KRISHAK SAMACHAR

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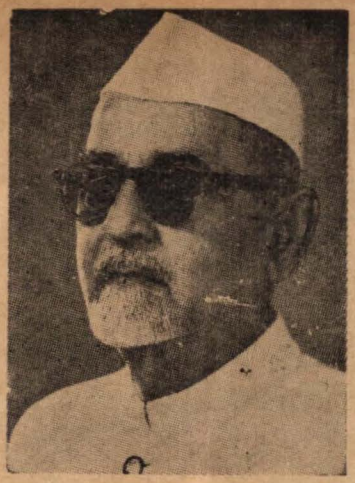
MAY-JUNE 1969

Seminar and Convention Special

Science on Fields

Condolence Resolution



This meeting of the 13th National Convention of Farmers and 22nd National Council of Farmers, of the Bharat Krishak Samaj express its deep sorrow and profound grief on the sad and sudden demise of our beloved President, Dr. Zakir Husain.

He had been a towering symbol of the secular character of our country and his contribution towards educating the illiterate people in the country has earned him a prominent place in the history of resurgent India. By his sudden demise India has lost a great patriot and educationist and beyond all, one of the greatest humanists. May his soul rest in peace.

This National Convention and Council of Farmers send its heartfelt condolence to the bereaved members of his family.

MESSAGES

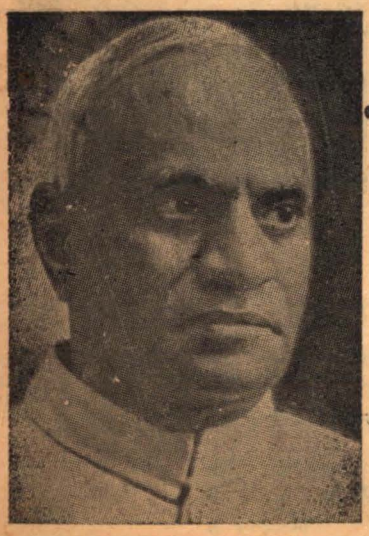
PRESIDENT OF INDIA

Secretary to the President of India
Rashtrapati Bhavan
New Delhi-4
April 24, 1969

Dear Dr. Bholay,

The President has asked me to thank you for your letter of the 15th April 1969, informing him of the Convention, Council Meeting and Seminar on 'Farm Revolution', to be held at Bombay from the 7th May, 1969, under the auspices of the Bharat Krishak Samaj. He feels sure that this get-together of farmers from all parts of the country will prove mutually beneficial to the delegates in the exchange of agricultural know-how. The President sends his greetings to the participants and his best wishes for the success of their deliberations.

Your sincerely,
Sd/-
NAGENDRA SINGH



VICE-PRESIDENT OF INDIA

New Delh
April 25, 1969

The Bharat Krishak Samaj deserves congratulations on thoughtfully organizing a Seminar on "FARM REVOLUTION". This laudable venture is, indeed, timely as it synchronises with the heralding of the Fourth Five Year Plan which appropriately lays accent on growth with stability. I am fully alive to the services rendered by the Samaj in generating enthusiasm and interest among the peasants in India for adoptiug modern methods and practices in agricultural operations. This same fervour for imbibing and assimilating progressive techniques and novel ideas needs to be recaptured in assisting the "Green Revolution" to gain momentum.

India is poised on the threshold of an agricultural breakthrough. The high-yielding varieties have brought to the fore new horizons of the level of production. Yet India has still miles and miles to traverse to reach the goal of self-reliant, stabilized growth. The 'New Agricultural Strategy', apart from elements like price support to the farmers, streamlining of the channels of credit and agricultural inputs to the farmers, comprises : (i) production of high quality and high potential agricultural inputs in required quantities, (ii) introduction of new crops like soyabeans and sugarbeet which have changed the very complexion of agriculture in other countries, (iii) proper and fuller utilisation of the various inputs. the adoption of suitable package of practices and (iv) adoption of intensive cropping rotation to increase the intensity of cropping into 200% and more. Bharat Krishak Samaj workers should play the role of pace-setters in bringing about a marriage between scientific research and farm techniques and management. I send my best wishes for the success of the Seminar as well as the 13th National Convention of Farmers and 22nd meeting of the All India Farmers Council.

Sd/-
V.V. GIRI

PRIME MINISTER

With the help of dedicated scientists and administrators, our pioneering farmers have initiated a technological revolution in agriculture. Our task now is to expand this activity and involve millions of the less fortunate kisans in it. Our immediate goal is to achieve national self-sufficiency in food and in other crops. But the larger aim should be to improve the standard of living of the ordinary rural households, provide greater wherewithal for industries and exports, and overcome the disparities and imbalances within the country-side, and between rural and urban areas.

My good wishes for the success of the Thirteenth National Convention of Farmers and the Fair and Seminar which are being held in Bombay in May.

New Delhi,
April 25, 1969

Sd/-
INDIRA GANDHI

●

HOME MINISTER OF INDIA

New Delhi
April 29, 1969

I am glad to know that the Bharat Krishak Samaj would be organising a Seminar at Bombay from the 3rd May 1969, on 'Farm Revolution'. During the last two years we have achieved notable increases in agricultural production. This has been made possible due to a combination of both, improved inputs and a welcome change in the outlook and approach of our farmers. Considerable effort is, however still required to maintain and carry this, what has been so aptly called, 'Green Revolution' to each and every farm in the country.

I trust the Seminar and the Nationl Convention of Farmers would contribute towards that object.

My good wishes.

Sd/-
Y.B. CHAVAN

●

MINISTER OF STATE FOR FOOD & AGRICULTURE GOVERNMENT OF INDIA

New Delhi,
April 26, 1969

I am happy to know that the Bharat Krishak Samaj is holding the 13th National Convention of Farmers from 7th to 10th May, 1969 and is also organising on this occasion a Seminar on 'Farm Revolution'. I believe a forum of this kind where farmers from all parts of the country are assembled will be doing a useful service by arranging exchange of knowledge and experiences on the various aspects of the Farm Revolution.

The country has turned the corner on the agricultural front after years of hard and sustained endeavour. The cultivation of the new High-Yielding Varieties of foodgrains on a rapidly growing scale in the country has turned our dream of agricultural revolution into a reality. Our farmers have

shown magnificent response in implementing the new agricultural strategy which aims at maximising production by increasing crop yields and raising more crops per acre. In fact, the dynamism, adaptability and progressiveness of the Indian farmers has taken the whole world by surprise and even foreign experts admit that the agricultural progress achieved in our country during the short period of 2 to 3 years has no parallel even in the most highly agriculturally developed countries. The pace at which the Mexican varieties of wheat have spread and gained popularity in the wheat-growing States, specially Punjab is phenomenal. In Ludhiana district of Punjab, almost the entire cultivated area under wheat is saturated with these varieties.

The farmers have adopted the new technology recommended for the successful cultivation of the High Yielding Varieties to the extent possible consistent with the availability of resources like seeds, fertilisers, pesticides, credit etc. Wherever the inputs have been made available in the required quantities and these have been applied to the crops in recommended doses, the farmers have reaped bumper harvests expected from these high-yielding varieties. Problems like increased incidence of pests and diseases, lack of consumer acceptance etc. which cropped up in the wake of cultivation of the high yielding varieties, are being gradually overcome and the research workers are constantly engaged on evolving better and more acceptable varieties.

Let it be remembered that this is only the beginning of the farm revolution in India. The break-through process has set in. The ultimate realisation of the goal depends only on ceaseless efforts on the part of all concerned with agricultural production, the research worker, the extension worker, and, above all, the farmer.

I wish the Seminar all success in its deliberations.

Sd/-
ANNASAHEB P. SHINDE

●

Minister of State Food, Agriculture, Community Development and Co-operation, India
New Delhi-1
April 25, 1969

India's agricultural breakthrough is mainly attributable to spread of technical know-how among the farmers. While scientists have developed new techniques of production with the help of science and technology, farmers in their turn have accepted the new practices most enthustiastically. It is, indeed, a tribute to the open-mindness of our farmers. The farm revolution will spread further when there is greater sharing of experiences and knowledge among farmers belonging to various regions of the country.

In this connection, I am happy that a seminar is going to be organised in Bombay along with the 13th National Convention of Farmers under the auspices of the Bharat Krishak Samaj. I wish the seminar all success.

Sd/-

M.S. GURUPADASWAMY

DEPUTY MINISTER FOOD, AGRICULTURE COMMUNITY DEVELOPMENT AND CO-OPERATION, INDIA

New Delhi
April 23, 1969

It is really pleasing to learn that Bharat Krishak Samaj is holding the 13th National Convention of Farmers and the 22nd meeting of the All India Farmers Council from 7th to 10th May, 1969 at Bombay and a Seminar on 'Farm Revolution' from 3rd to 6th May, 1969.

These are undoubtedly unique occasions for the farmers from all over the country to express their views and exchange ideas and practical experiences in the field. I associate myself with its useful and valuable deliberations and convey my best wishes for its all round success.

D. ERING

GOVERNOR OF MAHARASHTRA

Raj Bhavan, Bombay 35
25 April, 1969

I am happy to learn that the Bharat Krishak Samaj is holding meetings and seminars to provide opportunities to farmers to exchange their experience and to learn more profitable methods of farming.

Till recently our tradition-bound farmar was apathetic towards new farming techniques. But he has been persuaded to use chemical fertilisers, tractors and hybrid varieties, and he is now enthusiastic about any new method that promises increased output. This would not have been possible but for the continuous propaganda and demonstrations by our devoted agricultnral officers.

Agriculture is the backbone of our economy and only enlightened farmers can give another morsel to India's teeming millions. I have no doubt that Green Revolution which our patriotic farmers have ushered in, will be intenisified by such meetings of farmers from all over India.

For example, new techniques evolved in Mandi or Kangra or the Nilgiris can certainly be of interest to agriculturists in our other hilly regions, if these farmers come together and narrate their experiences to each other. In a a vast country like India there is a great scope for innovation and seminars such as these.

I send my warmest greetings to the farmer delegates. May their deliberations be fruitful. The country has much hopes in them.

Sd/-
P.V. CHERIAN

GOVERNOR, UTTAR PRADESH

Governor's Camp, Uttar Pradesh, Lucknow
April 23, 1969

I am glad the Bharat Krishak Samaj is holding the National Convention of Farmers at Bombay and an All-India Farmers' Council also is preceding the Convention.

The farmers' conditions in certain parts of India have opened our eyes to the urgency of increased food production in the country, and all the State Governments are wielding their energies in this direction. The high-yielding varieties of seeds and the great availability of fertilizers and increased facilities for irrigation have added a new impetus to the farmers' determination to produce more food from their acres. They are reaching the take-off stage in agricultural production. Indian agriculture is undergoing rapid changes and the Convention is meeting at an opportune time. Let it inspire the agriculturists for greater determination of producing more food from their fields.

I wish the Convention every success.

Sd/-
B. GOPALA REDDI

RAJYAPAL RAJASTHAN

Raj Bhawan, Jaipur
22nd April, 1969

Dear Dr. Bholay,

I am glad to note from your letter of the 15th April that you are holding a National Convention of the Farmers and the 22nd meeting of the All India Farmers Council at Bombay. These Meets are of great value particularly when a great revolution is taking place in our country. The extent of knowledge and experience among the farmers is of utmost importance during these days. A large number of our farmers are still following conservative methods and means and it is absolutely essential that they should realise the importance of adopting the latest methods. The Seminars like the one that you are arranging would have great effect in accelerating such a revolution and spread necessary knowledge to all farmers.

I send you my good wishes for the success of your functions.

Yours sincerely,
Sd/-
HUKAM SINGH

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LIEUTENANT GOVERNOR, GOA, DAMAN & DIU

Cabo Raj Niwas, Caranzalem, Goa
April 26, 1969
Vysak 6, 1891

Our country is steadily progressing towards the goal of self- sufficiency in food, thanks to the efforts of experts and farmers in the field of agriculture. The pace of progress has, however, to be greately accelerated with a view to reaching the goal at the earliest. Continued use of improved varieties of seeds, fertilizers, pesticides and proper irrigation facilities will greatly help in achieving our objective.

I send my best wishes to the Bharat Krishak Samaj on the occasion of the 13th National Convention of Farmers and the 22nd meeting of the All India Farmers Council which are to be held at Bombay from 7th to 10th May, 1969.

Sd/-
NAKUL SEN

●

LIEUTENANT GOVERNOR, DELHI

Raj Niwas
Dated : 28-4-1969

I am glad that the Bharat Krishak Samaj is holding the 13th National Convention of Farmers at Bombay from 3rd to 6th May, 1969. I am sure the farmers will benefit from the exchange of views on the new techniques of farming and other matters related to their up-lift. Such Conventions are useful for stepping up agricultural production in our country which is the prime need of the hour.

I wish the Convention all success.

Sd/-
A.N. JHA

CHIEF MINISTER, KERALA

Trivandrum
April 24, 1969

I send my greetings and good wishes to the 13th National Convention of Farmers being held at Bombay from 7th to 10th May 1969 under the auspices of the Bharat Krishak Samaj. I hope the Convention would certainly discuss the various problems confronting land and agriculture and promote the schemes for increasing production.

Sd/-
E.M.S. NAMBOODIRIPAD

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CHIEF MINISTER, WEST BENGAL

Calcutta
April 25, 1969

I send my greetings to the 13th National Convention of Farmers and the 22nd meeting of the All India Farmers Council meeting in Bombay in early May.

No country can call itself truly independent unless it achieves self-sufficiency in food and secures economic emancipation. The "Farm Revolution" in India has brought us closer to use of the modern technology. This needs many things—land reforms, better irrigation, seeds, fertilizers, implements and pest control methods; application of scientific methods and a new outlook. Then it calls for better transport, storage and marketing facilities and liberal credit for agro-economic activities.

The farmer must understand his interests and Government should accept their responsibilities and the scientists should reach the results of researcher to the farmer in his field. The three should co-ordinate, when alone some result can be achieved.

I send my greetings.

Sd/-
AJOY KUMAR MUKHERJI

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CHIEF MINISTER, GUJARAT

Sachivalaya,
Ahmedabad-15,
April 29, 1969

I am glad to learn that the Bharat Krishak Samaj is holding the 13th National Convention of farmers and the 22nd meeting of the All India Farmers' Council at Bombay from May 7, 1969.

Despite the fact that great emphasis was laid on measures of Agricultural development during the Third Plan period, much leeway has yet to be made in this field. Any effort which leads to boost up agricultural production deserves appreciation. I am sure that the deliberations of the Convention would substantially help step up agricultural production in the country.

I wish the convention all success,

Sd/-
HITENDRA DESAI

MINISTER OF INFORMATION & BROADCASTING AND COMMUNICATIONS, INDIA

New Delhi
April 28, 1969

The country today needs more agricultural production. To achieve this, it is necessary that green revolution is carried to the nook and corner of the country. There is need, on one hand, to impress upon the farmer, especially the small one, advantages of adopting modern methods while on the other, it is equally necessary to make the inputs available to him.

I am glad to learn that Bharat Krishak Samaj is holding a Seminar on Farm Revolution along with 13th National Convention of Farmers and 22nd meeting of the All India Farmers Council at Bombay. Any effort which promotes agricultural production is most welcome.

I wish the seminar all success.

Sd/-
S.N. SINHA

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DEPUTY CHAIRMAN, PLANNING COMMISSION

New Delhi,
26th April, 1969

Dear Dr. Bholay,

I am glad to know that you have gathered at this Convention of farmers from all over the country to have a meaningful exchange of ideas and experiences regarding the prevailing farming techniques and practices and the various recent innovations and improvements in agriculture.

In the Fourth Plan, we are proceeding on the assumption that we are near a break-through in agriculture. In fact, we have considered that the success of the Plan will be judged, above all, by performance in agriculture. While the problem relating to agricultural productivity is for the moment being tackled, the problem of agricultural organisation still remains. The fact that we have recently had definitive increase in production vests with special importance efforts at sorting out problems relating to organisations. A beginning is already being made in the Fourth Plan with the special scheme for the benefit of the small farmer. One of the main objectives of the Fourth Plan in the Agricultural Sector is to enable the small farmers to participate in development and share its benefits. I am sure your Seminar will devote a good deal of attention to the problems of the small farmers.

You would be happy to know that we have given a high priority to farmers' education and training in the Fourth Five Year Plan. The Progrmme has been given an altogether new orientation consistent with the needs of a complex and technology-based production programme. The bias of the programme is intended to demonstrate how our present-day agriculture can be raised to a higher level of technological efficiency. Attention will have to be focussed on the dry areas, special areas and the backward areas. The experience of cultivators in these areas would, I am sure, be of considerable utility and value in the formulation of action programmes for these areas.

The main components of the farmers' education programme included in the Fourth Plan relate to demonstrations organised by agricultural scientists drawn from agricultural universities and research stations and assisted by peripatetic teams and extension staff; dissemination of agricultural information throngh audio-visual aids such as radio-broadcast, films and posters; formation of farmers' discussion groups and a two-way channel of communication between the farmers' groups on the one hand and scientists and agricultural officers on the other.

I am confident that the discussions at the Convention will be as interesting as they will be useful to the administrators and policy makers concerned with the implementation of agricultural programme in the country.

I wish your deliberations all success.

Yours sincerely,
Sd/-
D.R. GADGIL

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GOVERNOR OF MYSORE

Raj Bhawan, Banglore
May 1, 1969

I am glad to learn that the Bharat Krishak Samaj, New Delhi will be holding the 13th National Convention of Farmers and 22nd meeting of the All India Farmers Council in the first week of May, 1969 at Bombay.

In order to achieve success in the field of agriculture in our country, it is essential that our young farmers should acquire a scientific knowledge in modern methods of agriculture and learn from the more advanced nations the scientific techniques of farming.

I have great pleasure in sending my felicitations to the National Convention of farmers and wishing their deliberations all success.

Sd/-
G.S. PATHAK

●

GOVERNOR OF MADHYA PRADESH

Raj Bhavan,
Bhopal-3
29 April, 1969

I am glad to know that the Bharat Krishak Samaj would be holding the 13th National Convention of Farmers and the 22nd meeting of the All India Farmers Council from 7th to 10th May, 1969 at Bombay.

Agriculture is the most vital sector of the Indian economy and the real prosperity of India depends on a sound development of this sector, I trust the deliberations at the Convention as well as at the Council would set proper guide-lines for the farmers.

I have pleasure in sending my best wishes for success of the function.

Sd/-
K.C. REDDY

MINISTER FOR LAW, INDUSTRIES, LABOUR AND AGRICULTURE SECRETARIAT, PANAJI, GOA

Panaji, Goa
1st May, 1969
11 Vysk 1891 Saka

I am very happy to learn that expert's Seminar on 'Farm Revolution' and the Thirteenth National Convention of Farmers of India is being organised by the Bharat Krishak Samaj from 3rd to 10th May 1969 in Bombay. The Convention and Seminar is being held to synchronise with the 5th National Agriculture Fair organised by the Samaj.

To eommemorate this important event a useful publication "5th National Agriculture Fair Souvenir" is being brought out. This treasured publication will contain many useful and informative articles dealing with the problems and progress of the Agriculture Sector in India. I am sure that this "Souvenir" will be a very useful document for all those who are interested in making an advanced study into various problems connected with Agriculture.

I wish the Bharat Krishak Samaj all success in this venture of bringing out a publication.

Sd/-
(ANTHONY J. D'SOUZA)

●

GOVERNOR, HARYANA

Haryana Raj Bhawan
Chandigarh

I am glad to know that the Bharat Krishak Samaj is holding the 13th National Convention of Farmers as also a meeting of the All India Farmers Council. We have now had a revolution in agricultural technique in this country. A meeting of farmers to discuss their problems and exchange their experiences would certainly help in bringing about improvement in agriculture. I hope the deliberations at the convention and the meeting would be fruitful.

I send my greetings and good wishes to all the participants.

Sd/-
B.N. CHAKRAVARTHY

22nd Meeting of the All India Farmers Council Bombay

7th May, 1969, 4.00 P.M.

Dr. Bholay announced the programme of the Council meeting and the Convention and requested Shri Mushran, Chairman of the Samaj to address the delegates of the National Council.

Shri Mushran said about the sad demise of our late President, Dr. Zakir Husain. The Members observed two minutes silence by standing and passed the following resolution as a mark of respect to the departed soul. Following resolution was passed :

"This meeting of the 22nd All India Farmers Council of the Bharat Krishak Samaj expresses its deep sorrow and profound grief on the sad and sudden demise of our beloved President, Dr. Zakir Hussain.

"He had been a towering symbol of the secular character of our country and his contribution towards educating the illiterate people in the country has earned him a prominent place in the history of resurgent India. By his sudden demise India has lost a patriot and a great educationist and beyond all, one of the greatest humanists. May his soul rest in peace!

This meeting of the 22nd All India Farmers Council sends its heart felt condolence to the bereaved members of his family."

The following recommendations of the Seminar on 'Farm Revolution' were presented by Shakti Trivedi.

The meeting ended at 7.30 p.m, and decided to re-assemble on 8. 5. 1969 at 10.00 a.m.

Inaugural address of Shri Mushran

The farmer of our country is hard working and labourious. He requires more incentive and inspiration. Still he is debarred of the suitable remuneration for his labour, he puts in the fields. Persons who are away from practical farming are deciding the real fate of farmers by fixing the minimum prices. They do not experience the virtual problems of these farmers, who have now been awaken very well.

The fate of our farmer is being decided in the air-conditioned rooms of sky scraping offices and the farmer is ignorant of all such activities which are happening without his least consent. Government has not yet opened her ears to the farmers voice. Why Govt. ignores us? This is not her fault, we are actually at fault. We are not powerful and well organised. Of late there was furious drought and famine in Rajasthan. Still many farmers and their cattle are dying for water.

The need of the hour is that all of us should strengthen our Unity and raise our voice. Dr. Deshmukh's sad demise hampered our fast progress. In the first instance in 1959, he organised such a big World Agriculture Fair in New Delhi, we ever had in our lives. His only one effort made the Samaj financially strong. But after his death we had to suffer many set backs and difficulties.

But our present Secretary, Dr. Bholay has overcome many hurdles and problems. Now we are breathing freely and calmly. There is no turmoil. We are now in a position to raise our voice before the Government.

Take the example of USA. Only 6% farmers produce bread for whole of the population. The U.S. Govt. can't take any decision without their consent. In India we face adverse situation. Here Govt. decides every farm-policy-without consulting the farming community. Tax on fertilisers and the proposal of putting levy on diesel are the living examples of Govt.'s high handedness.

These days fertiliser is popular in poor farmers also. They had a craze for it to raise their production. Thus, it will affect every farmer. But we shall cry against this tax. The prices of wheat should be raised in accordance with the shooting prices of fertilizers and other inputs. We have to discuss all such points during this session.

The only solution is left that you have to unite and strengthen this Organisation in your district or region. It is a miracle that our farmers are in majority and the employees are quite handful and meagre. Still we are not dictating the administration for our welfare. The simple reason is that we are scattered and lacking finances. If we decide to work hard for organisation, we could turn every stone for our interest.

After the inaugural speech of Shri Mushran the discussion on Seminar began with the speech of Shri Shivraj Singh (Uttar Pradesh). He made an offer of donating 7000 Qnt. of wheat straw for famine-hit farmers in Rajasthan. Secretary, Rajasthan Krishak Samaj, Shri Ram Singh thanked him for this generous attitude and timely help.

Capt. Charan Singh from Harayana spoke about the problems of his State. He also emphasised upon the need of uniting and launching a revolt against the Govt. He said Govt. should help much more. The present quantum of helpis quite unsatisfactory and insufficient to the tone of the green revolution, in the country. We can fetch more help only through strong organisation. The real producers get only 35% profit and 65% is taken away by other profiteering agencies. The farmers must get atleast 65% profit. He also criticised the attitude of agricultural universities. He also criticised the working of Banks, which have come forward to lend loans to our farmers. He said such schemes will trap the farmers in loan for ever.

He said that Govt. has earned

150 crores of rupees profit from fertilizer dealing. This money should be used for farmers' welfare. We must set up action committees to watch and tackle the farming problems in every State. We should inerease the number of life members. We have to launch a campaign to organise a Farm lobby of Legislators and members of parliament.

Shri Brahmachari from Bihar stressed the need of growing more soyabeans for protein-rich food. This crop will suit to our vegetarian population, which commands a majority in India. Soyabeans contain 42 percent protein. We can also prepare milk from soyabean powder. To make the soyabean flour more tasty we may add wheat flour.

We must too pay more attention to our cows to get more milk. In other countries cow produces milk four times a day. They give good stuff to their cattle. If we give leguminous fodder, oilcakes and other tasty fodders to our cattle, we too can have more fertile cowdung full of humus and good quantity of milk from them.

Shri Mangat Singh Khanuja of M.P. gave five suggestions on the (1) better prices for agricultural produces, (2) cheap implements, (3) loan and interest, (4) Extension and publicity, and (5) BKS Organization.

In nutshell he said that the prices should be fixed well in advance before the harvesting and sowing as we see in Maharashtra. Govt. should guarantee fair prices to the produces. Cheap and small size machines and implements may be developed for medium and small cultivators who are in majority. Threshers, small tractors and many other bullock-driven machines may be manufactured. If present policy and condition of affairs will continue our farmers will never get cheap tractors at their convenience.

Loan should be disbursed on easy and nominal interests. Scheduled banks are trying to get rid of their job by distributing the amount among the big and well-to-do-farmers, who are not in need. This type of working will defeat the purpose and small farmer will remain throughout down trodden and green revolution will bear no fruits.

About extension and farm publicity, he said that films, newspapers and Radio should be more active and work according to the needs of the farmers. Our radio is most backward and hopeless in this regard. Samaj should persuade the Information and Broadcasting Ministry about the working of Radio. After 22 years of independence our 36 crores farmers, the same number which existed in 1947, is backward and illiterate. Samaj should too take pains for farm publicity and increase the number of ordinary members. Small films on the use of seed, fertiliser and insecticides should be dubbed in Hindi and regional languages to benefit the farmers in remote villages.

Council Session Continued

On 8th May, 1969

Shri H.G. Patil

He said that the country is making good progress in connection with agricultural production and the Green Revolution. He also said that it should not be treated as Green Revolution but Green Evolution. He said that it is the duty of the Government to encourage the farmers to continue the Green Revolution. The Green Revolution should be a continued Process and the farmers should be encouraged to take part in the food production of the country. He said that farmers should be given incentive prices for his produce like rice, wheat and other crops, so that he may save something and also encourage him to produce more. The farmers are now encouraged to put up pump set etc. on their farms to produce more from their fields. He said that we should raise our voice so that the farmer will get good price for his products. The farmers should lead a good life. The farmers should live in well furnished houses and send their children to schools for higher education. He said that the farmers should increase their acreage under irrigation so that they should not depend upon the Monsoon.

He also said that we should strengthen our Organization i.e. the Bharat Krishak Samaj by enrolling more life members without that it is not possible for the Government to have the extension programmes successfully implemented in the States. He asked to organise more Clubs for Young Farmers to teach them the new techniques. He urged that the young farmers should be encouraged in this green revolution.

Shri Kulkarni (M.S.)

He said about the utilisation of cow dung gas plant, which is good for fuel. He also said about the necessity to strengthen the Samaj by increasing the Life membership of the Samaj. He requested all members to do their best to enrol more members for the Samaj and to strengthen the same.

Shri Moonigi (M.S.)

He referred to the levy on the fertiliser and agricultural input. He said to raise our voice against this. He also said about the need for a comprehensive agricultural plan.

Shri Anjani Kumar (Bihar)

He said that fertile land should not be used for industries and for other non agricultural purposes. He expressed his desire to strengthen the Samaj. He invited the Samaj to organise the next Council meeting in Champaran District of Bihar.

Shri Kamala Kanan (Madras)

He said about the National Agriculture Fair organised by the Samaj in Bombay. He said that he had seen many new things in this exhibition. He said about the food shortage (famine) in Madras due to failure of Monsoon. He said about the training camps organised by him in Madras. He suggested to have three training camps in all districts regarding the development of agriculture. He also said about the necessity to find out the water resources availability in different parts of the State of Madras with the help of the Government or other agencies.

Shri R. Srinivasan

Said that we are fighting for freedom from foreign food. He wanted that everybody should be associated with this, whether big or small farmers. He said that scientists have a real part to play in this revolution. He commended the scientists for the know-how they have given for this revolution. It is not that the Organisation is to be strengthened for it being heard. Prices, credits, inputs etc. should be made available to the farmers. He said that there is no objectivity and reality in the approach of Agricultural Price Commission. He said that it is necessary that there should be representation of farmers in the Commission from village to Central level. He said that farmers as well as representatives of Farmers' Organizations should be associated with the Agricultural Prices Commission.

He said that there must be proper distribution of agriculture credit. He said that the Cooperative banks and scheduled banks should help in this regard. He said that there should be more cooperative agencies for credit facilities to the farmers.

Shri Shivraj Singh (II) from U.P. said that our country is quite forward and progressive in yielding huge quantity of crops. Our land and farmers are quite potential, but we are lacking means and inputs to increase the production. We have to exploit the resources and research. The prices of inputs should not be raised atleast for another 15 years. The prices of inputs should go down or atleast be stable. This will increase the net income of farmers and their living standard shall improve. This is the main purpose of our green revolution.

More legislators and parliamentarians should be enrolled as member of our Samaj. State Govt. should provide more sum and subsidies to increase the income of our poor and small farmers. It is revealed in many States that funds allotted for farmers' welfare are lapsed and misused for other purposes. Poor farmers had to waste lot of time, energy and money for getting Govt. help and subsidies.

