KRISHAK SAMACHAR

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Mushran & Bholay on GDR Tour

On an invitation from the Farmers Mutual Aid Association of German Democratic Republic, the chairman of the Samaj, Shri S.N. Mushran, and Secretary, Dr. D.A. Bholay left India on 22nd September, 1969 by air. They will be in GDR from 23rd September, 1969. During their stay in GDR, they will meet the officials of the GDR Government as well as farmers in general. They will study the working of the Farm Organisations, Cooperatives, etc. in that country. They hope to improve the Farmers Exchange Programme and explore other programmes with the Farmers Mutual Aid Association. They hope to strengthen the bond of friendship between our two organizations i.e. Bharat Krishak Samaj and Farmers Mutual Aid Association and two countries.

On their return from GDR, they will also visit Scotland for one week at the invitation of the Scottish Young Farmers Association. There too they will try to study the working of the Farm organization ; cooperatives etc. in addition to meeting the farmers and officials of that country.

In addition to the Staff of the General Office a number of dignitaries and well wishers of the Samaj were present at the Palam Air Port to see them off.

BANISH FIELD PESTS OF ARHAR

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Among the various pulse crops grown in the Indian Union, Arhar (Cajamus Cajan L.) having its origin from India or Upper region of river Nile in Africa has been under cultivation from the last three thousand years and is grown over an area of 2,473.4 thousand hectares annually producing 1,893.9 thousand tonnes of grains. The green leaves and tops of plants are fed to animals or used as green manure. Green pods are used as vegetables. Husk of pods or seeds with part of the kernel constitutes valuable cattle feed. Dry stalks obtained after threshing are used for basket making or thatching material. Being deep rooted, it is also planted as a soil renovater to break up the sub soil and as counter hedge to check erosion. (Bhatnagar 1967).

So far in India 34 different types of insects have been reported attacking various parts of this leguminous crop right from sowing till harvest of the crop. Pod fly, Pod bug, Plume moth. Pod borer and Chrysomelid flea beetles have been found to be very destructive and are responsible for lowering down the yield both qualitatively and quantitatively. The flea beetless make their appearance and cause appreciable damage to the crop when it is in seedling stage by making shot holes in the leaves by cutting and nibbling the foliage. The leaf roller folds the leaf as well as tender shoots and gets concealed is between the web in early days of the crop. Larvae of the plume moth eat up the flower buds and flowers and also feed on the young pods and grains within. The maggots of the turped fly enter inside the growing pods and feed on the developing seeds. Pod Bug sucks the sap from the unripened pods till they become too hard to be pierced through. (Pandit and Rawat 1965) Apart from these above noted pests, Leaf Roller, Cutworks, Weevils, Bettles, Thripa, and Membricids also cause appreciable damage to the crop. Here only the marks of identification, nature of damages, life history and control measures of Plume moth, Pod bug, Pod fly and Pod borer have been given.

Tuar Plume Moth (Exelestes atomosa W.) : This is a specific pest of Tuar is any parts of the country. The adults are slender, grey in colour and measure 7-8 m.m. in length and 20-22 mm across the wings. Wings are deep brown with whitish hairy patches. Each fore wing bears one or two brown spots and is divided longitudinally into two lobes or plumes (From which the familiar name plume moth has been derived). Hind wing is divided into three lobes provided with fringe like border. The caterpillars are short, greenish brown covered with short hairs and spines.

NATURE OF DAMAGE : This is the most destructive pest of Tuar. Upto 30% loss to the grains has been reported due to this pest in Gwalior (M.P.). Argikar and Thebbi (1957) have estimated 19.56% loss in weight of grains and 46.43% grains bored by this pest. The caterpillars feed on tender buds, flowers and tender developing pods by making holes and feeding voraciouly on the developing seeds, thrusting their heads inside. The pods thus are rendered seedless or with partially eaten grains. The seeds from damaged pods become shrivelled.

Life History

Mating occurs at any time one to three days after the emergence of adults. Eggs are laid singly on tender pods, flowers, calyx, underside of the leaves and tender shoots of the plant. The eggs are glued firmly. Single female lays 60-139 eggs during her life time. Eggs are small, light greenish with bluish tinge when fresh and become yellow at the time of hatching. Egg larvae and pupal periods are 2-9, 15-38 and 6-15 days respectively. Single life cycle from egg to the adult requires 23-52 days. The pest is active from September-October to February-March during which period 4-5 generations are completed.

Control Measures

Dust 5-10% B.H.C. @ 10 Kg./ acre or spray 0.2% D.D.T. Suspension (1 lb. 50% D.D.T. W.P in 25 gallons of water) @80 gallons/acre.

Tuar Pod Bug (*Clavigralla gibbosa S.*)

The adult bugs are stout and greenish brown in colour having spined pronotum. The femora of the hind legs are swollen. The nymphs are brownish in colour.

Nature of damage

Moth nymphs and the adults suck the sap from the leaves, flowers and developing pods. The seeds of attacked pods remain shrivelled. Green pods are attacked more than mature ones.

Life History

Mating takes place at any time of the day and night. Single act of copulation lasts for 5-10 hrs. The eggs are laid on the pods in clusters of 5-13 firmly glued. Single female lays 150-200 eggs during her life time. Eggs are dirty white in colour bearing swollen projections on the ventral and dorsal part of the egg towards the anterior side. Egg and nymphal periods are 4-10 and 12-25 days. Single life cycle from egg to the adult takes 16-35 days. The adults live for 40-50 days. The pest remains active from Nov. to May during which period as many as 8

generations are completed. After May the pest disappears from the field probably migrating to alternate hosts and again appears on the Tuar crop in October-November when it flowers.

Control Measure :

Dust the crop with 5-10% BHC @ 10 Kg./ acre.

Tuar Pod Fly (*Acromyza obtusa*):

Maggots are small, apodous white in colour while the adults are small insects having only one pair of wings having somewhat blackish colour.

Nature of Damage

The maggots bore the pods and feed on tender developing seeds rendering them unfit for human consumption and seed purposes. Though the whole seed is not eaten up by the maggot the partial damage caused spoils the seed and the latter also becomes subjects to bacterial and fungoid diseases. (Ayyar, 1940). Gangrade (1963) has reported upto 86.4% infestation to Arhar due to this pest alone in Jabalpur (M.P.).

Life History

The adult female fly thrusts minute eggs into the tissues of tender pods and the hatching maggots enter the pods and feed on the developing seeds. Single female lays about 70 eggs. Egg, larval and pupal periods are 3, 6-10 and 10-20 days respectively. Single life cycle takes 19-33 days, and the pest passes through 3-4 generations from October to April.

Control Measures

Dust the crop with 5-10%BHC @ 10 Kg./ acre or spray with 0.25% DDT or 0.05% nicotine sulphate @ 80 gallons/acre

Tuar Pod Borer (*Helio this armigera*) Though this insect is a specific pest of gram throughout the country but it has been reported attacking various other crops of economic importance like Tuar, Tobacco, Cotton, Groundnut, Tomato, Pea. Opium Ganja, Linseed, Safflower, Brinjal and Maize. This is an important pest of Arhar in South India and often causes serious damage. The full grown caterpillar is elongated, cylindrical growing to about an inch and a half in length; its colour is variable though generally it is green having light longitudinal or grey streaks along the sides. Setae, tubercles and spiracle, are distinctly visible. The adult is stout medium sized, olive grey to dark reddish brown moth. There is a dust speck and dark area near the margin of each fore wing. The hind wings are creamy yellow with large marginal smoky area (Dubey and Verma 1967.

Nature of Damage

The freshly hatched caterpillars feed on the tender parts of the plant and the latter stages feed on the tender pods. They eat away the grains by making holes in the pod. **Life History :** Shining greenish yellow eggs, spherical in shape and beautifully sculptured are laid singly on the tender parts of the plant Ayyar (1940). Single female lays 250-500 eggs during her span of life. The hatching out caterpillars first feed on the tender parts including leaves. They later migrate to the pods and feed on the developing grains. Egg, larval and pupal period are 6-8, 17- 9 and 14-15 days respectively as worked out at Sehora (M.P.) by Dubey and Verma (1967). These developmental periods vary according to the environmental conditions.

Control Measures

Because of the cannibalistic habit found in the larvae of this insect, the pest does not multiply in alarming proportion as the full grown larvae eat away the young ones in nature and thus keep an indirect check over the pest. Spray the crop with 0.2% DDT@ 80 gallons per acre. Crop rotation also helps in reducing the incidence of the pest (Singh 1968).

Note

Handle the insecticides with great care. Wash hand, mouth etc. with soap after the spraying or dusting operation is over.

Support Prices For Kharif Cereals

The Government of India, after considering the recommendations of the Agricultural Prices Commission, have decided to announce minimum support prices for Kharif cereals for 1969-70 season, as follows:

1. Minimum support price for standard variety of paddy will be Rs. 45 per quintals. The minimum support prices for other varieties will be fixed by State Governments in consultation with the Central Government after taking into account the qualitative differentials,
2. Minimum support price for jowar, bajra, maize and ragi will be Rs. 44 per quintal.

The Government shall make effective arrangements for purchase of these grains at the minimum support prices. Open market prices will not be allowed to fall below this level. The intention of announcement of these prices is that these prices should serve as a long term guarantee to producers so that they can pursue their efforts with the assurance that any temporary glut in the market would not depress prices and consequently their incomes.

A Supper Egg.

A Supper Egg weighing 135 grams, was recently laid by a hen at the cooperative in the Harz (GDR) when the enormous egg was broken another egg with the shell was found, apart from the usual yolk and egg-white.

Fertilizers and Its Application

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The crop yields in India are very low. It is the low position of the yields, which is responsible for the chronic agricultural crisis in India. It is well known that the crop yield per acre is closely related to the input of fertilizers per acre of cropped land. The level of fertilizer consumption in terms of plant nutrients (N+P+K) (figures in Kgs/hectare) is presented below :—

	N	*P*	*K*	*Totat*
Europe	29.09	24.71	24.01	71.81
U.R.S.R.	4.32	2.71	3.10	10.13
N. America	10.04	7.20	5.74	22.98
Asia.	4.59	2.18	1.73	8.50
India	4.68	1.55	0.75	6.98
World.	4.59	3.59	3.00	11.18

The low level of fertilizer consumption in India is strikingly clear. It is obvious that if we have been doing rather badly on the agricultural front, it is not the weather or the soil that is to be blamed, but our failure to introduce modern agricultural techniques, in which of-course adequate use of fertilizer plays a prominent role.

Of the two principal reasons for low agricultural production, (i) shortage of fertilizer production, (ii) inadequate use of fertilizers, the reason shortage of fertilizer production is much responsible for the low achievement in III Five Year Plan, equally as much as the scarcity condition. Fortunately, the self-sufficiency in fertilizer productiou is expected to be achieved by 1973-75. According to the production targets now finalised for the IV Plan, output of nitrogenous fertilizers will be of the order of 3.7 Million tons and of Phosphates 1.7 Million tons. To achieve these targets the Union Petrochemical Ministry proposes to establish a capacity of 5 Million tons in the cases of the Nitrogenous fertilizers and of 2 Million tons for phosphate at the end of the Fourth Plan.

The position of production, imports and distribution of fertilizers during Plan periods is as under :—

(*Figs. in Lac tons*)

	N	P_2O_5
Installed capacity for production	9.05	4.34
Under implementation.	16.74	4.99
Approved in Principle.	4.26	2.38
Proposed for implementation.	9.11	2.11

So far we have seen the quantitative impat of the fertilizers on the economy of Indian agriculture. Equally important factor is the chemical quality of the fertilizer, which in technical terms known as 'balanced fertilizers. N, P_2O_5 and K_2O are the most important requisites of the plant food. Not only that but their proportion determines the balance of the nutrition to the plant. In a vast Agricultural area under our conditions and several crops grown in the different seasons, it is but natural that these proportions of NPK will vary under the various conditions line soil climate, season, crop, etc. These various types of various balanced fertilizers in definite proportions of NPK are to be borne in mind before we take up the manufacture of fertilizer complexes. The following table shows the proportions and quantities of N.P.K. at present used in the various states.

