. However, since Independence things have begun to change at quite a fast pace and stepping up of community development effort and the presentation of the educational system in to the rural areas have brought to the surface the desires and aspirations of our rural people. Because of the implementation of various health and welfare programmes, the expectation of life in our

land has gone up and the mortality rate has dramatically declined. The result is that there are more mouths to feed than one can really support. As I have said earlier, when the prospects are of horsepower replacing manpower the small family norm is the surest way of preventing the trauma which is a by product of such a shift. When we correlate this factor with higher personal aspirations, we come to the *sixth law: that higher the personal aspirations and the greater the ability to handle technology, the more the need for keeping fertility within check.*

Now let us consider another aspect of life. We have talked of aspirations as a result of the changing economic situation. There is no doubt that the young children of today are going to learn more and have more than their elders ever had. Even our generation is going to feel that they never had it so good. But let us also realise that the aspiration of the young generation would be very different from those of their predecessors. The older generation aspired to come out of the bondage of the past, but the younger generation will seek further avenues of advancement and consolidate the gain already made. In brief, what we are going to witness in the very near future is that the resources

## Results of Foliar Spraying

An extra yield of 68.5 quintals radish per hectare has been obtained through spraying half the recommended dose of fertilizers on the foilage of the crop, reports the Indian Agricultural Research Institute, New Delhi.

The radish variety used was Japanese White.

The fertilizer solution containing urea, triple superphosphate and muriate of potash was sprayed on the crop in three equal doses, beginning from 27 days after the crop was sown at an interval of five days.

The extra net return by foliar spraying is put at Rs. 585/- per hectare.

available in the community or in the family will be used for further raising the living standard in preference to having diluted standard in a large family. From this follows the seventh law that *lesser the social burden or family responsibility, more the possibility for personal advancement and more the diversion of resources for investment in future.*

Taking in terms of the community and the family of which the individual is the most important part, we have to take into consideration their customs, values and norms. And if we study various cultures we would find that those of them which in their present status still reflect the glory of the past have in fact been able to do so because of lower pace of economic and social development and slower im-

pact of science and technology. Yet another unmistakable factor has been that in yet other societies the cultural patterns have changed because of the economic pressures and have also led to lower fertility. Accordingly, if we have to make progress we must also get ready to bring about modification in our social and cultural set-up. In other words, if we have to be a progressive society we must plan for it now. *We thus enunciate the eighth law that quicker the transformation of ancient cultures into modern functional societies sooner the decline in fertility and a rise in the standard of living.*

And last of all, let us not forget that with the great green revolution, we expect a change in the very fabrics of our national life. We are a democratic country and it is inevi-

table that as the rural areas begin to experience the economic boom they would also begin to share more and more in the task of raising revenue. And in order to get the best out of their contribution they would seek family planning as one of the effective tool of economic welfare. From this we may derive one ninth law : that *sooner the involvement of the agricultural population in the task of raising revenues or sharing tax burdens the greater the likelihood of their reaping the benefits by adopting and practising the small family norm.*

These are the nine laws which have to be taken into consideration while planning for the future of our programme. Guided by these we would surely be able to deliver the goods to the people and guide them along the path of progress and prosperity.

## Soybean the Miracle Crop

(Contd. from page 9)

or Desi plough may be done which will kill the weeds and increase the aeration of the soil. Chaubey (1968 Proc. of Conf. on Soybean at JNKVV, Jabalpur pp. 44-48) reported that cultural practices controlled all weeds. Among various herbicides Tok E-25 was significantly superior in controlling weeds followed by Treflan over control. In another experiment he found that clean cultivation gave the highest yield followed by farmer's practices, BV-201 at 2 kg. Treflan at 1.5 kg. Tok E-25 at 1.5 kg. per ha. Among the various herbicides, Treflan, Tok E-25 and BV-201 have given significantly higher yields, 20%, 15% and 13% respectively over control.

### Irrigation :

Usually irrigation is not given in soybean crop but when pre-monsoon sowing is done two to three irrigations may be given and the postmonsoon sown crop does not require irrigation but when rainfall ceases one to two irrigation may be given. Soil moisture at flowering and grain filling stage helps in better production of crop.