On the 8th May, the Council meeting resumed. Shri S. N. Mushran, presided, Shri Lavan Singh from Haryana said that Samaj should work in such a way that our farmers may take more interest and lay confidence in it. Our land is quite fertile, but now industrialists and capitalists are purchasing these lands on high rates and using it for factories. This practice should be stopped immediately. This practice has ruined many good farmers.

One farmer from Maharashtra spoke about Gobar Gas Plant in Marathi.

Another resented against impositing any levy or tax on the inputs use by our farmers. He favoured preplanned crop economy scheme.

Shri R. D. Chuturvedi of (Rajastan) told that work of the Samaj should reach to the interior villages. Farmers Organisation campaign may be launched and the workers should be guided and given incentive.

Mrs. Deshmukh spoke as M.P. and Life member of the Samaj. She praised Shri H.G. Patil and said that our green revolution has proved successful only because of varun devta (water). She said that during 20 years, we have done only 2% progress in irrigation schemes. The task of promoting. irrigation facilities comes under the purview of Govt. not under farmer. Farmers can onl ydig a well. I think Govt. should pay more attention to irrigation.

Shri Pritam Singh Chaudhri Haryana :

In our State, we have trial boring schemes for wells, the expenditure of Rs. 600-700 is to be incurred by the farmer himself. This tantamounts to a speculation. Still I request Govt. to give this facility to more number of farmers. We always face flood problem. If flood water of one district is diverted to other district facing water shortage, the flood problem will be overcome.

He further said that many illiterate farmers are unable to understand the names of insecticides and pesticides. If possible numbers should be marked on these chemicles to make the selection and use more easy.

Shri Dharma Singh from Mathura said that our country is never food-deficit nation. Last year we produce 9.5 m.ton. food and tons of grain had gone waste for proper transportation and storage facilities. The actual production was 16.1 m. ton. From this production one unit gets 40 lbs. food in a month which is quite sufficient for nutrition and healthy living. Long back Gandhiji told that there is no dirth of food in our country but the malpractices run by grain dealers always show artificial shortage. Our beloved food Minister—Shri R.A. Kidwai also proved my conviction true. Now I say, if food zones are abolished the problem of food shortage will never arise. The officials and dealers should be handled in a strict way.

Shri S. Singh of Manipur said that Agricultural Depts. should help the Samaj in farmers activities. Youth and adult farmers should work together. This exhibition is quite attractive and useful to us.

Shri Ram Updeswar Prasad Singh of Dalmia Nagar (Bihar) complained about transport facilities in the rural areas. This brings food shortage at one end and spoilage of grains in many stores at the other end.

The behaviour of fertiliser, seed dealers and agricultural officials is not pertinent to farmers, Samaj should move a resolution in this connection so that these people should behave properly with the farmers and their wives too.

Shri Mathuralal

Gopalsagar, Chittorgarh said that our farmers come under three categories : (i) Capitalist farmers, (ii) hand to mouth medium type farmers, and (iii) poor or poormost farmers. The economy of our nation depends upon the poor farmers. Samaj should help and uplift such farmers.

Shri Ram Swarup Verma (Rajasthan)

He said about the fate of Camals that die due to some disease. He said that Government is importing medicine for this from abroad. The Bharat Krishak Samaj should take agencies for this medicine in the State and offer his help and co-

operation in this respect. He also said about the famine condition that is being faced in Rajasthan.

Shri Bhognath (M.S.)

He said about organising strong organization of BKS. He also said about the small holdings in West Bengal. He said about maintaining the remunerative prices for food—grains. He also said about bringing the wives, sisters or mothers of the farmers when they come for the Council or Convention. He said to send concession for them also. Shri Mushran said that there is new catagory of family Life Membership, recently introduced in the Constitution. As such one who pays Rs. 150/- can take his relative, wife/son/daughter as Family Life Member and they will be given Certificates of the Convention and therefore, they both can attend the meeting.

Mr. T. Salunke: (West Bengal)

He suggested to have paid Secretaries and employees for the strengthening of the Organization in the State, District and Village levels. He wanted that the Government should come forward to help the Samaj founded by late Dr. Deshmukh.

Shri Mushran offered his concluding remarks to the council.

With a vote of thanks to the Chair. The National Council meeting disperesed.

Speech of Madhukar Chaudhari

(*Contd. from page 17*)

I have cited this example only to emphasis the need to take this organisation to the villages. Without this, there cannot be any revolution. We would have to change the whole set up for it. We have to emulate Japan also. I marked that in these countries researches were going on the farmers' fields or just nearby. For soil tests and other similar things the farmers don't have to run to the towns. Test laboratories are located in villages. But in our country the matter is just the reverse. Our Voice-Chancellor Shri H.G. Patel is present here. This is a matter of his own field of action. I hope, this convention would inspire the farmers to work in this direction too.

Resolution Passed by . . .

Contd. from page 22)

in all such areas to establish Regional Salinity Research Centres to minimise the damages that has already been done and to prevent deterioration of soil fertility.

Resolution No. 5

This Convention of the Indian farmers is of the opinion, that agricultural Wealth Tax should not be levied because agricultural land is one of the inputs of agricultural production.

13TH NATIONAL FARMERS' CONVENTION

was Inauguarated on 8th May, 1969 at 4.00 P.M.

The deleberations of the 13th National Convention of Farmers started at the National Agriculture Fair grounds, Bandra, Bombay on 8th May, 1969 at 4.00 p.m. Shri B. Rachaiah, Minister of Agriculture, Mysore presided over the function. He said about the sad and sudden demise of our late President, Dr. Zakir Husain. The meeting observed two minutes silence by standing as a mark of respect to the departed soul. Shri Rachaiah read out the resolution which was passed unanimously. (*See Resolution on cover page* 2)

This meeting of the 13th National Convention of Farmers sent its heartfelt condolence to the bereaved members of his family."

Welcome address by Shri S.N. Mushran

Shri S.N. Mushran, Chairman in his welcome address said :

Shri Mushran welcomed both the guests. He said that Dr. Deshmukh had a desire that one agriculture fair should be held in the city of industrialists and businessmen like Bombay. These people should fecl the importance of farmers and their role in the making of the country's economic structure. This is why Samaj has organised this Fair in Bombay.

The land for this exhibition has been spared free of charge by the MaharashtIa Govt. We are very much grateful for this help and cooperation. Our farmer knows the importance of agriculture in the development of industries and various trades. He sends raw material for industries. We want to show him the development in various sectors for which farmers are playing an important role.

You enjoyed the deliberation of our Seminar and discussions on its recommendations in the Council meeting. The passed resolutions will be sent to the concerned Departments and Universities in the States and Central Govt.

After the speeches of Shri Madhukar Chaudhri and Shri B. Rachaiah few farmers spoke in the Convention and Dr. Bholay read out secretary's report, published separately.

Smt. Shakuntala Pundrikakash from Meerut (U.P.) spoke quite funny and interesting. She admired the farmers exchange programme and supported its expansion upto the far east countries. She announced two prizes of Rs. 5,000 each to the highest paddy and wheat growers amongst the members of the Samaj. She said it will be a sort of incentive to high-yielders. She opposed the proposal of tax imposition by the Union government.

Shri Motilal Yadav (U.P.) said that prices of foodgrains immediately slumped down as the produce comes in the market. Our farmers are facing heavy shortage of compost and organic manure. We are only depending upon the fertilizers. Water is the main problem. The prices of sugarcane and potatos are quite low. Our plans

Presidential Address

(*Contd. from page 19*)

very near what is required to be done, the fact cannot be overlooked that a substantial progress have been made in this direction.

Similarly, agricultural inputs, like seeds, fertilizers, pesticides and implements are required in large quantities in modern agriculture. It is heartening to note that many of the agro-industries that provide inputs to farming and use farm products as raw materials are developing. Many more new ventures are likely to come up in the near future. Fertilizer production for instance, which is being done to limited extent at present, is being stepped up through factories that are contemplated to be established in the next few years.

Competent Staff needed

Competent men in agriculture are required to man age the vast and rapid agricultural development efforts. Men are required for the agricultural organisations in the States, for research, teaching, and extension work, and also for the commercial banks and agricultural Universities in the country have to play a major role.

With the concerted efforts of the various agencies of the Central and State Governments, the Agricultural Scientists, and above all, the willing cooperation of the farmer to subject himself to new ideas and practices and a determined optimism on his part, I am sure before long we would reach our goal of self-sufficiency in food production and agricultural prosperity. But let us not become complacent over some of the successes we have achieved here and there. The task ahead of us is stupendous which needs a sustained efforts by all of us. With a determined will-power, we can always raise up to this task.

At Thomas Jefferson the Third Predsident of United States put it "Those who labour in the earth are the chosen people of God, if He ever had a chosen people". Our late Prime Minister Shri Lal Bahador Sastriji put it as "Jai Jawan-Jai Kisan". I think it is better to give the first place to Kisan because the Nations survives by his efforts only.

I thank you again, ladies and gentlemen, for enabling me to share my thoughts with you and for giving me this opportunity of participating in this essentially important convention.

and projects are not much useful to our farmers as they should be. The distribution of irrigation water is full of malpractices and improper. Govt. should chalk out a healthy and useful policy in this connection. The water on the surface is in plenty. We can take use of it through increasing lift irrigation facilities.

Shri M. D. Chaudhary, Minister of Education Maharashtra, delivered inaugural address.

(Full text on page 19)

Dr. Amrik Singh Cheema, Agricultural Production Commissioner, Govt. of India said about the drought being faced in the country. He said that still they are not afraid there will be any shortage of food because they are proud of the farmers, who will increase more food production by adopting new techniques and using improved varieties of seeds. He said that the cost of production should be known through research by the Bharat Krishak Samaj. He said that BKS should have their look on the cost of foodgrains. He insisted that the Samaj should see that the prices of foodgrains are not coming down eventhough the foodgrains are in surplus.

He also said that the Farmers should be made to receive and return the loan taken as credit in time without fail.

The meeting adjourned for the next day.

9th May, 1969, 10.00 A.M.

Convention Continued

Shri Jagjit Singh Mann

He said that those people who worked very hard for the Samaj from the inception of the Samaj is now present here now. He said that his youthful age was spent for the Samaj. He said about the work done by him for the Organisation of BKS in Punjab and the enrolment of Life Members done by him. He said that his aim was to spend his life to convey the message of farming and agriculture. He said that there should be a non-official Commission of farmers in fixing agricultural prices. He said that Shri Jagjivan Ram, Minister for Food, Agriculture, Community Development & Cooperation, even being the President of the Samaj does not consider about the producers but only about the consumers. He said about his intention to take a Rally of 1 lakh farmers to the Parliament for conveying their right. He wanted that the Universiteis should not go into trading. He asked whether the BKS is doing something whether at the Central, State or District level excepting organising Conventions or Council meeting for the farmers. He said about the expenditure incurred by the farmers for agricultural production including the cost of agricultural machineries, fertilisers, marketing etc. as compared to the low agricultural prices.

Shri Mohanti (Orissa)

He said that Soil Testing Laboratories should be started in all the Districts.

He also said that lift irrigation projects should be taken up by the Government and the Samaj should work towards this direction for the heip of small farmers so that more acreage should be brought under cultivation.

He suggested that the Samaj should have some simple accounting for the farmers. The fertiliser companies should be requested to open Depots in each Block Centres for the help of the farmers. He also said about ground water survey. He also said that agricultural implements, like power tillers should be given on hire in all the States. He said that the State Governments should be asked to see that agricultural implements are distributed at District level on hire for the farmers. Agro-chemicals should be made available at the Pahchayat level for the benefit of the farmers. The Samaj should ask the Central Government to start factories for low cost power tiller with foreign collaboration so that every farmer may have them for their agricultural operations. Home canning scheme for home canning should be made available to the farmers so that they can take up the work. Cold storage facilities should be made available for the farmers. The prices should be incentive but it should not touch the pockets of the consumers too. The Governing body meetings may be held atleast once in three months at different places in the States.

Shri Misra, Minister of Agriculture spoke as dislinguished guest. (Speech on page 20)

Shri Mushran thanked the GDR farmers' delegation, Mr. Fischer and Winter for having accepted our invitation and thanked them on behalf of the BKS. He said that the farmers of India will receive them wholeheartedly wherever they go. He requested Mr. Winter to address the Convention.

Mr. Winter of GDR Delegation

On behalf of the Central Executive of the Farmers Mutual Aid Association as well as the farmers of GDR he wished greetings to the Convention. He thanked the Samaj for the invitation to them to visit India and expressed their appreciation for the same. He said about the friendly relations between the Farmers' Forum, India and the Farmers Mutual Aid Association. He said about the growth of our two organisations. He said about the talk the Prime Minister of India, Smt. Indira Gandhi, made while welcoming a delegation from GDR recently. He said about the visit of the members of the Forum, like late Dr. Deshmukh to GDR. He also said about the opportunity the Delegation had to exchange views and experience with the Indian farmers who had assembled for the Convention about Indian and GDR agriculture. He said that this exchange of views will go a long way in deepening the mutual relations of our two Organisations further. He assured his full cooperation in the development of agriculture. He also said that GDR has become a modern industrial and agricultural country of the world. He said about the high yield for agricultural produce in the country. He illustrated the achievements of GDR in agriculture during

1968. He said about the Cooperative movements in GDR. He said about the free medical facilities extended to the children and workers. He said about the Associations and Cooperatives for Agricultural purposes. He said about the avenues received by the farmers for agriculture. He also said about their aim to live friendly and peacefully with other countries. He said about the depening relations between the Farmers Forum India and Farmers Mutual Aid Association as the route for peace and friendliness between our two countries.

As a token of their growing friendship, he presented to the Samaj a Slide Projecter on behalf of the Farmers of GDR and the Farmers Mutual Aid Association of GDR. Shri Mushran accepted the present and thanked the GDR Delegation and the Farmers Mutual Aid Association for the same. Dr. Bholay also thanked the Delegation for having presented the Slide Projecter and thanked on behalf of the farmers of India.

Smt. Shakuntla Pundrikakah (U.P.)
Shri Anil Jhaveri (Gujarat)

He said that the Bharat Krishak Samaj should start Custom Service and Contractive farming.

Agencies of seeds, agricultural implements, inputs, fertilisers etc. should be undertaken for the benefit of the farmers. He said about the National Agro-Development Corporation started by IFA Gujarat and suggested to form National Agro-Development Corporation with State Branches. He suggested to have close collaboration and contacts with financial agencies for giving money (credit) to farmers by commercial banks.

The BKS should set up Panels of experts and their proposals should be placed before the Government.

He said that steps should be taken to estimate the crops and estimate of packing materials to be used by farmers.

Smt. Jaya Arunachalam (Madras)

She said that BKS should have more dynamic programmes for helping the farmers and especially young farmers. She also suggested to have programmes for farm women by the BKS.

Shri M.B. Desai (Gujarat)

He said that the fertiliser price should be reduced. Composit should be made and used by farmers. He also said that the cow-dung should used as a manure than for fuel purposes. He asked to organise Bee-keeping. He suggested to have Boards for fruits like mangoes like Cashewnuts etc. He said every State should have an Agricultural University. He said BKS is functioning efficiently. He said more publicity should be given to BKS. He suggested that Badges be given to Life members of BKS.

Speech of the Education Minister of Maharashtra Shri Madhukar Chaudhari

After the speech of Shri Mushran Shri Madhukar Chaudhari, Education Minister, Maharashtra inaugurated the Convention. He said "I have come here as a farmer. I have all the experiences of farmer's life. After returning from abroad I heard about this exhibition. I came here on the advice of my friends. I feel that the public of Bombay city did not take much interest in it. Why, I do not know.

It is evident that industrial progress in the country depends on the agricultural development. So industrialists will have to take interest in us. Due to certain reasons, people's attention could not be attracted towards this exhibition.

In this Convention there is shadow of tragedy. The sudden demise of our President is very shocking to us. But duty demanded and this programme was to be conducted. Radical changes are taking place in the field of agriculture for the last few years. Much more is yet to be done in this field, though I agree that what has been achieved is not insignificant. Great changes are seen in the villages. In comparision to that situation prevalent 20 years back, now a revolution is distinctly breaking through. Our farmer has made lot of advancement. He has started using modern inputs. But when compared to the foreign countries the work done in our country is too small.

Recently I visited Japan. I stayed there for 5—6 days. A revolutionary progress has been marked there in recent years. The credit for this revolution goes to the farmers to a great extent. It appears that, perhaps we may also do the same in India. Japan seems to be using new seeds, implements etc. In Japan farming and gardening can be seen in every house. Land is being fully utilized there. Entire Japan looks like a happy garden full of greenaries. The Govt. has helped them a lot, no doubt, but the farmers too have played an active part in changing their life themselves.

To bring change in our country, we would have to look to the East instead of West. This is why, I have mentioned the example of Japan.

Bharat Krishak Samaj aroused consciuousness among the farmers during last 15 years I used to hear much about the Samaj. I thought that revolution could not be brought about only by 10—15 thousand members. If Samaj is increased to the maximum, then revolution could be possible. Now any farmer can become a member of this Samaj as I understand, and take part in all of its activities by paying a rupee only. As I have been informed the constitution of Bharat Krishak Samaj has been amended to this effect. It is quite encouraging. Our farmer is quite conscious and aware. He understands the problems very soon. But do not forget that the farmer will not be ready to accept anything, if it does not appear beneficial to him. The agricultural life is Maharashtra has also seen great change. The change is attributed to the change in his outlook. Farmers himself has brought about this change,

Prices of the agricultural commodities are being fixed in our State. Now the acreage of Jowar cultivation in Maharashtra is increasing. If the farmers are to be encouraged,the prices will have to be increased further. We should have enough respect and sympthy for farmers. Maharashtra administration is feeling likewise. Union Govt. is also of the same view. I agree that the Govt. should pay more prices than what it is paying now. Prices of cash crops will also have to be raised further in order to change the farmers living status. In our land cotton is a promising cash crop. Farmer's future depends on it. In our Govt. the producers has still no right to fix the prices. Weather (monsoon) is not the only gamble for the farmer. Price fixation is also a gamble. This has not been considered while fixing the maximum and minimum prices. In my opinion, the stock exchanges should be stopped forthwith. It is then only that a new ray of hope will glitter in the farmer's economic life. The Maharashtra administration is unanimous for removing the other broker type agencies which affect the fixation of the prices of cotton. Something has been done for sugarcane also. Maharashtra Govt. is very much interested in helping the farmers for their betterment. In 2—3 places we have tried to change the farmer's life. The administration will have to invest more amounts in agriculture. You know that I cannot speak more about the administration. We can make the Govt. execute the plans in a better way only when our farmers are awakened and well organised.

During my visit to America, I came across a small forest in California. It is merely a sample that makes a great impact on the farmers' life. An organisation invited me. It was a students' organisation. They exhibited some cows. The subject of the exhibition was cattle breeding. They had to get a policy formulated on animal husbandry for more milk and meat. The Bank of America has offered big loans for keeping cows, so that students may also do cow-husbandry and learn it from their very childhood. These students exhibited the cows only after taking training in cow-keeping. I noted that the cows were quite healthy.

We in India, talk too much about cow. Have we any solid programme for cattle keeping? Is there any bank in our country ready to give loans for this purpose? In America this whole work is being done on the basis of organisations right from village to the district level. In America there is a large cow place. This is a big farm stretched in 50 hectares. The district organisation supervises the work here. Conferences of both the political parties are also held in this cow place. This cow place has been constructed by the organisation itself. In other words it is the farmer who constructed it.

(*Contd. on page* 13)

13th National Farmers' Convention

Presidential Address by Shri B. Rachaiah

Agriculture Minister, Mysore

It is of utmost importance that all of us who are connected with the problem of agricultural development in the country should seize every opportunity to understand the various problems that Indian Agriculture as a whole and the farmer in particular is confronted with and try to find ways and means of meeting those problems. In this direction, nothing would be more appropriate than the farmers, the planners and the administrators meeting together to exchange their views and evolve measures which should improve the conditions of the farmer and increase the agricultural output in the county.

Increasing the Agricultural Production is a must to feed the growing population and to meet the rising standards of living. In order to achieve higher production there needs to be a radical change in the out-look on farming, from the traditional and substistence farming to the modern and commercial farming. Various factors are involved in bringing about this change. However, it is the farmer who has to change to achieve the desired results. The role of farmers in this process around whom all developmental activities are centered, is vital.

Farmers Education

The most important aspect that is not adequately thought of in this transformation is the educational aspect. Farmers need to be educated to adopt the improved practices. This includes technical know-how, latest and better skills and change in outlook. The farmers are to be taught better methods of cultivation, proper use of machinery, better seeds, fertilizer, pesticides, irrigation etc.

The skill is involved in the use of the newer inputs, further, farmers' attitude towards the newer products, efforts to consume them in place of the older products to which they are accustomed has to be built up. For this, emphasis has to be laid on educational aspects in addition to the supplies and services. We have gone through a lot during the last ten or fifteen years. The decade in particular was one of losing faith in our agricultural capabilities. The seasons were bad and farm production was low. The targets for the output of inputs like fertiliser and seed were also nowhere near realisation.

Baseless Misgivings

We had our own misgivings regarding our abilities. There was a feeling about 5 to 6 years back that the target of one million tones of nitrogen fixed for the third plan was excessive and unrealistic. The extension staff of both the agricultural and Community Development Departments were targets of redicule, without any appreciation of their dilemma in having little to extend either by way of knowledge or inputs. It was in the midst of such pessimism that the high-yielding varieties programme had its birth in 1965. It was greeted with cynicism and criticisms by some of planners, statisticians and economists, who felt that the fertilizer doses recommended for the new varieties of wheat, rice, maize, sorghum and bajara were not correct either from the viewpoint of profit or maximum production.

But after two annual plans, the mood of the Country is different now. Foreign experts and others discovered that our farmers are not as fatalistic, conservative and resistant to change as they thought him to be all these years. Farmers, who had no interest in buying seeds five years back, are now prepared to pay fantastic prices for new strains. The availability of Nitrogen even at the level of 1.2. million tonnes does not fulfil the needs.

New Pattern

How did this happen ? What might motivate the farmers to adopte a totally new pattern of agriculture was only a very marked rise in the yield and income from food crops. A difference of 10 or 20% which would be considered a marked improvement in industry would be of no avail in enthusing the farmer. It is the developing of new hybrids and high yielding varieties that yield 100% over the best yield obtained earlier that made a dramatic impact on the minds of the farming community. As a result a whole set of changes in technology have set in. And now there is an air of self-confidence in our agricultural capabilities.

The spectrum of change covers all aspects of farming, from sowing to marketing and consumption. New land use and crop use pattern are being developed so as to stabilise production, utilise the enormous unutilised cattle wealth and convert agriculture into a potent instrument of rural prosperity. The huge unirrigated areas, are being harnessed to produce more through better seeds, better moisture conservation practices and improved agronomic aspect.

Integrated programme

In developing a parity of income among farmers, helping the unirrigated areas to adopt a new technology, rather than retarding the progress of irrigated areas, should be the approach. All this can be achieved only by converting the "Intensive Agricultural Development Programme" into an "Integrated Agricultural Development Programme" where, man, plants and animals can live in a new symbolic balance. Advantage should be taken of the large farmers for training extension workers and farmers. An extension worker who has not himself produced six tonnes of wheat per hectare cannot teach a farmer how to produce this much. Similarly, irrigation, drainage and crop production cannot be developed in isolation, if we are to derive proper returns from the investments in these fields.

One of the important inputs in increasing production is water. In order to see that farmers utilise the available water efficiently the technical know-how, credits and other inputs required by them should be provided. Drought has been one major problem in this unhappy land of farmers from time immemorial. Last year we were in the grip of drought. The great drought of Bihar in 1966-67 practically wiped off in one stroke all that we had claimed as progress in food production during the last three plans. As I was telling the other day, only last year we had a sense of pride for the so called break through in Tanjore delta with ADT 27 paddy, for safegaurding which harvests, mechanical drying equipment had to be rushed with the aid of Ford Foundation. But curiously enough we find Madras State passing through an unprecedented drought at present, already necessitating rush of foodgrains from the Centre. Our memories seem to be very short of all these calamities. While droughts and scarcities are having their tragic impact on some parts of our Country, Floods, Cyclones and pests affect other parts, while still other parts are claiming that they are Passing through the "Green Revolution". We have to be scientific; and unless we plan to achieve balanced progress we may continue to face those paradoxes of bumper harvests and scarcities.

Role of Science

The transformation of traditional agriculture into modern, scientific farming is only possible through the role of sciences and technology. This transformation is impossible without research with our crops, on our lands, with our water and under our seasonal conditions. A great deal of importance has to be given to research, for we cannot prosper with borrowed technology. Without research work our advisory work to farmers becomes futile. Without it we cannot fight drought and promote balanced growth. The future of our agriculture is therefore what our research holds out to us.

In all agricultural programmes, the farmers have to be actively involved. If they remain passive, none of the programmes are likely to produce the desired results. In a commercial type of farming the economic aspects are more important. The farmers have to learn to identify the costs of inputs and the prices of their output and plan a programme to secure the most with a given piece of land, available labour and capital. Thus, a farmer should know his needs resources and prepare a cropping or animal production plan for himself. The other agencies including extension service, cooperative organisation and gram panchayats should help in planning. A ready made of stereotyped plan may not be acceptable or suitable to his needs. It is only when the farmers are involved in this progress the desired results are likely to be produced.

In India about 70% of the labour force is employed on the farm and this was the cause with U.S.A. the advanced country about 150 years ago. But now in U.S.A. there is only 7% of the labour force on the farm. One farmer supplies food and other agricultural products for 29 people at home and abroad. But with so much labour force we have not been able to become self-sufficient in food. To find production employment for the unemployed and the under employed is the major problem of our Indian Agriculture. This can be done by using the labour force for raising agricultural out-put per acre through intensive cultivation ; until the idle labour is absorbed for production activity in Industrial Sector. We must infuse in the mind of the farmer a creative "Will" In change over the 'Will' to develop is of great importance. Unless the farmer develops this 'Will' we will not be able to achieve better results.

Incentive to farmers

In order that the farmers play an active role, their interests have to be protected and sufficient incentives have to be provided. In order to protect the interests of the farmers, price incentives, adequate facilities for storage of their produce, marketing etc., need to be provided. The policies need to be stable over a period of time. The fear with the farmers that if they produce more the prices will come down should be removed by suitable price policy. Adequate storage and proper marketing facilities will help in getting maximum returns for their efforts. Similarly, the crop insurance. In India the need for crop Insurance is great because of the instability and uncertainty of Agricultural Production as the cultivator is exposed to great risks due to vagaries of monsoons etc. This needs utmost consideration.

When agricultural development takes place on the scale that is being witnessed now, many more things need to be over and above the supply of seed, fertilisers and know-how. On the other hand, enormous capital will be used up at this stage when traditional farming gets transformed into a commercial farming. This is required for land development, irrigation facilities, utilisation of new inputs and managerial work. Since most of the agriculturists do not readily possess this capital with them, they will have to borrow this from outside. In the recent years enormous funds have been pumped into agriculture through the co-operative structure and the commerical banks. While what has been done is not

(Contd. on page 14)

SPEECH OF SHRI MISHRA AGRICULTURE MINISTER OF ORISSA

I pay my homage to Dr. Deshmukh at the outset. Our country is lagging behind in agricultural production. We have to import food grains from abroad. This Samaj gives us strength. We will be weak if we are scattered. It is a shame for a free nation to import food grain from abroad. We have been independent for the last 20-21 years, but our dream of self-sufficiency has not come true. The planners of agricultural schemes have blundered. Tractors, fertilisers, sprayers, etc. are being imported. We did not accord priority for the indigenous manufacture of these things. We import 60% of the fertilisers. It costs us quite a lot.

So far as the enhancement of the prices of fertilisers is concerned, Morarji must have done it per force of circumstances. The fertiliser costs 32 crores of rupees and the custom duty amounts to 25 crores, thus the total comes to Rs. 47 crores. Expenditure on fertilizer is approximately Rs. 84 crores which is a huge sum. The Central Government should re-examine the steps that it has taken till now. The imposition of tax to make up the financial deficiency is not good. The Govt. will have to find some other way out. If tax is less, the cultivator will gladly give it. If he is well off he will definitely give the tax. Orissa has exempted Panchayat tax and malguzari (land revenue) because the farmer is very poor there. The common farmers' condition is poor.

Man learns from his past mistakes. What shall we do against the high price of fertilizers ? Why are we lagging behind ? Are we lacking strength or intelligence ? We are doing today such things as we could not do earlier. Today we are giving a thought to all these problems.

A private concern wants to set up a fertiliser plant in Maharashtra Meethapur at a cost of Rs. 200 crores. But the Government does not permit it. Such things give rise to unemployment. Governments' weak policies are responsible for these drawbacks. Rural people can adopt two or three crop rotation for their livelihood.

There is dearth of raw material or water in our country. There is no such thing in Japan. Japan sets an example before us as to how a country can advance even in the absence of raw material. We are unable to deliver the goods despite tons of raw material. We do not take prompt decision. Small cars are said to be under manufacture for the last 7 or 8 years. Nothing has taken shape so far.

The population of our country is 52 crores. But the number of motor car is not in the neighbourhood of 50 lakhs. Birlas are giving 200-250 crores of rupees to the Govt.

There is a need for augmentation of transport and communication facilities. In democracy a number of people are to blame and not one particular person. If fertilizer industry has to develop, more people will get work. Our farmers are confident that they are capable of shouldering any responsibility.

We need money for water management and irrigation. Our Government used to give subsidy for the purchase of wheat and that is why we got it comparatively cheaper. The amount of subsidy was 100 crores. The Government has stopped it. But it is not known whether this amount has now been channalised to irrigation or not.