(*Fig. in kg./cropped hectare*)

Tract	*N*	*P*	*K*
India	7.18	2.77	1.30
Assam.	0.15	0 57	0.26
M.P.	1.32	0.44	0.14
Orissa.	1.50	0.23	0.29
Rajasthan.	1.59	0.49	0.08
Maharashtra.	5.38	2.90	1.12
West Bengal.	5.93	1.52	1.91
Gujarat.	5.98	3.20	0.30

(*Figs in 1000 tons*)

	N			P_2O_5			K_2O		
Year	*Production.*	*Imported*	*Distributed*	*Production*	*Imported.*	*Distributed*	*Production*	*Imported*	*Distributed.*
1952-53	53.1	44.3	57.8	7.5	—	4.6	—	3.3	—
1955-56	76.9	53.4	107.5	12.4	—	13.0	—	10.3	—
1960-61	112 0	171.9	211.7	53.7	0.1	53.1	—	24.9	29.1
1965-66	237.9	376.3	582 8	118.8	21.8	134.1	—	93.6	89.6
1967-68	402.6	975.9	1135.7	207.1	370.3	438.2	—	276.5	205.8

	N	P	K
Bihar.	6.01	2.44	0.28
Mysore.	8.06	4.35	1.98
U.P.	8.24	2.65	2.04
Kerala.	10.48	4.72	8.04
Himachal Pradesh	10.65	5.29	0.49
Andra Pradesh.	12.30	3.97	0.33
Punjab,	14.00	3.68	1.08
J. & K.	15.04	15.00	11.77
Madras.	20.71	9.19	6.24

They were used with various combinations by mechanically mixing them.

The uptake of N.P.K. of some important crops is given below :

Figures in kg./hectare

	N	P	K
Paddy.	81	23	122
Jowar	51	18	86
Wheat.	58	29	67
Cotton.	26	11	83
Sugarcane.	119 to 144	30 to 104	181 to 407
Gr. Nut.	78	22	44

It will be seen from the above two tables that in almost all the states, the use of P_2O_5 and K_2O is far less as compared to the consumption by the plants. Inspite of the fact that our soils are rich enough in supplying P_2O_5 and K_2O, still it is necessary that the balanced nutrient should have higher proportion of $P_2O_5$and K_2O .

Response from fertilizer use

The input output response yardstick is usually taken as 10 tonnes of additional food grains from an additional tonne of fertilizer nutrients used. It may vary according to the effective rainfall or irrigation water and soil fertility levels. By using hybrid or new varieties of Jowar, Bajra, Maize, Paddy and Wheat, response of 12 or 14 tonnes of food grains per tonne of nutrients are indicated as possible where appropriate water, and other inputs are combined.

The practical field experience shows that the value of increased production must exceeed the cost of fertilizers by 2-3 times if there is ready acceptance for extensive use of fertilizers and other yield increasing practices. The benefit cost ratio is even higher than 2-3 times if the fertilizers are used for high yielding varieties. These varieties give a substantive increase in yields by the proper use of fertilizers.

What nutrients are needed ?

The soils are usually deficient in N & P_2O_5. In some cases, K_2O is also deficient. Plant, however, absorbs these nutrients on large scale from the soils. Hence, it is necessary to supplement these nutrients to soil artificially through fertilizers. Nitrogen gives quick and spectacular response immediately. But in the case of P_2O_5 and K_2O, the response is indirect and rather slow. P_2O_5 and K_2O act very slowly and keep up the fertility of the soils. If P_2O_5 and K_2O are not supplemented in adequate quantities, the soils get adversely affected and crop production decreases. It is, therefore, advantageous to use the nutrients in combination rather than singly. The nutrients should be applied as recommended by the State Agricultural Departments or as determined by the Soil analysis.

Quantity of nutrients to be applied

Maharashtra Agricultural Department has recommended the following doses to the hybrids and high yielding varieties

kg./acre.

	N	P_2O_5	K_2O
1. Paddy- Taichung I.R.8. Seedlings.	40	25	20
2. Hybrid Jowar (Kharif) Heavy soil.	30	20	15
Medium soil.	15	10	10
Hybrid Jowar (Rabi) Irrigated.	30	20	15
Dry (Heavy soil)	20	10	10
3. Hybrid Bajri	20	15	10
4. Wheat Mexican Wheat N.I.747-19	40	25	20
& other varieties.	30	10	10
5. Hybrid Maize.	40	25	20

In general, application of 30 to 50 kgs. of N, 20 to 30 kgs. of P_2O_5 and 15 to 25 kgs. of K_2O gives very good yields of these varieties. Considering the fertility of irrigation water and kind of the crop and personal experience, these doses can be suitably modified. These crops thrive well on medium and black soils and yields the best when adequately fertilized. The fertilizers are to be applied in two doses. Half the quantity of N, and full quantities of P_2O_5 and K_2O be applied just before sowing or at the time of sowing, while remaining doses be applied after 3 to 4 weeks of plant growth.

Which fertilizers to be used ?

The fertilizers are available in the market in various forms. Some of them supply the particular nutrient, while some mix or complex fertilizers supply 2 or more ingredients. Fertilizers like Ammonium Sulphate, Calcium Ammonium Nitrate, Urea, Super Phosphates, Potassium Sulphate, Murate of Potash, etc. supply single nutrient only. Farmers are put to inconvenience and loss if they mix and use these fertilizers. Secondly, if the required fertilizers, which supply different nutrients, are not available in time, farmers apply whatever fertilizer is available. This practice not only decreases the yield, but also adversely affects the soil fertility.

(*Contd. on page* 6)

Points to Note About Smooth Sponge Gourd & Ridge Spongs Gourd

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Smooth sponge gourd and ridge sponge gourd are important common vegetables grown in India. The smooth sponge gourd is called by different names in different places such as *Nanuya, Ramtorai, Ghiya, Torai, Raruya* etc. and ridge sponge gourd is known as *Taroi, Kali taroi* and *Satputia.* The smooth sponge gourd is believed to be originated in South Asia and it is found growing wild in India and Jawa and both of these gourds are found growing all over the country.

The fruits of smooth sponge gourd is smooth and the fruits of ridge sponge gourd possess sharp ridges on the fruits. The seeds of ridge sponge gourd is black and the seeds of smooth sponge gourd is black or white. The flowers of smooth sponge gourd are deep yellow and open in the morning, whereas, the flowers of ridge sponge gourd are light yellow in colour and open in the evening. Usually male and female flowers are seen separately on the same plant and the male flowers appear first on the plant and female flowers later on and therefore the fruiting is delayed, but in some varieties the male and female flowers appear almost simultaneously, on account of which these varieties are preferred.

Climate

The plant grows well in warm humid climate and has got a wide adaptability, but is affected by frost.

Soil and Soil preparation

The crop can be raised on a variety of soils like sandy loam, alluvium, but prefers to grow on loamy soils. It can also be successfully raised on clayey soils provided it is supplied with organic matters and it is not waterlogged. Four ploughings should be done, followed by one or two planking in order to break the clods of the field. Harrowing may also be done in order to remove weeds from the fields.

Manures and Fertilizers

The smooth sponge gourd and ridge sponge gourd respond to manures and fertilizers and an application of 20.25 tons/ha of farm yard manure or well decomposed compost should be applied before sowing at the time of field preparation and in addition to application of 70 to 80 kg/ha of nitrogen, 60-80 kg/ha each of phosphorus and potash may be applied. When the sowing is done in pit, it is filled up with well decomposed farmyard manure or compost (3 to 4 baskets) and fertilizer mixture (100 grams of ammonium sulphate, 100 grams of Superphosphate and 50 grams of muriate of potash per pit) is also applied in the pit and is mixed thoroughly. Purewal and Arakeri (1966—Vegetables—Hand Book of Agriculture I.C.A.R.) have suggested to apply in cucurbitaceous crops a fertilizer mixture of 56.00 kg/ha each of nitrogen and phosphorus and 112.00 kg/ha of potash before sowing the seeds.

Varieties

There are a number of local varieties of smooth sponge gourd and ridge sponge gourd, but two important varieties have been recommended from I.A.R.I., which has gained popularity all over the country. These are as follows:

1. *Pusa Nasadar*: It is a mid-early variety of ridge sponge gourd which flowers in about 60 days in summer.

2. *Pusa Chikani*: It is an early variety of smooth sponge gourd which flowers in about 45 days. The seeds of this variety can be sown in rainy and summer season.

Rotations

(1) Smooth sponge gourd—Cauliflower—lady's finger—Tomato—Onion.

(2) Smooth Sponge gourd—Cabbage—Lady's finger—Brinjal—Garlic.

(3) Ridge sponge gourd—Onion—Cowpea—Radish—Cluster bean.

(4) Ridge sponge gourd—garlic—Clusterbean — Carrot — Lady's finger.

(5) Chillies—Smooth sponge gourd—Lady's finger—Potato.

(6) Brinjal—Ridge sponge gourd—Cowpea—Turnip—Bittergourd.

(7) Tomato—Smooth sponge gourd—Runner beans—Tomato.

(8) Lady's finger — Potato (early)—Ridge sponge gourd — Runner beans—Bottlegourd.

Time and method of sowing and seed rate

The rainy season crop is sown in June and July and the summer season crop is sown from the last week of January to March. The crop may be sown in pits, or in furrows or in broad beds. When the crop is sown in pits, the pits of suitable dimensions (one meter deep and 60 to 90 cm. wide) are dug. The distance between rows is about 2.5 meter and 1.5 to 2.0 meter between two pits and at one place 4-5 seeds, are sown, and later on, they are thinned upto two or three plants at one place. In some plaees they are sown in furrows and the

seeds are sown at a distance of 90 cm. in the furrow and furrow to furrow distance may be about 2.0 meter and in some places broad beds of about 2.0 to 2.5 meter are prepared and in between the beds 30 to 45 cm. broad irrigation channel is prepared and the seeds are sown on both the edges of the beds at a distaace of 1.20 to 1.80 meter. The seeds are sown at a depth of 2.0 cm. The seed rate is about 4.5 5.0 kg/ha.

Interculture and Irrigation

In rainy season crop, two weedings should be done and one weeding in summer season crop and at the time of weeding a little earthing should also be done, so as to impart a little more strength to the plant. In rainy season crop the vines are allowed to trail on the thatch prepared with dry sticks of Cajanus Cajan and bamboo which is supported with bamboo pegs of 1.50 to 1.80 meter high or dry tree branches may be fixed near the plant and the plant is allowed to trail on it. The dry tree branches may be about 1.80 to 2.50 meter high, having a good number of spreading branches in order to give a good support to the growing and spreading vines. The summer season crop is allowed to trail on beds, this is because the growth of the plant in the summer season is not so prolific as compared to the rainy season crop and also because of high temperature in May and June, plant needs a little moist condition for better growth and better fruiting.

The rainy season crop is raised under rainfed condition, but when the rain ceases from September onward 3 to 4 irrigations may be given which increases the flowering and fruiting. The summer season crop is raised on the availability of irrigation and in summer the crop should be irrigated at an interval of 4 to 6 days depending on the source of irrigation and type of soil.

Harvesting and yield

Tender and good quality fruits are preferred and therefore, fruits should be picked up when they are one third grown. If fruits are not picked up in time they become hard and spongy and are not good for vegetable purpose. The fruits should be harvested in the morning without interfering with the vines. Generally the consumer tests the quality of the fruits by pressing them with nails. The fruits are perishable and, therefore they should not be stored more than a day. Usually 30-35 fruits per plant are obtained. The rainy season crop gives about 125 q/ha whereas the summer season crop gives about 50-60 q/ha of good quality fruits.

Fertiliser & its Application . . .

(*Contd. from page No.* 4)

The fertilizer mixtures are available in 12 : 6 : 0, 9 : 9 : 5, 15 : 15 :15 etc. forms supplying N, P_2O_5 and K_2O. No doubt this saves the troubles of mixing and applica tions. However, as the ingredients are not homoge neously mixed, these are not available to plants uniformly. Secondly, these mixtures are costly.

Ammonium Phospate, Nitrophosphate, Ammonium Nitrate Phosphate are the complex fertilizers wherein above difficulties are eliminated. Government of India has prepared a granulated complex fertilizer--Ammonium Nitrate Phosphate, commercially know as Suphala From 1969, an additional essential plant food nutrient was added to Suphala viz. Potash. Now the Suphala is available in 3 grades viz 20 : 20 : 0, 18 : 18 : 9 and 15 : 15 : 15 These balanced fertilizers are the existing modern fertilizers.