### Harvesting and Yield :

When the crop matures the foliage become yellow and the colour of the pods become brown. An average yield of 25-26 q. per. and 30-32 q. per ha. can be obtained from Clark-63 and Bragg respectively. Under suitable conditions 40 q. per ha of grain can be obtained. It gives about 25 tons of green fodder per ha.

### Storage :

The grain should be dried in the shade and filled in the gunny bags and it should be stored in a cool and dry place.

### Pest and Diseases :

Among the diseases the following diseases are important, Wilt caused due to *Fusarium* sp; downy mildew due to *Peronospora manshurica* (Naoum) Syd; leaf spot due to *Phyllosticta glycines* Thuem, (and root rot caused by *Macrophomina Phaseolai* (Maubl) Ashby. Among pests grass hoppers (*Chrotogonus trochypertus*), hairy Caterpillars, Stemborer beetle, groundnut sural and bugs are found (Anony-

mous 1956. The Wealth of India, Raw Materials 4 : F-G pp. 142-150, CSIR, New Delhi). It has been advised (M.S. Lal *et al* 1968. Package of practices for Soybean, Soybean Research Technical Bulletin No. 10 pp. 69-71) to spray aldrin/Dieldrine 18 EC 0.05% (25 cc. Aldrine/Dieldrine 18 E.C. in 10 litres of water) in seed furrow. 80 gallons of solutions will be sufficient for an ha.

(b) After emergence of the seedlings spray 0.05% Dieldrine 18 E.C. (25 cc. of Dieldrine 18 E.C. in 10 litres of water) at the rate of 80 gallon per ha. in order to protect the crop from caterpillar.

(c) At 4 weeks old stage.

One spary with 1 : 1 mixtures of Diazinon 20 E.C. 0.02% and Rogor 30 E.C. 0.03% (1 cc. of Diazinon 20 E.C. and 1 cc. of Rogor 30 E.C. in 2 litre of water) followed by one spray of Diazine 0.02% after 3 weeks interval may be done so as to control the leaf caterpillar, stemfly and petiole borer. At maturity spray Malathion 50 E.C. 0.05% (1 cc. of Malathion in 1 litre of water.

# Multiple Cropping Programme

Under the new strategy for increasing agricultural production in the country, the multiple cropping programme, designed to raise more crops per year per acre, is to cover 15 million acres in 1968-69. It is also proposed to bring during the Fourth Five Year Plan, now under making, 40 million acres all over the country—30 million acres in irrigated areas and 10 million acres in areas with assured rainfall—under this programme.

The proposed 5 per cent (compound) rate of growth per annum to be achieved in agriculture during the Fourth Plan roughly envisages an overall growth rate of about 28 per cent over the five-year period. This means that the production of foodgrains has to go up by 31.5 per cent on the basis of the projected production of 102 to 105 million tonnes of foodgrains during the base year 1968-69. In terms of production potential, it comes to about 33 million additional tonnes of foodgrains by 1973-74. So far as major commercial crops are concerned, their base level production in 1968-69 will have to be increased by 20 per cent in the case of major oil seeds and sugarcane, 21 per cent for cotton and 7 per cent for jute.

High yielding varieties programme and the multiple cropping programme are the two main planks of this additional production drive.

Last year's experience—when the multiple cropping programme was originally introduced in 9.25 million acres—has shown that short-duration varieties like moong, potato, cowpea, channa, maize, bajra, toria, dwarf rai and fodder can be grown profitably as a third crop after two bumper grain crops. It has also been proved that according to rainfall patterns in particular areas the rotation might include rice and crops like hybrid maize, sorghum, wheat, cotton, groundnut, potato, sugarcane, banana and fodder legume.

A nation-wide survey has revealed that the additional irrigation potential created in the last three

Plans mostly remained unutilised and needs most urgent attention. With the successful introduction of short-duration varieties, it has also been found possible to grow more than one crop, may be two, three or four, in all these irrigated areas.

While emphasising the need to take up the multiple cropping programme in a big way, the Union Department of Agriculture has stressed that the introduction of multiple cropping requires comprehensive planning. This includes selection of suitable areas, optimum utilisation of available irrigation potential, fixation of suitable crop rotations with short-duration varieties, timely supply of all other inputs and training of extension and farming personnel.