I know about Bhilai, Rourkela and Durgapur. Rourkela was set up with an investment of several thousands of crores. All these three industrial establishments are run with foreign aids. If this money could be utilised for providing irrigation facilities, it would have been better. Even if half of the money could be so utilised grains worth 500 crores of rupees could have been produced with it. Half the money could be taken in the form of foreign aid. Today there are several projects wherein a lot of money has been spent but they are even now incomplete. We should pressurise the Government for accelerating the pace of activites. I also extend my thanks to Shri Jagjit Man who has manufactured 5,000 tractors. Orissa needs such ventures.

He suggested that the members of the Standing Committee and Governing Body should visit other States. This will give impetus to the organisation and accelerate its activities. Meetings of the Council should be held in different towns.

We should also visit small countries, e.g. Japan and Phillipines. In Russia, the area of holding has been extended to 160 acres. There will be no holding of a lesser area. Such work is being done in the eastern States of India also.

Speaking on loans he said that so far loans are granted through Cooperatives. Our Cooperatives have indulged in other spheres. They have not discharged their functions fully.

Provision of cold storage for potatoes should be made. Potatoes get spoiled. There are no adequate arrangements in cold storage also. They are not kept in ideal conditions. They need expert hands for construction. If Government takes up all these things, God alone knows what fate they will meet ! Private sectors should get encouragement also in such fields.

There is an acute problem of adequate arrangement for storage of grains in surplus areas. This necessitates doing away with the barriers of sending food grains from surplus areas to deficit areas. This will save people from starvation and the grains would not be allowed to rot in surplus areas. Control on Arid Zones must be finished.

Railway concession should be given to farmers other than the Life Members.

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Mrs. Deshmukh said that Ministers of many States have no knowledge of the activities under "the Freedom from Hunger Campaign". All should coordinate and members should visit the States. Seminars on varied subjects should be organised off and on.

PLENARY SESSION

ADOPTED RESOLUTIONS

Resolution No. 1.

Proposed by Shri Vasantrao V. Patil—Maharashtra
Second by Capt. P.S. Grewal—Punjab—Haryana.

Resolution No. 2.

Proposed by Shri Anil Jhaveri—Gujarat.
Second by Shri M. Vasudevamoorthy—Mysore.

Resolution No. 3.

Proposed by Smt. Jaya Arunachalam –Tamil Nadu
Seconded by Suresh Chandra Gangrade—Madhya Pradesh.

Resolution No. 4.

Proposed by Shri J. C. Singh Deo—Orissa.
Seconded by Shri Subhash Chandra Yadav—Madhya Pradesh.

Resolution No. 5.

Proposed by Shri Jagjit Singh Mann.
Seconded by Shri M. S. Khanuja.

The full text of the resolution may be read on next page.

Awards

Dr. Bholay made the announcement regarding the award for Life Members enrolled :

1.	(a) Rolling shield and Rs. 500/-each to the State Krishak Samaj enrolling the highest number of Life Members.	Maharashtra State Krishak Samaj-519 members.
	(b) Silver Cup and Rs. 500/- cash for enrolling the second highest number of Life members.	Orissa Krishak Samaj-149 members.
	(c) Cash award of Rs. 500/- to the Krishak Samaj for enrolling the third highest number of members.	Haryana Prant Krishak Samaj 113 members.
2.	Cash award of Rs. 500/- to the District enrolling 50 or members	i Jalgaon-110 ii Kolhapur 120
	iii Amaravati-69 iv Aurangabad-69 v Bulsar-(Gujarat) 53	
3.	Gold Medal to the individual enrolling 100 or more life members.	Shri N. S. Nejjur
4.	Certificate to individuals for enrolling 25 or more life members.	i Shri P.K. Salunke.

ii Dr. D. A Bhoiay iii Mrs. Lila Patil iv Shri V.L. Mahajan. v Shri G.R. Patil vi Dhannalal Kundia.

Dr. Bholay spoke about the necessity of strcngthening the Bharat Krishak Samaj. He requested the members to enrol at least one Life member each by everyone and strengthen the Samaj which is the least responsibility that everyone must fulfill. He briefly explained the financial position of the Samaj. He said that the Samaj owes nothing now and has cleared all the debts. He said that the Samaj is now in a sound position and hence if the members wholehartedly cooperate with them by enroliing more life members, it can be strengthened easily and made more useful to the farming community for which it was organised by the late Dr. Deshmukh. He appealed all the members that on their return to their respective areas, they should to spread the message of the BKS and to enrol life members for the Samaj.

Shri S.N. Mushran Chairman briefly said about the background of the Samaj. He said about the rola played by Farm Organizations in foreign countries like USA, GDR etc. He also spoke of the desire of late Dr. Deshmukh that BKS in India should be brought to such a status like the Farm Organizations in USA and other countries. He therefore stressed the necessity to strengthen the Samaj. He said that if the Samaj is strengthened, it will play a key role for the farmers of this country. He said that the Samaj should be strengthened and it be heard by the farmers of this country. He asked whether the farmers will stop purchase of fertilisers etc. in view of the levy charged upon. If the farmers hesitate to purchase totally at this exhorbitant charges, the Govt. will certainly bring down the prices. He asked if only 6% of the population of USA who are engaged in agriculture can play a key role in the administration of foreign countries with regard to agriculture why not 70 to 80 of the population who are engaged in agriculture in India coult not play a significant role in agricultural matters in India. He said eventhough they are 6 in USA, they are all united whereas even the 70 to 80 who are engaged in agriculture are not united and hence they cannot play a significant role in the agriculture in India. He asked the farmers all over the country to unite under one banner, i.e. the Bharat Krishak Samaj so that we can play our role better in the administration on important policies with regard to agriculture. Shri Mushran also asked why late Dr. Deshmukh put a provision in the Constitution of the Samaj that at the Centre and in the States the Minister in charge of Food & Agriculture will be the President of the Samaj. He said it was only with the intention that with their support and assistance the Samaj will become more and more stronger. He asked the youngers to thing calmly.

Thanks giving by Capt. Charan Singh :

He thanked the Government of Maharashtra and the Reception Committee for the arrangements made for the holding of the Convention in the great city of of Bombay. He thanked the experts who had come and participated in the Seminar on Farm Revolution by sparing their time to make the Seminar a grand success. He was also thankful to all the participants.

Resolution Passed by the 13th National Convention of Farmers at Bombay

This meeting of the National Conveation of Farmers places on record its grateful thanks to the Government of Maharashtra for naming the newly set up agricultural university as Dr. Punjabrao Deshmukh Agricultural University, thus recognising the valuable services rendered by late Dr. Deshmukh for the development of agriculture and agriculturists.

FARM ORGANISATION

The Bharat Krishak Samaj; having its units in a number of talukas. districts and States, can rightfully claim to be the only natioaal organisation of the Indian farmers. At the same time it is also to be borne in mind that the Samaj has not grown to its full stature. The message of the Samaj should reach to large majority and in remotest villages. This calls for a dynamic programme from the Samaj, which will make the farming community aware of the imperative need for organising themselves under one banner to voice their rightful needs and grievances.

This meeting of the National Convention of Farmers', therefore, calls upon the Members of thc Bharat Krishak Samaj to chalk out a constructive and useful programme by which the farming community can be fruitfully served. Such a programme by which the farming community will be better served will undoubtedly serve as an incentive for the farmers to come into the fold of the Samaj and raise their voice as one. The programme should be worked out by a sub-committee consisting of one member from each State Unit within a period of two months which should be placed before the Governing Body, so that the body should send it to the States for implementation.

This meeting also calls on every member of the Samaj to go to the remote villages and make a intensive drive for enrolling members.

PRICE FIXATION OF COMMODITIES

This meeting of the 13th National Conveution of Farmers is convinced that by far the best means for hastening a successful 'green revolution' in the country is the prices of agricultural commodities so far as the farmer is concerned. The price for the produce must be not only economical but also incentive. It is regretable that inspite of the imperative need for stepping up agricultural production, the precurement price offered in most of the States is neither economical nor incentive.

To meet the shortage in food grains, import is resorted to paying exhorbitant shipping and freight charges. It is an irony that the Indian farmer is paid for his produce very much less than what is being paid for the imported grains,

The Agricultural Price Commission, the authority to fix the prices, should be composed predominently of actual producers, drawn from various regions and farm organisations. The Commission, merely of scientists, statisticians, economists and others, who have the least knowledge or practical experience of production and its cost cannot be so successful in any manner in fixing proper price without the assistance of the actual producers.

Further, the prices fixed should be declared for a specific period of longer duration and that too well in advance. They should have a correlation to the cost of inputs like fertilisers etc.

Another important factor to enthuse the farmer to play his full role in the revolution is the imperative need for maintenance of uniformity of prices fixed. Any fluctuation in the prices from region to region will have disastrous effects.

It is also observed that the producers ln some surplus areas are not able to get minimum support price and arə forced to market their surplus sometimes even below the minimum price fixed. This meeting is convinced that the Government with their limited and not so efficient machinery will hardly succeed in buying the surplus in time. The formers in surplus areas may, therefore, be given freedom to dispose off their surplus in other areas.

IRRIGATION

Land and water are the two essential elements of productivity. It is heart rending that there exists a sorry state of affairs in most parts of the country where successful cropping could not be carried out for lack of lrrigation facilities, though abundant water resources are available underground for exploration.

It is beyond the poverty-stricken farmers with their limited resources to take fuli advantage of this nature's gift, This meeting of the Nationai Convention of Farmers, therefore, suggests that the Government should take neeessary steps for the creation of agencies like the Tube well Exploration Organization only to explore the underground water resources to provide adequate irrigation facilities to the agriculturists.

The Indian agricuiturists are indebted to the Union Minister for Food and Agriculture for his successful efforts in inducing the commercial banking institutions to come forward to offer credit facilities to the farming community. However, this facility has not been found fruitful to the poorer section of the Indian farmers, who are still struggling under great strain, in easily securing the required credit facilities. It is, therefore, suggested that credit facilities for irrigation purposes should be made available liberally and in time, to all farmers irrespectlve of their holdings. It is also suggested that in order to bring the benefit of lift irrigation even to the smallest farmer, the Government should promote the formation of 'water lifting societies' with the required credit facilities.

Of late it is found that salinity is a great menace to the productivity of land due to continuous irrigation, particularly in Punjab, Haryana and Rajasthan. It is, therefore, recommended that immediate steps be taken

(*Contd. on page* 13)

Annual Report of Secretary General Bharat Krishak Samaj

The 21st meeting of the All India Farmers Council was held at Goa from 6th to 9th May, 1968. The report submitted by the Secretary for the Goa meeting had covered a period upto 5th May, 1968. Therefore, this report covers a period from 6th May, 1968 to 6th May, 1969 (one year). The Goa meeting elected Shri S.N. Mushran, M.L.A., as the President of the Samaj unanimously. The President was authorised to nominate the four Vice-Presidents and to form the new Governing body. Accordingly he nominated four Vice-Presidents and formed the new governing body. During the Goa session, some amendments were passed in the Constitution of the Samaj. It was decided that the Minister for Food, Agriculture, Community Development and Cooperation at the Centre should be requested to become President of the Samaj and the elected President and Vice-Presidents will be the Chairman and Vice-Chairman respectively. Accordingly, Shri Jagjivan Ram, Union Minister for Food and Agriculture took over the Presidentship of the Samaj in Aug., 1968.

Drought and Famine

During this period an unprecedented drought and famine conditions were to be feared in certain parts of the country, like Bihar, Rajasthan, Madras, Madhya Pradesh, Orissa, West Bengal, etc. The State Krishak Samaj in those States affected by droughts and famine played a vital role in helping the State Government and the people of the affected areas. Inspite of this, there was increase in agricultural production during last year. The people in the country are calling it as a 'Green Revolution'. I am proud to say that many of our members in the country played a vital role in bringing this breakthrough in agriculture and they deserve our congratulations. The country is proud about this new development and the State Governments and the Central Government are spending a lot towards the development of agriculture. We hope, the members of the Samaj will continue to do their best in increasing the agricultural production of the country and to sustain self-sufficiency in food grains.

Obituary

Mr. Ray Newton passed away on 24th November, 1968. He was the retired Executive Secretary of the Farmers & World Affairs, Inc, U.S.A. He was the man behind our Farmers Exchange Programme with U.S.A. He was the best friend of our late President, Dr. Deshmukh. He was a well-wisher of the Samaj. The Samaj mourns his death. His death is a loss to the Farmers & World Affairs, Inc., and to the Samaj.

Life Membership

The accounts of the Samaj were audited from the very beginning, that is from 1954 to 1967-68 and the work for 1968-69 is progressing. As per the Auditors, the total number of life members upto 31-3-1968 is 9743. They have struck off the name of members who had not paid full life membership subscription, from the register and hence the difference in the total number of life members, I had reported as 10,594 at the Goa meeting. During last year, from 1-4-68 to 30-4-69, 876 new life members were enrolled, thus making a total of 10,520 full life members. Eventhough the actual enrolment of life members during last year is 876, it is felt that more life members may be enrolled since number of inquiries are coming for membership from different quarters.

Family Planning and Agricultural Production Pilot Programmes

One project was started in Maharashtra (Jalgaon) and the other in Madras (Chingleput). Due to the success of these projects, one more Project has been added in Anakel (Mysore). The three projects are functioning satisfactorily. The Education Workers in the projects have been provided with Motor Cycles.

The theme of the project is "Produce more on Farms and less in homes."

The Executive Secretary of the Farmers & World Affairs Inc., Mr. Lyle Tatum and Programme Director, Mr. H. Nelson Leavell visited India in connection with these Projects. We are trying to expand this Pilot Project Programme to all the States in India.

Farm Leader Training Programme

We had selected Mr. R.C. Sohaney from Madhya Pradesh for this programme. He could not proceed till now. We hope he will be leaving shortly.

Farmers Exchange Programme

U.S.A. : Under the Farmers Exchange Programme with USA, 9 Indian farmers were sent to USA. These members represented Goa, Punjab, Gujarat, Orissa, Madras, Mysore, Delhi and Maharashtra. They were in USA for about 6 weeks from 17th August, 1968. The group stayed with farm families in USA.

Under this programme four couples and a man from USA also visited India from 18th to 3rd March, 1969. Besides seeing Delhi and its surroundings, they visited Orissa, Andhra Pradesh, Mysore, Madras, Rajasthan, Madhya Pradesh, Punjab, Haryana and Agra. In some States they were the State Guests. They stayed with farm families in some States during their visit. They enjoyed their visit to India very much.

G.D.R. : Under the Farmers Exchange Programme with GDR, a group of four Indian farmers from Madhya Pradesh, Mysore, Orissa and Punjab visited GDR for two weeks from 29-7-1968. The group enjoyed their stay in GDR very much.

National Agriculture Fair

After the holding of a State Agriculture Fair in Delhi in 1967, the Samaj could not hold any Fairs. This 5th National Agriculture Fair, most of you must have seen was

inaugurated on 23rd March, 1969 by Shri Jagjivan Ram, Minister for Food, Agriculture, Community Development and Cooperation and our President. The Fair will remain open till 26-5-1969. We are grateful to the Government of Maharashtra and specially to the Chief Minister and Agricultural University.

Farmers Training Camps

The Government of India released grants to the Samaj for holding 31 Farmers Training Camps in various parts of the country. The State Krishak Samajs organised as many short duration camps as possible, within a short period, because of the delay in receiving the grants from the Ministry. It is hoped that the Government will release more grants and the Samaj will be able to organise more Farmers Training Camps in the States in future.

Standing Committee and Governing Body meetings

After the Goa Session, the Governing Body met once in Delhi on 4th and 5th August, 1968. A reception was accorded to Shri Jagjivan Ram, Union Minister for Food and Agriculture for his accepting the Presidentship of the Samaj, which was attended by a large number of persons including Governing body members and officials of the Government of India.

Second meeting of the Governing Body was held on 7th May, 1969 which adopted the audited accounts and balance sheet of the Samaj for the year 1967-68 and also passed the budget for the year 1969-70.

The Standing Committee met thrice after the Goa meeting.

Fourth meeting of the Standing Committee was held on 6th May, 1969.

Shivaji College

The W.A.F. Memorial Shivaji College is now functioning under the Delhi Administration. Mr. Ram Niwas Mirdha, Vice-Chairman of the Samaj is the President of the College.

Farmers Education Trust

The W.A.F.M. Farmers' Education Trust is now working under the Presidentship of Shri R.N. Mirdha, Vice-Chairman of the Samaj.

W.A.F.M. Farmers Welfare Society

Since the resignation of H.H. Maharani Mohinder Kaur of Patiala Shri S.N. Mushran was elected as the President of the Trust Society. Dr. D.A. Bholay was appointed as Honorary Secretary of the Trust. The Trust did not give any scholarship last year. The Trust has been very much helpful to the Samaj.

Young Farmers Association, India

Young Farmers Association held its last annual Convention at Jabalpur and now they are having their Convention at Bombay alongwith the Samaj Convention. YFA have shifted their head quarters to our Samaj premises at Nizamuddin in Delhi. Shri Utsavbhai Parikh is the President. Dr. D.A. Bholay has been recently nominated as the Executive Vice-President of the YFA. Shri B.J. Trivedi continues to be the Secretary. Because of financial difficulties, YFA, has not been able to forge ahead during the last year. However, Gujarat, Madhya Pradesh and Punjab State Units are working satisfactorily.

Farmers Co-operative Bank of India Ltd.

Farmers Co-operative Bank of India continues to be in the Samaj premises. Shri S.M. Wahi is the Chairman and Shri Jagdish Kodesia is the Honorary Secretary of the Bank. Shri Chhabra is the Manager of the Bank. Current transactions of the bank has increased considerably.

BKS Year Book—1968

The Bharat Krishak Samaj Year Book for 1968 is being brought out by the Madras Farmers' Forum from Madras. It is hoped that the book will be released shortly.

State Krishak Samajs

A brief report of the State Krishak Samajs are given below :

Bihar

Two District Conventions were held at Monghyr and Bhagalpur. The Executive of the State Krishak Samaj met thrice which discussed several important matters relating to the farmers and agriculture in the State. Two Conventions of farmers at State level were held twice at Patna in which farmers from different districts participated. Kisan Melas were organised in several places. The State Krishak Samaj organised two Farmers Training Camps in Bihar State.

Madhya Pradesh

Shri S.S. Selot of Sagar, Madhya Pradesh was nominated as the Chairman of the Samaj to look after the working of the State Samaj. The Panchayat Raj Training Centre run by the State Samaj is running properly. The Centre started in 1963 has so far trained Sarpanches (523); Up-Surpanches (329); B.D.C. Members (21); Panchayat Secretaries (723); Members of Nyaya Panchayat (34); Youth Workers (69) and Panchas (3390). The State Samaj organised three Short Duration farmers training Camps in the State. The Samaj brought out a farmers diary and manual last year.

Mysore

The District Krishak Samaj, Tumkur, has started a Farmers' Service Cell which is doing excellent serviee for the farmers of that area. The State Krishak Samaj brought out an Agriculture diary-cum-Hand Book (1969). The Samaj is publishing Vyavasaya Patrika regularly. The Farmers' Forum Printing Press is doing good work. The Press is getting the work of the State Government and is expected to earn profit shortly.

A Family Planning and Agricultural Production Pilot Project is functioning at Anakel Taluka in the State.

The Farmers' Forum Cooperative Cold Storage has made good progress. The Cold Storage will be commissioned shortly.

The State Farmers Convention and an Agro-Industries Exhibition were organised at Banglore during April, 1969.

The Samaj organised three Farmers Short duration Training camps in the State.

Uttar Pradesh

The U.P. Krishak Samaj organised Agriculture Fair and Farmers

Conventions and Camps at Block and District levels throughout the State. The 5th National Convention of U.P. Krishak Samaj was organised in September 1968 at Kanpur. Dr. D.A. Bholay, Secretary, BKS and Capt. Charan Singh, Secretary, Haryana Krishak Samaj attended the Convention. The Convention passed a number of useful Resolutions. The publication of the Samaj "Krishak Wani' is being published regulary and its annual subscription has been increased from three to four rupees. The Samaj organised two exhibitions in the State. It has decided to hold exhibitions at Divisional level throughout the State. The Samaj organised short duration farmers training Camps.

Rajasthan

The Annual Convention of the State Samaj was held on 28th and 29th January, 1969. It celebrated the Farmers' Day on 3rd April. Cattle breeders Convention and Farmers Training Camps were organised in Ajmer and Jaipur. The members of the Samaj visited the famine stricken area of the State and helped farmers in every possible way.

The Samaj aims to establish a Farmers' own Institution to deal with seeds, fertilisers, insecticides, pesticides, to run workshop for manufacturing simple agricultural implements etc. and organise a co-operative Society to help the farmers.

The Samaj also organised short duration Farmers Training Camps.

Kerala

The Samaj continued to work under the able guidance of Shri M.N. Govindan Nair, Minister of Agricuiture and President of the Samaj. The paucity of funds of the Samaj is limiting its progress.

Gujarat

The State Samaj has started working efficiently with the help of a State Organiser. The Samaj organised Demonstration and Seminars. A large number of farmers participated in these Demonstrations and Seminars.

Maharashtra

Farmers' Day was celebrated on 3rd April. The Samaj distributes quality seeds to the farmers for 'Grow More Food Front'. Demonstrations of Hybrid Jowar and Wheat crops were organised at several places. The Family Planning Project is functioning progressively. The Samaj organised short duration farmers training camps in the State.

The death anniversary of late Dr. Deshmukh was performed on 10-4-1969. Villagers Day was celebrated on 11-9-1968. National Solidarity Day was celebrated on 20-10-1968. The birth anniversary of late Dr. Deshmukh was celebrated on 27-12-1968.

Madras

Shri Srinivasan retired from the Secretaryship of the Samaj and Smt. Jaya Arunachalam has taken over the charge recently. Shri Srinivasan is now the Chairman of Farmers Forum Madras. The Family Planning Project is functioning satisfactorily. The Forum brought out the Farmers Diary this year also as usual.

The Forum is bringing out the Bharat Krishak Samaj Year Book 1968 shortly from Madras. The Forum organised short duration farmers training camps.

Punjab

The Punjab Krishak Samaj organised Farmers training camps. It also organised Farmers Rally in Punjab. The State had also organised their convention.

Haryana

The Samaj organised its Annual Convention recently at Hissar. A large number of farmers participated in the Convention and many useful resolutions were passed on the occasion. The Samaj organised Farmers Training camps.

Orissa

The Samaj organised Conventions and Seminars in almost all Districts. It celebrated the Farmers Day. It organised farmers training camps.

West Bengal

The Samaj organised Seminars and meetings in the Districts in the State.

Manipur

The Samaj organised a short duration farmers training camp in the State. Due to shortage of funds no major activities could be undertaken.

Assam

The State Krishak Samaj organised a farmers special train. They have visited Delhi, U.P., M.P. and Bombay. They also visited the 5th National Agriculture Fair.

Expert Seminars on "Farm Revolution" 3 to 6 May, 1969, Standing Committee & Governing Body and National Council meetings were held.

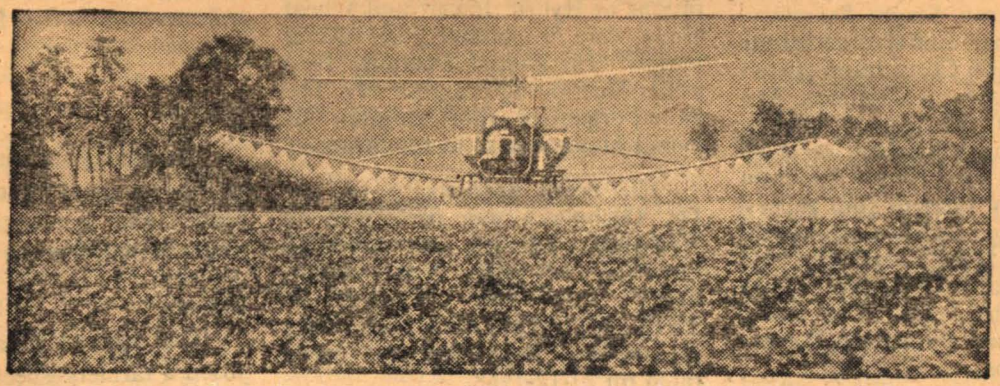
I am grateful to you all, the members of the Governing Body and the All India Farmers Council for the help and co-operation rendered to me to discharge my duty as the Secretary of the Samaj. I am sure without your help and cooperation, I won't have been able to do much for the Samaj. I also wish to express my gratitude to the members of the staff who worked hard and patiently to discharge my duties as the Secretary of the Samaj.

Once agein, I sincerely request and hope to receive the same co-operation, help and guidance from you all so that the Samaj will be able to forge ahead successfully in serving the farming community in the country and making sustained efforts to make the nation self-sufficient in food.

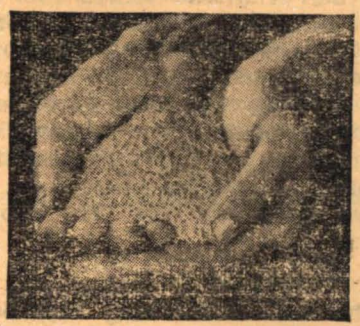
Thank you.

Jai Hind.

a field full of cotton...



a handful of rice...



Union Carbide Agro-Chemicals protect both

Every year nearly nine million tonnes of food grain worth Rs. 1000 crores are destroyed by pests in India. This is an enormous waste—a waste that *must* be prevented. The food has to be protected; the pests destroyed. The answer lies in the increased and effective use of pesticides. With this in mind Union Carbide has started a large scale pesticide manufacturing and marketing programme in India.

Today, specialists from Union Carbide reach the very heart of Indian villages teaching farmers the correct use of pesticides. The range manufactured by the Company includes SEVIN Carbaryl Insecticides, DHANVIN Granular Insecticides for rice, TEMIK systemic Insecticide/Nematocide/Acaricide and SIRMATE Herbicide. Formulations of these pesticides are now helping to destroy most of the pests that affect cereals, fibre crops, vegetables, fruits and plantation crops as well as ectoparasites of poultry and cattle.

UNION CARBIDE SOWING THE SEEDS OF PROGRESS

UFRC-16

SEMINAR ON FARM REVOLUTION

The Seminar on "Farm Revolution" was conducted from 3rd May to 6th May 1969, which was largerly attended by eminent Scientists, experts of specific branches of Agriculture, foreign delegates and eminent persons of international repute.

Inaugural Session of the Seminar opened with the welcome address by Dr. D.A. Bholay, Secretary General of Bharat Krishak Samaj. Shri L.P. Goswami. Minister for Agriculture Assam and Shri B. Rachaiah, Agriculture Minister, Mysore also addressed the delegates participating in the Seminar.

The Seminar was divided into eight groups to submit report on 1. Soil & water conservation. 2. Farm Management. 3. Plant food. 4. Plant protection chemicals. 5. Rural credit & Banking. 6. Agricultural Machinery 7. Dairying, Poultry, Fisheries & animal Husbandry & 8. Farmers' Organisation.

After warm discussions the Seminar finalised the reports and consequently made recommendations to the 13th Farmers' Convention.

The Seminar concluded its session after Presidential address & vote of thanks on May 6, 1969.

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OUR PARTICIPANTS

- ☐ Dr. Cedric Day
- ☐ Dr. Ray Choudhury
- ☐ Dr. D.S. Bhandar
- ☐ Shri A.P. Joseph
- ☐ Dr. T.J. Mirchandnai
- ☐ Dr. V.K. Saolapurkar
- ☐ Dr. S.V. Balkundi
- ☐ Dr. H.K. Jain
- ☐ Dr. Rusall O. Olson
- ☐ Dr. K.N. Singh
- ☐ Dr. S.V. Pingale
- ☐ Dr. Hari Bhagwan
- ☐ Shri Man Singh Manohar and Shri S.C.P. Sachan
- ☐ Shri D.S. Vyas and Shri D.K. Misra
- ☐ Dr. Gangabhusan Panda
- ☐ Shri J.M. Holcomb
- ☐ Shri B.K.S. Jain
- ☐ Dr. Donald Green
- ☐ Mrs. Rajammal P. Devadas
- ☐ Dr. Amrik Singh Cheema

Welcome Address

By Dr. D. A. Bholay
Secretary General
Bharat Krishak Samaj

On behalf of the President, the Chairman and the members of the Bharat Krishak Samaj and on my own personal behalf, I have great pleasure to extend hearty welcome to you all. It is indeed gratifying that the Bharat Krishak Samaj has been honoured by a number of farm experts and scientists in the country through their ready response to the Samaj's invitation to participate in this most timely and purposeful Seminar. Today is, indeed, a momentus day for the country in general and for the Samaj in particular, since it is for the first time that an experts' seminar of this kind is being held mainly to discuss the most urgent need of the country *viz.*, the much needed 'Green Revolution.'