The chemical mixing of Suphala is homogenous, which keeps the nutrients in exact proportion upto the granule level. The readily available forms. Nitrate Nitrogen and Water Soluble Phosphate are immediately available to crops in thc early stages of growth. The rteadily available forms—Ammoniacal Nitrogen and Citrate Soluble Phosphate—keep the nutrients in available form for a longer period and maintain steady growth of crop. Gradual release of nutrients assures continuous supply of plant food to the growing plants and maintains high nutrient status of the soil. Presence of trace elements enhances absorption of vital nutrients. Granules being spherical and uniform, are easy for application to crops directly with seed or with the help of seed drill on the sides of crop lines. The granules reduce phosphate fixation, release nutrients steadily which assures healthy and luxurious growth. Granules are coated with coating agent to prevent caking and is thus suitable for storing. 50 Kgs. polythene lined hessein bags makes it suitable for handling. It is a concentrated fertilizer containing the nutrients in combination, which reduces the cost of transport, handling, storage and application to soil.

The results of the trials and demonstrations of Suphala show that it is effective to variety of soils and crops and suitable for basal as well as top dressing for short and long duration crops. The residual effect of Suphala is high and beneficial to the crops following the main crops. The 18 : 18 : 9 or 15 : 15 : 15 grades of Suphala are very suitable for the high yielding and hybrid crops for basal dressing. The additional Nitrogen can be given through Urea or Ammonium Sulphate at the time of earthing up.

Trombay Unit of the Fertilizer Corporation of India not only manufactures fertilizers, but also gives free soil testing and agronomy services to the cultivators.

Tractors & Implements will ensure the Success of Our Green Revolution

An interview with Mr. A. P. Shinde Minister of State for Food & Agriculture Govt. of India, after his Poland & Moscow visit

—SHAKTI TRIVEDI

* 200 uses of Potato in Poland
* New horizons of Sheep breeding in USSR.
* Introduction Sunflower in India
* No green Revolution without automobiles

Shri Anna Saheb P. Shinde, the Union State Minister for Food and Agriculture found his recent visit of Poland & U.S.S.R. very interesting & benefitting—was ths impression I could gather from an interview I had sought with him. The small farms & farmers of Poland equipped with tractors and other modern farm-machines attracted Shri Shinde's attention and it occurred to him that the picture of green revolution in India was yet incomplete without mechanisation of our farming on large scale.

He said, "Poland reaps bumper crops of potato and not a single potato goes waste. Potato has its 200 uses from kitchen to cattle feeds. Potato is also used for malting wine and Starch industry. Its export rate is quite high in that it earns a lot of foreign exchange for Poland."

The prosperity of Poland farmers depends on potato cultivation. Farmers produce 70 to 80 quintals of potato per acre. 50 million tons of potato is grown in Poland. This is 4 to 5 times higher than the yield in India. Cattle get highly nutrient and rich food from potato wastes. This is why Poland leads in milk and dairy production.

Asked about his purpose of visit to Poland, he said, I was invited to visit Poznam Fair which was first organised some 800 years ago and is still held there. This is a cultnral and historical fair of Poland which is attended widely by many other countries including the U.S.S.R., the U.S.A.; Germany and Japan etc."

"But Poland is red, how can individual farmers afford to take initiative for higher production ? "I questioned.

Shinde's reply was rather bewildering. He said that poland is the only red country where 85 per cent small farmers own their holdings and the land ceiling is upto 50 hectares or 125 acres. They believe in mixed farming and raise poultry, piggery and do animal husbandry alongwith farming. The average polish farmers earn as much as any our rich farmers. The Polish farmer is quite well to do and rather apparent from our standard. He has means of recreation and is very enthusiastic. He is free to enjoy any religious or social life which is rare in other communist nations. I came across the happy and joyful life when I travelled by Motor car for about 1000 miles across rural Poland.

After second world war how Poland became prosperous in such short span ? I asked.

"The automobile industry of Poland has improved a lot and is well-run and no country could be prosperous and rich without the help of automobiles such as tractors, power tillers and other power driver implements. India is far behind in this regard. We are trying to put more and more tractors and machinery in our fields.

He said that Polish Government has promised to help India's potato farming and processing industry. Our scientists will visit Poland in this connection shortly. Shri Shinde was confident about India's bright future in agriculture. Then he shifted to Moscow affairs. He started with cotton breeding in U.S.S.R. He enlightned me that the U.S.S.R. is the foremost cotton producing country in the world. Russian scientists have evolved many medium and long staple varieties of cotton evolving of colour varieties of cotton including Pink cotton has become a natural and easy process in U.S.S.R. During the last ten years Russia has made tremendous progress in cotton breeding. The work of Russian scientists has put Russia on the top of the list of cotton breeding countries on the world map. What is our performance of India in cotton cultivation ?

(*Contd. on page* 9)

Production of Pure Seed of Cultivated Fish in India

by V. G. JHINGRAN

Director, Central Inland Fisheries Research Institute, Barrackpore

Feeding India's 53 million people a diet of adequate protein content is a challenging problem facing the nation's agricultural research scientists today. Fishery scientists of India, being alive to their responsibility to the nation, have responded in no small measure, to the call of 'Grow More Protein Food'. While research on several fishery problems was simultaneously started immediately after India's independence in 1947, it was soon realised that an extension of fish culture and augmentation of fish yields from ponds in inland pisciculture will remain severely handicaped until and unless pure seed of cultivated fish is available in plenty. Urgent attention was, therefore, paid to solving the problems of fish seed shortage in the country in the ninteen-fifties.

As the commonly cultivated fishes of India. viz. catla, rohu. mrigal ond calbasu, do not ordinarily breed in confined waters, their young ones are collected from the flooded rivers during the monsoon season, when these varieties naturally breed. But, as the rivers are also inhabited by other uneconomic and predatory fishes, the seed collected from this source is almost always a mixture of both desirable and uneconomic varieties. It being practically impossible to segregate them at the spawn stage, the seeds are *en masse* reared in nursery ponds. If the nurseries are prepared, abound in fish food and are free from predators, the undesirable varieties in the mixed riverine spawn not only compete for food with the young ones of desirable carps but the young of predatory forms, which grow fast, prey upon them directly. This, among other causes results in extremely poor survival of the desired varieties in fish nurseries. The yields thus got from nursery ponds are often very low. Besides being mixed, there are certain other disadvantages in riverine spawn collections. It is only the rivers of North India which harbour these cultivable varieties in abundance; the rivers of the south, where these have been transplanted from the north, are rather poor in the stocks of Gangetic carps. Hence, the seed of these fast-growing carps is available in meagre quantities in the South Indian rivers. And again, the riverine stretches, where the seed is available in plenty, are not always easily approachable during the monsoons, making seed collection difficult.

Besides the flooded rivers, the Indian major carps spawn in special type of water bodies called the bundh-type of tanks, where some riverine conditions are stimulated.

The bundh-type of tanks, were at one time, known to exist in the Midnapore and Bankura districts of West Bengal. In recent years, however, scores of so-called dry bundhs have been constructed in Madhya Pradesh where carp breedin induced naturally.

While very many countries in the world were busy inducing the economically important species of their own countries to spawn in captivity through administration of either synthetic or fish/mammalian pituitary gland hormones, the scientists of the Central Inland fisheries Research Institute at its Pond Culture Substation at Cuttack (Orissa)were also experimenting with the fast-growing Indian carps. Ever since they first induced these food fishes to spawn in captivity in cloth 'hapas' by injecting fishes pituitary gland extracts in 1957, considerable improvements have been effected in the technique, simplyfying it greatly with a view to enabling fish undertake the spawning of these carps at his farm to meet his own requirements of pure fish seed.

New Technique

The technique is quite simple and comprises the collection of pituitary glands preparation of their extract and intramuscular injections to the male and female breeders in the natural breeding season of the fish. As the pituitary gland is most potent when the fish is fully ripe, it is best collected from mature fishes only. Glands collected from ripe fishes well-preserved in ice or kept in cold storage even for seven days or from these just spawned are also effective. The glands are preserved in absolute alcohol as the hormones are soluble in water. During the spawning season, especially on cool rainy days, the fully ripe male and female breeders are selected for injecting, each set comprising two males for every female but weight for weight the two sexes are kept equal. The females are injected a smaller dose of the pituitary extract, prepared in distilled water, intramascularly on the caudal pedunle and the two sexes are kept segregated initially. After an interval of 4 to 6 hours, a second and a slightly higher dose of pituitary extract is given to the female while a smaller dose, almost equal to the first dose as that for the female is given to the males. The

two sexes are then put together in a cloth 'hapa', and spawning usually takes place within six hours of the second injection to the female.

Pitutary Hormones

The process of preparing the injection has recently been further simplified in that it is not necessary to prepare fresh extract each time the fish is injected, but the extract could be prepared in advance, preserved in glycerine and ampouled for future use. There is a proposal to establish a pituitary bank in the country. Efforts are also being made to find out a substitute for fish pituitary. The active chemical ingredient of the pituitary hormone has so far not been indentified and isolated and highest scientific honour of the world await a scientist who isolates the substance which, in course of time, may lead to its synthesis.

Induced Breeding

The technique of induced breeding by pituitary injection has now been extended throughout India by organising several training courses for development and extension workers. The spawn requirements of Assam, Tripura and Tungabhadra Fisheries Board are presently being met only by the induced spawning of carps through administration of pituitary extracts.

The two exotic carps, the grass carp and the silver carp, have also been induced to spawn in the same way as the Indian major carps. India, on importing these fish, independently of the Russians and the Chinese, induced-bred them by hypophysation. The technique is not only a way out to increase the supply of pure spawn, but is highly useful in that it makes selective breeding and hybridisation possible. Several intergeneric and interspecific hybrids amongst Indian major carps have already been produced and contrary to the accepted belief, these hybrids are viable. The development of hybrids with better qualities of flesh, growth, resistance to to disease and infection, etc., than their parent forms will further help increasing fish yields and giving a real scientific bias to the fish farming industry of India. Induced breeding of brackish water cultivable fishes like bekti, bhangon, so-called Indian salmon and the mango fish, following the examples of Indian Chinese carps, will go a long way in giving a fillip to be development of fish farming in the Sunderbans and other areas located on the edge of the seas of India.

Tractors & Implements . . .

(*Contd. from Page No. 7*)

Our textile industy is based on cotton only. Every year we import cotton worth Rs. 60 to 80 crores to run our textile mills. But we are striving hard to make our nation self-sufficient in cotton and Russian scientists have also given a word to help Indian Scientists in cotton breeding.

'What is the cotton production in U.S.S.R. ?'

Russia produces 24 quintals cotton per hectare. This amounts to 8 tonnes more than India, Shindeji told.

'How can we produce more cotton in our country ?'

'By adopting new techniques such as spraying urea by planes, evolving disease-resistant varieties of cotton, using sprinkling irrigation system, putting high doses of fertilizers. Cotton requires 200 kilogram of nitrogen per acre to give maximum yield. If we grow cotton in rows, as I saw in Tashkand we can successfully use all these operations. Our 80% cotton is grown under Barani (fry) tract, while cotton requires 5—6 regular irrigation's.— Shindeji said. Shri Shinde himself comes from a farmers family. He still grows cotton on his farm at Ahmednagar, Maharashtra. Naturally he could but take . . . interest in what he does at home.

He also narrated the theory of sheep breeding and fur collecting from the sheep without killing them at the time of lamb bearing. Previously the sheep were killed at this stage for taking our costly fur. Thus one sheep could produce only one fur. Now one sheep produces as many lambs it delivered. This kind of fur sheep is called here Kashakul. This is not the end of the technique. Russia have also developed a method of taking colourful furs from these sheep by using various chemicals. The other miracle what Shri Shinde observed was to get one dozen lambs at one time from one sheep in one delivery. This shows how much Russians have developed the breeding technology.

'Sunflowers are under experiment at Pusa institute and we are following the Russian pattern for its cultivation' he said. The visit of Shri Shinde was quite encouraging and inspiring for Indian farmers and farming developmment.