## Rotation Schedule

An All-India symposium, organised in January, 1968 by the Indian Council of Agricultural Research, on cropping patterns suggested a comprehensive crop rotation schedule suitable for varying agro-climatic regions in different States. The State Governments have also been advised to go ahead with the programme not only to achieve the targets fixed for 1968, but also for the entire Fourth Five Year Plan period.

While each State is expected to finalise its own programme of multiple cropping, the Union Department of Agriculture has suggested selection of a minimum of two districts in each State comprising one IADP district and at least one other district where irrigation facilities particularly through tubewells or assured rainfall are available. To begin with, one or two blocks in these districts will be selected during Rabi/Summer, with village as a unit. An intensive farmers' training programme will also be arranged for each crop under the programme. State Governments have also been advised to seek the services and guidance of the research institutes, agricultural universities and experts of the Food Foundation and USAID Mission.

After identifying suitable areas,

a detailed programme is to be prepared on the basis of a survey of the existing original situation. This survey will take into account irrigated areas by different sources, drainage, problems, crop rotations and cultivation of various crops in Kharif, Rabi and Summer seasons. Availability of the extension, staff at district and block levels on the IADP/HVP pattern, and of seeds of short-duration crops to be grown under multiple cropping including pulses and commercial crops and fodders. This will also cover fertilisers, improved implements, machinery, plant protection services including pesticides, weedicides and technical know-how and credit facilities through Government co-operatives and private banking agencies. Requirements of machinery hiring and service centres, training of extension personnel and farmers information support will also be looked into.

The State-wise targets, in units of lakh acres, for multiple cropping programme both for the year 1968-1969 and the Fourth Five Year Plan are as follows: (Figures in the brackets indicate the tentative targets proposed for the Fourth Five Year Plan).

Andhra Pradesh : 20 (53.30) ;  
Assam : 10, (26.80);  
Haryana : 2, (7.50);  
Kerala : 1, (3.00);  
Maharashtra : 1.75;  
Mysore : 10, (26.50);  
Punjab : 10, (27.50);  
Uttar Pradesh : 25, (80.00);  
Pondicherry : 2, (50);  
Himachal Pradesh : 2, (50);  
Bihar : 34, (50.30);  
Gujarat : 2, (7.40);  
Jammu and Kashmir : 1.5, (2.00);  
Madras : 10, (26.70);  
Madhya Pradesh : 2, (15.50);  
Orissa : 8, (23.50);  
Rajasthan : 6, (15.50);  
West Bengal : 6, (18.00);  
Goa : 15, (40);  
Delhi : 2, (50).

# World

World wheat and flour exports during the fiscal year 1968 were 52.4 million metric tons. This is 3.7 million below shipments in the previous year. Wheat movements decreased six per cent while flour exports dropped 18 per cent.

Agreement has been reached between Cambodia and ten countries and the United Nations to help finance construction of a 117 million dollar dam and power complex on the Lower Mekong River. Countries signing the agreement include: Australia, Canada, West Germany, Pakistan, India, Italy, Japan, the Netherlands, the Philippines, and

the United Kingdom.

Nepal has revised its Third Five-Year Plan, 1965-70. The original Plan envisaged increasing Nepal's food production by 15 per cent over the five-year period. Under the revisions, the Government recognizes that this objective cannot be fully met by mid-July 1970.

Ceylon is exporting less tea. Shipments in the first quarters of last year totalled nearly 353 million pounds valued at 148 million (U.S.) This is about 23 million pounds less than in the same period of the previous year and 24 million (U.S.) less in value.

# Trade

# Review

The U.S. honey crop of 1968 was down for the second year in a row. Output was 200 million pounds, a 23 million pound drop from the previous year.

World grapefruit production has expanded rapidly in the past ten years. Production for the coming year in the major producing nations is estimated at an all-time high of about 74 million boxes.

Chile's livestock is being attacked by the worst epidemic of foot and mouth diseases in the last ten years in the country. The province of Santiago is among the areas worst hit and outbreaks have been reported on almost all the dairy farms near the capital city.

There will be a slight decrease in egg production in 1969 in the United States, but there will be a substantial increase in broiler output. That's the U.S. Department of Agriculture forecast which also anticipates a small increase in turkey production in 1969.