The Bharat Krishak Samaj needs no introduction to you. It has been serving the farming community for the past decade and a half. It has been consistent in its constructive construction towards the development of Indian Agriculture as a whole. There has been a feeling for long that a dialogue between the farmer and the scientist as well as the farmer and the industrialist is essential in the context of the fast changing scene which we are witnessing today in agriculture. Agriculture is no more being viewed just as a mere way of life but as a full fledged commercial venture. The slogan of the Samaj has always been that agriculture should be viewed as an industry and should be treated at par with any other industry. The often repeated charge that the Indian farmer is illiterate and ignorant is, in the manner, justifiable. It has been amply proved that the Indian farmer is as enterprising, if not more, as his counter-part in any other part of the world. The recent break through in the agricultural sector has firmly establishehd the high potentialities of the farmer. The unprecedented increase in the consumption of fertilisers, new strains of seeds etc. also to a great extent indicate the advancement of Indian farming. This has also brought to the fore the profitability of pursuing agriculture as a commercial venture,

The industrial recession and the economic depression that the country had to go through recently emphasised the imperative need for strengthening the agricultural sector, the mainstay of our country's economy. The authorities, on their part, realising the miserable condition that the agricultural sector was left to, started paying attention towards its development, Thanks to the band of enterprising farmers throughout the country; a break through was achieved. We are now on the threshold of a revolution, We are on cross roads, It is for us to choose the path that we have to tread. The present atmosphere is conductive to sow the seed of revolution. We cannot afford to miss this opportunity and continue to neglect agriculture and the agriculturists. It can be safely stated that the seed for an agricultural revolution has been sown. It is for us to see that the seed germinates and then grows to its full stature to reap the harvest.

The need of the hour, therefore, is to inject a new spirit in the Indian farmer, who has just succeeded in shattering the shackles of tradition wound round him. It is our responsibility to re-vitalise him so that he may play his vital role in hastening the much talked about 'green revolution' in the country. It is, therefore, imperative that proper education for the farmers is provided, The Bharat Krishak Samaj since its inception has been concentrating on this aspect. Organisation of exhibitions and fairs, holding of Seminars etc. form the main role of the Samaj. I am happy that in this Seminar a large number of experts have consented to contribute their mite in making this discussion a useful one. If I may venture I would introduce the main subjects which are to be discussed during the Seminar :—

Soil and Water Conservation

In spite of the twenty years of planning, agriculture still remains a "gamble of rains" in this country. The farmer who is under the mercy of the vagaries of nature, has been the victim many a time of drought and other calamities of nature. The experts, we hope, would concentrate on the possibilities of extending minor irrigation wherever necessary.

Soil testing and conservation is another thing in which we have not made much headway. The extension of soil testing facilities to reach the farmers of this country is of paramount importance. Applications of fertilisers has no meaning if the fertility is not taken into consideration.

I have every hope that the group on soil and water conservation would have a serious discussion on the points raised as well as other points which are brought out on the existing system of agriculture as a whole.

Farm Management

With the introduction of modernisation of Indian Agriculture the supervision and management of

farm practices have become highly technical. Farm management till recently in India was quite new and even now it has not reached the doorstep of the farmer. In changing Indian farms from subsistance to profitable profession, farm management has an indomitable role to play. The shortcomings, which we witness in the management of the farms ultimately results in inefficient or uneconomical running of the farms, are to be discussed and the solution found out. The Samaj has every hope that the discussion on 'Farm Management' by the experts collected here would pave way for initiating a change in Indian farms.

Plant Food

There is no denial of the fact that the utility and the importance of the fertilisers have been very well acknowledged by the Indian farmer. Fertilisers have a vital role to play in increasing agricultural production and revolutionising the farms. However, the faulty distribution set-up of fertilisers puts the poor farmer of the villages into lot of difficulties and the manufacturers have to take into consideration this painful flow which is existing in the present distribution set-up. It is also the responsibllity of the manufacturers to popularise the various types of fertilisers in different soil conditions and crops among the millions of farmers of this country. The use of fertilisers as well as the quantity applied are still not done in a scientific manner by the Indian farmer. The persons connected with the fertilisers should take up the responsibility of directing us in finding out solution to the many of the problems faced by the farmers.

Plant Protection Chemicals

The role of pesticides in farm production, is not recognised or accepted or well-known to the farmer to the extent it is required. The inevitability of using pesticides in the case of hybrid seeds is gaining momentum only on a limited scale. The crop diseases or the irreparable damages pests can do in the destruction of crops are still not very clear to many of our farmers. It is on this point the group discussion on Plant Protection Chemicals could enlighten us through various suggestions in improving the existing systems.

Rural Credit and Banking

The role of credit in developing the industry or agriculture need not be stressed. However, it is a matter of sorrow and regret that even now the credit facilities available are very meagre and a very low percentage of the total demand of the farmer is met with by the credit institutions at the moment. The possibilities of increasing credit facilities to the Indian farmer are to be proved into and in this we expect the experts to give us some concrete suggestions which could be implemented on governmental level as well as through voluntary agencies.

Agricultural Machinery

Mechanisation of Indian Agriculture and modernising the agricultural practices has been much talked about during these days. Though a section of the population have strong views against mechanisation of Indian Agriculture, the inevitability of partial mechanisation of Indian Agriculture has been widely accepted. However, the important point as far as the farmers are concerned, is the high price of the agricultural machinery produced in this country. It is a fact that even now tractors and other agricultural machineries are not within the reach of the ordinary farmer and it is for the manufacturers to make it available for the Indian Farmers at cheap rate. Unless and until the prices of the tractors are reduced, and the production of the same increases, no improvement can be made in the field of mechanisation of Indian Agriculture. As is the case in many fields, here also the interests of the manufacturers are always safeguarded and the consumers are neglected, if not ignored. But such a state of affairs cannot exist for a longer period. Therefore, it is in the interest of the manufacturer also to discuss this highly controversial subject and come up with suggestions to improve these handicaps being faced by the farming community.

Dairying, Poultry, Fisheries and Animal Husbandry

Our idea behind organising this Seminar has already been mentioned a little while ago. It is a painful fact that India was known as a land of milk and grain in the past. Now she is recognised as a country of shortages. The group on Dairying, Poultry, Fisheries and Animal Husbandry would discuss the possibilities of developing these spheres which would indirectly or directly help the economy of the villages. The development of these fields would mean not only increase in production of milk and other products, but also the development of ancillary industries and strengthening of rural economy as well as more employment. This vital sector of agricultural industry requires special concentration and we hope the discussion which we will have here during these days would culminate in constructive suggestions on improving this field.

Farmers' Organisation

The misnomer that Indian farmer is illiterate and ignorant and cannot adopt scientific farming has been in current for many years. The unprecedented increase in agricultural production during the last couple of years and the increasing hopes for an agricultural revolution has completely extracted the Indian farmers from such a malicious charge. The Indian farmers are prepared to adopt modern techniques provided they are properly guided and the inputs are available at the proper time. Unfortunately, the vital role that the farmer plays in the country's economy is not yet fully appreciated. He is at the mercy of the vagaries of nature and for a better price he is left in the hands of the unscrupulous trader. It is our desire that the working group on farmers' organisation would take these pertinent subjects and would suggest measures to improve the existing unfavourable conditions.

I am sure discussions under these heads would definitely contribute at least to a little extent in improving the existing conditions. It is also our fervent hope that this dialogue which we will be having for four days would also promote better understanding between the farmer and the industrialist as well as the scientist and it will also help in initiating a practical approach to the problems of the Indian farmer, The

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Shri B. Rachaiah, Agriculture Minister, Mysore Addresses Seminar

Agriculture which is the mother of all science and technology is evolving itself continously since the first sod was turned by man with the object of producing what is wanted by him for consumption instead of the natural vegetation that existed on the Globe. The ever growing population and the shrinkage of resources due to constant use were the two compelling factors which were responsible for adopting more and more techniques to produce more food to meet the demand. It is true that agriculture productivity demands on natural factors to some extent but modern research and technology have reached a point where agriculture inputs are made available and used in increasing agricultural production in spite of natural handicaps.

The central task of agricultural development is the more effective use of land, labour and inputs. The agriculture structure varies from country to country and region to region and place to palce depending upon natural and other resources. So, the adoption and application of techniques do change from place to place. We have to develop our techniques to suit to the needs of our country. We cannot dispense with manual or animal labour one fine day and mechanise the whole farming. But unless the traditional farming gives place to modern farming, we cannot think of any change for the better, let alone green revolution.

Agricultural Development

'Green Revolution', miracle stories of food production and breakthrough in agriculture are the words and phrases currently fashionable while referring to agricultural progress in recent times. Action programme for increasing production do not however, depend for success on fine phrases or slogans, but on evolution of crops with high-yielding potentials and of agricultural practices that would bring out these crop potentials to the highest level, along with economy in production or with large margin between production cost and crop return. In the ultimate analysis, each farmer is the final judge to decide his cropping programme and practices based on the realities of the conditions available to him. This basic truth is often overlooked and the trend is towards over-simplification or excessive generalisation.

In a recent analysis, one Ford Foundation expert in India has shown that while the gains in wheat production in our country from 1958-61 to 1967-68 is the highest, being 258 per cent, the corresponding figure for hybrid maize is only 104 per cent and in rice only 37 per cent. The Green Revolution is therefore an appropriate term to apply to our wheat growing regions, for, we find in May 67 that India planted 7,00,000 acres to dwarf Mexican wheat and were expecting to plant to the same about 6 million acres in 1968.

This is indeed a very steep progress limited mainly to the Indo-Gangetic Plains possessing fairly uniform conditions with good sources of irrigation through canals or underground resources.

Varied Problems

In contrast with this, we in the State of Mysore have an entirely different type of development. Only 10 percent of the area is blessed with irrigation facilities in Mysore, and agricultural conditions for a crop like paddy varies from 15 inches of rainfall to over 300 inches, soil ranges from gravelly to stiff black clay, elevation varies from sea level to about 4,000 feet. Green revolution is but a distant cry under such a diversity of crop growing conditions operating under the constraints of uncertain rainfall and equally uncertain rain fall distribution. Let-us therefore recognise that it is long long way from break throughs in laboratories and test fields to the harvests obtained by millions of farmers in the sub-continent of ours. It is an extreme over-simplification of the Indian Agricultural problem if we say that the Green Revolution in the Wheat growing area of the North and North Western India is a symptom of the changing agricultural scene in India as a whole. No that the rest of India has remained totally unaffected. High-Yielding varieties of rice, Jowar, Bajra, ragi and other crops have been evolved by breeders all over the country, has resulted in India reaping a record harvest of over 95 million tons of food grains last year. But let not this achievement lull us in to a complanence that we have solved our food problem once and for all. Far from it, not only our population is increasing at a rate faster than the increase in food production, to make available to each person much less food and nutrition now than what was available some years ago, but the impact of new technology has also been very varying and dissimilar in different parts of the country.

As an example, it is easy to conceive a high-yielding variety of wheat spreading very fast in the uniformly growing conditions of Indo-Gangetic Plains or of rice in Tanjavur delta, but such a thing is impossible when soils water-supply elevation and other growing conditions for a crop varies within short distances. Extension of irrigation at heavy cost has undoubtedly increased our potentialities for better agricultural production, but it has also incidently served to create islands of favoured excellence amidst

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Improved Seeds For High Yields and Multiple Croping

By H. K. Jain

Division of Genetics

Indian Agricultural Research Institute, New Delhi

The agricultural transformation which is at present taking place in India has depended to a large extent on the high yielding strains of cereals and other crop plants developed at the Indian Agricultural Research Institute. The wealth of plant material found in India is very great and even in their relatively unimproved form, the different crop species account for nearly one third of the Gross National Products of India. At the Genetics Division, scientists have been engaged in the improvement of cereals, oilseeds, pulses, fibre plants (cotton and jute) and fodder plants through the application of scientific techniques of plant breeding. The new high yielding and early maturing strains which the Division has already produced, should make it possible to double the production of several of these crops in India within a few years, with the availability of necessary inputs like fertiliser and irrigation. The main problem in Indian agriculture continues to be that of low average yields per unit of land and per unit of time. The low yield results from poor soil fertility and also from the fact that the crops, which have been grown over large areas, have not received a great deal of attention from the standpoint of their genetic improvement. The low productivity per unit of time results from the fact that the Indian farmer cultivates his fields only during part of the year; for several months in the year the land remains free of any crop. It also results from the fact that a large number of crops commonly grown in our country take a long time to mature. The Division of Genetics have been attempting to break these yield barriers through a number of experimental approaches. The Division has developed crop varieties which have a very high yield potential and which mature in a relatively short period.

1. High Yielding Varieties

Using the scientific techniques of exploitation of hybrid vigour and other types of gene action, it has been possible to develop high yielding varieties in wheat, maize, sorghum and pearl-milltet. The new strains of these crops have given yields of 50 to 70 quintals per hectare as against yield of 10 to 20 quintals per hectare, which have been commonly obtained by the Indian farmer in the past. The new strains have been so evolved that they show good response to conditions of high fertility and irrigation. Some of the techniques which have been employed to achieve these results are described below :

(i) Advent of Dwarfing Genes in Wheat

The New Pusa wheat varieties of the 700 and 800 series which the Division had developed in earlier years have been well-known for their grain quality and disease resistance. These varieties, however, had been bred for conditions of average fertility. A reappraisal of the wheat improvement programme in the country was made by the scientists of the Division in 1962 in the wake of increasing food shortages in the country. This analysis showed that the removal of barriers to high yields in wheat required development of varieties marked by a plant type, which would respond to conditions of high fertility level and irrigation. In 1963, the Institute with the help of the Rockefeller Foundation imported 100 kg of seeds of Mexican wheats, which included Sonora 64, Sonora 63 and Lerma Rojo. Also imported from Mexico were a large number of promising wheat selections in early stages of development. These were tested in several locations under the All-India Coordinated Trials in 1964. In the succeeding crop season, the Institute arranged for the import of 250 tons of seeds of Sonora 64 and Lerma Rojo. The rapid and extensive evaluation of those introduced varieties enabled the Government of India to introduce during 1966-67, 18,000 tons of these wheats from Mexico for commercial cultivation over wide areas. The results from the dwarf wheat varieties directly introduced from Mexico and others developed in India showed that they were of very great value in increasing wheat production in the country. During the crop season 1967-68, nearly two million hectares were under cultivation with these varieties in many parts of the country. The year saw a record production of over 17 million tons of wheat in India, which was nearly double the quantity produced in 1950-51.

The Mexican wheat varieties

although outstanding from the point of view of yield, did not find good consumer acceptability in view of their red grain colour. It was, therefore, considered necessary to improve the grain characteristics of these wheats. As a result of selection and through mutation breeding, a number of new strains were developed, which are both high yielding and show improved grain colour. Some of the important characteristics of these new varieties, which are at present under widespread cultivation, are described below :

Sonalika :

A selection from an improved line (S.308), this variety possesses bold and amber coloured grains like those of many of the Indian wheats and is early in maturity. It is a one-gene dwarf suitable for timely as well as late sown conditions in Eastern Punjab, Delhi, Rajasthan, Uttar Pradesh, Bihar, Haryana, West Bengal, Orissa, Assam, Madhya Pradesh and other central and peninsular states of India. It is moderately resistant to the rusts.

Safed Lerma :

A selection from the Line S-307. It resembles Lerma Rojo, a previously released Mexican variety, in all its characters except the grain colour, which in this case is white and, therefore, more acceptable to Indian farmers.

Choti Lerma :

A selection from the line S-331. It is a two-gene dwarf, unlike Lerma Rojo (one-gene dwarf), which it closely resembles, however, in all its other characters. Choti Lerma combines in itself a degree of rust resistance not found in any other strain available in India at present, and as such, is of particularly great value.

Kalyan Sona :

A brown rust resistant selection from the line S-227 developed independently by the Punjab Agricultural University and this Institute. It is a two-gene dwarf combining resistance to loose smut, hill bunt, and also considerable resistance to brown rust under field conditions. Kalyan Sona is late in maturity and is recommended for timely sowings in all the wheat growing states of the country. The variety is characterised by amber, hard grains and has given record yields in farmers's yields (80-90 quintals per hectare).

Sharbati Sonora :

An amber seeded mutant of the red seeded Mexican variety Sonora 64, produced through mutation breeding technique. It resembles Sonora 64 in all its characters except for those relating to grain. The new variety is marked by a 20 per cent greater protein content and a higher lysine content.

Exploitation of heteaoris in maize, sorghum and pearl millets.

The techniques of plant breeding offer many possibilities for improving crop varieties ; none of these techniques, however, has been so striking in their impact as that of the development of hybrid strains. The first commercial double cross hybrids were those of maize produced in the United States more than 30 years ago. The development of hybrid maize in the United States gave rise to a completely new industry, and one might say that it also had a social and cultural impact, apart from the purely economic one, on the people of that country.

High yielding flint type maize hybrids yielding more than 2,500 kg. of grain per acre were produced at the Institute more than 5 years ago. Under an all-India programme, sponsored by the Indian Council of Agricultural Research, and coordinated by this Institute, 8 of these double cross hybrids have been released so far for large scale cultivation in different parts of the country. The areas of adaptability of the different maize hybrids are given below :

Name of hybrid	*Area of adaptability*	*Duration in days*
Ganga 101	Northern plains	95-100
Ganga 3	Northern plains	85-90
Ganga safed-2	Northern plains	95-100
Ranjit	Southern Rajasthan, Gujarat and Maharashtra	100-105
Deccan	Peninsular India	105-110
Himalayan 123	Himalayan hills upto 6,000 ft.	110-120
Hi-starch	All maize areas	100-110

Development of composite strains in maize

The performance of maize hybrids and varieties depends on the germplasm base from which they are developed. If the level of performance of the foundation material can be raised, it is expected that hybrids and varieties evolved from it should have higher yields. This information has been utilised to develop a number of composite strains of maize from inter-racial crosses. Some of the combinations from these crosses have been found to give yields similar to those of the best double crop hybrids now under cultivation. The performance of advanced generations of such combinations has also demonstrated that their yield potential does not decrease significantly with years. The development of composite populations from selected races and varieties of maize has, therefore, provided a method of developing superior gene pools by appropriate procedures. The additive genetic variances has been exploited and the level of performance of the composites raised higher. Six outstanding composites developed in this manner were released for commercial cultivation during 1967. In the context of shortage of seeds of high yielding hybrids of maize, the composites have a particularly significant role to play. In the case of a composite variety, the farmer does not have to replace the seed every year, as he has to do in the case of hybrid strains. The seed of the composite strains has been extensively multiplied by the National Seeds Corporation, and it is expected that several lakhs acres of maize will be covered this year with these now strains. Thus, by the combined cultivation of hybrids already

released and the composites now recommended, a quicker impact on food grain production can be made.

Composite	*Grain yield potential (Kg/ha.)*	*Salient characters*
Amber	6,500 to 7,800	Recommended for Peninsular India and Himalyan hills upto an altitude of 5,000 ft. Maturity period 110 to 115 days; plants tall vigorous growing, bearing broad dark green leaves; partial resistance tolerance to downy mildew, leaf blights and rust; one big ear per plant; ears long and tapering with uniform kernel rows; grains flat and bold, pale yellow and semi-flint.
Jawahar	5,600 to 6,600	Recommended for Northern plains and Peninsular India; maturity 100 to 110 days; resistant/tolerant to downy mildew, leaf blights and rust and possesses considerable measure of resistance to the top shoot borer (*Chilo Zonellus*) ; one ear per plant; ears long and cylindrical with tight husk cover; grain orange yellow bold, round and semi-flint.
Kisan	5,600 to 6,500	Recommended for the Northern plains; maturity 105 to 110 days; plants compact with thick stem and long, broad dark green leaves; considerable resistance/tolerance to the top shoot borer, downy mildew, leaf blights and rust; tendency for 2 ears per plant, ears with tight husk cover; ears cylindrical and short; grains medium in size, yellow and hard flint.
Vikram	5,000 to 6,000	Recommended for Northern plains; maturity 90 to 100 days; plants vigorous; considerable resistance to drought and partial resistance to downy mildew, leaf blights and rust; tendency to bear 2 ears per plant, ears long and tapering, with bold, hard, orange yellow, shining, flint grains.
Sona	5,000 to 6,000	Recommended for Northern plains; maturity 90 to 100 days; tall vigorous plants, with broad light green leaves, tendency for 2 ears per plant; ears small and conical; grains small, bright orange, hard flint.
Vijay	5,500 to 6,300	Recommended for the Northern plains; plants tall growing, with long narrow comparatively lighter green leaves; resistant/tolerant to leaf blights and rust; strong tendency to bear 2 ears per plant; the ears are long and tapering with bold flint to semi-flint yellow grains.

The important characters of the composite strains developed are described below :

Sorghum hybrids and varieties

The exploitation of heterosis in Sorghum in contrast to maize is of recent origin. The possibilities of heterosis breeding in sorghum were opened up with the discovery of cytoplasmic—genetic type of male sterility in this crop. The significance of this finding was that male sterile lines became available for the first time, which could be used as female perents in hybrid seed production. The finding of fertility restoring genes in a number of other lines made it possible to produce F-1 hybrids, which unlike the female parents, were fully fertile. The first sorghum hybrid CHS 1 was released from the Institute in 1964. The Sorghum hybrids CHS 1 and CHS 2, the latter released in 1965, have resulted in a breakthrough in the otherwise stagnant and low yield levels of this major millet. The two hybrids are marked by wide adaptability as against the local varieties, which were suitable for cultivation in small pockets only. Dwarf and semi-dwarf in nature, the hybrids respond to high fertility levels and return yields of 6,000 to 7,000 kg. per hectare, under optimum conditions. Most local strains are of 5 months duration and fail to make grains in years of drought. On the other hand, the earliness of the hybrids coupled with their quicker rate of growth provides the necessary assurance against drought and enable harvest of 2,000 to 2,500 kg. grains per hectare even under drought.

Apart from the two hybrids, the Division has also produced a high yielding variety of Sorghum which was released last year. The new variety named 'Swarna' has given as high yields as the two hybrids and has shown wide adaptability. Swarna can be grown without the need for renewal of seed for the next crop.

Pearl Millet

Heterosis breeding in bajra became possible with the discovery of male sterility as in the case of Sorghum. The four hybrids of *bajra* which have been released till this time are making a similar contribution to the cultivation of this crop as the high yielding strains in maize

and sorghum. The first of these hybrids was developed by Dr. D. S. Athwal of the Punjab Agricultural University, Ludhiana. Another bajra hybrid which is the first dwarf hybrid of this crop, has been developed more recently at this Institute. The dwarf hybrid was tested extensively last year and has given very encouraging performance. The new hybrid is expected to be released this year.

Hybrid vigour, it will thus be seen, has been exploited in the development of improved varieties of a number of improved cereal crops. The greatest success of this technique, however, is probably yet to come. For many years now, scientists in the United States and Canada have been experimenting with the development of hybrids of wheat. At one time, the hybrid wheat project appeared to be beset with many difficulties, and the outlook did not appear to be very bright. However, at the recent Wheat Genetics Symposium in Australia, a number of scientists presented results from their experiments which clearly show that hybrid wheat is in very advanced stages and many hybrid strains are expected to be released within the next few years. The expreimental work on the production of hybrid strains of wheat has been intensified at the Indian Agricultural Research Institute.

Pulses : The earlier work on the improvement of pulses at the Institute yielded a number of wilt rust strains of pigeon pea. The Institute has recently formulated the all-India Pulse Improvement Project in collaboration with U.S. Department of Agriculture. As part of this project, a world collection of genetic stocks of gram and *moong* has been built up. The breeding work on these and other crops has placed special emphasis on the development of short duration varieties. A number of early maturing strains have been developed in *Moong* and *Arhar*, which can fit in a number of multiple cropping patterns. A new variety of *Moong* named "Pusa Baisakhi" which takes only 70 days to mature has been recommended for cultivation during the summer months of May and June, when the fields in most of Northern India remain unoccupied. A number of high yielding strains of *Arhar* have also been developed, which mature in five months time, unlike most of the present varieties, which take 9 to 10 months for ripening. Another significant development is the production of a variety of *Khesari dal* which is relatively free from the neurotoxic compound responsible for the disease lathyrism. *Khesari dal* has been cultivated for many years over several million acres of land in Bihar, Madhya Pradesh and U.P. The new variety will make it possible to free this crop from its crippling neurotoxic effects.

The new varieties of *moong* giving yield of 10 quintals per hectare and the new varieties of *Arhar* yielding 20 quintals per hectare are expected to make a valuable contribution to the increased production of pulses in the country. Pulses constitute an important part of the Indian diet and are considered very important from the nutritional point of view, because of their high protein content. Increased consumption of pulses by our people offers the main hope and perhaps the only practical means of eliminating the protein malnutritional problem from our country.

Oilseeds : The earlier work on the oilseeds crops resulted in the development of a number of linseed varieties. A number of rust resistant strains were developed by crossing the indigenous types with exotic strains. Some of these linseed varieties have become very popular in Bihar, Uttar Pradesh, Rajasthan, and Madhya Pradesh.

In more recent years, improved varieties have been developed in *Brassica campestris* (*Brown sarson*) and in *Brassica juncea*. These should help to break the yield barrier existing in these crops. The new *Juncea* varieties have given yields of 40 quintals per hectare, which is more than double the yield of the existing types. A hybrid strain of castor has also been produced following the identification of a pistillate line, which is genetically stable. The fertility restorer line has also been identified, and the hybrid, which is dwarf and early maturing, excels the existing varieties in yield by a wide margin.

Fodder Plants :

Pusa Giant berseem, an artificially produced tetraploid strain was released nearly 5 years ago. This variety gives 20 to 30 per cent more fodder than the existing diploid varieties, and is relatively resistant to low temperature. The variety has been in demand in several countries of Europe, particularly in the Netherlands, for reclamation of saline land.

Another very popular fodder strain developed in the Division is Pusa Giant Napier, produced by crossing of *Pennisetum purpureum* and *Pennisetum typhoides*. The triploid hybrid so produced has given yield of over 110,000kg. of fodder per acre. This grass which is rich in protein and sugar has performed well all over the country. In more recent years, the world collection of sorghums and pennisetums being maintained at the Division has been exploited to develop fodder strains of *jowar* and *bajra*. A number of these high yielding strains are at present in advanced stages of testing.

II. High yielding varieties in multiple cropping

The high yielding varieties which the Division has evolved are helping not only to increase per acre yields, but also the per day productivity of the land. The increase in per acre yields is being made possible by a number of multiple cropping patterns, which the new varieties are generating. Thus, it should now be possible for our farmers to obtain from one hectare of land over a one year period more than 100 quintals in addition to more than 25 quintals of pulses and oilseeds. This is possible with a one year cropping pattern, which involves the cultivation of wheat, *moong*, maize and mustard in that order. The early maturing wheat variety Sharbati Sonora can give an yield of nearly 45 quintals from January to 15th April. The wheat crop is followed by a crop of *Moong*, which is grown from 20th of April to 30th of June, giving an yield of 10 mds. The third crop to be raised from this land can be that of hybrid maize, from 7th of July to 30th of September, giving an yield of nearly 60 quintals. Lastly, a crop of *Brassica* (tria) can be taken from October to December, with an yield of nearly 15 quintals. Multiple croping paterns of this type have already been successfully attempted at the Institute's farm ; they are also being practised in National Demonstrations in Union Territory of Delhi.

Freedom from Hunger—A Birth Right

By Mr. Cedric Day

Deputy Regional Representative

Food & Agriculture Organisation of the United Nations, New Delhi

The United Nations Food and Agriculture Organization is wholly preoccupied with the promotion of one of man's basic right—the right to freedom from hunger. This must be the first of the human rights, and it is for this that FAO sends experts to developing countries and helps governments in their work of promoting the development of agriculture and the increase of food production. Such work, of course, covers every aspect of agriculture, including forestry, fisheries and nutrition, and such related activities as land reform and associated agriculture and food legislation, credit and financing and education and cooperatives as well as the more easily identifiable agricultural work such as improved farming practices and the introduction of irrigation, better seeds, fertilisers, pesticides, and so on.

FAO is not only working in the present but is attemping to peer into the future and assess what will be required then. This interesting development is known as the Indicative World Plan (IWP) and is seeking to look at the food and agricultural situation as it is likely to be in 1975 and 1985. The IWP, it is hoped, will provide Governments with guide lines to their future agricultural policies and programmes.

This history of FAO since its foundation in 1945 is a reflection of the world's growing need to banish hunger. FAO is committed by its own constitution to raise levels of nutrition and standards of living, to secure improvements in the efficiency of production and distribution and, most significant of all, to better the condition of rural populations.

Since its first days—when it was mainly concerned with the collection and dissemination of agricultural information—it has become one of the largest operational agencies in the United Nation family.

But making real progress in world food production is a complicated task if only for the fact that, in the final analysis, it is the farmer himself who must introduce innovation and the farmer is to be numbered in his hundreds of millions. This add magnitude to the complexity of the task already made very difficult by the poverty and illiteracy of the mass of the farmers in the developing countries. Illiteracy, of course, adds to the problems of communication and instruction while poverty adds to the financial and other burdens of the Governments concerned. Thus there is need to educate the farmer in modern farming practices, persuade him to adopt better seeds, fertilisers, pesticides, irrigation, etc., and to provide him through credit arrangements with the wherewithal to pay for these inputs. Further, new land tenure systems have to be introduced to afford him security and reasonable returns on his efforts. He must also be assured of a fair and responsive marketing and distribution system so that his increased production does, in fact, increase his earnings. All these requirements demand a vast increase in Government participation in agriculture in one way or another, including the organisation and support of agricultural services and infrastructure. In particular, Governments must organise on an increasing scale agricultural research in all fields and at all levels to support their drive for increased agricultural production and ensure that the results of such research are put to use on the farms. The introduction of the new high yielding varieties is a present case in point. Not only does it call for continuous and expanding research for the development of the new varieties but their introduction leads to an increasing need for research in other fields, such as in pesticides and insecticides, fertiliser and water use and so on.

Thus FAO is involved in a complex of programmes concerned with an almost endless variety of problems which must all be solved if there is to be a lasting improvement in the world food and agricultural situation. Nevertheless a number of questions do stand out for special treatment:

Increased effectiveness in the use of the newly developed high-yielding cereals

Already, in a number of countries, remarkable increases in production have resulted from the use of new crop varieties – but, successful as they are, there are also many problems to be solved before the new varieties can be generally used. The supply of certified seed has to be vastly increased and more effective quality control maintained. Also the quantities of fertilizer, insecticides and water must be increased and maintained because it is the combined use of these that produces results, not the seeds in isolation.