More Milk Through Cross-Breeding

An English, Dutch or Danish cow gives much more milk than the best Indian breed. Moreover, a foreign cow matures early, breeds regularly and has a short dry spell after each milking period.

What now ails the Indian cow had ailed the European breeds also for several centuries. But scientists there through selective breeding and good management were able to build up a few excellent breeds capable of producing on an average 4,000 litres of milk per lactation.

Can't we also make our cows as productive as their foreign counterpart ? Surely, we can. The clue to our cattle improvement, according to experts, is cross-breeding, as this is the quickest and the most dependable means to raise the level of production of our breeds, equal to that of a Freisian or a Brown Swiss.

Simply stated, cross-breeding is the mating of animals belonging to one breed with animals of opposite sex of another breed to transmit the desirable characteristics of both the breeds into their off-spring.

This technique has yielded good results in the various experimental stations in the country.

A striking example of the success of cross-breeding programme comes from the Central Livestock Research-cum Breeding Station, Haringhata, in West Bengal. Here, under a scheme sponsored by the Indian Council of Agricultural Research, 400 Harayana cows were bred to 10 bulls of the Jersey breed.

Milk Yield Increases

The cross-bred Jersey calved for the first time when about 2½ years old. In the following five years, the cow was in milk for 1,586 days (87%) and dry for only 234 days (13%). And the milk yield was 10,363 kgs. The Harayana cow calved for the first time when 4½ years old and in the next five years comprising four lactations, she was in milk for 1,237 days (71%) and dry for 527 days (29%). And she yielded only 3,304 kgs milk.

Similar results were obtained from the Southern Regional Station of the National Dairy Research Institute, Bangalore. Here, the local breed used was Tharparkar and the exotic breeds, Jersey. The lactation period among the cross-bred daughters was 295 to 310 days and dry period 50 to 100 days. Tharparkar dams had a lactation period of 250 to 290 days and a dry period ranging from 160 to 260 days. The cross-bred cows produced nearly 11,400 kgs of milk during the first five lactations by the age of eight years, while Tharparkar dams had by 8½ years of age completed only four lactations and produced only 5,200 kgs of milk.

These and other examples from the institutions like the Indian Agricultural Research Institute, Delhi, and the Allahabad Agriculture Institute have underlined the possibility of improving our breeds through cross-breeding.

Intensive Programme

Little wonder, therefore, that the Fourth Plan accents on cross-breeding in all Intensive Cattle Development Blocks and those Key Village Blocks which lie in the milk shed areas to improve our milch animals.

Cross-breeding, however, is not an end by itself, but a means to solve the problem of low production of the Indian cow. More milk from the best breeds is obtained only through better feeds, housing, management and disease control.

Fodder Problem

According to an estimate by Central Council of Gosamvardhana, there is a shortage of 358 million tons of green fodder and 23.8 million tons of concentrates in the country.

A firm breeding policy can eliminate the unwanted number of cattle, and with lesser mouths to feed the fodder problems will ease somewhat. Side-by-side, through proper crop husbandry, the hectare yield of fodder can also be raised.

Medical Aid

Through the opening of a chain of veterinary dispensaries, diseases of cattle in the villages are being tackled more efficiently than before.

With the spate in the demand of milk and milk products in urban centres, fuller utilisation of milk and milk products through latest technological methods is also being undertaken. This leads to the dairyman getting a better price for the milk.

These are all healthy signs, but we have to travel far, before we can really be proud of our dairy herds.

World Farm News

Soviet winter wheat down

It is estimated 20-25 per cent of the Russian winter wheat crop was killed by poor weather conditions : wind erosion, water erosion or freezing temperatures. Present indications point to a Russian winter wheat crop for 1969 of 26 to 28.5 million tons. This would compare with a 33 million tons crop last year. In 1967, the Soviet Union's Winter wheat production hit 40 million tons.

Soviet farmers planned an increase in the area sown to spring wheat to offset some of the winter wheat losses. Spring, however, arrived late in most areas and there may well not have been the expansion anticipated.

Russian planted area planned for corn for 1969 is 50.2 million acres. Some farmers have planted corn in areas where winter wheat was lost.

Coffee Output Rising

Coffee production will increase in 1969-70. First estimate of production by the U.S. Foreign Agricultural Service puts the 1969-70 coffee output at 65.2 million bags, of which 47.6 million bags would be available for export. The total production figure is approximately seven per cent above the harvest for 1968-69.

Brazilian coffee production is expected to increase substantially this year to 20 million bags. This compares with 16.5 million last season. Columbian coffee output for 1969-70 is put at 7.8 million bags.

Other big producers for this season include, Mexico, 3 million bags ; Ivory Coast, 5.1 million bags ; Uganda. 2.9 million bags ; Angloa, 3.3 million bags ; Ethiopia 2 million bags.

Australian Wheat Piles up

Australian farmers are expecting another big wheat crop for 1969-70. The Australian wheat board reports deliveries from the 1969 crop of 513 million bushels. This plus a carry-over of 52 million bushels, provides 565 million bushels of wheat for the 1969 marketing year. It is anticipated that exports will be in the vicinity of 210 million bushels and domestic consumption will be about 57 million. On this basis, the Australian carryover for next December would be close to 300 million bushels, the highest ever recorded.

Meat-Eating Figures

There has been a reversal in meat consumption trends in trading countries. People in supplying nations are eating less meat while those in meat-importing countries are eating more.

In Argentina, the world's biggest meat-eating country, the per person average is 181 pounds of beef and veal per year. This is eight pounds below the 1956-60 average.

Second place among the beef and veal eaters goes to the Americans. The U.S. per person average is 110 pounds, a 19 pound per person per year increase over 1956-60.

The third biggest meat-eaters are in New Zealand where the average is 109 pounds per person per year. This is an increase of four pounds since 1956-60.

The sharpest drop in meat-eating has occurred among the Australians. In 1956-60 the per person per year average was 125 pounds but it has fallen to 86 pounds for a drop of 39 pounds.

Over-all among the meat-exporting nations, the per capita consumption has fallen 18 pounds from 1956-60 to an average of 146 pounds. Among the meat-importing countries, the per capita consumption has increased 13 pounds to 80 pounds.

Mid-East Foot-and-Mouth Disease

A foot-and-mouth disease outbreak is threatening the whole of the Middle East. The Food and Agriculture Organisation says the outbreak was reported first in Lebanon among sheep and goats. It is now widespread both in Syria and Lebanon and may have spread to Turkey, Jordan, and Israel.

Israel, Jordan and Lebanon have applied to FAO for vaccines to combat the disease.

75 Million Tons of Sugar

World sugar production for 1968-69 set a record high. Output totalled 75.7 million short tons, raw value. This is a four per cent increase over the previous season. The record crop was accomplished despite poor weather in many of the major producing countries.

Some areas hard hit by bad weather, primarily drought, included Puerte Rico, Cuba, Peru and South Africa. However, offsetting these poor harvests were record or near-record sugar crops in the United States (beet), Dominican Republic, France, India and Australia.

Prices for world market sugar have risen considerably in the past year, averaging slightly less than four cents a pound in recent months.

Canada Farmers Earn less

Canadian farmers had a lower net income last year. Statistics just released show realized net income of Canadian farmers from farming operations amounted to an average of $ 1,597 (Canadian) in 1968. This is 3.2% below 1967 and 8.3% below 1966. The drop is blamed on increased operating expenses and depreciation charges.

Portugal Wheat Down

Portugal's wheat prospects this year are poor. Heavy rainfall has hurt the 1969 crop and present estimates are for production of between 450,000 to 500,000 metric tons. The average output for 1960 to 1968 was 554,000 tons. In 1968, Portugal's wheat farmers had an 800,000 ton crop.

Not only have portuguese wheat farmers suffered from the weather,

but there has been large-scale soil erosion.

The poor crop for 1969 will mean bigger wheat imports for 1969/70. In the 1968/69 season, imports totalled only 100,000 metric tons. About 350,000 tons may have to be imported in 1968/70, however, because of the poor crop.

Plenty of Jute

A bumper jute crop is indicated for this year. There has been a marked expansion in area planted to jute in both Pakistan and India. As a result, large supplies are expected when the crop is marketed in late 1969 and jute prices are expected to be lower than they were a year ago. Fibre prices were higher in 1968/69 because of bad weather and a short crop.

India on Agricultural Map

Improvement in India's food situation continued as it became apparent that the 1968-69 food grain crop would at least equal the bumper 1967-68. crop estimated at 95.6 million tons.

Good harvests of rice, wheat, barley and corn should offset smaller crops of sorghums and millets. Food grain imports declined from 8.8 million tons in 1967 to six million tons in 1968 and imports this year will probably continue at the lower level. India's total imports declined to $ 2,500 million in 1968, mostly because of smaller grain imports.

Tractors are eagerly sought by larger farmers who earn money from customwork done for smaller farmers. Some 14,000 farm tractors will be assembled in India in 1969, and imports are to be continued. The number of tractors used on Indian farms may rise to 100,000 by early 1970. Tractors are used to plough more than half the wheat area planted in high-yielding varieities.

Production of milled rice during 1968-69 is estimated at 40 million tons. The harvest in Andhra Pradesh suffered from drought but this was offset by higher yield in Bihar, West Bengal and Uttar Pradesh. Use of more fertiliser and high yielding varieties boosted yields. The area planted in high-yielding varieties exceeded 3.6 million hectares in 1968/69, up more than 40%.

More attention is being focussed on export crops since the critical shortage of food grains has eased. Tea production increased to 400,000 tons in 1968 and this year's crop will likely show a slight gain. The harvest of flue-cured tobacco in 1969 is expected to be at least 25% above the previous crop. Floods along the Brahmaputra in early 1968 reduced this season's jute crop to only 871,000 tons.

The uptrend in imports of vegetable oils and tallow should resume in 1969. Arrival of rice at Indian ports in 1969 may reach 500,000 tons after declining to about 470,000 tons in 1968. Imports of an estimated 100,000 tons of rice from the United States under P.L. 480 and continued purchases of rice from Asian exporters are expected to cause slightly larger imports in 1969. More rice probably will be imported from Burma in exchange for Indian manufactures.

AROUND THE WORLD

Japan estimates it will need 114,000 metric tons of rape-seed oil this year. Indications are, Japan will have increased need for rape-seed in the years ahead. One estimate is an import need of 500,000 tons by 1977.

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Cigarette smoking per person is down in the United States in 1966, the average was 4.180 cigarettes (209 packs) per person per year, two per cent below 1967.

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Uaganda is increasing tobacco production. Output is expected to reach 18 million pounds by 1970, up from roughly nine million pounds in 1967. Most of the increase will go into export.

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Turkish cotton farmers report a record high crop for 1968/69. Output is placed at about two million bales, 200,000 bales higher than the previous record.

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The 1968 hops crop in Eastern Europe is estimated at about 45 million pounds. Russian output hit 15.4 million pounds and in Czechoslovakia production was 18.5 million pounds.

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Finnish "Soil Bank"

Finland has launched new 'farm retirement' program to reduce surplus production.

Almost 250,000 acres are expected to be 'retired' over the next two years at a cost of about $ 6 million.

Under the program, farmers over 60 years old with small farms may voluntarily stop farming from 5.5 to 34.6 acres each and receive annual compensation of the equivalent of about $ 24.30 (U.S) per acre. This is roughly equal to the estimated income per acre on the farm affected.

The Government launched the program in an effort to stop further accumulation of surpluses, especially grains and butter.

More Zambian Tobacco

Zambia farmers are paying more attention to growing tobacco in view of the continued sanctions of Rhodesian trade in major world tobacco markets.

Tobacco output in the country last year was 14.8 million pounds, up moderately over 1967, but still below the recent five-year average. Most of the Zambian tobacco is flue-cured which earned the country nearly $ 6 million in 1968. The United Kingdom is the major buyer of Zambian tobacco.

Acreage for 1969 is lower than anticipated because of a curb on bank loan facilities. The support price this season will be the equivalent of 28 cents a pound on barley and the crop may reach one-million-pound mark.

Tractor is South Asia

An explosion in the use of tractors is occurring in South Asia. Farmers in the area now are using more than 110,000 tractors, almost three times the number in use only seven years ago. Tractors are used on the wheat fields, rice paddies and garden plots in India, Pakistan, Ceylon, Nepal and Afganistan. Here is a country-by-country review of the tractor use in South Asia as prepared by the U.S. Department of Agriculture.