## A New Variety—"Kulu"

Australia has very recently developed a long grain rice variety "Kulu", which is one of the highest yielding varieties. It has helped Australia to raise its rice production to 230,000 tons in 1968. With an average yield of 2.87 tons per Acre in areas with ample irrigation facilities where highest yield was recorded as 4.7 tons per Acre. Extensive Mechanisation and the use of Scientific farming methods have helped Australia very much to have bumper rice crop.

### Research work

Researches revealed that nitrogen is the only fertilizer needed to get maximum results from New South Wales rice fields. Rice takes nitrogen in the Ammonia form and nitrates are quickly lost after application of water to the soil. Research also reveals that a legume pasture for several years in rotation improves the soil fertility greatly. The amount of organic nitrogen built up during the pasture rotation becomes available to the rice when the land is returned to the crop.

## Edible Cottonseed Flour

Protein forms an essential constituent of human diet. Cottonseed oilcakes are now increasingly used for the preparation of edible cotton-

seed flour and there is considerable scope for commercial production of this product. The flour is rich in protein and lysine and may be used as a protein supplement in human dietaries. It is obtained as a powder which may be used both in blended and processed foods. In view of these possibilities, the Research Laboratory, Hyderabad, carried out pioneering work on the production of edible cottonseed flour and it is now being manufactured in the country on a commercial scale.

## Poultry Farming in Maharashtra

Poultry Development in Maharashtra is being accelerated. Under the Emergency Poultry programme 14 intensive Poultry Development Blocks having facilities for production of breeding stock, disease control, feed supply, training and credit are being organised to help cooperative poultry farming being run in the State on large and small scale.

These centres rear sexed chicks for 5 months and then farm them out to member societies 200 to 500 chicks (large cooperative) and less than hundred to small ones.

# Know about Poultry

## Non-protein Nitrogen

Poultry researchers are reporting favourable results by adding non-protein nitrogen in the diets of laying hens. In Texas, U.S.A. they have found that urea or diammonium phosphate lowers the ration costs when substituted in a 14 percent sorgum-soybean diet at the equivalent of 2 per cent protein. Such a substitution produced favourable responses in terms of egg production, egg size feed efficiency and income over feed cost. The non-protein nitrogen diets were supplemented with 2.2 pounds of methionine hydroxy analog calcium (MHA) per ton. Supplementing the control diet with the MHA did not increase egg production but did increase egg size, feed efficiency and income over feed cost.

## High in Efficiency

Compared to other domestic animals, the laying hen is the most efficient converter of feed protein to food protein. She also has low requirements for land and capital. Relative conversion effectiveness of different animals are as follows: the laying hen 26 per cent, dairy cow 23 per cent, broiler chicken 18 per cent, swine 11 per cent, and beef about 4 per cent.

## Poultry Space Needs

What are the space needs poultry? Here are some recommendations from poultry specialists at Purdue University, Lafayette, Indiana, U.S.A. They stress that the following are not intended to be minimum requirements; they are practical allowances.

Nest space—1 per 5 layers of 1 square foot of colony nest per 7 layers.

For broilers:

Floor space—1 square foot per bird or 1.5 square feet if raised to roaster size.

Feeder space—one inch per chick to 4 weeks; 2 inches per bird from 4 to 10 weeks; 3 inches per bird from 10 to 15 weeks, or 15 tube feeders per 1,000 birds to 10 weeks.

Waterer space— $\frac{3}{8}$  to  $\frac{1}{2}$  inch per bird with automatic trough type; two 8-foot V troughs per 1,000 birds. For replacement pullets:

Floor space—0.5 square foot per bird to 6 weeks; 1 square foot per bird to maturity in controlled environment; 1.5 square feet per bird to maturity in conventional housing.

Perch-space—4 to 5 inches per bird.

Feeder space—1 inch per chick to 4 weeks; 2 inches per chick from 4 to 10 weeks, 3 inches per chick from 10 weeks to maturity.

Waterer space— $\frac{3}{8}$  to  $\frac{1}{2}$  inch per bird with automatic trough-type waterer, and three 1-gallon waterers for 250 chicks at start.

## New Feed Additive

Cyanamid International has announced a new non-antibiotic growth promoter for broiler chickens. The new product, Payzone nitrovin, is now available commercially in Great Britain, Australia, Taiwan, Hong Kong, Ireland, Malaya and Thailand. It will also be marketed in other European and Latin American countries.