Increasing the production of protein

Malnutrition—the slow wasting hunger that saps vitality and destroys initiative – is one of the greatest problems. A special UN Advisory Committee recently reported that "Today there are over 300 million children who, for lack of sufficient protein and calories, suffer grossly

retarded physical growth and development..." To meet this need FAO is helping Governments to increase livestock and fisheries production, and is encouraging research in the production of new high protein foods.

Waste

There are many causes of waste such as the loss of food grown before it can be eaten; crops destroyed in fields; consumption by insects, birds and rats; waste through bad handling, inefficient storage and lack of processing knowledge and equipment. There is also the waste of natural resources-land, water, forest, fisheries —because of inefficient or destructive use which, in effect, means the waste of a food potential. The rapid reduction of waste resulting from all these sources is a constant theme of FAO's work and an increasing part of its efforts is being directed to this target.

Mobilization of human resources

There is another and very serious waste—that of the most valuable of all assets, the human being. Unemployment, under-employment, lack of training, of capital, of supplies; bad systems of land tenure; the absence of marketing arrangements or any methods of cooperative action—all these hamper progress. But above all there is the need to ensure that "rural development is in truth a development by rural communities and not just a series of projects or schemes imposed upon them." It is FAO's concern to ensure that the farmer and his family become the real basis for rural development. FAO wants to remove them from the category of raw material on which the planners work. Man's right to freedom from hunger is not enough. It must include his right to participate in all that is done to ensure that freedom so as to preserve his dignity and self—respect.

Improving foreign exchange earnings

World trade conditions have been among the greatest barriers to progress of the developing world over the past few years. Here again FAO sees need for urgent action. There is room for improvement in the terms on which the poorer countries sell their goods in the developed world and there is the possibility of increased trade within the developing world. Through such measures as these the developing world must be helped to expand and conserve its foreign exchange earnings and thus speed up its escape from poverty and want.

The five items dealt with above represent the five priority areas as determined by FAO's Director General, Mr. A.H. Boerma. FAO will concentrate its efforts, in cooperation with its Member Governments, in these areas in its forthcoming programmes and work. But the important point which needs to be emphasised again is that FAO cannot by itself achieve any of the goals represented by the five priorities. It needs not only the full and active cooperation of its Member Governments but also the support, enthusiasm and work of the people in those countries.

The Government of India, of course, is already engaged in programmes and work in the five priority areas. As to be expected in a country of the size of India, those programmes are among the largest —if not actually the largest—to be found in the world. And I am happy to say that FAO is working in cooperation with the Government to some extent, if not fully, in all these priority areas.

At this point it might be worth while to mention a few examples of FAO's activities here. There is, for instance, the international fertiliser programme of the Freedom from Hunger Campaign which is bringing in supplies to help demonstrate the growing of high-yielding varieties in Uttar Pradesh and Maharashtra. Then there are a number of FAO/Special Fund projects under the United Nations Development Programme concerned with the development of fisheries, the improvement in milk production, the reclamation of land, the better use of forest resources, and so on. Another example, this time in the war on waste, is a project on finding better methods of grain storage and the elimination of post-hervest losses. In the mobilization of human resources FAO is cooperating with the Government in a project in farmers' training and functional literacy. An example in the field of saving foreign exchange is a sheep and wool project now being operated by FAO in eight states. This project will help India to improve wool and meat production, reduce imports and build up exports in wool.

These are just a few illustrations taken from a wide range of FAO's field activities in this country. There is a good deal more work that could be described, particularly FAO's role in the Applied Nutrition Programme and the development of the dairy industry. There is also the provision of the services of specialists and consultants under the Technical Assistance Programme who come to India at the request of the Government to assist in the various fields of activity in food and agriculture. And, of course, there is the Regular Programme of FAO which assists Governments through scientific and technical meetings, studies, reports and in other ways to increase agricultural production, raise the standards of nutrition and, in general, contribute to the world-wide battle against hunger and malnutrition.

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DEMAND AND SUPPLY OF FERTILSERS

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Fertiliser happily needs no introduction to the farming community. Days of hesitancy and doubts regarding the use of fertilisers are no more. The key role of fertiliser is fully recognised both for increasing the yield of per acre directly and as a catalyst for the induction of other improved agronomic techniques. Prior to 1965-66, the fertiliser was in short spply and had to be rationed. This was because the domestic production was low and the imports were inadequate due to limited foreign exchange resources. The position has now changed. Thanks to the awareness on the part of the Central Government that the success of the Agricultural programmes depended upon the adequate use of fertilisers; the imports are being arranged in sufficient quantities to fill the gap between indigenous production and the likely demand. In fact, the fertiliser trade has moved from the "seller's market" to the "buyer's market".

Fertiliser consumption in the past

Before dealing with the demand and supply of fertiliser in the coming years, it will be useful to review the past trends in fertiliser use. The following table gives the consumption of fertilisers from 1955-56 to date.

Table—I

Consumption of Fertilisers

Year	N	P_2O_5	K_2O	Total $N—P_2O_5 + K_2O$	
1966-56	122,000	14,000	12,000	148,000	tonnes
1960-61	210,000	54,000	26,000	290,000	"
1965-66	582,000	134,000	90,000	806,000	"
1967-68	1,030,000	335,000	175,000	1,540,000	"
1968-69 (estimate)	1,400,000	400,000	180,000	1,980,000	"

Table shows that the consumption of fertiliser during the last twelve years has increased substantially, specially during last two years, when the high yielding varieties programme was initiated and fertiliser supply position improved. The Government decision to fix procurement and floor prices for major foodgrains was a vital factor in pushing up the fertiliser consumption in the country.

Fertiliser Production

The table No. II shows the production of fertilisers in the country since 1961-62 for nitrogenous and phosphatic fertilisers in terms of plant nutrients.

The domestic production did not keep pace with the demand and the deficiency had to be made up by imports. As there was no indigenous production of potassic fertilisers, all the requirements were imported.

Demand forecast

The forecast of demand for fertilisers during Fourth Plan has been made by various agencies. The Working Group of the Ministry of Agriculture, the USAID, the Standard Research Institute and the Sivaraman Committee prepared targets in 1965 for the then proposed Five Year Plan i.e. 1966-71. These are listed below. (Table No. III)

Table—II

Production of Fertilisers

Year	N	P_2O_2	
1961-62	154,326	65,360	tonnes
1965-66	237,889	118,779	"
1966-67	308,993	145,478	"
1967-68	361,977	204,589	"
1968-69 (estimate)	655,000	320,000	"

Concurrently at the suggestion of the Planning Commission, the Fertiliser Association of India carried out a study on the likely demand for fertilisers during the Fourth Plan i.e. 1969-74. The Association adopted four methods in order to determine a range within which the effective demand might settle. The four methods are.

(i) Straight line based on the projection method of past five years' actual distribution, the growth being at a compounded rate.

Table—III

Estimates of Fertiliser Consumption (Tonnes)

	1966—67			1970—71		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
I. Working Group of Ministry of Agriculture	850,003	370,000	190,000	2,000,000	1,000,000	350,000
II. U.S.A.I.D.	890,000	310,000	—	2,650,000	1,340,000	680,800
III. Standard Research Institute.	—	—	—	2,080,000	1,290,000	670,000
IV. Sivaraman Committee.	1,000,000	370,000	200,000	2,400,000	1,000,000	700,000

Recently the Working Group on fertilisers in the Central Ministry of Agriculture and Planning Commission has proposed the targets of fertiliser consumption for the Fourth Plan 1969-74. These are largely based on the desired growth of agricultural production and the likely areas to be fertilised are shown below.

Table—IV

Targets of fertiliser consumption (Tonnes)

Year	N	P_2O_5	K_2O	$N+P_2O_5+K_2O$
1969-70	2,000,000	800,000	550,000	3,350,000
1970-71	2,400,000	1,000,000	700,000	4,100,000
1971-72	2,780,000	1,200,000	815,000	4,795,000
1972-73	3,220,000	1,440,000	950,000	5,610,000
1973-74	3,730,000	1,735,000	1,105,000	6,570,000

(ii) Population-nutrition method assuming an annual growth rate in population of 2.5% over the 1969-70 level of 541 million. The level of nutrition assumed is 18 oz per person per day.

(iii) The third method, based on area-crop approach. Areas under different crops fertilised with recommended doses.

(iv) The fourth method based on a desired rate of growth in agricultural production, a 5 per cent annual growth rate in foodgrains production over the 1967-68 level has been assumed.

The results of the four methods are summarised in the table V.

Table V

Anticipated level of demand for N, P_2O_5 and K_2O

1969—74 (*Million tonnes*)

	1969-70				1973-74			
	N	P_2O_5	K_2O	Total	N	P_2O_5	K_2O	Total
First Method	1.54	0.63	0.25	2.42	4.22	2.32	0.77	7.31
Second Method	2.02	1.01	0.50	3.53	3.07	1.53	0.77	5.37
Third Method	1.92	1.03	0.68	3.63	3.68	2.20	1.67	7.55
Fourth Method	1.90	0.95	0.45	3.32	3.54	1.77	0.88	6.19

The estimates vary from a low figure of 5.37 million tonnes of plant nutrients to a high of 7.55 million tonnes. The Fertiliser Association of India recommended the targets as 3.8 million tonnes of N, 1.9 million tonnes of P_2O_5 and 0.9 million tonnes of K_2O. It will be seen that the targets suggested by the Fertiliser Association of India and those by the Working Group of the Ministry of Agriculture and the Planning Commission are very close to each other.

These studies clearly indicate that consumption targets whatever be the method of calculation, have to be very high if we are to be self-sufficient in foodgrains and other essential commodities and build up an efficient agricultural economy in the country.

Fertiliser Production Plans:

In recent years, the Central Government has sanctioned many projects in public, private and co-operative sectors to increase the production of fertilisers in the country. It is undoubtedly desirable that every effort be made to produce enough fertilisers to meet our needs. The table VI shows the present position (table attached).

A few more projects are being considered including those based on coal. It would appear from the tables IV and VI that self-sufficiency in fertilisers is not likely to be reached during the Fourth Plan. For a projected demand of 3.7 million tonnes of Nitrogen and 1.7 million tonnes of P_2O_5 (table IV) by 1973-74, the installed capacities have to be of the order of 4.6 million tonnes of N, 2.1 million tonnes of P_2O_5 calculated at 80% production performances on an average. It seems therefore essential that the pending proposals should be firmed up quickly. Further, the fertiliser production should continue to receive priority and the additional manufacturing capacities installed on a continuing basis to the extent that the demand is likely to grow in the subsequent Plan periods. It is rockoned that a sum of Rs. 1,400 crores would have to be provided during the Fourth Plan, out of which roughly one-third will be in foreign exchange. The import of the required raw material will have to be put on a more secure and rational basis. The shortage of water and power, which are at present limiting the full production capacities of some factories, has to be overcome.

It is gratifying to note that the technological know-how for the fertiliser manufacture has been developed in the country and a stage has been reached when no foreign collaboration or only a little of it is required for the manufacture of Nitrogenous and Phosphatic fertilisers. Urgent attention is also being given to the indigenous production of Potassic fertilisers.

Fertiliser Imports

For some years to come, the fertilisers will continue to be imported. As this will involve pressure on our foreign exchange resources, it seems very desirable that the consumption trends be carefully watched, stock position assessed from time to time so that a realistic import programme be drawn up. Experience during the last year or two has shown that the imports, production and demand were not properly co-ordinated, with the result that the stocks accumulated in some places and consequently indigenous production of Superphosphate had to be cut back to the disadvantage of the domestic producers. It may be that the import was not intrinsically excessive but it was not properly timed on account of lack of accurate relevant data. It is suggested that a statistical intelligence agency should be set up to collect and collate information on production, consumption and stock position of fertilisers in the country on a continuing basis. It should have representatives of the Central Government, Fertillser Association of India and the State Governments on it. An up-to-date estimate of fertiliser position obtained through this agency will enable the Central Government to organise imports rationally in relation to a realistic demand and phase them in accordance with the needs of the different areas in the country.

Achievements of fertiliser consumption targets

It is simple enough to prepare targets of production and consumption of fertilisers. It is also not so difficult to manufacture sufficient quantities of fertilisers in the country. What is really difficult and extremely so, is the achievement of the consumption targets. The Fourth Plan envisages an increase in fertiliser use from 1,980,000 tonnes in 1968-69 to 6,570,000 tonnes in 1973-74 of $N + P_2O_5 + K_2O$. On the assumption that the availability of fertilisers will be ensured through domestic production plus imports, the task of efficient use of such massive quantities of fertilisers will be by no means easy. The fertilisers

have to be moved from factories and ports to the godowns and thence to the cultivators' fields, some of which are difficult of access. The cultivators have to be educated and motivated to use fertilisers in optimum doses and in balanced ratios. They have to be given loans to buy fertilisers and above all, they have to be convinced that the fertilisation of crops pays rich dividends through quick sale of the produce at good prices. These mani-fold activities involved in the promotion of fertiliser use will need co-ordinated effort by all the agencies concerned—the Government, Manufacturers, the Distributors, the Banking institutions and the Farmers.

Fertiliser Promotion

Fertiliser Promotion has two aspects: (i) general promotion, to use fertilisers in increasing quantities, and (ii) brand promotion, to use a particular brand of fertilisers. The second is the exclusive responsibility of the manufacturers. Most of them have recently geared up their marketing organisations and have qualified staff who not only sell fertilisers to the farmers but also render after-sale service and advise them on other inputs such as good seed, plant protection measures, water conservation practices, etc. Some of them also provide soil testing facilities. The fertiliser promotion by the manufacturers is naturally oriented towards the brands of fertiliser produced by them.

The general promotion is the main responsibility of the Governments but the industry is also vitally interested in it. The collaboration of the Industry with the Government will be very desirable if best results are to be obtained.

The ingredients of fertiliser promotion are wellknown. These are demonstration plots on cultivators' fields, audo-visual aids, farmers' education, soil testing services to advise on the correct doses of fertilisers, training of salesmen, radio, talks, farmers festivals and pictorial informative charts and posters. These activities have to be expanded to cover the entire farming community. And closely linked are the problems of distribution, transport, strategic warehousing, credit to service, the distribution of fertilisers all the way down from the manufacturer through wholesalers and retail agents to the level of farmers. Any inpediments in the smooth operation of supplies and services have to be identified and removed. It is outside the scope of this paper to go into further details of the promotional programmes.

Balanced fertilisation of crops

The past trends in fertiliser use have shown that P_2O_5 and K_2O are not being used in sufficient quantities to balance the use of Nitrogen. This is an unhealthly sign and needs to be corrected as quickly as possible. In this context, the role of the mixtures has to be recognised. Even though the State departments of Agriculture invariably recommend the application of N and P_2O_5 and in many cases also K_2O, in certain proportions, depending upon the crop, soil and climate, the experience of the extension workers has been that in actual practice the farmer usually omits one or the other nutrient or applies them in incorrect proportions. To counteract this, the fertiliser mixtures of corresponding grades should be supplied to the farmers. With the new marketing freedom to the manufacturers the problems of imbalanced fertilisation may be aggravated unless precautions are taken. What is urgently required is the agency charged with the special responsibility to promote balanced fertilisation of crops and soils in the country.

Fertiliser Promotion Board

An autonomous Fertiliser Promotion Board should be set up at the centre with branches in the States. It should have the representatives of the Government, the Manufacturers, the Distributors and the Farmers. The Fertiliser Association of India has been pressing for such a Board and the Sivaraman Committee also recommended it. The constitution and function of the Board should be broad-based to enable it to deal with the problem of fertiliser use in its entirety. It should plan and carry out intensive as well as extensive fertiliser promotion compaigns directly as well as in collaboration with the Governments and the Manufacturers.

Conclusion

The consumption of fertilisers in India in 1966-67 was 8 kg. per hectare of arable land as against 71 kg. U.S.A., 100 kg. U.A.R. 221 kg. U.K and 354 kg. Japan. We have a long way to go to reach the level of fertiliser use in the agriculturally advanced countries. Fertilisers have to be used in plenty, nutrients should be well balanced and domestic production increased to reach self-sufficiency. The fertiliser consumption targets should be made a reality and not merely a hope. The progressive farming commuuity assembled here has the responsibility to the nation raise the level of agricultural production in the country through the optimum use of inputs. Fertilisers have a major contribution to make for the success of the "Farm Revolution."

(*Contd. on page* 16)

Role of Soil Testing in Increasing Agricultural Production

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For promoting application of balaned fertiliser at optimum levels to achieve higher levels of agricultural production soil testing is one of the essential agro-technical services which should be provided to farmers. It is well recognised that, if properly interpreted, it is a very useful tool for predicting manure schedules for increasing production. During 1953-56, under Indo-US Aid Project on soil fertility and fertilier use, 24 soil testing laboratories were set up at different centres in the country. In addition to these 24 laboratories, several States have set up Soil Testing Laboratories at different regions. By the end of the 1968, 100 State Soil Testing Laboratories have been equipped, each to analyse 10,000 soil samples a year. More recently the laboratories at Ludhiana, New Delhi, Bangalore and Sambalpur have been remodified with the help of the US Aid and everyone of these four laboratories have been generally rendering free advisory service to farmers. By 1967, the total capacity of the Soil Testing Laboratories was of the order of 6.7 lakh samples per year. During the fourth plan soil testing facilities will be considerably expanded and 34 mobile soil testing laboratories will be set up for providing service on the spot. Programmes for large scale extension of soil testing facilities are under implementation by the Government of India and also by the State Government, Fertiliser manufacturers and fertiliser promoting agencies are also planning for setting up large soil testing laboratories. It is likely that by the end of the Fourth Plan the total capacity of all the soil testing laboratories in India will exceed 4 million samples a year.

Under the All India Coordinated scheme of the Indian Council of Agricultural Research some well-equipped centres in the various soil climatic regions have been strengthened for working on the soil test and crop correlation work more intensively with the coordinating centre at the Division of Soil Scienee and Agricultural Chemistry, Indian Agricultural Research Institute, to evolve a firm basis of soil test crop response.

Although only a few years old, soil testing programme has shown considerable progress. Soil fertility maps prepared on the basis of soil test data, have shown that the need for nitrogenous fertilisers is almost universal and that a major portion of soil samples (more than 50%) tested low in the available phosphate. Similarly more than 30 per cent of the soils tested low in available potassium Soil testing has also established that problem soils testing acidic or alkaline require lime practices or application of gypsum respectively. The need for taking suitable measures for these problem soils is very urgent for stepping up crop production. Not much attention was given earlier to liming the acid soils and applying gypsum to alkali soils.

Soil Survey equally important

In addition to soil fertility maps, basic soil maps are also being prepared by the All India Soil and Land Use Survey Organization and the State Governments based on standard soil survey for specific areas in the command of irrigation projects and for intensive cultivation. While soil survey determines the inherent characteristics of soils from which the reserve plant nutrients may be predicted, based on parent materials and other conditions of soil formation, the available nutrients on which crop growth mainly depends, may vary even in the same soil type from place to place which is determined by soil testing of surface soils (0.15 cms.). Soil Survey and Soil Testing are thus closely inter-related and the results of soil tests of surface soils along with the information from basic soil survey are useful for obtaining maximum return from the land.

Where we lack ?

There is however no doubt that the advisory part in soil testing is not being given as mueh attention as the analytical part. The major deficiencies in the soil testing services advisory programme in the centre are :

(a) Absence of sufficient experimental data correlating soil test with crop response for the different crops and soil types in the country.

(b) Lack of attention for soil test in respect of secondary and micronutrient deficiencies.

(c) Weak programme of follow up in relation to soil testing.

Most of the soil testing laboratories in respect of plant nutrient deficiency utilise the soil test data obtained at the Indian Agricultural Research Institute before the anticipation of the soil testing programme. It is now over-due that plant nutrient critical level data are formulated for each major soil region in the States. As more and more field data are examined and soil test crop response correlation becomes of higher prediction value the cultivator will be more and more benefitted by optimum produce from his farm through soil test service. For this more intensive research is needed, the necessity for which has been emphasied at the October (10-11) 1968 workshop at Jabalpur, on the coordinated scheme for investigations on correlation of soil tests with crop responses.

With increasing use of N, P and K fertilisers to obtain higher yields, specially with high yielding verieties,

micronutrient deficiencies will certainly come up. Methods of analysis for micro-nutrients suitable in a soil testing programme and their correlation with crop response need to be developed. In new strategy in agricultural production, it is planned to consume 3.73 million tonnes of N, 1.735 million tonnes of P_2O_5 and 1.105 million tonnes of K_2O in 1973-74. About 60 per cent of this is requirement for high yielding varieties programme. The planned allotment is based on a generalised recommended dosage of fertilisers per hectare without taking into consideration the differences in the inherent fertility of the soil. It is here that testing of surface soils is to play a vital role. There is lot of evidence to show that crop yields can be increased by 30-60% over that due to a generalised fertiliser recommendation, by following a modified soil based fertiliser recommendation. It is suggested that a coordinated soil survey-cum-soil test programme will lead to further efficient use of fertilisers. At present such consideration is lacking.

India's agriculture has for long been a gamble for rains. It has, however, been established that there is considerable scope for improving Indian Agriculture by proper management of soil and water and growing varieties suitable for varied weather conditions.

The following suggestions are made :

1. While a good start has been made with the soil tests that would help formulate fertiliser recommendations, follow up of the soil test recommendations has been frequently inadequate. The bottlenecks in this respect need rectification.
2. Since 70 per cent of the country's cultivable land will continue to be rainfed for a long time to come a full knowledge of the soil resources by basic soil survey and soil testing of surface soil is urgently called for. This will lead to increased efficiency of inputs like fertiliser, irrigation etc.
3. Addition of lime to acid soils and gypsum to alkali soil as determined by soil test will greatly increase efficiency of the added fertilisers.
4. With increased use of fertilisers, specially with the high yielding varieties, micronutrient deficiency is likely to come up. Special attention is needed in a soil testing programme to add micronutrients for correcting soil deficiencies for these elements which may be added to soil as prophylactic measures.

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Refrences

1. Indian Council of Agricultural Research (1959), Fertiliser Trials on Paddy—Report of Experiments conducted from 1953 to 1956 under the Fertiliser Use Project.
2. Indian Council of Agricultural Research (1959) Fertiliser Trials on Wheat—Report of Experiments conducted from 1953 to 1956 under the Fertiliser Use Project.
3. Indian Council of agricultural Research (1968), Coordinated Agronomic Experiments Scheme —Results of Simple Fertiliser Trials on Cultivators' Fields, Kharif and Rabi, 1967-68.
4. Indian Council of Agricultural Research (1968), Coordinated Agronomic Experiments Scheme —Model Agronomic Experiments, Rabi 1967-68.

DEMAND & SUPPLY OF FERTILIZER

(*Contd. from page* 14)

TABLE VI

Capacity of N and P_2O_5 under various stages of implementation in Public, Private and Cooperative Sectors (as on 31-10-1968)

(tonnes of Nutrients)

CATEGORY					P_2O_5			
	Public Sector	*Private Sector*	*Coop. Sector*	*Total*	*Public Sector*	*Private Sector*	*Coop. Sector*	*Total*
1. Factories in production	688,860 (76%)	212,240 (24%)	— —	901,100 (100%)	107,160 (25%)	325,240 (75%)	— —	432,400 (100%)
2. Projects under implementation	1,042,000 (61%)	450,000† (26%)	215,000 (13%)	1,707,000 (100%)	218,200 (55%)	53,000† (13%)	127.000 (32%)	398,200 (100%)
3. Project licensed	—	410,000 (96%)	16,500 (4%)	426,500 (100%)	100,000 (30%)	237,680 (70%)	—	337,680 (100%)
4. Projects proposed and under consideration*	—	315,000 (100%)	—	315,000 (100%)	156,450 (74%)	55 000 (26%)	— —	210,450 (100%)
	1,730,860 (52%)	1,387,240 (41%)	231,500 (7%)	3,340,600 (100%)	581,810 (42%)	670,920 (44%)	427,000 (40%)	1,379,730 (100%)

*These do not include the Tata Project at Mithapur and the International Ore & Fertiliser Project at Vishakhapatnam.
†M/s. Shriram Fertiliser & Chemicals, Kota with an installed capacity of 132,000 tons of N and 26,600 tons of P_2O_5 has recently gone into production of firm.

Making Agriculture Profitable

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Incomes of many farmers have increased substantially in the last few years. However, still much of Indian agriculture remains unproductive and provides a meagre reward to the farmer for his efforts. The purpose of this paper is not to argue that farm incomes should be higher, though in terms of social justice they probably should be, but rather to discuss the possibilities of improving *profit possibilities* or economic incentives for larger numbers of farmers. These economic incentives will be discussed from the standpoint of their importance in bringing about desirable adjustments in organization of agriculture and increases in agricultural productivity.

India has set for itself a goal of becoming self-sufficient in food within the next few years. If we accept this as a desirable goal. agricultural production will have to increase at a much faster pace than in the past. There is now very little possibility for expanding agricultural production in India by extending, horizontally, the traditional farming system. While during the 1950's perhaps as much as 60 per cent of the increase in output came about through the expansion of acreage, the possibilities for further expansion in cultivated area is now negligible. A real transformation of agriculture, employing yield-increasing production inputs intensively, is required. Since decisions conerning what to produce and how to produce it are made by millions of individual, independent farmers, the problem is one of influencing them to make appropriate decisions—decisions which, added together, well result in the targeted production.

Until very recently the alternatives offered by the available technology and the existing social and economic environment were very limited. In that relatively static environment, systems of farming evolved over time, by trial and error, probably made about as good use of resources as was possible. Under the circumstances it is understandable that farmers came to be viewed as tradition-bound and unresponsive to economic stimuli. Custom and tradition were until recently reasonably reliable guides to good farming.

The situation is now quite different. The recent breakthrough in cereal production ushers in what we now speak of as the "Green Revolution". A real transformation of agriculture is now underway. The traditional subsistence type of farming is giving way to a commercial system emyloying large amounts of manufactured inputs and producing for the market. In this new situation improved production technology has greatly increased the flexibility in time of sowing and time of harvesting and expanded the choices open to farmers as to cropping patterns and production practices. The rapid advances in technology and the dynamic economic and social environment of today make the customs and traditions of the past poor guides for many of the decisions farmers must make. Can we depend on the Indian farmer, in this new situation, to make the decisions that will lead to increased agricultural production and more efficient production? In the last few years farmers have demonstrated a sensitivity to economic opportunities. The old view of the peasant as conservative, superstitious, and tradition-bound is giving way to the view that farmers, generally, given the opportunities and the relevent facts, act to economize. Given the chance, they are usually willing and eager to make the investments and innovations that give promise of making them better off. They respond to profit opportunities.

It is not, of course, certain that farmers acting in what they consider their own best interests will always serve the national aims. However, government policies can be used to create an economic environment in which interests of individual farmers converge on national goals. The primary purpose of this paper is to discuss some of the more important things that a government can do to induce farmers to make decisions that are consistent with and contribute to national objectives.

Prices and Markets

In modern, commercialize agriculture, prices are obviously very important in determining farmers' production decisions. In subsistence agriculture a farmer is little affected by prices and is primarily concerned with meeting consumption requirements with the minimum of effort and risks. In the emerging commercialized farming in India there will still be considerable production for home consumption but most farms will use some commercial inputs and produce significant amounts for the market : their decisions will be influenced by the profitability of different opportunities. Prices of a crop must be high enough relative to the price of fertilizer, for example, to assure the farmer that applying heavy doses of fertilizer will be profitable—will more than pay for the extra costs.

The phenomenal rate of increase in fertilizer use in the last few years indicates that farmers have been very sensitive to the profit opport-

unities presented by the favourable fertilizer/given price ratios.

If markets are well organized and functioning well the market established prices will indicate consumer preference and provide a guide to shifts in production. However, the market prices reflect the supply and demand situation only after the crops are produced, whereas the decisions about what to produce and how to produce it have to be made several months earlier, before the beginning of the planting season. Even in well organized markets grain prices fluctuate considerably. At the time of deciding how much of various crops to grow and how much fertilizer to use the farmer usually cannot know for certain what prices will be at the time of harvesting and sale. His decisions must therefore be made on the basis of expected rather than actually realized prices. Government policies can reduce some of the uncertainty about prices. The present progamme of price supports for major cereal crops does this. The minimum support prices, announced before the planting season, give the farmer assurances that prices at marketing time will not be below some minimum. Even if this minimum price is set below the cost of production it can have a healthy stimulating effect in that the farmer, having expectations of a higher price, has the assurance that if his expectation is in error, at least the price will not be disastrously low—losses are limited.

There is much more that a government may do to improve the effectiveness of prices in directing production. Regulated markets have been established in some states which help the forces of demand and supply to work more effectively in establishing prices. Improved marketing and storage facilities can help reduce marketing losses and handling costs. A market reporting system, by newspaper or radio, can be used to help provide buyers and sellers with timely, reliable information on the market situation and allow farmers to respond more intelligently to the market.

The pricing of inputs is also of great importance in inducing the farmers to make desirable production decisions. The traditional systems for pricing irrigation water, for example, often encourages a very wasteful, uneconomic use of water by farmers. Change to a pricing arrangement in which water is purchased on a volume—used basis would encourage farmers to allocate water more efficiently.