India

About 13,000 to 14,000 tractors are expected to roll off India's assembly lines in 1969 and more than 20,000 by 1971.

India manufactures about two-thirds of the tractors sold to Indian farmers and production doubled in the last two years. Use has run strong on farms in North India which contributes most of the recent gains in wheat production.

The country's biggest tractor factory is operated with Polish technical assistance. It was expanded last year to an annual capacity of 7,000 tractors. At least six other factories are turning out tractors for Indian farmers. Near Madras, one of the world's leading farm machinery firms has expanded its annual tractor capacity to nearly 7,000 and near Bombay, India's newest plant plans to have output of 7,000 by 1970.

India's efforts to best output have been stimulated by shortage of foreign exchange for imports. Imports in recent years have been bought mainly through trade agreements not requiring payment in hard currencies.

About 7,300 tractors, worth $ 10.5 million, were imported in 1967, triple the 1962 volume. Yugoslavia provided about 40% of these imports, with Poland and Russia the other major tractor suppliers.

Pakistan

Strong demand for tractors has pointed up the shortage in Pakistan. But the situation may be easing somewhat in West Pakistan where one of the same big international companies that operates in India now is building a plant near Lahore with a planned capacity of 25,000 tractors a year.

Also Russian and Pakistani officials have announced plans to build an assembly plant with a capacity of 5,000 small and medium-sized tractors.

Pakistan imported about 16,000 tractors in 1967 valued at Rs $ 31 million. This was 300% more than in 1964. The United Kingdom is the major supplier, with the United States second and West Germany third.

Ceylon

Mechanisation per capita in Ceylon is considered the highest of any country in South Asia. As a result, agricultural output has heen rising.

The 1968 rice harvest was two million tons, double the 1966 output partly because rice farmers were making extensive use of tractors in Eastern Ceylon in clearing new areas.

Tractor imports have risen from 365 in 1965 to more than 4,000 in 1967. Most of them came from the United Kingdom, with other big suppliers being France, the United States and Australia.

Nepal

Tractor numbers in Nepal are currently estimated at about 100, most of them from India. The main users are rice farmers in the Terai who have begun to increase their plantings. Garden tractors are popular in the Kathmandu Valley where religion bars the use of draft animals.

Afghanistan

Most of the 400 tractors now used in Afghanistan have been imported from the Soviet Union in the past ten years. Most of them are needed to expand commercial wheat production which mainly is on the larger northern farms.

Russian Cotton Prices Raised

Russia is giving farmers more money for their cotton. The Soviet State procurement prices for raw cotton have been increased on the average by 15%. This increase follows three successive seasons in which cotton production remained around 9,3 million bales. It is anticipated the high procurement price being paid to farmers will be a strong incentive to them for expansion of cotton production this year in the Soviet Union.

Cyprus Farm Output Rises

The value of the farm output in Cyprus in 1968 rose to the equivalent of U.S. $ 82.8 million. This is a record high for the conntry and was achieved despite a drought which reduced the cereal yields. Most of the improvements was due to increases in output of Cyprus' main export commodities: citrus fruits and vegetables. Agriculture is the most important sector of the Cyprus economy.

Iran to Boost Production

Iran will increase farm production on an area of 140,000 acres through irrigation, on farm development and introduction of modern agricultural techniques.

Financing of the project is provided under a $ 30 million World Bank loan, and the project, when completed, is expected to enable Iran to save nearly $ 10 million a year on farm imports.

Japan efforts for More Rice

The Japanese rice support level of the equivalent of Rs $ 13.88 per cwt. of rough rice is nearly three times the United States support level for rice. In fiscal year 1968 about one-third of the entire budget of the Japanese Ministry of Agriculture and Forestry has been used to finance the rice price support program.

New In Farming

KUFRI SINDHURI

A Potato that Never Fails

Kufri Sindhuri, suited to the plains, is a potato variety that never fails the farmer, a report from the Central Potato Research Institute, Simla, says.

A medium-late variety (90 to 120 days), with bright pink tubers, this is bred to replace the once-famed variety, Darjeeling Red Round.

Kufri Sindhuri yields 300 to 500 quintals per hectare.

It is resistant to early blight and can stand light frost. Its cooking quality and taste are also ranked high.

HAMSA

A Fine—Grain Dwarf Rice

A new dwarf rice variety, as high-yielding as Taichung Native-1 and with superior grain quality has been released, reports the Andhra Pradesh Agricultural University, Hyderabad.

The variety is named Hamsa.

The grain of Hamsa compares well with the fine quality rice variety of Andhra Pradesh, H.R. 35.

The new variety matures a week earlier than Taichung Native-I, its duration being 120 days for kharif and 130 days for rabi.

The variety is neither resistant to diseases nor pests like gall-fly and stem-borer.

GROUNDNUT

A New Weed-Killer

A weed-killer, TOK-E-25 is found to control weeds in groundnut effectively, according to trials conducted at the Regional Research Centre, Rajendranagar in Andhra Pradesh.

TOK can control both grasses and broad-leaved weeds. The weed-killer was found at its best when applied just after sowing the crop.

The dosage of TOK recommended is 16 litres per hectare.

The weedicide-treated plot yielded 1345 kilograms pods per hectare compared to 1266 kilograms from the hand weeded plot. The cost of treating with TOK was Rs. 93.25 per hectare and hand-weeding Rs. 236.25.

New Castor Variety

A new castor variety, NPH-I has scored over HC-6, the leading variety, in the trials conducted at the Regional Research Centre, Hyderabad, Andhra Pradesh.

In the trials, the new variety gave 1078 kilograms more seed per hectare, the yield from NPH-I being 3083 kilograms compared to 2005 kilograms from HC-6.

Another attractive feature of the new variety is that it takes only 150 days to mature as against 240 days by HC-6. NPH-I also yields 598 kilograms more oil per hectare than HC-6.

The net profit from one hectare of NPH-I at the Regional Research Centre was Rs. 2420.50 compared to Rs. 1234.70 from HC-6.

Top Working in Mango

Top working in mango helps inferior seedling mango trees yield good quality fruits.

For top working a large tree, its main branches are cut back within three to four feet from the top of the trunk in February. The cut ends are painted with Bordeaux paste and covered with gunny cloth or grass.

The new shoots arising below the cut ends are ready for grafting in June or July.

Top worked trees will start bearing superior fruits within three to four years.

Raise Edible Mushrooms on Paddy Straw

Edible mushrooms can be grown on paddy straw profitably. It has been reported by the Agriculture College and Research Institute, Coimbatore in Tamilnadu.

The cultivation of mushrooms is possible only in places where the temperature is not less than 24°C.

Under this method hand threshed paddy straw bundles are placed on raised platforms in layers and the murshroms grown on their edges.

The straw bundles about 20 centimetre thick are first steeped in water for 12 hours and then placed on a raised platform or wooden plank, four in each row. Another row of four bundles is placed over them with loose ends on opposite side.

Bits of the Mushroom spawn are placed on the edges of the layers and a spoonful of powdered redgram is sprinkled over it. A second layer is formed with eight bundles of straw, but the bundles are placed crosswise.

The third layer is formed by placing the bundles parallel to the first layer and the last parallel to the second. The beds are pressed lightly and moistered with rose—can once a day and covered with a white polythene sheet.

The mushrooms begin to appear in 10 to 12 days. They are picked when the cuplike structure is formed.

Preservation of Fruits & Vegetables

The Central Food Technological Institute has now developed an emulsifiable wax for the preservation of highly perishable fruits and vegetables.

Micro-crystalline paraffin and caranaulia wax are melted with emulsifiers. Fungicides are added to ward off fungal attack and plant hormones to advance or delay ripening of fruit as well as enhancing the colour. The wax is available as wax tablets which are dissolved in 500 ml. boiling water. In the cooled solution 2.5 gallons of soft water is added and the wax is ready for use.

In the wax available in tins, 3 parts of cold soft water is needed for use.

The wax may be used on the plucked fruit or while it is still on the trees. Plucked fruit is graded and dipped. Drying takes a few minutes but can be hastened by a blast of air hot or cold. For further information contact : Chairman, Industrial Research, Consultancy & Extension Department, Central Food Technological Research Institute, Mysore—2A.

News From State Samajs

MADHYA PRADESH

Resolution passed by Khargone Samaj :

The Executive Committee of Bharat Krishak Samaj, Khargone District, Madhya Pradesh was held on 29th July, 1969 under the Presidentship of Shri Mangat Singh Kharnuja in which the following decisions were taken unanimoualy.

(1) It was decided that rupees One lac will be spent on the building of the Samaj and the building account in the bank will be operated by joint signatures of President and anyone of the following two.

1. Shri Mangat Singh Khanuja —President.
2. Shri Balram Singh
3. Shri Vijai Singh

It was also decided to include the name of Shri Prakash Chand Vyas in the Bhawan Committee.

(2) In the light of reports, regarding crop thefts received in the office from different parts of the district it was decided to constitute a Sub-Committee to negotiate with the district authorities to adopt adequate measures for checking the thefts and help farmers to get gun licences.

(3) It was resolved to constitute a Club of educated and progressive farmers to gather informations regarding Farm Leaders Exchange Programme and to negotiate with the farmers of other countries in order to gather information about farming in their countries.

Besides, the Committee also decided to correspond with the authorities concerned for instituting Tractor & Buldoser Unit in the District to arrange for rigs to dig wells; to negotiate with the State Government, to issue instructions to cooperative Banks not to realise interest on the old loans given to farmers during Gandhi Centenary year.

It was also agreed upon to approach Government to adopt measures to save fertile land of several tehsils of the district from being submerged, if Navgaon Dam is constructed by the Gujarat Government.

MYSORE

Monthly meeting of Farmers

Mysore Krishak Samaj has decided to have a farmers' meeting at its State Office on 1st Monday of every month in which day-to-day problems of farmers will be discussed and necessary recommendations will be made by Government to redress genuine grievances of the farmers.

Shri S.K. Dey addresses members

Shri S.K. Dey, President, All India Panchayat Parishad addressing the members of Mysore Forum at a meeting held at 3 p.m. at the premises of the Forum, laid stress on the backwardness of rural India. He said that he knew by personal experience the wants under which the rural folk were suffering and how any improvement whatsoever had to be instilled into them from scratch.

It was in these circumstances that Community Development was envisaged and some achievement had to be anticipated by sending officials to them who could with all the little they knew win their hearts by their approach, which was actually much different from an approach of zabardast.

Criticism levelled against Gramasewaks was not to be taken as though they had not played their part, but soon the impact of Community Development proved to be so successful that the farmer himself had come to know more than the Gramasevak.

Then the problems of the farmers moulded in such a way that the old doctors were not enough so to say and the demands from the farmers required more and more specialists to diagnoise their cases and help them.

The newer patterns necessitated to be evolved took the shape of Panchayat Raj and a comprehensive scheme for villages had to establish cooperatives, schools and the rest of the institutions. It was a case of helping the stronger and the weaker. There were further human factors like the Panchayat Chief and the co-operative chief coming into opposition.

The Farmers' Forum had a significant part to play bringing all farmers in the village together, discussing all their problems and help properly adjusting the Panchayat and co-operative efforts. Lobbying for farmers has been often spoken of and their is no reason why the farmers should not have lobbying but there was much to do in the co-operative and economic spheres.

Moreover as the people became more alert, there were pressures working on all sides, placing a limitation to rural progress. He hoped the Farmers' Forum would take cognizance of all the problems and play its part.

Shri P.S. Thimmappa Setty, Member of the Farmers' Forum Executive Committee presided. Earlier Shri B.C. Bhagwan, Member of the Farmers' Forum Executive Committee welcomed the Chief guest and the members psesent. Shri U.K. Subbaiah, Hon. Secretary, Young Farmers Association, proposed a vote of thanks.

Shri S.K. Dey visited the Cold Storage in construction and the Forum Press.