In Cyanamid trials, 10 parts per million of dietary Payzone produced on the average an extra 0.24 pounds liveweight, which is equivalent to a 6.3 per cent increase in weight to nine weeks. The date also showed that significant responses to Payzone were achieved over any response gained from dietary penicillin.

## New Dairy Breed

A new breed of dairy cow called *Jamaica Hope* has been developed in Jamaica. It is the product of 50 years of development with the major breeding based on the Jersey with various crosses to Sahiwal, from India and other breeds including Holstein and Guernsey. According to reports from Jamaica, production of some *Jamaica Hope* cows exceeds 20,000 pounds of milk in a lactation. *Jamaica Hope* breeders are striving for a dairy animal which

is adapted to tropical climates and carries a degree of resistance to tick fever. Because of the varying amount of cross breeding, the color of *Jamaica Hope* varies from fawn to almost black.

## Leaf Proteins

Can lucerne be a major source of Protein for human food? Biochemists at the University of Wisconsin, Madison, Wisconsin, U.S.A. are seriously investigating this very thing. They have successfully prepared a leaf protein concentrate by spray-drying the juice squeezed from fresh lucerne. The resulting powder has a high nutritive value. The vitamin content is higher than in commercial dehydrated lucerne products. The nutritive value and digestibility of the leaf protein concentrate compare favourably with common human food proteins, with about the same protein value as whole milk.

The Wisconsin biochemists have built an experimental processing machine in which a hammer mill breaks up the lucerne plant cells, after which the juice is squeezed out by applying pressure to the material as it moves around a perforated drum. Juice drips into a collecting pan and is later spray-dried.

The process offers a very high utilization efficiency, as the powder can be processed into human food and the fibrous residue used as a cattle feed. The residue still contains 50 per cent of lucerne's original protein supply, and it can be given the same nutritive value as lucerne haylage by adding urea.

## Aluminium and Soil Acidity.

The problem of soil acidity is mainly an aluminium problem explains Eugene Kamprath at North Carolina State University Raleigh, North Carolina, U.S.A. Excessive amounts of aluminium in the soil prevent plants from taking up needed calcium, magnesium and phosphorus. Lime is the answer to this acidity, or aluminium problem. Proper liming neutralizes aluminium and eliminates its harmful effects, permitting plants to resume normal and profitable growth. Kamprath says the harmful effects of aluminum are most noticeable on

young seedlings. Seedling roots develop poorly in highly acid soils.

Kamprath and his associate have also found that the petioles (stems which support leaf blades) of soybean plants growing acid in soils tend to deteriorate. The petioles bend over and the leaves fall off. This is caused by aluminium in the soil taking up needed calcium. Kamprath's research has also shown that magnesium deficiency is most likely to be problem where soils are too acid for the crop being grown. Other studies have shown that phosphorus rates can sometimes be cut in half once sufficient time has been applied to the soil to neutralize the effects of aluminium.

#### India's Grain Storage Plan Receives Rs. 2 Crore Grant

PESTS-rats, insects and others and plant diseases destroy food to a significant extent. Various estimates of this destruction have put the figure at anywhere

between 10 and 20 per cent of India's total production.

The value of food so lost could work out to as much as Rs. 750 crore a year, according to one authority. To counter these losses, the Government of India has launched a nationwide protective programme.

Besides measures to apply pesticides widely to fight plant disease steps have been taken in the fields of rat control.

A key effort involves the development of steel food-storage bins which afford protection from menace.

The U.S. Government recently announced a grant of Rs. 2.03 crore for speeding construction of rodent-proof storage.

The U.S. grant will help build storage capacity for 135,000 tons of foodgrains.

A portion of the rupees derived from the sale of American farm products to India under the PL-480 programme is reserved for meeting the expenses of the U.S. Government in India.

The grant of Rs. 2.03 crores has been made by a reallocation of such 'U.S.—suses' rupees.

## Poultry Business

How much will it cost to run a poultry farm with 1000 laying birds?

The estimate is Rs. 30,000.

This includes capital investment like land, poultry houses, equipment, water and electricity arrangements and raising cost including cost of baby chicks, feed for six months and medicines.

Such a unit will give the farmer a profit ranging from Rs. 500/- to Rs. 1,000/- per month.

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