Agricultural Credit

Consumption of commercial fertilizers has been increasing at a rate of over 25 per cent per year in recent years. Similar expansions have been taking place in use of plant protection materials and other purchased inputs. A continual expansion of credit is required to finance the short, medium and long term investments necessary to maintain a suitable rate of growth, as the volume of commercial inputs needed will continue to expand.

Apparently, up to now, available credit has been adequate, at least for short term needs; availability of supplies of seeds, fertilizers and other inputs has been more of a limitation. However, it is likely that many individual farmers have been unable to adopt the new technology because of lack of finances available to them. Small farmers and tenant farmers, those unable to provide suitable loan collateral, are often unable to avail of profitable opportunities because they lack credit. Improvements in credit institutions could help many of the smaller farmers to intensify production by investing in modern technology. The profit opportunities in agriculture would thereby be more equitably distributed.

Land Tenure

More than 60 per cent of Indian farms are less than 2 hectares in size. Many of these farms still follow traditional farming methods, using little or no commercial inputs and producing primarily for subsistence. If increasing the marketed surplus of agricultural commodities was the only important consideration, this sector could probably be ignored. Programmes could be undertaken for reducing the numbers of small farms, by combining them into larger units. But this involves a large part of the Indian population, and incomes and living conditions for families on these small farms must be important considerations in development policy. The technical possibilities for increasing production and income on farms of small acreage are, moreover, very considerable. The high yield seed varieties, fertilizers, and plant protection inputs are not inherently biased in favour of larger farms. The inability of many of the farmers on small holdings to participate in the green revolution is not directly related to the small acreage but to the inability to finance the investments needed for more intensive systems of farming on his limited acreage. Revised credit institutions better able to serve the small farmer's requirements will help to make seeds and fertilizers available to the small farmer.

Public investments can make efficient irrigation facilities available to the small farmer as well as the large farmer. Public investments can also be organized to provide modern mechanization to small farmers economically. Tractor and implement hiring stations and custom hiring services are now being provided in some areas to small farmers at per acre costs comparable to larger farms.

Aside from the problems of small size, many farmers are insulated from the incentives for adoption of modern intensive practices by leasing or tenure arrangements. Legislation and education can be used to modify these arrangements so that the farmer will share in the benefits of any changes more in proportion to his investments.

Taxes and Subsidies

Subsidies have been used extensively to promote adoption of improved practices. With the more favourable price ratios and higher yields obtainable in recent years it has been feasible to reduce or eliminate subsidies on many inputs without unduly discouraging their use. Certain inputs, such as canal irrigation water, are priced under a traditional system which, while often involving considerable subsidy, does not encourage efficient allocation and use by farmers. Charges

(*Contd. on page* 23)

Role of Standards In Green Revolution

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Hybrid seeds have brought about a break-through in agricultural development but three other inputs, namely, fertilizers, farm implements and pesticides, are equally important. It is generally recognized that these three inputs wherever available lead to higher yields. This is by and large true, but it should also be recognized that unless quality of these inputs is controlled suitably, higher yields may not stabilize. For instance, seeds should not only belong to the high yielding variety but they should also be pure and viable. Similarly, farm implements should not wear out fast and they should not pose any difficulties in maintenance repair and replacement of interchangeable components. Moreover, fertilizers and pesticides should contain active ingredients at least at the declared level. Keeping these points in view, the Indian Standards Institution has issued a large number of Indian Standards for standardization and quality control of agricultural inputs. A brief resume of these activities alongwith a summary of work done in the field of storage and marketing structure is given below.

Farm Implements and Machinery

The rate of farmers' acceptance of new and efficient implements largely depends on the quality of farm equipment put on the market. ISI, therefore, initiated work on standardization of farm implements quite sometime ago and the Institution has so far issued some 35 Indian Standards in the field (see Appendix A). Each of these standards prescribes steels for various components; they also include a design for the guidance of new enterpreneurs. Some implements are being produced on the basis of these designs and manufacturers are coming forward with better designs. As steels prescribed in these standards are not always available, the matter is receiving fresh attention of ISI and a manual on steels for farm implements is under preparation.

Recently, work has also been initiated on test code for agricultural tractors, and the code for installation of agricultural tractor. The latter would cover training of the customer with special reference to the controls, proficiency of components, maintenance and operation techniques, dealers' responsibilities, spare parts catalogue, after use storage and maintenance charts. Another code of preventive maintenance of agricultural tractors, covering servicing to be carried out in the routine manner in different free service operation, minimum tools and fast moving spare parts to be maintained by the farmers, is also under preparation.

Seeds

The Institution has so far prepared 30 Indian Standards for the seeds of various crops, oil seeds and vegetatively propagated materials such as seeds potatoes, sugarcane seed material, etc. A complete list of these Indian Standards is given in Appendix B.

In all these Indian Standards, the quality of the seed with regard to its purity, germination capacity, freedom from weed seeds, etc, has been stipulated. In the case of standards relating to vegetatively propagated materials, stress has been laid that the materials shall be free from diseases, pests, pathogens, etc; wherever necessary permissible tolerances have been specified. These standards have been arrived at after elaborate discussion and consultation among all the interests namely the Agricultural Scientists comprising all representatives drawn from the Department of Agriculture, Ministry of Food, Agriculture, Community Development and Co-operation; Indian Council of Agricultural Research; Indian Agricultural Research Institute, and other Central Research Organizations; representatives of the seed producers and the plant industry and others. Besides these, the views of the commentators abroad were also obtained.

The standards are being implemented under the Central Seeds Act, 1966.

Fertilizers

In this field, standards were prepared in the first instance on single nutrient fertilizers. Now, in line with the current trend of manufacture, two nutrient fertilizers like diammonium phosphate, are being covered (see Appendix C). In near future, this work would be extended to three nutrient fertilizers as production on organized scale is likely to commence soon. All these specifications prescribe requirements for minimum nutrient content and the impurities which affect uses or keeping quality.

Besides specifications, attention has also been given to packing problems which arise due to hygroscopic, acidic and caking nature of fertilizers. It is hoped that a standard may be evolved soon on packings which would also prevent deterioration to the maximum possible extent.

The work on storage godowns for fertilizers is also in progress.

Pest Controls

A large number of Indian Standards have already been evolved on all the pesticides and pesticidal formulations that are used in plant protection work (see Appendix D). All these standards are fully adopted by the industry and practically the entire industrial production of pesticides in the country is covered under the ISI Certification Marks Scheme. Thus one can be sure that pesticides and pesticidal formulations available to farmers contain the declared

quantity of active pesticidal ingredient. Still, if there are any complaints in this regard, the Institution would gladly examine them for all possible action under the ISI Certification Marks Scheme.

It should be noted that for household purposes insecticidal sprays which are generally used contain a mixture of 2-3 pesticides. Their analysis and quality control is, therefore, difficult. Such sprays are, therefore, not available with the ISI Mark. Moreover, even when farmers use ISI Certified pesticides, they should exercise fullest possible care. Misuse of pesticides can lead to many dangers; here obviously the responsibility is that of farmers and not the ISI.

Storage Structures for Agricultural Commodities

Only the stepping up of agricultural production is not adequate. Foodgrains that are produced should be stored properly and all avoidable losses in handling be prevented. Recently, it has been estimated that the country loses about 9 percent of foodgrains during post harvest handling and storage. This amounts to 10 per cent of our present production and the level of recent imports. Thus if we prevent all these losses, we would emerge self-sufficient in food even now. The importance of efficient and modern structure for food storage of food grains, therefore, cannot be over-emphasized.

The Indian Standards Institution has formulated a number of Indian Standards (see Appendix E) on storage structures at farmers trade and government level. Besides Indian Standards embodying the norms of good storage and proper care during transit have also been formulated. These structures constructed according to Indian Standards would minimise the losses of foodgrains due to moisture, temperature, insect pests, rodents, etc.

The work has now been initiated on formulation of Indian Standards on Silos and metal bins of 6—30 tonne capacities.

Conclusion

Thus, the Institution has tried to serve the farmers in a modest way. For service on a larger scale, ISI expects that farmers would demand ISI certified agricultural inputs in a big way.

APPENDIX A

LIST OF INDIAN STANDARDS OF FARM IMPLEMENTS AND MACHINERY

IS : 619—1961	Pruning knives, hooked and curved (*revised*)
IS : 621—1957	Forks for plantations and estates
IS : 1515—1968	Light duty chaff cutter blades (*First revision*)
IS : 1973—1961	Sugarcane crushers, bullock driven type
IS : 1976—1961	Paddy weeder, rotary type
IS : 2192—1962	Mouldboard plough, turnwrest type
IS : 2226—1962	Mouldboard plough, fixed type
IS : 2238—1962	Transplanting spade and *SEPRANG*
IS : 2559—1963	Garden rake
IS : 2563—1963	Hedge shears, straight edge type
IS : 2564—1963	Blade harrow, *GUNTAKA* Type
IS : 2565—1963	Ridger, animal drawn
IS : 3092—1965	Rubber draining and tapping knife
IS : 3093—1965	Dah, jungle cutting
IS : 3094—1965	Bill-hook
IS : 3108—1965	Pruning saw, straight and curved
IS : 3122—1965	Budding and grafting knife, combined
IS : 3153—1965	Thresher, *OLPAD* type
IS : 3185—1965	'V' blade hand hoe
IS : 3292—1965	Three tined hand hoe, fixed type
IS : 3293—1965	Levelling (KARAHA) KENT), animal drawn
IS : 3301—1965	Green manure trampler, animal drawn
IS : 3310—1965	Single row cotton seed drill, animal drawn
IS : 3327—1967	Paddy thresher, pedal operated
IS : 3342—1965	*TRIPHALI* (three-tined cultivator), animal drawn
IS : 3350—1965	Three tined cultivator with seeding attachment, animal drawn
IS : 3360—1965	Soil scoop
IS : 3363—1965	Harrow *PATELA*
IS : 3369—1965	Puddler, animal drawn
IS : 3372—1965	Bund former
IS : 3467—1966	Wheel hand hoe
IS : 3494—1966	Pruning secateur
IS : 3606—1966	Disc harrow, animal drawn
IS : 3939—1966	Hand maize sheller
IS : 4358—1967	Sickles
IS : 4366—1967	Agricultural tillage discs
IS : 4468—1967	Dimensions for three point linkage of agricultural wheeled tractors
IS : 4930—1968	Guide for axle assembly for animal drawn carts
IS : 4931—1968	Power take-off shafts of agricultural tractors.

APPENDIX B

LIST OF INDIAN STANDARDS ON PROPAGATION MATERIALS

IS : 2729—1964	Methods of sampling and test for seeds
IS : 2735—1964	Seeds of tomato
IS : 2736—1964	Seeds of garden beet
IS : 2737—1964	Seeds of *BHINDI* (Lady's finger)
IS : 2738—1964	Seeds of bean
IS : 2739—1964	Seeds of pea
IS : 2936—1964	Seeds of carrot
IS : 2937—1964	Seeds of cabbage
IS : 2999—1965	Seeds of cauliflower
IS : 3000—1965	Seeds of turnip
IS : 3001—1965	Seeds of brinjal
IS : 3002—1965	Seeds of radish
IS : 3125—1965	Seeds of capsicum
IS : 3126—1965	Seeds of cucumber
IS : 3127—1965	Seeds of onion
IS : 3128—1965	Seeds of lettuce
IS : 3376—1965	Groundnut seeds
IS : 3377 1965	Sesamum seeds
IS : 3378—1965	Castor seeds
IS : 3379—1965	Safflower seeds
IS : 3380—1965	Tobacco seeds
IS : 3647—1966	Seed potatoes
IS : 3866—1966	Sugarcane seed material
IS : 4194—1967	Mustard and rape seed for propagation purposes
IS : 4195—1967	Wheat seed for propagation purposes
IS : 4196—1967	Maize seed for propagation purposes
IS : 4197—1967	Rice Seed for propagation purposes
IS : 4932—1968	Mango grafts
IS : 4934—1968	Jute seed for propagation purposes
IS : 4933—1968	Cotton seed for propagation purposes

APPENDIX C

LIST OF INDIAN STANDARDS ON FEATILIZERS

IS : 1114—1964	Ammonium chloride, fertilizer grade (*revised*)
IS : 2256—1962	Ammonium sulphate nitrate
IS : 826—1967	Ammonium sulphate, fertilizer grade (*first revision*)
IS : 853 —1964	Bone-meal, raw (*revised*)
IS : 1014 - 1956	Bone-meal, steamed
IS : 2409—1963	Calcium ammonium nitrate
IS : 3029—1964	Castorseed cake for fertilizer purposes
IS : 1023—1956	Dicalcium phosphate
IS : 1304—1963	Glossary or terms used in fertilizer trade and industry (*revised*)
IS : 1024—1956	Kotka phosphate
IS : 2779—1964	Potassium chloride (muriate of potash), fertilizer grade
IS : 294—1964	Superphosphate (*revised*)
IS : 2764—1964	Potassium sulphate, fertilizer grade
IS : 1013—1956	Triple superphosphate
IS : 1781—1961	Urea, technical and pure
IS : 4830—1968	Ammonium phosphate sulphate (16-200).

APPENDIX D

LIST OF INDIAN STANDARDS ON PEST CONTROL

IS : 560 1961	BHC, technical (*revised*)
IS : 561 1962	BHC, dusting powders (*second revision*)
IS : 562 1962	BHC, water dispersible powder concentrates (*second revision*)
IS : 563 1961	DDT, technical (*revised*)
IS : 564 1961	DDT, dusting powders (*revised*)
IS : 565 1961	DDT, water dispersible powder concentrates (*revised*)
IS : 632 1966	BHC emulsifiable concentrates (*second revision*)
IS : 633 1966	DDT emulsifiable concentrates
IS : 634 1966	Ethylene dichloride carbon tetrachloride mixture (3 :1 *V/V*) (*revised*)
IS : 881 1956	BHC refined
IS : 882 1956	*gamma*-BHC (lindane)
IS : 885 1967	Common names for pesticides (*first revision*)

IS : 1050	1957	Lime sulphur solution
IS : 1051	1957	Pyrethrum extracts
IS : 1052	1962	Dieldrin technical (*revised*)
IS : 1053	1962	Dieldrin water dispersible powder concentrates (*revised*)
IS : 1054	1962	Dieldrin emulsifiable concentrates (*revised*)
IS : 1055	1957	Nicotine sulphate solution
IS : 1251	1958	Zinc phosphide, technical
IS : 1306	1958	Aldrin, technical
IS : 1307	1958	Aldrin emulsifiable concentrates
IS : 1308	1958	Aldrin dusting powders
IS : 1309	1958	Endrin, technical
IS : 1310	1950	Endrin emulsifiable concentrates
IS : 1311	1966	Ethylene dibromide (*first revision*)
IS : 1312	1967	Methyl bromide (*first revision*)
IS : 1486	1959	Copper oxychloride, technical
IS : 1488	1959	2, 4-D sodium
IS : 1505	1968	*gamma*-BHC (lindane) smoke generators (*first revision*)
IS : 1506	1967	Copper oxychloride dusting powder (*first revision*)
IS : 1507	1966	Copper oxychloride water dispersible powder concentrates (*first revision*)
IS : 1665	1960	Cuprous oxide water dispersible powder concentrates
IS : 1669	1960	Cuprous oxide dusting powders
IS : 1682	1960	Cuprous oxide, technical (fungicidal grade)
IS : 1824	1961	Household insecticidal spray
IS : 1827	1961	Liquid amine salts of 2, 4-D
IS : 1832	1961	Malathion, technical
IS : 1833	1961	Diazinon, technical
IS : 1970	1965	Hand compression sprayer (*revised*)
IS : 1971	1965	Single-barrel stirrup-pump (*revised*)
IS : 2125	1962	Phenyl mercury salicylate, technical
IS : 2126	1962	Phenyl mercury acetate, technical
IS : 2127	1962	Stabilized methoxy ethyl mercury chloride concentrate
IS : 2128	1162	Parathion ethyl, technical
IS : 2129	1962	Parathion emulsifiable concentrates
IS : 2353	1963	Phenyl mercury chloride, technical
IS : 2354	1963	Ethyl mercury chloride, technical
IS : 2355	1963	Stablized ethoxy ethyl mercury chloride concentrate
IS : 2358	1963	Formulations based on stabilized ethoxy ethyl mercury chloride concentrate
IS : 2359	1963	Formulations based on stabilized ethoxy ethyl mercury chloride concentrate
IS : 2477	1963	Hand rotary duster, shoulder mounted type
IS : 2555	1963	Official test insecticide (OTI)
IS : 2567	1963	Malathion emulsifiable concentrates
IS : 2568	1963	Malathion dusting powder
IS : 2569	1963	Malathion water dispersible powder concentrates
IS : 2570	1963	Methyl parathion, technical
IS : 2682	1966	Chlordane emulsifiable concentrates (*first revision*)
IS : 2861	1964	Diazinon emulsifiable concentrates
IS : 2862	1964	Diazinon water dispersible powder concentrates
IS : 2863	1964	Chlordane, technical
IS : 2864	1964	Chlordane dusting powder
IS : 2865	1964	Methyl parathion emulsifiable concentrates
IS : 2870	1964	Charge pump for pressure-retaining knapsack sprayer
IS : 2928	1964	Pressure retaining knapsack sprayer
IS : 3062	1965	Rocker sprayer
IS : 3284	1965	Organo mercurial dry seed-dressing formulations
IS : 3383	1965	Wettable sulphur powder
IS : 3634	1966	Dust applicator for burrows
IS : 3652	1966	Foot sprayer
IS : 3897	1966	Sprayer, atomizer type, hand operated
IS : 3898	1966	Zineb, technical
IS : 3899	1966	Zineb, water dispersible powder
IS : 3900	1966	Ziram, technical
IS : 3901	1966	Ziram water dispersible powder
IS : 3902	1966	Dimethoate, technical
IS : 3903	1966	Dimethoate emulsifiable concentrates
IS : 3904	1966	Thiometon concentrates
IS : 3905	1966	Thiometon emulsifiable concentrates
IS : 3906	(Part—I) 1966	Continuous sprayer, knapsack type Part I reciprocating type
IS : 4015	(Part—II) 1967	Guide for handling cases of pesticides poisoning: Part—I—First aid measures

IS : 4015 (Part II)	1967	Guide for handling cases of pesticide poisoning: Part II Symptoms, diagnosis and treatment
IS : 4320	1967	Thiram, technical
IS : 4321	1967	2, 4-D Technical
IS : 4322	1967	Endosulfan dusting powders
IS : 4323	1967	Endosulfan emulsifiable concentrates
IS : 4324	1967	Endosulfan water dispersible powder concentrates
IS : 4325	1967	Binapacryl emulsifiable concentrates
IS : 4344	1967	Endosulfan, technical
IS : 4345	1967	Binapacryl, technical
IS : 4451	1967	Toxaphene, technical
IS : 4808	1968	Pyrethrum emulsifiable concentrates
IS : 4766	1968	Thiram water dispersible powder
IS : 4783	1968	Thiram seed dressing formulations
IS : 4929	1968	Dichlorvos, technical
IS : 4958	1968	Phosphamidon, technical

APPENDIX E

LIST OF INDIAN STANDARDS ON STORAGE AND MARKETING STRUCTURES FOR AGRICULTURAL COMMODITIES

IS : 600	1955	Code of practice for construction of *BUKHARI* type rural foodgrain storage structure
IS : 601	1955	Code of practice for construction of *KOTHAR* type rural foodgrain storage struccture
IS : 602	1955	Code of practice for construction of *MORAI* type rural foodgrain storage structure
IS : 603	1955	Code of practice for construction of underground rural foodgrain storage structure
IS : 607	1955	Code of practice for construction of bagged foodgrain storage structure suitable for trade and government purposes (*revised*)
IS : 609	1955	Code of practice for improvement of existing structures used for intended to be used for foodgrain storage
IS : 610	1955	Code of practice for storage of foodgrain and its production during storage
IS : 611	1955	Code of practice for handling of foodgrain in transit
IS : 631	1961	Aluminium foodgrain storage bins
IS : 1497	1959	Layout for regulated market yards for agricultural commodities
IS : 1787	1961	Layout for regulated market yards for fruit and vegetables
IS : 1788	1961	Layout for regulated market yards for cattle
IS : 2059	1961	Layout for regulated market yards for tobacco
IS : 2821	1964	Thermo sampler
IS : 3453	1966	Code of practice for construction of hexagonal type concrete cum-masonary bins for bulk storage of foodgrains.

Making Agriculture Profitable

(*Contd. from page* 18)

are usually at a fixed rate per acre for specified crops. A pricing arrangement based on volume used would provide farmers with profit incentives to use the water economically.

With the new evidence of a green revolution there is naturally increasing interest in agricultural taxes, to mobilize the increased incomes presumably generated. Without debating the question whether or not additional taxation is justified, it should be stressed that the form and nature of the tax is most important in determining its impact on production. A relatively high, graduated tax on net income may have an adverse effect on expansion of large farms but probably tax on inputs such as fertilizers or insecticides would most certainly result in a reduction in their use—it would make their use less profitable.

To summarize, briefly, continued agricultural growth at a suitable rate depends on modernizing agriculture, introducing commercial inputs on a large scale, on an over increasing number of farms. Farmers are not likely to make the investments and improve their farming practices to increase production unless they are provided appropriate incentives. A suitable economic environment, in which improvements in farming practices provide prospects for profit, is essential to induce the kind of transformation of agriculture needed. This economic environment is primarily the product of government policies.

Green Revolution at Cross Roads

Dr. Amrik Singh Cheema

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As you know India has been facing a population explosion. Whereas the rate of increase in population over the decade from 1951 was only about 7 million persons every year, it went to about 11 million persons every year by 1966. This means we have been creating more or less one Australia every year. I will leave it for you to visualise the impact of this population explosion – what it means to feed and maintain the population of a country like Australia. The population has been increasing at the rate of about 2% and now it is estimated we have reached to about 535 million.

Obviously we have to aim at food production in keeping with the increase in rate of population. It was as a result of the awareness of this fact that Govt. of India invited an agriculture production team from USA for studying the problems of agriculture production of this country and to suggest ways and means of boosting up the agriculture production. The Team brought out a nice report and on the basis of this report, an Intensive Agriculture District Programme, what is popularly known as Package Programme, was launched in the country in 7 districts of 7 States in the years 1960-61. Subsequently, it was extended to the other States of the country also. The objective of the Intensive Agriculture District Programme was to demonstrate the way to achieve a rapid increase in agriculture production through an integrated and intensive use of improved agriculture techniques and by providing sufficient incentives to the farmers. The idea was to concentrate on efforts in areas which had the maximum potentialities. The achievements under the IADP were quite re-assuring and it was possible for the country to overcome the food scarcity which was threatening more or less our survival. Drawing upon the good experiences of the Intensive Agriculture District Programme, Intensive Agriculture Area Programmes were also started in almost all the States covering large number of districts in places which had adequate irrigation facilities and assured rainfall conditions.

Fruitful Researches

While the IADP and IAA Programmes were launched by the Govt., our research scientists were busy evolving high yielding varieties of some of the major foodgrain crops. In 1961, 4 double crops of maize hybrids, namely, Ganga-1, Ganga-101, Ranjit and Deccan were developed under the All India Integrated Maize Imporvement Programme sponsored by the ICAR in collaboration with the Rockfeller Foundation. These hybrids had high yield potentials and offered 5 tonnes per hectare or so. In 1964, the first jowar hybrid CSH-1 was released. This was a short-duration hybrid which had the yield potential of about 5 tonnes per hectre in about 100 days. Subsequently, in 1955, the first bajra hybrid, HB-1, was developed at the Punjab Agriculture University and another hybrid Jowar CSH-2 was released. In April, 1964, the single and two gene dwarf varieties of wheat, namely, Larma Rojo and Sonara-64 respectively were introducted in the country. These were Mexican varieties and they a yield potential of about 5 tonnes per hectare. In early 1965, it was clear that Indica rice varieties possessing dwarfing genes like Taichung Native I could help to make a major advance in increasing rice yields. Even more significant was the observation that the dwarf varieties of wheat and rice as well as hybrids of jowar and bajra were of photo insensitive and consequently could be cultivated over a wide range of latitudes and altitudes. This paved the way for the new agriculture strategy for the farm revolution, as it is generally known.

1. The new agricultural strategy aims at raising more yields per acre and more crops per acre per year with the objective of achieving a rapid breakthrough in agricultural productivity. The High-Yielding Varieties Programme and the Multiple Cropping Programme constitute the two major planks of this new strategy.

2. The High-Yielding Varieties Programme is based on the cultivation of the newly identified and evolved strains of paddy and hybrids of maize, jowar and bajra, which are responsive to high doses of fertilisation. The programme is concentrated mainly in the area of assured irrigation and rainfall which are responsive to such intensive production efforts.

The programme has made rapid progress since its inception in 1966-67 as can be seen from the following table :

	Area in million acres
Achievement during 1966-67	4.66
Achievement during 1967-68	14.92
Anticipated achivement for 1968-69	21.00
Target for 1969-70	27.00
Fourth Plan target	60.00

It will be seen from the above figures that at the present rate of progress, a little less then 50% of the Fourth Plan target is likely to be realised in the first year itself. Though, in general, the progress under this programme has been very encouraging, the experience with different crops has varied in different areas.

Progress and Problems

The progress and problems experienced in regard to each crop are discussed below :

Wheat :

Spectacular progress has been made in the case of high-yielding wheat varieties. The total acreage under wheat in the country is about 37.00 million acres, out of which about 13.00 million acres are irrigated. The area covered by the high-yielding varieties of wheat showed a sharp rise from 1.34 million acres in 1966-67 to 7.27 million acres in 1967-68. The estimated acreage during 1968-69 is likely to exceed 10 million acres. At this rate of progress, it is hoped that the Fourth Plan target of 15.00 million acres will be achieved earlier than visualised. In some of the wheat growing States of the country the new varieties have nearly saturated the irrigated area. In Ludhiana (Punjab) the coverage under the new varieties is about 95.5% of the total wheat area. Another significant development is the spread of the new varieties to non-traditional wheat areas of the country. The cultivation of wheat with the new varieties is rapidly spreading in the States of Tamil Nadu, Mysore, Andhra Pradesh, West Bengal and Orissa. Some of the factors which strongly influenced the spread of exotic wheat varieties are :

(a) Quick multiplication of the seeds of these varieties;

(b) Incentive prices assured to the farmers for the new varieties;

(c) Improvement in the quality of the original varieties so as to make the new varieties acceptable to the consumer;

(d) Expansion of irrigation facilities both in the public and private sectors ;

(e) Introduction of flat rate for electrical energy based not on actual consumption but on the H.P. of the motors used.

The new wheat varieties were readily acceptable to the farmers because of the controlled irrigation conditions in which they are generally grown and their comparative immunity from pests and diseases.

Rice :

Though the progress in the case of rice varieties has not been as spectacular as in the case of wheat, it is significant that the newly introduced varieties have done exceedingly well in Rabi/Summer seasons when the irrigation water is controlled and the incidence of pests and diseases lesser than in the main monsoon season. Out of the total paddy area of about 93.00 million acres, 33.00 million acres is irrigated. An area of about 2.15 million acres was covered under exotic varieties during 1966-67 and 4.41 million acres in 1967-68. It is likely to go up to about 6.50 million acres in 1968-69. The progress during the Kharif season has been rather slow because these new varieties generally require good water management practices which are particularly difficult during the monsoon season. The weather during Kharif season is conducive to large scale infestation of pests and diseases. Another factor influencing the acceptance of new varieties has been the consumer preference for non-glutinous and finer rice. For example, in Kerala, field performance of Tainan-3, when first introduced, was very good. But it became unpopular. It is a measure of success of the High-Yielding Varieties Programme that by now Tainan-3 has been completely substituted by IR-8 as may be seen from the table given below :—

Year	*Area under Tainan-3*	*Area under IR-8*
1966-67	1,47,164	—
1967-68	8,238	30,105
1968-69	—	2,62,800

Similarly, Andhra Pradesh is adopting in the current year a much large IR-8 programme. The same course would be followed in Tamil Nadu. The Government now propose to give price support to IR-8 which would give a big fillip to this programme. Research efforts are also continuing to replace the existing high-yielding paddy varieties with varieties having better performance and grain quality. New varieties like Padma, Jaya and Hansa have already been released and are under extensive field trials. On significant development with the introduction of high-yielding paddy varieties has been the enlarged scope for multiple cropping. The high-yielding varieties being short duration ones afford opportunities for raising a second and in some cases even a third crop. A good example of this is large scale conversion of Samba (long duration single crop season) with ADT-27 in Tamil Nadu. About 2 lakh acres of additional areas was brought under cultivation by the introduction of ADT-27. Action has been taken on hand for an all out effort in extension and training for stepping up paddy production in the next kharif season.

Hybrid Maize :

Out of the total maize area of about 13.95 million acres, only about 1.90 million acres is irrigated. Though the hybrid maize programme has not made the expected progress, remarkably good yields have been obtained in some States, notably Mysore. The coverage is expected to be 1.00 million acres during 1968-69. The slow progress is mainly due to price disparity and marketing difficulties. Maize is not a staple food in greater part of the country. Its uses are also limited to starch and other subsidiary industries. Its cultivation needs linking up with its industrial uses and more so with the livestock feeds industry.

Hybrid Jowar :

As compared to hybrid maize, hybrid jowar has made better progress. Out of about 46.50 million acres under jowar, 1.80 million acres are irrigated. It is expected that about 2.00 million acres will be covered under Jawar hybrids during 1968-69. The programme has been taken up in a big way by the State of Maharashtra. The other important States are Mysore, Madhya Pradesh, Andhra Pradesh and U.P. The crop is generally grown under rainfed conditions. Since the rains have been erratic during the last few seasons and the cultivation of hybrid jowar calls for higher investments by way of seeds, costing about Rs. 40/- per acre, fertilisers and insecticides, the farmers are hesitant to grow hybrid jowar on a large scale. Another bottleneck has been incidence of pests and diseases requiring well-organised plant protection

measures and thus higher investments in plant protection.