Gurgaon Samaj Meets

The annual General meeting of the District Farmers' Forum, Gurgaon was held under the Presidentship of Ch. Attar Singh on 6-9-1969. Capt. Charan Singh, Secretary, Haryana Krishak Samaj conducted proceeding of the meeting. The following resolutions were unanimously adopted:—

1. A Separate office of the Forum should be opened at Gurgaon and a spacious room be taken on rent which may also be used as Rest House for the Kisans.
2. An ex-serviceman be employed as whole-time clerk.
3. An Organiser be appointed to organise the institution and en-

(*Contd. on page* 17)

Seminar on "Toxicological Aspects of Pesticides

A Seminar on Toxicological aspects oj Pesticides" was organised by Madras Farmers' Forum at Coimbatore in collaboration with Velsicol chemical Corporation. Chicago, Illinois, U.S.A. nnd Mysore Insecticides Co. (Pvt.) Ltd. of Madras. A Summary of the prolonged discussions on the most Scientific and Technical Subject is being published for the benefit of the readers.

—EDITOR

Madras Farmers' Forum sponsorned a Seminar on a highly scientific subject which is generally considered to be the purview of the top scientists, but which vitally concern the farmer and consumer as the pesticides hazards to human beings are little known. For the first time eminent scientists, Extension Workers, industrialists in the fields of pesticides, firms dealing with pesticides and farmers whom the above people try to serve were all brought together and entered into a dialogue on a vital subject of human and farmer interests namely the "Toxicological Aspects of the use of Pesticides".

The Seminar was held in Arignar Anna Mandram Hall of the Agricultural College, Coimbatore. The Director of Agriculture Shri Hari Bhaskar I.A.S., presided. Shri R. Srinivasan, Chairman of the Madras Farmers Forum welcomed the gathering. In his welcome address, he told the august audience that the Farmers' Forum is a non-political and non-secretarian organisation concerned with the welfare of the farmer and that it works to solve the problems of farmers and promote their interests.

He then said that the phenomenal advance of science in recent years have revolutionalised our agriculture and in its wake the science of entomology has made great progress. Though we have better insecticides and have found better methods of using the same, still the problem caused by insects and the use of pesticides, seems to be bigger than ever. One of the main drawbacks of most of these newer insecticides is their toxicity both to humans and animals. The toxicological nature of pesticides and their residual effects on food crops, plants and soils, vitally affect the farmer both as a consumer and marketer of agricultural produce. Even progressive farmers know precious little about the health hazards of pesticides both to mankind and mammals. Further a number of new pesticides are everyday appearing in the market and it is quite necessary that farmers should have some broad guidelines about their toxicological effects and measures to deter or counteract these effects. We thought therefore that it is fitting and timely that we should sponsor this Seminar. We are thankful to M/s Mysore Insecticides Company Private Ltd. for coming forward to collaborate with us in sponsoring this seminar. Too often such seminars are eonsidered an exclusive purview of the top scientists and even extension Scientists and other experts connected with farming, but those who are not connected with plant protection are considered to be outside their purview. I believe we are breaking the ice in this Seminar by bringing together top scientists in Plant protection, other extension scientists, agronomists, specialists, extension workers, and farmers for whose benefits all of them work. I am happy that all of them including our progressive farmers have responded to our invitation. This is therefore not only a very important scientific and technical seminar, but also a very pleasant get together of eminent scientists and practical farmers to analyse their doubts and solve their mutual problems with reference to usage of pesticides which is a must. It is a pleasant coincidence that our guest speakers are Americans, because our farmers Forum has been having big collaboration and exchange programme with the leading organisation of farmers known as Farmers & World Affairs, Inc., U.S.A. for the past fifteen years under which a number of American farmers visit us every year".

Shri Hari Bhaskar the Chairman of the day then addressed the gathering emphasising that pesticides are being used extensively and intensively by farmers and therefore it is appropriate and timely that we should consider their toxicological and safety evaluation. Dr. Eisler of Velsicol Chemical Corporation, Chicago, addressing the gathering said "With the development of new testing procedures for pesticides such as gas chromatography, enzyme studies, and radio active tracer studies, the problem of toxicological evaluation has become a matter of major concern. Since there is probably no biologically active substance which does not exhibit some effects in living organisms, toxicological testing will always accompany the progress we are making in the pesticides industry. In many countries, toxicity studies are evaluated by governmental agencies and such studiest must be accepted by them before permission is obtained to market a new chemical. This practice gives the toxicological evaluation an almost official status as distinguished from other types of scientific investigation. It will require great effort on the part of toxicologists to be able to improve our understanding of the mechanisms of action of chemicals in animals and to be able to better predict their effects in man. With any chemical that is being tested for toxicological evaluation and safety, it should be kept in mind that extremely complicated chemical systems with their homeostatic mechanisms are set in motion in the organism. The various tests used

for evaluating toxicity in the mammal was discussed, and some light was thrown upon this growing area of investigation in order to protect the health and well being of mankind". It was said that a cow has to consume twice its own weight of Endrin when sprayed at half pound technical per acre within 48 hours for a lethel dose. So it was made clear that the health hazards of using pesticides are very remote. Dr. Eisler said that Asperin ranks first among the human killers in USA., that sleeping pills rank second and pesticides poisoning come far below in the line. He illustrated his points with a number of slides.

Dr. Watson then addressed the gathering. The following is the summary of his exhaustive lecture of 45 minutes duration illustrated liberally with slides. The extensive loss in yield associated with insects on the major agricultural crops Rice, Jute, Sorghum, Sugarcane, Cotton, Groundnuts and vegetables is pointed out. Suggestions are made on the control of these pests with special emphasis on the Chlorinated Hydrocarbons.

A review is presented on the new experimental phosphate insecticides of Velsicol Chemical Corporation VCS-506. The review covers the properties, biological activity and very brief comments on the toxicology. The relatively low degree of toxicity to warm blooded animals, the wide range of biological activity especially on the pests of vegetables, Rice, Citrus, and on Man and Animals is emphasised.

Not injurious to health

The subject of exposure to chemicals based in Crop protection is covered briefly including comments as it relates to production, to agriculture, to the environments, to air, to the fact that when pesticides are used in accordance with due consideration to safety in handling and related precautions, crop protection chemicals can be used with confidence without hazard to man, animals or the environment."

While Dr. Eisler said that a complete series of pharmacological tests for one chemical takes 6 to 7 years and ½ a million dollars from the time what work is initiated till it is put out in the market, Dr. Watson said that it costs 7 to 8 million dollars and 7 to 8 years for the same chemical for the biological, chemical, and food tests including facilities.

Dr. Watson's speech was followed by a lively discussion in which many of the farmers from all over the State, Scientists, Plant Protection officers and Extension Specialists took part. Replying to questions Dr. Eisler said while DDT is retained in the body Endrine is excreted. Dr. Watson said that contamination of tanks, drinking water, wells, etc during aerial spraying is not likely to affect the cattle and humans drinking that water or bathing in it as they have to consume twice their weight within 48 hours for a lethal dose. The Chairman Shri Hari Bhaskar then wound up the session summarising the salient points and appreciating the interest evinced by farmers. Mrs. Jaya Arunachalam, Secretary, Farmers' Forum, Madras proposed a vote of thanks.

News from State . . .

(*Contd. from page* 15)

list members of the Forum.

4. Occasional meetings be held in every tehsil and all the members be invited to attend it.
5. Annual Convention of the Samaja be held in this district in a roadside village.
6. Owing to lack of rain kharif crop has greatly suffered and very little grain or fodder is expected to be produced, the recovery of taccavi and land revenue be suspended till June 1970.
7. Rate for supply of electticrty for agricultural purposes should be reduced from 15 to 9 paise, the previous rate and the electric connections be given on top priority basis.
8. Land which has been acquired in the Ballabhgarh tehsil under Master Plan should be restored to the owner cultivators for use till the construction of buildings thereon. It is lying waste since long.
9. This Forum strongly and emphatically requests the Union Govt. to give the area recommended by the Shah Commission to the Haryana Govt. which is their legal right.

Role of Pesticides In Food Production

by SHRI Y. M. TALEY

Annual crop losses due to pests and diseases in India are estimated between 15 to 20 percent which in a monetary terms come to about Rs. 1,000/- crores. Pests and diseases affect crops from sowing to harvest stage. The losses to crops are not only stopped at harvest stage as harvested produce that is stored by farmers suffers loss to about 5 percent due to pest, which amounts further to 2.5 million tonnes during storage of produce. The populatian of our country is increasing by eleven million per year. The problem of food has never been more vital than at present. The food grains which are imported in India are about 7 to 8 percent of the total production of foodgrains in our country. In the year of average monsoon our food production is just 10 per cent short of our needs. We have to import 8 to 9 million tonnes of foodgrains every year to meet this deficit. Thus it clearly denotes if we could save our crops from pests and diseases we would have saved 15 to 20 per cent loss or about 16 million more tonnes of foodgrains. This is enough to eliminate imports and gives us a surplus by spending only Rs 80 to 100 crores on pesticides. On the basis of this estimat on we would have not only enough food for ourselves but save on precious foreign exchange which is to the tune of about Rs. 500 crores annually.

Food production is expected to be achieved by land reforms, intensive cultivation, better irrigation practices, more use of organic and inorganic fertilizers, improved high yielding varieties and new hybrid strains. In this the farmer must control the pests and diseases. Otherwise all these pests can ruin our above efforts to produce more food.

Pesticides are chemicals that are used by farmers to control pests and diseases. They are classified according to the groups of organisms against which they are intended.

(1) Insecticides	:	For control of insect pests
(2) Acaricides	:	For control of mites
(3) Rodenticides	:	For control of rats
(4) Nematicides	:	For control of nematodes
(5) Fungicides	:	For control of fungal, bacterial and viral diseases.
(6) Mollus cocides	:	For control of slugs and snails
(7) Weedicides	:	For control of weeds.

These are agricultural pesticides used in plant protection pesticides, including fumigants (insecticides) used for control of rats and insects that attack storegrains in warehouses and godowns. Insect pests constitute a greater threat in comparison to others. They do not only eat our food but are also responsible for transmitting diseases in plants and animals. Pesticides are also equally important to safeguard public health. Diseases like malaria. typhus fever have been successfully eradicated through the use of DDS, BHC and other pesticides. Many municipalities and corporations are using pesticides to control houseflies, mosquitoes and rats on a wider scale.

During the last thirty years much attention has been given to strengthen our line of defence against pests and diseases. The productive capacity of crops of Japanese and American farmers is between 390 to 500 percent more than their Indian counterparts. We have achieved these international standards only in some areas where improved methods of cultivation are combined with good seed, fertilizers and pesticides.

Comparative Study

Pesticides do not only help to augment yields but they maintain better quality as well. By way of comparison we can see the difference in agricuitural production with those of advanced countries achieved by use of pesticides as given below.

Japan spends about Rs. 100/- per hectare

U.S.A spends about Rs, 35/- per hectare

India spends about Rs. 1.50 per hectare

Nowaday a variety of pesticides are in common use in our country. Some of them are imported and many are locally manufactured. About 30 percent of pesticides are produced in India and 60 percent of them are being imported which amounts to about Rs. 10/-crores, The need for encouraging the production of pesticides in India seems to be too evident.

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Towards Mechanising Indian Agriculture

The modernisation of agriculture needs not only inputs like better seeds and plant nutrients, but also better implements. It is essential, therefore, that the Indian farmers acquire modern agricultural machinery.

Mechanisation of agriculture will not only step up production, but will also create greater employment opportunities. The investment on machinery in Japan and Taiwan, which are agriculturally advanced countries, is among the highest in the world and yet they utilise substantially more human labour than in India. A study of mechanised and non-mechanised farms around Delhi by the National Productivity Council has shown that labour displacement as a result of mechanisation is marginal and is more than offset by the increase in cropping intensity. over the long term, mechanisation will generate greater employment because multiple cropping which mechanisation will make possible by accelerating the whole tempo of agricultural work would triple or even quadruple the number of field operations.

The conservatism of the Indian farmer is an exploded myth today. There is steadily increasing demand for tractors and even sophisticated equipment like harvester combines. The affluent farmer has the means for buying these equipments. But the small farmer lacks the resources and there is thus the danger that the gap between the rich and the poor farmer may widen. It has also to be remembered that small farmers constitute the major section of the farming community and the area of land under the possession of this section is not negligible. Until this land is also brought under high-yielding varieties and multiple cropping, the total overall production of foodgrain in the country will not be adequate. We have not ambitious targets for both these programmes—60 million acres for high-yielding varieties and 40 million acres for multiple cropping by 1973-74. It is essential therefore that the small farmer acquires modern agricultural machinery. He can do this only if he is helped to do it on a deferred payment basis. Servicing facilities for tractors and other equipment have also to come up in the rural areas. It is for the provision of these services and facilities that Agro-Industries Corporation have been set up.

These Corporations have been established with an authorised capital of Rs. 5 crores in Uttar Pradesh, Rs. 4 crores in Bihar, Rs. 2.5 crores in Madhya Pradesh, Rs. 2 crores each in Andhra Pradesh, Madras, Assam, Haryana, Kerala, Maharashtra, Gujarat, Mysore, Punjab, and West Bengal and Rs. 1.5 crores in Orissa. The Central and State Governments contribute to the equity capital generally on a 50:50 basis. The Corporations are bodies registered under the Companies Act. The Boards of Directors consist largely of representatives of the State Government concerned. Operating like commercial enterprise, the Corporation has a substantial freedom of action and can design suitable programmes in the light of local conditions.

The principal objectives of the Corporations are distribution of machinery and equipments for agriculture as well as industries connected with agriculture, enabling persons in agriculture and allied pursuits to own the means of modernising their opertions, providing technical guidance to persons concerned with agro-industries, etc. Cultivators can acquire equipments by depositing 15 to 20 per cent of the cost as down payment and paying the balance over a period of years, together with a moderate interest.

The distribution of imported tractors has, by and large, been entrusted to these Corporations. During the year 1968-69, 15,000 tractors, which include Zetor-2011, DT-14B, RS-09, Russian Byelarus and Rumanian Super UTOs have been allotted to the States, the Agro-Industries Corporations handling the distribution in the States where they have been set up. Most of the Corporations have started supply of tractors, power tillers, pumpsets, etc., on hire-purchase terms. A sizable amount has been invested by some Corporations in this regard. During the Fourth Plan, it is proposed that about 30 hire centres with eight subcentres under each would be set up in the country by the different Agro-Industries Corporations. Schemes for settiug up these centres have already been received and are under examination. Tbe Corporations in Andhra Pradesh and Haryana have already set up these centres. Some Corporations like those of Assam, Maharashtra and Mysore have also taken up distribution of fertilizers and pesticides. The Andhra Pradesh Corporation has taken up groundwater exploitation and has acquired 13 rigs for the purpose.

Several Corporations have evolved to the further phase of taking up industries allied to agriculture The Assam Agriculture Industries Corporation has taken over the Silchar Fruit Preservation Factory from the State Agriculture Department. The Government of U.P. has also transferred its two fruit processing factories at Ramgarh and Lucknow to the State's Corporation, which proposes to expand these factories for increasing their production. The Andhra Pradesh Corporation has decided to take over one fruit processing factory from the State Government.

In addition to these, various Corporations have different schemes to promote agro-industries. The Maharashtra Corporation has a scheme to set up a cattle feed compounding factory at Goragaon, a poultry feed compounding factory at Pimpri and a maize milling plant at Pimpri. This Corporation has also decided to take up the super-phosphate and N.P.K. granular fertilizer manufacturing plants at Rasayani. The Bihar Corporation has decided to set up two cold storage units and two poultry units. There is also a proposal to set up a bakery unit at Patna. The Haryana Corporation has approved a scheme for setting up of a wool grading-cum-marketing centre. The Mysore and Orissa Corporations have schemes to set up maize milling plants in their respective States.

New Researches

Pest-Resistant Melon

MUSKMELONS—the juicy, nutritious fruits may be grown in all parts of India and consumed widely if a new research project underway at Annamalai University. Tamil Nadu, proves successful.

A good source of Vitamin A and C. muskmelons are now grown largely in Andhra Pradesh and certain parts of North India.

Dr. C.N. Sambandam, Dean of the Agriculture Faculty at Annamalai University, is engaged in a five-year study to isolate pest-resistant strains of muskmelon. Once such varieties are evolved, he believes, muskmelons can be widely grown in the deltaic region of Tamil Nadu and elsewhere. And they can be produced all the year round.

With a Rs. 1.24 lakhs grant from the U.S. Government, Dr. Sambandam began the research in 1967 to isolate different melons resistant to the fruit fly and the leaf spot disease.

Under the project, Dr. Sambandam and his research associates have set about screening melon varieties for resistance to the two diseases. Some 179 varieties of muskmelons have been collected so far from within the country and abroad. Their fruit has been subjected to fruitflies.

Among the varieties tested so far, one wild melon variety was found resistant to the fruitfly. This variety also readily crosses with the cultivated muskmelons.

At present, this wild variety is being crossed with an American Variety, Delta Gold, to see whether the resistance can be transferred to the new strain resulting from the cross.

Baroda on Child Nutrition Research

The M.S. University at Baroda, Gujarat, has undertaken a five-year research project on better child nutrition.

Dr. R. Rajalakshmi of the university heads a team of scientists who will develop nutrition low-cost meals for children between the ages of 2 and 5. Children in this age group are highly susceptible to the effects of malnutrition.

Locally available foods such as wheat, bajra, maize, groundnuts and vegetables will be used in preparing the low-cost meals. The team will study way of making the foods more nutritious and palatable by parching, malting, fermenting and other processes generally preactised in villages.

A number of children in the rural area near Baroda will be invited to participate in the programme. A doctor will check the health and growth of the participants periodically.

The research team hopes that the diets it is able to develop will find widerspread acceptance in the villages and help to improve the health of children.

The U.S. Government is assisting the project with a grant of Rs. 4.2 lakhs.

Quick Nutrient Test

Correcting soil nutrient deficiencies is one of the keys to replacement of tens of millions of acres of native grassland in Australia with vastly more productive clover and medicgrass pastures.

The task of mapping the kaleidoscopic pattern of deficiency combination by plot techniques is laborious and agronomists are on the lookout for better techniques.

Richard Bouma and E.J. Dowling of the Commonwealth's Division of Plant Industry at Canberra have developed a novel method which promises some important practical advantages. Instead of establishing fertilizer plots on the suspect soil, they dig up plants and grow them in nutrient solutions in a greenhouse. A range of nutrient deficiencies was provided. The growth of the test plants that had been growing in the field at a deficiency level of a particular element was substantially slower in solutions deficient in that element than in a full nutrient solution. Furthermore the scientists were able to diagnose some deficiencies after two days by using changes in leaf area rather than drying and weighing the herbage.

The test has proved valid for phosphorus, boron, sulphur and potassium, but not for calcium or nitrogen. Although unlikely to replace leaf or soil analysis, the new method provides a rapid way of identifying nutrients limiting plant growth. It is not designed to define fertilizer rates.

New Method of Ensuring Fungus Free Crops

Crops free from fungus disease are now possible following successful research in Britain. The Agricultural Research Council's National Vegetable Research Station at Wellesbourne Warwickshire, has developed a new method of killing fungus on the seeds so that the diseases have no chance to ruin the plants.

Dr. W.G. Keyorth, of the research station, said that the method is potentially extremely valuable to the World's food crops. "For the first time, we can guarantee that seeds sent from dealer to dealer the World over can be absolutely clean and no disease will be transmitted," he added.

Treatment of Seeds

Many fungus diseases are carried on seeds. The station's method is to soak the seeds for 24 hours in lukewarm water containing thiram, a substance which is used in vulcanising rubber and is also a fungicide. Penetration is complete and even fungus right inside the seed is killed.

Seedmen are already using the method. Crops grown from small quantities of seed will benefit first. Quantities of seed for such crops as wheat are too large, but disease-free types can be built up gradually. The Wellesbourne team is now attempting to improve the method so that seeds in practically any quantity can be made disease-free.

New Seeds, Fertilizers and Plant Protection Chemicals

A NOTE OF CAUTION

K. R. KURUP

Department of Agriculture, Kerala State

In the recent past Indian Agriculture has been enriched with several new varieties of cultivated crops having high yield potentials. This gives us a clear indication that the efforts of our scientists in bringing out a revolution in agricultural production has started bearing fruits.. The cultivators are convinced that the use of high yielding varieties and the adoption of scientific cultivation practices can definitely increase the yield of crops several folds. It can be asserted that realisation of this fact by our people has created in them a feelings of self dependence, We can be proud that the cultivators of our country are anxious to adopt all such practices that will directly or indirectly lead to an increase in production. But due to the limited facilities available it is found difficult to satisfy the huge demands of the cultivators for better seeds, fertilisers etc., within a short interval from the date of their introduction.

High yielding varieties

Efforts are being made the world over for the evolution of high yielding pest and disease resistant varieties in all the cultivated crops. In the field of food production, encouraging results have been shown mainly by hybrid varieties. Such varieties are produced by cross pollinations. Cross pollination may be affected naturally or artificially by skilled human labour. Among the cereal crops, natural cross pollination is only negligible under field conditions and so, artificial cross pollination is the only alternative in the production of hybrid strains.

A hybrid strain produced by cross pollination need not necessarily be a high yielding one. It might be only one in a hundred or thousand hybrid strains that exhibit all the desirable characters for which hybridisation was attempted. Such a selection of the best strain would be possible only after conducting a very detailed study of the growth habits and yield potentials of all the strains evolved by breeding. In case it is found that certain qualities are lacking in a strain otherwise qualified as high yielding, the breeders can modify it as a more acceptable strain by backcrossing those progenies with either of their parents or by crossing with an entirely new strain in which such characters are prominent. A new hybrid strain evolved in this manner will be compared with a few other locally important strains for establishing their superiority over the latter. If a few seeds are found acceptable, these strains will be again subjected to a comparative study in the fields of a selected number of cultivators under the different soil climatic conditions. Only after, trying a new strain under the ordinary cultural practices adopted by the cultivators it will be adjudged as high yielding or resistant to pests and diseases. Such a step is necessitated on the presumption that the soil conditions and the cultural practices followed in a research station will be markedly different from those soil conditions available in the cultivator's field or the cultural practices adopted by him.

Detailed Studies

It is possible that the yielding capacity of a particular seed varies with the soil and climatic conditions in which it is cultivated. Hence it is not obligatory on the part of the seed evolved in another state or country that it should perform eqally well under the changed agro-climatic zones. A seed produced for a certain soil type and climate has to be tested under varied soil and climatic conditions before its suitability to a particular tract is determined. Since these studies have to be made on scientific lines it consumes more expenditure, time and labour. Moreover, such work can be done only by technically qualified personnel. Due to these limitations, usually all this preliminary work will be done only in a Government financed Research Station or by private Organisations and Institutions having the required technical knowledge and recognised for this purpose by the Government.

A new seed cultivated in a new locality for the first time may, some time, perform fairly well making it look like a high yielding strain. Hence, with the first year's results it cannot be definitely established if a particular strain is high yielding or not. A seed with a promising yield in the first-year may not even produce as much as the locally cultivated strains if raised continuously in the subsequent seasons. It is unscientific to recommend such seeds for general cultivation before they are studied in detail and their suitability to the tract determined. The usual practice is to compare the growth habits and the performance of a new seed with a few of the local strains for two or three continuous seassons in research station, before recommending to the public. In these preliminary trials if a particular strain gives encouraging results, then it is tested under the cultivator's field conditions under the supervision of technical officers. If a seed gives satisfactory performance in all these preliminary trials, then only it is recommended for general cultivation

and distributed among the agriculturists.

Some Grave Consequences

The yield potential of a newly evolved strain is not the only criterian which qualifies it for general cultivation. The nature of growth of the plants, susceptibility to pests and diseases, suitability to diverse soil and climatic conditions, etc. are the additional characters having critical importance in finally deciding the stability of a variety for large scale recommendation. It is generally seen that certain varieties of crops showing appreciable resistance to pest and disease attacks in certain regions succumb to their destructive power in other tracts with varying soil and climatic conditions. Experience has proved beyond doubt that the nature of growth & plants is also governed to a great extent by the climate. Uncontrolled and unscientific introduction of plants may evan lead to new pests and diseases unknown to the tract. The agriculturists should see that by the cultivation of seeds received from undependable sources, he may be inviting himself, without his knowledge, one or more of the disasters mentioned above. Sometimes. a pest or disease introduced in such a manner may spread to the neighbouring fields assuming serious proportions threatening the crop in the entire region. The bunchi top disease of banana, supposed to be introduced to India from Ceylon, serves as a typical example to the disastrous consequences of unscientific introduction of plant. It is left to the reader to imagine how far this disease has affected the economy of the agriculturists of the country since its introduction.