Hybrid Bajra :

The total area under bajra is about 31.00 million acres, of which 0.80 million acres is irrigated crop. The coverage is expected to be 1.50 million acres during 1968-69. In case of hybrid bajra seed production and certification had initially presented some problems with regard to timing of flowering of both parents and needed isolation for maintaining purity. These problems have now been solved to a great extent. The progress in the initial stages was slow on account of seed production, low yields and lower economic returns compared to cultivation of groundnut crop. The higher food-grain prices in the last few years have, however, helped to stabilise the areas under hybrid bajra. Now farmers are taking to better management practices and are going in for cultivation of larger areas under this crop. Significant progress has been made in Gujarat. The area under Hybrid Bajra has been rising steadily in Gujarat. It was 71,239 acres in 1966-67, 3,05,044 acres in 1967-68 and in Kharif 1968 it was 4,37,300 acres. In 1967 it constituted 7.31% of the total area under Bajra, and 16.73% of the Bajra out-turn in Gujarat. The Fourth Plan of the State of Gujarat envisages coverage of 2.90 million acres under Bajra hybrid.

The high yielding varieties programme is just one of the methods of maximising yield per acre. The important factor in agriculture is the time factor. The Multiple Cropping Programme which is the second major plank of the new agriculture strategy aims at maximising yield per day and the total yield in the whole year. The concept of the Multiple Cropping Programme envisages that the field is not kept fallow for more than a few days in the year for cultural operations. Through proper cropping sequences and relay cropping, now we can utilise the fields for 360 days out of 365 days in the year.

Spectacular progress in this direction has been made in other parts of the world. In Taiwan where agriculture production has increased by 40% in the last 10 years, the intensity of cropping has increased from 115 in 1945 to 185 in 1964 and the country has a plan to attain an intensity of 212 by the year 1974. Pakistan has cropping index of 137 and Korea as 151 whereas in India it still stands at 115. The total crop area of all country at the end of the Third Five Year Plan was about 155 million hectares. Out of this, the area cropped more than once was only 19 million hectares. The total irrigated area by different sources was 24.44 million hectares and the irrigated crops were raised on 30.92 million hectares which showed that at present only 15% of the total irrigated area in the country is being used for multiple cropping. The percentage of area cropped more than once is also almost the same under unirrigated conditions. It means that irrigation is not helping to grow double or triple crops to a considerable extent. Low intensity of irrigation in certain areas and prepondence of long duration crop varieties have been the principal limiting factors. The introduction of short-duration crops of high-yielding varieties and other improved varieties have a significance here and even the non-high-yielding short duration varieties have a significant potential in the rotation of the crop and in the period allowed for the crop. Over the Three Plans consistent efforts have been made to increase the area under irrigation and as a result at present about 90 million acres are under irrigation.

It was under this background that the Multiple Cropping Programme was started in the country from 1967-68. The achievement was reassuring, about 9.25 million acres was brought under multiple cropping against the about 7 million acres. It is proposed to bring about 4.5 million acres under multiple cropping during this year and the Fourth Plan has suggested an additional target of about 19.80 million acres. In this multiple cropping programme, in addition to cereals, crops like oil-seeds, vegetables, potato, cotton, sugarcane, jute and pulses etc. have also to be included in crop rotation depending upon their economic importance in the different regions of the country.

I have tried to give you the details of the Farm Revolution, specially, the two new strategies of high yielding varieties programme and multiple cropping programme. But as you will realise, the high-yielding varieties programme has its own limitations, as it could be operated mostly under irrigated and assured rainfall conditions only. There are rumblings now that the high-yielding varieties programme is not a panacea for pushing up the agriculture production. But you will agree with me that as a short term measure for boosting up agriculture production, this was the best programme because at that time in 1965 and 1966-67, we had large scale food scarcity because of droughts and the question then was of our survival. The high-yielding varieties programme has certainly made appreciable dent in our agriculture economy.

However, now we are at the cross-roads under the same unique agrarian conditions in our country. Any food plan can succeed better only if it is more broad-based and takes into account the need and capacity of the mediums of small farmers which form the majority of our farming population. Also, after all, there is limitation of providing irrigation and even at present about 80% of our cultivated land depends mostly on rains.

During the Fourth Plan, only about 3% yearly rate of growth is envisaged under irrigation potentials and the target production of food-grains has been kept at about 129 million acres. So, it will be found that large areas will be obliged to continue to grow crops under rain-fed conditions and any long term strategy in agriculture must aim on making the rain-fed areas more productive. Concentrated effort on boosting up agriculture production in unirrigated areas will also help solve the growing disparity between the prosperous and backward cultivator and also the regional imbalances which are being talked of so much these days. The dry regions have to develop their agriculture and agriculture techniques have to be regions could be made viable and set the pace for supporting major industries and providing employment to the local people.

Role of Farm Women In Farm Revolution

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Farming is the principal means of livelihood for a majority of the Indian population. Agriculture is the foundation for the economic development of the country. Therefore all other developmental activities, whether industry or scientific research need to be geared to the demands of and trends in agriculture.

During the recent years, food shortage has become more acute in spite of the green revolution, owing to the draught conditions in certain parts and increasing population. The food shortage coupled with an exploding population has been presenting a twin problem. Thus self-sufficiency in food has become an increasing challenge in our times.

Every year, crores of rupees are being spent on meeting the food deficit for food loans, shipping food aid and investments in agticultural production projects. Food import can be only a temporary relief to ease the food problem.

Since the Dawn of Freedom, laudable efforts have been initiated to increase food production. The Community Development programmes and National Extension Services have been working hard towards self sufficiency in food and self reliance in all aspects. One of the main goals of the Community Development Programme, is to change the outlook of the people — the farmers, the homemakers and others. However, their activities have not brought the desired results because the family approach and involvement of women have been lacking in the developmental efforts.

It is a well known fact that women play a vital role in farming. Therefore, farmers' education towards the introduction of new methods of cultivation into farming techniques must *first* involve the women. The bulk of the farming is carried out by the women. A majority of the farmers reside in the rural areas which are steeped in traditions. Changes in their attitudes from the traditional to modern, are not easily achievable. However, changes can be accomplished if the women are *motivated and convinced.*

Women give the concept of value to the members of the family. Since a farmer is exposed to and influenced greatly by his family, both in his childhood, and later in the family education of the mother becomes important. She moulds the personality of her children and inculcates in their minds the right attitudes which will persist throughout life. Her guidance and help in the agricultural operations are significant.

Besides their role in agriculture women play a prominent role in managing the household as homemaker in subsidiary occupations and as care takers of the family.

Women as wives and mothers have a considerable part in decision making in the home and the farm. Imperceptibly, they may be the only one person in the household who decide the adoption or rejection of new practices in agriculture. Even when the husbands make their decisions they are consulted. In the joint family system, such decision making process is vested with the older women, whose powers and abilities are unquestioned. The views and attitudes of those women are imparted to the other members of the family, mainly to the children. The saying 'If a man is educated only one person is educated; if a woman is educated, the whole family is educated' indicates the key role women play in family farming.

Thus the adoption of improved practices in farming by a farmer depends upon the decisions and influences of the women in the family. It is therefore necessary for the extension workers to pay attention to the values, attitudes, aspirations and perceived needs of the women in the family before a farmer can be motivated to adopt any improved practices. The farm women must be contacted and persuaded to influence their husbands and other men in the household. The adoption process will then be quicker and the farmers will be inclined to accept agricultural innovations more readily.

Farm women can be instrumental also to inculcate proper values towards agriculture among the family members and to get them trained adequately for the job. This is particularly valuable because people who get higher education are not interested in agriculture; rural students who came to the urban areas for higher studies, hesitate to go back to their own places and to reside there for pursuing agriculture as occupation. The farm women who run the family and determine the standards of living of a family are in a position to offset the hardships of rural living.

Extension workers should pay adequate attention to these roles of farm women in changing the attitudes of the farmers. A proper understanding of their psychology with special reference to their motivations is thus inevitable for the effective application of extension methods and approaches by the extension workers who intend bringing about desirable changes in the attitudes of farmers, towards new innovations.

References

1. Roy, M. and Majumdar, A.K. *The decision Making Process of Indian Farmers.* Farm Journal, May, 1968, Vol. IX, No. 7, pp. 13-15.
2. Taylor, R. Trained Man Power: *Key to Increasing World Food Output.* Farm Journal. November, 1967, Vol. IX, No. 1, p. 48.
3. Brock, R. *Food, a weapon for peace.* Tennessee Farmer. Summer 1967, Vol. 63, No. 4, pp. 7 & 8.

Farm Mechanization

The Farmer

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I am glad of this opportunity, under the auspices of the Bharat Krishak Samaj, to be able to draw your attention to some topical problems. The field of farm mechanization, however is quite vast and any attempt to cover all its facets here will not do them full justice. I will, therefore, deal with only some of the important ones.

Many technologies contribute to the high level of farm productivity. None is more important than that of the machines which multiply the effectiveness of human labour. A world-wide survey has revealed that the optimum power input for obtaining good yields is 1 HP per hectare. Our present availability is about 1/8th of this optimum requirement. We cannot step up the availability of power by launching a campaign to 'raise more bullocks' as nature takes its own course. We, therefore, have to take recourse to mechanical means. Mechanical power is required to fill this vast power gap, not to displace the present power sources.

We have to mechanize those farm operations :

(a) that are not possible through human and animal power,

(b) where such power is grossly inadequate, and

(c) where such power is not available promptly as required.

Our farm mechanization programme has to aim at—

(a) raising productivity — per worker and per hectare.

(b) performing a better job on the farm faster, and

(c) relieving the farmer of his drudgery and hard work.

I would briefly tell you of some of the experiences gained under our own local conditions :

InLudiana, each extra ploughing inpreparing the seedbed with a desi plough increased yields by 35 lbs. per acre. The number of ploughings ranged from 4 to 9. With a tractor one ploughing is enough. In Raipur, paddy yields increased by as much as 40% through a more effective preparation of fields for sowing over those methods commonly followed. A 3-row grain-drill permitting the side placement of fertilizers increased wheat yields by 13% and decreased the labour required by 40%. A one-row

And

planter with metering and side placement of fertilizers increased maize yields 40% and decreased man-hours by 36% from that of conventional planting. Losses during harvesting, threshing and storage, aggregating up to 25%, can be substantially reduced by using proper machinery. Man-hours required for harvesting a hectare of potatoes can be reduced drastically from 784 to 341 by using a potato digger. While it takes a pair of bullocks more than a day to plough an acre, a 35 HP tractor does the job in an hour. It takes a team of 5 men 12 hours to harvest an acre of wheat; a reaper will enable 2 men to harvest 5 acres a day. It takes us 350 to 400 man-hours to produce an acre of wheat or paddy; in the U.S.A. it takes them only 10 man-hours! The developing world has one tractor per 1000 hectares; the developed world has one for every 19 hectares.

These statistics speak for themselves.

Let us now deal with some of the aspects of mechanization to which I want to draw your attention.

Training and Education

To get the best out of equipment, one should be trained in its maintenance, operation, care, storage and minor repairs. Due to the out-of-the way location of farms and the importance of timely operations, it is all the more essential that you and your operators are familiar with your equipment.

To improve the traction of the tractor, you can add weights on the front wheels, on the reer wheels and on the front axle. For a given operation find out which combination of weights would be most favourable. For tillage, it is advisable to hydroflate the tyres, but not so far haulage. To improve the performance of the implements, you should be familar with the correct method of hitching and the various adjustments on them.

With the growing popularity and spread of mechanization, training is of the utmost importance. The magnitude of the task is so great that it cannot be born only by farm equipment manufacturers, suppliers and the Government agencies. Others who can and should join are companies like Oil, Tyre and

insurance and those dealing with equipment like fuel injection and electric starting and lighting. Educational Institutions too can play their part.

It may not be possible for everyone to come to a class room. To overcome this correspondence courses could be organised. Such courses can take care of elementary knowledge on common items of equipment such as tractors, implements, trailers, engines, motors and pumps. In view of the literacy levels of our people, audio-visual aids will have to be developed on a mass scale. We will require films, manuals and training aids in local languages.

Safety

The spread of mechanization and the growing use of chemicals on the farm has increased hazards calling for safety consciousness. For instance, we spray chemicals on the farm without any concern for the health of the operator. Can't we provide a simple face mask to the operator to protect his face and to prevent him from inhaling harmful chemical odours? By better education and useful tips, can't we prevent tractor accidents, in particular overturning? Tractors can be fitted with safety frames which will prevent their overturn and cut down fatal accidents. Prevention of accidents and improving the health of agricultural workers will undoubtedly result in better equipment worker availability and consequently higher productivity. It is not early to make a start with a Farm Safety Council.

Insurance

Modern farming does not only call for insuring the life of the equipment chemical user, but also of the equipment used. From the factory to the farm, under the current insurance tariff, a tractor has to pass through six stages of insurance, each calling for a separate policy. Assuming that all these risks call for an insurance premium of Rs. 200/- per tractor, the total annual premia amount in 1973-74 will work out to Rs. 180 lakhs for an estimated demand of 90,000 tractors (according to official circles) for the first year of the tractor operation. Can't we have a package policy to cover all insurance risks from the factory to the farm that may bring down the premium ? The annual premia amount of about Rs. 2 crores does not include other items of equipment and various other risks on the farm. Total premia amount under-writers can collect can be colossal. Shouldn't the under-writers take more interest in farm mechanization and contribute towards training, educattion and safety campaigns? Shouldn't a National Company like the Life Insurance Corporation of India organize a 'Farm Wing'?

Fuels and Oils

They reflect an important account in the annual farm budget. By the end of the Fourth Plan (1973-74, it is estimated that 1.75 million tonnes of fuel valued at about Rs 200 crores will be required to run farm prime-movers such as tractors, power tillers and oil engines. This is a sizeable business. These figures do not include fuels for farm vehicles like jeeps, trucks and cars. For keeping tractor maintenance expenses at reasonable levels, it is important to ensure use of clean and pure fuel. You must have heard of the menace of mixing of fuels. Can't we get door delivery of farm fuels ? Shouldn't the Oil Companies erect a storage tank and treat the farmer as a bulk consumer ?

Petrol pumps have played an important role in the development of road transport. They have an equally important role to play in accelerating the pace of farm mechanization. A petrol pump is a ready-made base of operation for emergeney services. Farmer should be able to obtain 24-hour service from a petrol pump, in particular during the season his equipment is in use round the clock. He should be able to buy common items of spare parts like fan belts and oil filters. It should be possible to drive a tractor to a petrol pump and get it serviced in a similar manner as a car is attended to at a petrol pump.

Lubricants and lubricating oils are not freely available for farm vehicles like tractors. Many prime-movers operate on light diesel oil which is sold at about half the price of the high speed diesal. Why shouldn't then light diesel oil be freely available in rural areas? In the absence of its availability prime-movers have to be run on high speed diesel. Use of light diesel oil will certainly bring down the cost of production. Shouldn't a national corporatian like the Indian Oil Corporation organize a Farm Fuel Service ? It is not enough to open more petrol pumps. These pumps have to be properly equipped to serve the farmer.

Tractors

At present tractors are not readily available. Register an order for the tractor today only if you do need one. Having bought a tractor, see that you use it to the maximum. A self-imposed discipline may call for a step that a farmer should not sell his tractor at least for a period of 5 years from the date of its purchase. This is a temporary measure. We should be able to ensure that unsocial elements do not take undue advantage of the current shortage of tractors. Only those with a genuine need for a tractor should, in fact, get one.

Other steps can include a custom service on farm operations. It should be made possible for a farmer to hire a tractor and/or custom out his farm operations. In many ways a farm equipment dealer is a ready-made farm machinery hiring centre. He has the necessary technical know-how and the men, all he may need is finance to set aside a set or two of his equipment for giving out on hire. It is necessary that the rates are economical so that the dealer finds the service worth offering.

When things are in short supply, the demand multiplies artificially. This may give planners a wrong picture of the demand.

Spare Parts

Many tractors may be idle for want of spare parts. If the tractors are imported makes and models, according to current policies, import of fast wearing parts is almost not permitted. Most of the fast wearing parts fall under the category of banned items irrespective of the fact whether they are manufactured locally or not. There is a provision

for actual user's import licence for a farmer, but can you imagine the task of the 80,000 tractor owners today in the country should each be applying for import licence. Such a procedure will only lead to more paper work and delays and even this will not ensure that the farmer has all the spare parts he needs.

In addition to the actual user's licence, licences should be available with established importers for importing such spare parts for the makes they are accredited distributors of. For makes not represented in India, responsibility can be taken care of by the Agro Industries Corporations. What is required by established importers is not only the licence, but also the permission to import fast wearing parts. Moreover, import of tractors should be restricted to only such makes that are indigenously manufactured.

There are sometimes difficulties for obtaining parts even for the indigenously manufactured tractors. They may relate to items like fuel injection equipment, rims, pistons and rings. For fuel injection equipment, there is only one reputed manufacturer in the country. Almost the entire nation depends on this source of supply. Obviously they are doing their best to meet the commitments on all fronts including the farm front. Similarly, for items like pistons and rings there are again a couple of reputed manufacturers with very heavy order books. We should ensure that tractor manufacture and use does not suffer for want of vital components. Today it may be rims, later let it not be tyres again or batteries.

Some fast wearing spare parts, which are used as original equipment by the equipment manufacturers, are not easily available. This has resulted in the springing up of the 'will-fit' trade. These parts may be available at quite attractive prices, but because of their quality, in the long run, the farmer may pay dearly for their use. This situtión can be overcome if you buy genuine spare parts. You should plan your spare parts requirements well in advance and take every possible step to keep the parts with you well ahead of your needs.

Dealer Margin

Often it is said that dealer margins in the farm equipment trade are high. This is a myth. In fact, a good dealer margin will ensure better service to the farmer. The services on equipment are a must. The farmer pays for them whether he gets them or not. In reality he pays more if he does not get them. The truth of this adage is easy to prove, particularly in the conditions which prevail on most farms and can be amply demonstrated by the complaints received from all parts of the country. His maintenance and repair costs shoot up and the farmer logs more downtime on the machine. Prompt services, therefore, are a must.

Services to the farmer do not simply include handling of the machine from the factory to the farm, but it calls for several installations and call-back services. The equipment has to be covered by a warranty. Even after the warranty period is over, services should be available to the farmer during the long life of the machine. The owner must be trained in the correct operation, maintenance and storage of his equipment. You must also take into account many other services which are so essential to accelerate the pace of mechanization in the country. These include surveys of farming conditions, mapping out of mechanizatian belts, selection of equipment for a variety of conditions, market surveys with a view to determining the requirement most suited to Indian conditions and carrying out of improvements on products.

During the height of the agricultural season when a tractor must work round the clock, it is desirable to operate mobile service vans and provide 24-hour service centres at selected retail points. An extension service should be provided to assist farmers in adopting modern methods of cultivation, the primary object being to raise agricultural productivity.

Financing too is an important part of the operation. Unlike automobiles farm equipment have to be serviced at site and owners contacted in remote off-the-highway places. In short, all such services call for expenditure. Compared to countries overseas, margins here are, in fact much lower. The margin on the price of the equipment is not so substantial as is made out to be.

Of the total cost of an item like a tractor, nearly 70% of the cost comprises of raw materials and vendor parts, leaving in the hands of producers an element of 30% to provide for labour, depreciation, financing and other services and profits. If any substantial reduction has to be effected, the cost of raw material and ancillary parts must come down, for even if we greatly improve the efficiencies in production and marketing, the impact this has on the final cost can never be very high.

Summing Up

In trying to survey the scene of farm mechanization, I have drawn your attention to a few points. Your taking to farm mechanization, has exceeded all previous expectations. You are to be congratulated on such excellent response. Mechanization, however, is still in the infant stage in our country. Today the operations are mostly limited to seedbed preparation. We have yet to enter the field of intercultivation, harvesting and processing. Mechanization of intercultivation and harvesting may call for certain changes in our cultural practices—in row to row spacing, in the method of planting and in the method of irrigation. I am certain this will come because you yourselve can see the benefits of mechanization. Farm mechanization is inevitable and all steps to accelerate it will bring quick results by way of increased agricultural productivity. I conclude on this note of great confidence in the future of farm mechanization in this country.

REFERENCES :

1. 'Safety & Health in Agricultural Work,' ILO Code of Practice, Geneva, 1965.

*2. 'Farm Power & Fuels', an unpublished study, Sept., 1967.

*3. 'Following a tractor from factory to farm', Agriculture & Agro-Industries Journal, April, 1968.

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Potentialities of Horticulture in Improving the Agricultural Economy

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Horticulture is a specialized branch of agriculture relating to the cultivation of fruits, vegetables and ornamental plants. It has been very much neglected in the past. The conditions after the partition of the country became all the more worst, since large tracts of horticulturally developed land went to Pakistan. However, some attention has been paid in recent years to bring more land under cultivation of fruits and vegetables, considering the potentialities of horticultural crops. Though the reliable estimates of area and production of fruits and vegetables in India are not available, however, the present area under fruits and vegetables is about 75 and 125 lakhs hectares, respectively with the production of about 76.2 million quintals of fruits and 162.6 million quintals of vegetables. This area is too small to meet the needs of 52 crores people of this country as compared to many other countries. In Israel, there are 18 persons/hectare land under fruits and vegetables. Likewise, there are 8 persons/hectare in California, where as in India it comes to about 140 persons/hectare. Similarly from the point of view of consumption of fruits and vegetables where there is about 453.6 gm/capita consumption in New York, 127.6 gm in London whereas it comes to about only 56.7 gm per head per day in India. Thus one can judge the standard of living of people and the prosperity of a nation from its production and consumption of fruits and vegetables. Cultivation of horticultural crops contribule to a large extent to the health, happiness and prosperity of the people.

Importance of Horticulture

The cultivation of horticultural crops has developed into one of the most skillful and intensive form of land utilization. This is one of the fascinating avocation of farming profession which influences the agricultural economy of the country in a very large measure. The potentialities of horticulture lies in the fact that it has the following points in its favour:

1. **Food value of horticultural crops:** High food value of fruits and vegetables is widely recognised, however, many people still regard fruits as a luxury rather than essential part of daily diet. Besides, good source of rouphage, they provide sufficient quantities of various vitamins, minerals, proteins and carbohydrates which are essential for maintaining proper health. Nutrition experts advocate consumption of at least 57 gm fruits and 283 gm vegetables per head per day in addition to cereals, pulses, milk and eggs. Vitamins which are important constituents of fruits are indispensable part of human diet. Although they are very essential for the maintenance of health. The role and source of important vitamins, minerals and carbohydrates are given in brief in the following table :

(Nutrients)	Role and deficiency causes	Source	
		Fruits	Vegetable
Vitamin A	Essential for growth and reproduction	Mango, Papaya, Persimon, Jack fruit and Dates.	Carrot, Peas Turnip, Beans, Tomato.
Vitamin B_1	Deficiency causes loss of appetite, loss of weight, beriberi etc.	Cashewnut, Walnut, Almond, Apricot, Banana, Apple and Plum.	Peas, Beans, Lettuce, Cabbage, Green pepper, Carrot, Onion.
Vitamin B_2	Deficiency causes loss of appetite and other diseases.	Bael, Litchi, Papaya, Pineapple and Pomegranate.	Green Leafy tender vegetables
Vitamin C	Deficiency may cause, unhealthy gums & tooth decay.	Guava, Citrus, Aovnla, Gooseberry, strawberry Pineapple, and Apple.	Methi, Palak, Cabbage, Pepper, Tomato
Calcium	For healthy bones	Almond, Litchi, and Walnut,	Beans, Cabbage, Carrot, Cauliflower, Lettuce, Onions and Spinach.
Phosphorus	For healthy tissues.	Almond, Cashewnut, Litchi. and Walnut.	Potato, Carrot, Tomato, Spinach, Cauliflower, Lettuce.
Iron	Good for red blood corpuscles	Dates, Cashewnut, Almond, Lemon, Mango, (green) and Walnut.	Spinach, Lettuce, Cabbage, Peas, & Beans.
Carbohydrates	Source of energy	Dates, Banana, Cashewnut, Custardapple, Grapes and Fig.	Potato, Sweet Potato.

2. Horticulture as an economic proposition :

The economic aspects of fruit and vegetable growing are also no less important. Well maintained and established orchards bring better returns than field crops from the same piece of land. Although the initial expenses involved in establishing an orchard may be much more than raising cereal crops. The growers initial expenses can however be compensated to a great extent if he grows vegetables as a inter crop during early stages of orchard life.

Besides, a farmer remains engaged throughout the year and can fully utilize the permanent labour maintained by him. Fruit and vegetable growing also promises the development of several ancillary industries like preservation, dehydration essential oils, package, transporation and refrigeration. In short the rural economy can be greatly influenced by cultivation of fruits and vegetables.

3. Horticultural crops yield foods of greater calorific value:

One of the basic needs of the body is food, producing energy measured in calories. The energy requirement of a person is about 1,100,000 calories per year, at the rate of 3,000 colories per day. Horticultural crops yield foods of greater calorific value as compared to cereals. The following table shows yield of some fruit crops in terms of calories per hectare as compared to wheat.

Crops	Calories	Average yield per hectare (Quintal)	Calories/hectare
Wheat	245	8.64	2,587,200
Banana	105	253.71	37,632,000
Guava	48	55.88	288,830
Mango	38	126.85	6,720,000
Papaya	28	121.93	47,308,800

Hence considering energy requirement and the average yield of various crops per hectare the area required to feed a person for above fruits as compared to wheat would work out as under :

Wheat	3.00 hectare
Banana	0.225 hectare
Guava	2.375 hectare
Mango	1.25 hectare
Papaya	1.50 hectare

The point here is not that only fruits and vegetables would be able to meet the daily food requirements but that a unit area of land can support more people if the land is used for horticultural crops instead of cereals.

4. Horticultural crops yield higher than cereals:

It is well known that vegetable and fruit production per unit area is

much higher than the cereals and thus a family can earn adequate income from an average holding by growing fruits and vegetables as compared to cereals. For example in Madras although only about 1.1% of the total cropped area is under fruits and vegetables but the produce forms 7.4% of the total crop wealth. At many places in India the earnings of more than Rs. 2,500/- per hectare from well kept orchard is not uncommon. Papaya is easily being grown and yields 3 crops in 4 years giving the profits of Rs. 12,500/- per hectare. Likewise, vegetables too are more profitable in terms of yield as well as profit per unit area. From the following table it is clear that vegetables also give higher yields in comparison to other crops.

Crop	Average yield/hectre in quintals	
Wheat	7.72	(p)
Paddy	7.94	(p)
Potato	79.40	(p)
Carrot	16.33	
Sweet Potato	136.08——181.44	

p = "Agricultural statistics of reorganised states" October, 1956 Director of Economics and Statistics, New Delhi.

5. Horticultural production stimulates establishment of certain industries:

Preservation industries are closely associated with the increased production vegetables. Surplus production during glut is properly preserved in the form of jam, jelly, marmalade, murabba, pickles, chutney etc. with the establishment of preservation industries. The industries therefore, help in regulating price levels of fruits and vegetables during glut periods and also help in maintaining supply during off season. Further, the establishment of preservation industries in turn help in developing other ancillary industries like, dehydration, production of essential oils, refrigeration, storage package and transportation. Thus increased horticultural production results in industrialization, reducing the pressure of population on the land, benefiting the nation physically as well as economically.

6. Horticultural produce has high export potentialities:

The need of the day is not only to eat more and quality fruits and vegetables, but also to earn more of foreign exchange to help national economic reconstruction. Fresh as well as processed fruits, vegetables and flowers offer a promising field to earn sizeable foreign exchange. Many countries like Israel, Spain, U.S.A., Japan, Italy, Australia are earning sizeable foreign currency through export of horticultural produces. Although India is also exporting some of the fruits and their products in large amounts specially Cashewnuts, Bananas and Mangoes. The export of Bananas alone to U.S.S.R. fetches Rs. 200 crores annually.

Since this country is gifted with varied agro-climatic conditions, it is possible to produce fruits and vegetables at times when they are in scarcity in important world markets, thus placing us in a rather favourable situation for increasing export of horticultural produce. Hence encouraging indigenous production of fruits and vegetables would go a great deal towards fulfilling local demands and increasing our export earnings.

Scope for Horticulture production & conclusion:

There is a great scope for increasing fruit and vegetable production in the country. The Production has not only to be increased to make the country self-sufficient but also to increase the earning significantly influencing the agricultural economy of the country in large measure. This can be achieved by rejuvenating the existing orchards, increasing the area under horticultural crops and by adopting better methods of controlling insect, pest and diseases. The agro-climatic conditions of the country being most favourable for most of the horticultural crops, there exists immense possibilities for cultivation of fruits and vegetables in wider regions, specially so after the completion of various irrigation projects.

To conclude, it can be said that production of horticultural crops offer vast potentialities in improving the agricultural economy and that there is great scope for this in India in view of the points described in its favour.

Farm mechanization and the farmer

(*Contd. from page* 28)

4. 'Marketing of Agro-Industrial Products', an address by Mr. R. F.S. Talyarkhan, Tata Management Training Centre, Poona, 27th June, 1968.

*5. 'Industrialise Agriculture', The Realist, June 1968.

6. Report of the Working Group for formulation of IV Five Year Plan Proposals on Agricultural Machinery & Implements, Govt. of India, New Delhi, Sept. 1968.