In addition to the possibilities of introducing new pests and diseases, supply of seeds from undependable sources may lead to severe losses to the cultivators in certain other spheres also. Important among them are the possible admixture of the seeds with weed seeds, loss of viability due to improper storage etc. All these factors have a cumulative effect on the success or failure of the variety newly introduced and cultivated without conducting detailed preliminary trials based on scientific principles.

A note of Caution

The nature of detailed studies conducted with a new variety either evolved by hybridisation or brought by introduction, before it is advised for large scale cultivation, is explained above. Hencc if any of the cultivators are interested in any of the crop varieties reported from elsewhere, the best advice that can be given to them is that they may contact the nearest agricultural Assistant or Extension Officer and collect complete information from him. He is the most competent man to give you an authoratative opinion on the suitability or otherwise of these crop varieties under the existing conditions of your fields.

The cultivators may also be careful in the use of fertilisers and Plant Protection chemicals. Several types of new fertilisers and plant protection chemicals are introduced to the market by the different manufacturers in the recent times. The success of crop production lies in the selection of the cheapest and the most effective forms of fertilisers and the specific plant protection chemical against the pest or disease. All soil will not respond equally to a particular fertiliser found to be effective elsewhere. Similarly, there are certain crops which prefer to have a particular form of plant nutrient. In the field of plant protection it may be seen that a particular chemical may not be equally efficient in destroying all the pests found in a crop. So only those fertilisers and plant protection chemicals recommended for the tract or the crop or the specific Pest as the case may be, beused in the field. Any doubt in these matters may be got clarified from a technical officer, preferably an Agricultural Extension Officer or Agricultural Assistant of the area,

The Role of the Government

The Central and State Governments have recognised long back the necessity for increasing the agricultural production in the country. The role of agriculture in building up the national income has caught the attention of the planners and hence such importance was given to its development. Varietal Improvement has been accepted as the first step in improving Indian Agriculture, followed by scientific cultivation and plant protection operations. Commodity committees and co-ordinated crop improvemcnt projects have been constituted for almost all major crops in their respeetive centres of the production. These organisations are responsible for the alround development of the crops allotted to them. The Tea Board, Rubber Board, Coffee Board, Co-ordinated Rice Improvement Project, Co-ordinated Wheat Improvement Project etc. are a few of the organisations constitutad for crop improvement work. Central and Regional Research Stations for all the important Cash and Food crops located in the different parts of the country are working on the verietal improvement and the development of cultural, manurial and plant protection operations that will improve the production pattern of each crop.

The various crop improvement bodies of the Government are in the fore front to dissemination and supply the materials to the agriculturists that will have bearing on increasing production of the crops concerned. But as seen from the foregoing paragraphs, it has to be ascertained first if a particular seed, fertiliser or plant protection chemical is effective in a new region far away from places where they have been found successfull in the area and recommended for general adoption. This much of delay in recommending such practices for general adoption in a new region will save the agriculturists from taking risk at the cost of production, This proedure enables ths cultivators to accept only those new techniques which have proved their worth in the region, and they can be assured of better returns.

The progressive agriculturists are thus advised not to be misguided by the information from unauthorised and unreliable sources and to adopt only those varieties or agricultural operations in their field after ascertaining their suitability, under the conditions existing in their own fields, from the nearest official of the Agricuiture Department or Development Department.

Tips on Vegetable Nursery

To get the best out of the vegetable garden, one has to raise good seedlings. Good seedlings, in turn, are raised by following sound nursery practices.

Here are a few tips on how to raise good seedlings both in the hills and the plains.

Even sprouting of seeds is important as otherwise due to delayed germination the beds get overcrowded resulting in weak plants. To avoid this, work the seed beds to a fine tilt and sow the seed at a uniform depth. If the soil of the seedbed is dry, a pre-irrigation to a depth of at least two feet (60 cm) should be given a few days prior to digging. Never work the soil while it is still wet.

Then dig the soil over to a depth of eight inches (20 cm) and at the same time break all the clods. Four feet (120 cm) is a convenient width for the beds, with two feet (60 cm) path between them. Using a string and pegs, mark out the beds. Shovel loose soil from the path on to the seedbed, so that it is raised 3 to 4 inches (7.5 cm to 10 cm) above the level of the path.

Spread half inch (1.27 cm) layer of well broken town compost or manure together with a 3 ozs. (84 grams) of superphosphate per square yard over the bed and work into the top four inches (10 cm) of soil. During the final preparation rake the surface of the bed to remove stone and unbroken clods. At the same time raise the bed slightly in the centre with a gentle slope to the sides.

Furrows are then to be opened up across the beds and spaced 4 to 6 inches (10 to 15 cm) apart. The depth of the furrows will depend upon the soil type and size of the seed. On light soils which are warmer and dry out more rapidly, the seeds should be sown deeper than in the heavier soils. By using a board across the seedbed, you can open up the furrow to a uniform depth.

The seeds have to be sown thinly in the furrows and covered with fine soil to the level of the bed. The seed of tomatoes may be sown individually one inch (2.5 cm) apart.

During dry sunny weather when water escapes from the soil rapidly, mulch the surface with straw, grass or some other suitable material, or erect a shade about one foot (30 cm) above the surface of the bed. Once the seeds germinate, remove the mulch or shade to avoid the plants becoming spindly. The seedbed should be kept moist by giving a fine spray from a watering can.

As soon as the seedlings are fully germinated they need to be thinned out to at least ½ inch (1.27 cm) apart in the rows. After the plants are well established, water them thoroughly but not too often. There is more danger from overwatering than underwatering. Watering should be done early enough in the day to allow the foliage of the plants to dry off before nightfall. It is best to do the watering in the morning, because watering during the middle of the day may result in scorching. If done in the afternoon, however, the plants may not dry off sufficiently before nightfall.

Transplanting

Beet, brinjals (eggplant), capsicum (chilli), cabbage, cauliflower, celery, knol khol (kohl rabi), lettuce, onions and tomatoes easily survive transplanting if the operation is carried out with care. Bean, cucumber, gourds, muskmelons (cantaloup), peas, pumpkins, turnip and watermelon are not successfully transplanted by usual methods and may suffer a serious setback if the roots are disturbed.

Forcing structures

Although forcing structures are seldom used in our country they will be useful in cool winter areas to raise young plants of warm season vegetables for early planting. Raise seedlings in a warm area preferably at the base of a south facing wall or in a specially constructed frame and covered with plastic sheeting.

The frame may be made of wood, cement, brick or stone and should be 6 ft (2 metres) wide, extending 12 to 18 inches (30 cm to 45 cm) above the ground on the back and 6 to 12 inches (15 cm to 30 cm) on the front, thus affording a slope preferably to the south. For every 3 feet (1 metre), a wooden crossbar has to be placed for the plastic sheet to rest upon.

In the plains of northern India, usually, to free the seedling for early season planting out, the frame structure covered with plastic sheeting does not require artificial heating.

Since most of the warm season vegetables are not successfully transplanted by usual methods, they are raised in pots of containers which eliminate root injury when planting out. Various kinds of containers are used for growing plants. They are.

Soil blocks, which have been extensively used in United Kingdom, are cheap and very efficient provided a suitable soil is available for making them.

Plastic tubes may be cut into the desired lengths and filled with soil for plant growing. For vegetables, 3 inches (7.5 cm) diameter plastic sleeves are the most convenient.

The Japanese have developed a type of paper container which may have value for raising vegetable seedlings. Its main virtue is that when empty it packs into a very small space, as the units are made up in the form of a concertina. These paper pots vary in size with diameters from 1.9 to 10 cm. and from 5 to 13.5 cm in height.

The uniformity of sheets makes it possible to sow the pots by machine.

The soil for pots should be light and friable so that it drains readily and does not crust after being wetted. The seedlings will make poor growth in infertile soils with low water retention. On the other hand, root growth is impeded in clay soils, which also have the disadvantages of packing. The addition of one part compost to four parts of soil, will bring most soil types into good friable condition. To every cubic yard (0.76 cubic metres) of soil and compost for potting mix 1½ lb (681 grams) single superphosphate and 3 lb (1.4 kg) of dolomitic lime (depending on the soil pH).

Draft Standard for Steel Bins for Grain Storage

With a view to minimizing the loss of foodgrains through scientific storage and employing proper storage structures, which can protect the grain from insect, pests, and outside humidity and temperature, a draft Indian Standard for the construction of steel bins for bulk storage of grains has been prepared by the Indian Standards Institution (ISI).

Agricultural commodities in India contribute nearly 50 percent of total income and of these foodgrains are the most important. An expert committee has recently estimated the total post-harvesting and storage losses as 9 percent, of which nearly 7 percent loss is attributed to defective storage.

With the agricultural revolution sweeping the countryside and the farmers having taken to more and more sophisticated structures for storage of their products, metal bins, which offer a scope of more scientific storage of agricultural commodities than the traditional rural storage structures, have now assumed an importance in the recent years and are being manufactured and fabricated indigenously. The metal bins are being manufactured with different materials and in different sizes, shapes and capacities, in the country. In order, therefore, to place the manufacture of metal bins on a scientific footing from the very beginning and to safeguard the interests of the farmers in getting proper type of bins, this draft standard has been prepared.

The recommendations contained in this standard are based upon the information supplied by various manufacturers of metal bins in the country and the experience gained by the Food Department of Mlnistry of Food, Agriculture, Community Development and Cooperation with different designs and sizes of metal bins.

Metal bins can be employed with advantage for storage of grains in bulk if the moisture content of grains is below 12 percent and may be used for storage of grains for seed purpose when the moisture content is between 8 and 10 percent.

The metal bins which are rodent proof, insect proof, etc., have an added advantage that wet grain, except rice, can be stored in the bin if proper aeration arrangement is made. Also these bins can be fabricated at a central place and can be supplied to the farmers without any difficulty.

Some of the other advantages of metal bins are that they have comparatively low weight of construction which influences the cost of foundation favourably, particularly in case of bad soils, and the construction is less sensitive to settlement. In addition. the metal bins can be shifted to another side without much difficulty if such a change becomes necessary.

An All Season Vegetable

A new variety of lab-lab, (Ottu Mochai in Tamil), akin to the kitchen garden lab-lab, valued for the tender pods, has been evolved at the Agriculture College and Research Institute, Coimbatore, in Tamilnadu.

The variety, Co. 1, unlike the kitehen garden variety, can be grown throughout the year. It is a short duration strain of about 120 days.

Experiments at Coimbatore show that from one hectare, Co. 1 lab-lab will yield 4300 kilograms green tender pods fit for vegetable and 1200 kilograms seeds for use as pulse.

Ergot of Bajra

Control Measures

Ergot, a fungus disease causing widespread damage, of late, to Bajra can be controled by cleaning seeds and by proper crop rotation.

Bajra seeds should be immersed in one per cent common salt solution to remove ergot bodies which will float on the surface. The disease can also be checked by including crops not attacked by ergot in the rotation.

The grasses from and around the fields should also be removed as they harbour the disease.

WORLD AGRICULTURE FAIR MEMORIAL FARMERS WELFARE TRUST SOCIETY

NOTICE

The World Agriculture Fair Memorial Farmers Welfare Trust Society was established to commemorate the First World Agriculture Fair organized by the **Bharat Krishak Samaj**. The Trust Society has instituted some scholarships for the sons and daughters of farmers for prosecuting higher education in any branch of Agricultural Science and Home Economics leading to B.Sc/M.Sc./Ph.D. Degrees.

Applications are invited on the prescribed form duly filled in by the desirous students. The application forms can be had from the undersigned on request by sending 9" x 4" self-addressed envelope with 35 paisa stamp affixed thereon.

Applications duly filled in along with copies of certificates be sent before 15-10-1969.

DR. D.A. BHOLAY
Honorary Secretary,
World Agriculture Fair Memorial
Farmers Welfare Trust Society;
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