*7 'Agricultural Machinery Industry in the IV Plan', Industrial and Engineering Annual, 1968.

8. Address by Mr. Keshub Mahindra at the 7th annual Conference of the Indian Society of Agricultural Engineers, 17th Feb., 1969.

*by the author.

Water Use Under Intensive Agricultural District Programme

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The Intensive Agricultural District Programme was taken up in the country for achieving rapid increases in agricultural production through an integrated and intensive use of improved agricultural techniques and by providing sufficient production incentives to farmers. It envisaged selection of favourable areas with maximum of irrigation facilities and simultaneously providing all the wherewithals needed for production increases. Irrigation as a pre-requisite infrastructure for application of all the production inputs and services has been recognised. But the efficiency and effectiveness with which irrigation water is actually managed and used by the cultivators as the key factor for raising yields to higher levels needs emphasis. The existence of a canal system or a state tubewell for irrigation does not necessarily ensure that water is available to cultivators within the command area when they need it. In many cases the resources might be adequate to supply the total seasonal requirements, but supplies if not adequate at periods of peak needs or for greatly intensified cropping patterns, the desired increases in production cannot be achieved. Division and distribution of water released from canal outlets among the individual cultivators is often irregular and inequitable. Lack of field channels and control structures and lack of land development cause inefficient use of water on the farms. Lack of research information and results from successful experiences on scientific irrigation farming limits undertaking wide spread extension programme to aid cultivators in their water use problems. But ample opportunities exist in improving the field distribution systems and land development for application of improved irrigation practices. These problems have received the attention of the planners of the Intensive Agriculture programme and accordingly a scheme to assist the cultivators to solve some of these problems have been included in the programme. Given in this paper is a brief resume of the findings after implementing this scheme in some of the package districts.

Water Use Problems :

While conditions vary considerably among and within the districts generally the need for the farmers is for assistance in two aspects—(1) conveyance of irrigation water between the individual farms and the outlets of state operated canals and tube wells (2) the use and management of water on individual farm lands. In most of the public irrigation projects the distribution of water from the canal outlets is the responsibility of the cultivators. Often this involves distribution of water to areas varying from 100 to 1,000 acres. There is no machinery for the lay out and construction of field channels and water control structures for water conveyance and its division and distribution among farmers. The past experience has been that the farmers rarely agree to spare land or join together, to plan, finance and construct these channels and structures. Often crude channels are dug out of sheer necessity, by the side of the field boundaries, by which seldom water reaches remote areas and results in poor yields and heavy wastage of water. There is need for farmer motivation and compulsion for getting these done for community benefits. Lack of proper preparation of the field due to lack of both the means as well as technical knowledge is the major impediment for efficient use of water on the farm. Land preparation for irrigation involves land shaping and levelling, construction of bunds, structures and drainage ditches. All these need capital, implements and power as well as know-how which is not within the reach of an average farmer. Besides the above there is need for technical guidance, subsidy loans and facilities for purchase or hire of implements to be provided on a large scale. The farmers also lack technical information which will help them determine when and how much water is needed for optimum production of different crops under particular soil, climate and cultural conditions. Available information have to be collected and compiled and disseminated through extension media.

Demonstrations :

Realising the great need for assisting and educating the farmers in their water use problems, a few states took up schemes to demonstrate improved water management practices on cultivators' fields by giving incentive to farmers by way of subsidy, technical help as well as supply of equipment. Aligarh in U.P. is one of the few districts which took up the lead in drawing up a scheme under water management in 1965 as an integral part of the package programme.

The district of Aligarh has great potential for pushing up agricultural production by way of proper management of irrigation water as well as in extending the irrigated cropping. It has three important

sources of irrigation water—the upper Ganga canal system, State owned deep tubewells as well as private percolation-wells and tube-wells. While the supply of irrigation water from the upper Ganga canal system is very much inadequate for intensified cropping in the command the available water is distributed by a system of rotation by which farmers get water every fourth week. Farmers have to supplement this from wells and tubewells for satisfactory production of crops like paddy, potatoes, etc. Similarly the availability from the state owned tubewells is also very much insufficient for raising any good yield. The 1½ cusec tubewells were originally meant for 1,000 acres each which were subsequently scaled down to 600 acres and recently to 400 cu. acres which is still a large area to be catered from such a tubewell. The only dependable source is for a farmer to have his own tubewell. During the last three years construction of private masonry wells as well as tubewells, is, steadily increasing in this district.

Aligarh district took up the programme to demonstrate improved water manangement practices on a few private farms which have dependable water supply. In the beginning the farmers were not agreeable for such government aided works on their land due to the fear that eventually the government may take away their lands. They also had the fear that by levelling the sloping lands yields may go down. As a result of the constant contact and persuasive work undertaken by the district staff under water use, some of the farmers came round to the proposal much against the advice of the neighbouring farmers. The nature of work thus undertaken in these demonstration consists mainly of survey, planning and proper lay out of fields, alignment and construction of lined channels with simple control structures, land shaping and levelling and provision for removal of excess water. As a result of the improved irrigation practices and use of the recommended production inputs after soil analysis etc. the crop grown was much better than that of the neighbouring fields. Where only one crop used to be grown, 2 or 3 crops are taken. The land improvement and water control system enable them to have diversified cropping on their lands. Yield has increased from 16% to 100% in these farms. These have attracted the farmers and awakened them to the new possibilities. More and more farmers demand help for such improvements on their lands. What they need is technical assistance and loan for the land development and field channel construction and no subsidy is demanded. A large area programme has therefore been chalked out for the district.

Tanjore in Madras State is another district which took up a programme under water use in 1965. Paddy is the major crop of the district situated in the Caveri river delta and receiving irrigation water from Mettur Dam. The water distribution system is outmoded with few structures for proper control of water resulting in great loss of water under the existing irrigation practice. Cultivators who are solely repsonsible for the distribution and use of water at the field level besides lacking the physical facility to have water control lack the necessary knowledge. Judicious use of irrigation water would make it possible to save water thereby extending the area under irrigation, reduce drainage problem and increase the yield. Accordingly to start with four Trial-cum-Demonstration Centres were set up to get information on suitable schedules for water application which will save water, as well as to demonstrate improved farm lay out for efficient irrigation and drainge. Taking 5 acres in 4 State seed farms representing the soil and water supply conditions in the district and making proper lay out, 1/2 acre size plots were constructed with bunds and separate channels for irrigation as well as for drainage, and different water application schedules were tested. Results of three years' observations showed that water is being excessively used under existing irrigation practices and with reduced irrigation, higher yields can be obtained. Also making size of bunds much smaller than that of the farmers' the rat menace was eliminated. The farmers have appreciated the new lay out. The duty of water worked out from the studies are being examined by the Irrigation Department to make modification in the duty adopted by them for canal operations.

A separate demonstration on a larger area was also taken up in 1967 in 391 acres in this district on improved lay out (land and field channel realignment, land levelling, etc.). Large plots (about 1 acre) with small bunds and separate channel for irrigation and drainage were constructed and land levelling done by tractor power. It was found that farmers have complete control over the water and means for effective drainage of the fields. Instead of reduction in area there is gain of ½% of area for cultivation. Farmers are very happy with the modifications and more of them are interested to have such improvements. A large area programme has, therefore, been chalked out for the district. The work is done by government and cost recovered from farmers in instalments allowing 25% as subsidy.

Sambalpur is another district where a programme for demonstration was undertaken. In this district the main source of irrigation water is the Hirakud Dam. There is tremendous potential in the district for increasing production through diversified cropping if the irrigation resources created are properly utilised. Here the problem is lack of arrangement for distribution of water at the field level and lack of land development for irrigated farming. Often fields in the tail ends of water courses suffer due to the lack of water during peak demand periods. Also due to the tendency of the farmers to grow paddy even in areas more suited to other crops water scarcity during critical periods is another big problem.

A demonstration in 581 acres area was set up in this district in 1966 with the objective to show how irrigation water can be distributed equitably among farmers to solve the water shortage problem as well as to show how crops like maize, jowar, wheat and groundnut can be successfully grown with less water than paddy in rabi by making

land improvements and changing the cropping pattern. After construction of field channels with water control structures rotation irrigation was introduced successfully for paddy by which the fields in the tail ends now get sufficient water. The yield has gone up in these areas. The demonstration of improved crop rotations is being taken up in this area to replace paddy by light irrigated crops in rabi and thereby extending the double cropped area.

Similar demonstration have been undertaken in other package districts—West Godavri, Raipur, Bhandara, Surat, Ludhiana, Pali and Palghat. Farmers have shown great appreciation to the improvement practices in water management.

Assured Water Supply :

Irrigation can be an effective means of increasing agricultural production only when the water is evenly distributed and applied in sufficient quantity at proper times. The problem of water delivery to the farmers from the projects overshadows the need for refinements in irrigation techniques to be made. The canal operations should be geared to the crop needs and not based on rigid rules made, based on adhoc requirements. The water delivery schedules are controlled by the staff in Irrigation Departments who have no background of the irrigation needs of the crop. Schedules should be worked out jointly by the Agriculture Scientists and the Irrigation Engineers taking into consideration the changing cropping pattern in the commanded area as well as the needs of the crop especially during the critical periods. Minor irrigation should be integrated where medium and major irrigation sources are inadequate to meet the needs of the farmers for intensive farming.

Water Distribution :

Digging of field channels upto at least 10 acres should be undertaken for proper distribution of water at the field level. The irrigation department is better equipped to undertake construction of these after survey etc. The cost can be recovered from the beneficiaries in instalments. Enactment of legislation to get over the problem of recalcitrant farmers in field channel construction has been done in some States. This should be expedited in all the States. Extension staff should work with farmers to induce them to join together for equitable water distribution by rotation schedules within the command of distributaries and for digging field channels.

Land Development :

The Agricultural Organization in the districts should have Engineering Sections with qualified staff to help the farmers in their problems of land development for efficient water use. This Section should have necessary tools and implements and tractor power for undertaking land levelling operations. Arrangements should be made for credit to the farmers to meet the expenses for land development. It is a highly technical job and the problem is stupendous. Career opportunities have to be created for attracting more engineers for such agricultural programmes. The present unemployment situation should be utilised for recruiting more engineers for such programmes. There should be regular training programme taken up to train these engineers and other technical staff to increase their competency for such works.

Research :

Water management techniques depend on Engineering design and basic agronomic research. While our country has taken the lead in developing civil engineering aspect of irrigation projects research on water problems as well irrigation management have been lagging behind. There is insufficient technological basis for undertaking sound soil and water management programme and to make irrigation schedules as an essential component of package practices to be recommended to the cultivators. High priority has therefore to be given for research for collecting such information.

Conclusion :

The water use demonstrations undertaken in the package districts have brought out the lacuna in the irrigation systems in our country and the scope for enhancing agricultural production through proper water management. It has also brought out that given necessary technical and financial help, the farmers are willing to undertake improved irrigation practices on their farms. Such practices have a direct impact on increasing production as shown by the results of the demonstrations in the package districts. Aligarh is a glaring example. There is an immediate gain in production increases. Seeing the imminent profit there is a cry in these districts for assistance for land modifications for improved irrigation practices. For the new strategy in agriculture for enhancing production from low levels to high levels using higher yielding varieties and higher inputs proper use and management of irrigation water is a must and therefore, needs to be given high priority.

Dr. Bholay's address

(*Contd. from page* 3)

anathema which was in current and which has by now been completely shattered should exit from the minds of all. The Utopian thinking which we witness in many of our programmes initiated should also be avoided.

I weleome you all once again, you, experts recognised in your respective fields, to have a serious discussion on the problems faced by my breathren all over India and it is my request that our problems and hazards may be carefully considered by you in order to guide us in pursuing our vocation to profitable manner.

I thank you all for having accepted our invitation and the interest you have shown in the well-being of the farming community.

JAI HIND

Farm Revolution For Whom

Dr. Gangabhusan Panda
Ex-chairman,
Panchayat Samiti, Bargarh

The question posed above deserves serious thought. After Independence, more attention was given to Agriculture in the 1st five year plan. To that extent, the plan was successful. But in the 2nd and 3rd five year plans, agriculture was neglected and more attention was given to industries in the state sector.

It is now evident and clear that State enterprises, either industries or agriculture are utter failures. To bring the economy of the nation to a sound footing private sector should be encouraged and, the agriculture should be given prime preference.

The Centre has relatedly realised this hard truth and is now giving more attention to agriculture. Fortunately, for the nation, the scientists have come forward, to rescue the nation from bankruptcy, in inventing the high yielding cross breed seeds, suitable for local conditions. Given proper direction and help, Indian farmer has been and will be able to give bumper crop to the nation. Thus the nation can create good capital, from agriculture sector, which will go a long way to clear up the huge debts incurred by following wrong priorities in investments of the last two five year plans.

But, there are buts. The small margin of profit, which the farmer is getting for a year or two from high yielding varieties of seeds, are being sapped by the following factors.

The price of fertilisers is soring high within a very short time. In comparing corresponding world prices, fertiliser price in India is highest. One factor of price rise is excise duty. To give impetus to agriculture it should be abolished.

So also excise duty on tractors, pumping sets should go for the improvement of agriculture.

The present Central Budget levies wealth tax on agriculture lands. This will further deter the agriculturist to concentrate on farming. The marginal big agriculturists, who are keeping bare standard of living, will be forced to leave their land seek some other living. Thus talent on farming will vanish. So to give encouragement to production, this tax on land should be abolished.

In some states, such as Orissa, there is Agricultural Income Tax Act. It is quite impossible for the ordinary farmer to keep tip-top accounts as per Act & Rules. So he is being harassed by the Taxing Authorities. Further, the tax free limit in Orissa, was formerly Rs. 5000/- net which has been reduced to Rs. 3000/- in 1963-64.

In the last session of Bharat Krishak Samaj Unit of Orissa, the following Resolution was passed.

"15 Standard acres of lands should be free from Agricultural Income tax and above that the tax should be Rs. 10/- per standard acre."

If this is accepted by the Government, the farmer will be saved from unnecessary harassment from the Taxing Department and realisation of tax will be easy and can be made by the Revenue Department.

Farmers' lot

The Farmer toils day to night and if weather and luck favours him, he gets a good crop in an interval of two or three years. But he toils for what? Surely for profit. But his goods are not getting proper prices due to controls and Food Zones. There is control between State and State, there is control within each state. Thus, an artificial barrier is being raised and proper movement of foodgrains is restricted, resulting in artificial slump price in productive areas and artificial scarcity in consuming areas. The profit from food-stuff is denied to the producer. It is taken by the bureaucracy, politician and business class. Last year, there was scarcity of Food in some parts of Orissa and there was good rabi crops in another area. There was the restriction above 10 quintals of rice movement within the State. The State Government wisely raised the restriction to 50 quintals and solved the scarcity problem within a very short time. Had the state tried to solve the problem in the ordinary course of procurement and distribution through supply department, there would have been deaths and diseases in scarcity areas by the time the food have reached the consumers. Further, there would have been much corruption and profiteering by third party.

Thus, in order that the producer should get proper market price of his produce, Control and Check Gates should go inside and outside each State and India should be treated as one unit. If the Government wants to keep reserve stock for emergency, let it buy the foodstuff in the open competitive market. Let it not artificially bring the price down, resulting poverty to the producer.

In case of bumper crop, throughout the nation, let the Centre assure producer to buy the surplus on fair economic price, less of which will not be remunerative to the producer.

If the above steps are taken, I hope the Country's economic ills will be removed soon. Farmers constitute more than 75% of the population. Even the labour engaged in farming is farmer. If the lot of the land owner improves, the lot of the labour engaged in farming will naturally improve.

Role of Storage in Availability of Food

By Shri S. V. Pingale

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Foodgrains comprising cereals, millets and pulses mainly contribute to the food requirements in the country. As much as 70—80% of the food of the common man comes from the foodgrains. In planning for food needs of the increasing human population, therefore, foodgrains assume considerable significance. In this context technology is now extensively being applied to growing of foodgrains and successive bumper harvests have brightened hopes of meeting the challenge of hungry mouths. It needs to be appreciated, however, that increased production has been rendered possible at a relatively high cost and effort and any loss in either quantity or quality of the foodgrain would, therefore, mean proprotionately increased loss of finance, mangerial talent and resources. In addition, the loss would continue to widen the gap between supply and demand there by either increasing the dependence of the nation on others for food or leading to starvation of a section of the population.

Wide publicity was received by an estimate of 50% loss of the foodgrains in the course of storage and processing. A number of estimates are on record, made from time to time by scientists. All these estimates including the one of 50% suffer from the drawback that they are based on very much limited observations and made with a view to supporting the work and finding of the author. The Food and Agriculture Organization published estimates of such losses for a number of countries including India arrived as result of a survey. Losses in storage according to these estimates generally ranged between 5—10%. An expert Committee of Government of India estimates the total possible loss in storage, transport, processing, distribution etc., as 9.3%. On the basis of a production of 100 million tonnes of food-grains, a loss of about nine million tonnes is quite sizeable.

The farmer retains as much as 70% of the production on an average with him to meet the seed and feed requirements. Recently, Krishnamurthi *et-al* have furnished a good account of the storage techniques adopted by the farmer in different parts of the country. These studies have revealed that the receptacles used for storage of grains on the farm though cheap and easily available do not offer the protection required from dampness, insects and rodents. Insects and rodents are shown to take a very high toll of the grain. In almost all cases observed by them in a number of villages, grain was infested with insects. Further, a population of 7—8 rats per house was seen to be present. In case of seed storage in U.P. a loss to the extent of 20% was noticed due to insect attack alone. India is not the only country where these losses occur. This should be no reason, however, for continuing the apathy to storage problems in relation to problems of foodgrain production. As a matter of fact scientists from developed countries feel that grains from better storage of what is produced would be immediate and obtainable at a comparatively low cost and effort.

Better storage is needed not only to save on quantities but also quality. Foodgrains are expected to satisfy certain portion of the human body needs of calories, proteins, minerals and vitamins. In case the quality of the foodgrains is affected, either the concerned grain would produce illness in the consumer or will be able to meet only a part of the expected requirements thereby necessitating consumption of larger quantities. The insects, the microbes, the rats and birds that feed on grain apart from satisfying their food needs by eating away grain, leave behind in the grain their own excretary products and dead bodies. With all the advances made, it is not possible to remove these excretary products from grain once the grain is affected. Strict standards are, therefore, laid down by national governments in almost all the countries of the world prohibiting sale of food articles containing such extraneous containments beyond a very small level. The good health enjoyed by consumers in general in countries having rigid standards of this nature is a testimony to the necessity of such a measure. Indirectly, in these countries more foods are rendered available due to saving of losses caused by the pests. In India too, such standards exist. The general shortage of food and the apathy of cunsumers, however, lend support to trade in foodgrains not conforming to standards. It is less realised that by ignorance of quality aspects not only low quality foodgrains are rendered available for consumption but a sizeable quantity which is badly needed for feeding the increasing human population is allowed to be lost.

Storage involves consideration of receptacle, the quality of the grain to be placed in storage, weather and pests such as insects, rats and birds. As far as the receptacle is concerned, presently receptacles prepared of earth, dry grass, ropes, bamboo, jute bags, concrete and steel are in use. Preference in this case is generally for a material that is locally available and insignificant in cost. It is interesting to note in this connection how a farmer storing one ton of grain costing around Rs. 700/- and losing on an average at the rate of 5% Rs. 35/- due to loss of the grain,

will not be prepared to spend even Rs. 35/- on a receptacle. As a matter of fact the justification for a much larger investment on receptacles to enable saving nation's food is being gradually realised by a few only now.

Scientifically, a receptacle that can be air-tight and avoid development of temperature gradients is to be preferred. In addition it has to be rat, bird and moisture proof. A cement concrete structure is rat, bird and even moisture proof but not air-tight unless rendered so by special treatment. A PVC or Polythene structure is sufficiently air-tight but is not rat-proof. A steel or aluminium structure, however, can staisfy all the requirements but will also enable built-up of temperature gradient particularly under conditions of weather extremes. It has been possible to overcome this drawback of the metal receptacles by provision of an internal air-duct. Metal receptacles are necessarily to be fabricated in a workshop and this makes it easy to maintain a quality control and further, this also renders these receptacles suitable for supply under a central credit facility. Promotion of the use of either steel or aluminium receptacles of different capacities was initiated in the country towards the beginning of 1968 and steel bins of different capacities have been set up at a number of centres in U.P. and Andhra Pradesh. These bins are in use with the farmers and increasing demand for them suggests their utility in the present circumstances. For capacities upto 10 tonnes, steel bins with aeration, grain lifting and self-emptying facilities cost around Rs. 200/- per ton. Considreing a minimum life of 20 years this cost amounts to Rs. 10/- per ton which is a fraction the loss suffered annually.

Research has shown that deterioration once started in the grain can only be minimised but cannot be stopped entirely. Initial quality of the grain to be placed in storage assumes significance in this context. Deterioration can be a result of either intrinsic, extrensic or both intrinsic and extrensic causes. Main factors that lead to damage are moisture content of the grain and environment in which grain are held, temperature, admixture present either of varieties of the same grain or other grains and of foreign matter, weed seeds, etc., and mechanical injury.

As far as moisture content is concerned, grains harvested during the dry hot period of the year carry a moisture load of less than 11% and, therefore, no problem is posed by these grains. Kharif harvests of grains like rice, maize, bajra etc., carry a moisture generally in excess 13%, sometimes going as high as 18-20%. Traditionally, the portion retained by the farmer used to be well dried before storage. Multi-cropping pattern, however, leaves no time now for carrying out post-harvest operation such as cleaning, drying etc. and the tendency therefore, is more towards placing these harvests in storage as quickly as possible after removal from the field. Simple mechanical arrangements need to be fitted to metal receptacles to protect high moisture grain from deterioration in the changed circumstances and make the multi-cropping pattern a success.

Admixtures change the physical characteristics of the grain mass in proportion to the extent and type of admixture. A grain mass that is uniform in size, colour and variety and clean to the extent possible will have the longest storability. This aspect of the effect of admixtures is generally less appreciated and when deterioration sets in some measures are taken but these measures invariably fail to give complete satisfaction on account of the basic aspect of quality having remained neglected.

Weather, particularly the temperature and humidity affect the storability in a number of ways. Higher humidities increase the moisture in the grain. Humidity and temperature further, as these move upward, accelerate the microbial and insect activities. Biological activity of the grain is also accelerated by humidity and temperature. On this account, storage is rendered relatively difficult in coastal areas where both humidity and temperature continue to be high. In the interior areas though temperature is high for some part of the year, this is not associated with increase in humidity and, therefore, long storage in such areas having extremes of temperatures but low humidities is easy. Employment of technology enables changing the environment of the storage place to suit the grain placed in it and the techniques involved being simple and harmless can be adopted without much difficulty. Automatic or forced aeration, temperature detection and assessment of moisture content as required are the techniques that facilitate long storage and loss-free storage in spite, to a large extent, of the weather. Enough know-how is now available in the country for these techniques and cost for their adoption is not high as is generally supposed to be.

Insects invariable occur in the grain stored on the farms and there is a tendency, therefore, to consider them a natural constituent of grain. Grain catches infestation either at the time of harvest, on the threshing yard, during transport or in storage through residual infestations occurring at these places. A number of different types of flying and non-flying insects attack grain to find food and shelter. Once in a grain mass, they ensure building up of weather conditions to suit their requirements and with favourable temperature and moisture, a well-protected shelter and ample food multiply very fast bringing about as a result a reduction in quantity, deterioration in quality and a residue that is capable of causing harmful effects on the consumer of affected grain. The injurious effects of insect attack on grain are now well realised and on this account, great care is exercised in a number of countries in this regard. In India food standards under Pure Food Act lay down a maximum limit for insect damage and prohibit sale of food-grains carrying live infestation and kernel damage beyond 10%. Fumigation of grain is the simplest and cheapest remedy to prevent damage by insects. For use on farm glass ampules containing requisite amount of fumigant are readily available in the country and their extensive use over last 10 years have shown how successful their use can be. Cost of fumigation amounts to lower than 0.25% of the cost of grain but the

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Farm Management—Its Importance

By Mr. J. M. Holcomb
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The Ford Foundation, New Delhi

I am grateful to you for inviting me to speak to you today on the subject "Farm Management—Its Importance". Why should you, as farmers, research workers, teachers, extension workers and policy makers be concerned with this subject?

Because—1. Superior management of farming units should result in an increase of total food and fibre production in any nation. We are in the early stages of a "Green Revolution", but much more food will be needed in the future to feed increasing population, for stockpiling and for export purposes.

2. Superior management should also result in more effective and efficient use of resources, particularly soil, water and capital resources. Soil erosion, either wind or water, often the result of poor farm management, reduces the yield potential of our soils. If erosin is severe enough, it will result in areas going completely out of production.

In many, many parts of India there is enough rainfall to produce two, or more, crops per year and yet in many of these areas only one crop is being produced. We need to materially improve the management of our water resources to increase further crop production.

3. We need to increase both the profits and savings of the farmer. He needs profits: (1) to stay in business, (2) to purchase inputs, (3) to support his family, and (4) for savings. And savings are necessary to buy capital goods if an economy is to move forward.

I have spent most of my adult life in the field of farm management. I have worked with farmers as a teacher, as a researcher and as an extension worker. I have been a private agricultural consultant to farm operators, farm owners, agri-business firms, commercial banks and cooperatives. I have been a farmer too. I have seen many changes in agriculture in my own country since the mid-twenties. Farming in my country during this 40-year period has changed from a way of life to a business. We, like you, have seen, and still are seeing, many changes in technology which require higher management skills.

When I started to farm I purchased only two inputs and these were for the threshing of food-grains and the shelling of corn (maize). Today on a corn belt farm in Central Illinois cash inputs acre of corn may reach $100, whereas 40 years ago when farming was a way of life, the cash inputs were less than $5.00 per acre! Cash inputs for producing crops in India, especially in the High Yielding Varieties Program are increasing rapidly. For example, Singh and Sharma Agricultural Economists at UPAU, Pant Nagar, in their "Mechanics of Farm Budgeting" have budgeted direct expenses for the production of one acre of paddy using an improved variety, as Rs. 282.75. The direct expenses for producing one acre of a traditional variety probably would have been Rs. 125 or less.

Increased use of rupees

The farmer considering switching from traditional to improved varieties obviously hopes to increase his profit per acre or he would not change his farming program. If he did not think so, he would not be willing to incur the additional costs.

The magnitude of his problems of acquisition and use of capital increases. This is true whether he uses his own or borrowed capital. He buys more inputs and his sales increase. In other words, he handles more money. As he uses more capital in his business his management problems increase. Where and how to acquire adequate capital in any country is a problem. In India it is especially difficult. Cooperatives have limited amounts to loan. Money lenders charge high rates of interest. Commercial banks are only in the early stages of providing adequate credit to farmers.

Three "Rs." of credit

The farm manager, when borrowing money, just as the lender when extending credit, should thoroughly understand the three "Rs." of credit use. *Returns*, *Repayments* and *Risk*. Credit should be used, for production purposes, only when it will make a profit. Repayment capacity, funds available for repaying debts as they become due, depends on profit, less living expenses, capital purchases and savings. Risk, when borrowing money, increases as owner equity in the farm business decreases. All three of these "Rs." need to be understood by the farmer, who uses borrowed funds if he is to be successful.

Financial management

To manage rupees wisely, be they used for operating expenses or capital investments, requires the use of at least three basic tools (1) budgets (2) cash flows, and (3) financial records, and the proper use of these tools requires a high degree management ability. Several alternatives should

be explored, using partial budgets, before contemplated changes are made in a farming program. Using some paper and a pencil, plus reliable, reasonable, and realistic input-output figures, in budgeting may mean the difference between success or failure as a farm manager. Following partial budgeting to compare alternatives, a complete farm budget should be prepared to estimate the outcome of the proposed farm plan. Next a flow of cash should be projected for each month of the entire farming year. With these carefully prepared complete annual cash flow projections the farmer and his lender will be able to predict for an entire year when capital will need to be borrowed, and in what amounts, as well as when repayments can be made and in what amounts. If all funds requested by the borrower are not approved by the lender the borrower should then revise his plans in such a way as to make optimum use of those funds that will be available to him.

Complete and accurate financial operating records will indicate to the farm manager the profit, or loss, in the business. A three to five year history will assist him materially in determining his repayment capacity. His records will help find both strong and weak points in his business.

Annual net worth statements will enable him to measure financial growth, or lack of it, in his business and assist both him and his lender measure his risk bearing ability.

Based on 40 years of experience in farm management and agricultural finance I believe that there is a close correlation between farm management ability and the farmer's ability to plan, budget, keep and use farm financial records.

Risks

Risks, including weather, insects, diseases and fluctuating prices, tend to increase as the farming operation becomes more specialized and cash inputs into the operation increase. The farmer faces "new" risks as well as increased risks. It is exceedingly important for him to anticipate these risks and do everything that he can to reduce them. Reducing them may be accomplished in part by his having a thorough understanding of the technology of production. For example, producing disease resistant crop varieties will reduce the risk of disease. Spraying crops at the proper time may mean the difference between saving and losing the crop. Providing water to a crop in the proper amount and at the proper time may mean the difference between profit or loss from producing the crop. Other risks must also be dealt with. Contracting a crop and/or a sound marketing program will reduce the risk of taking a low price for it. The risk of marketing perishable commodities such as vegetables, fruits and potatoes should be dealt with in advance of marketing dates. Yes, even before the crops are planted. This is all a part of successful farm management.

Changes increase management problems

When the farmer changes from traditional to commercial farming he faces a whole "new set" of management problems. He assumes more risk. He must find the additional operating capital needed and have it available when he needs it. He must find the additional inputs he needs to successfully implement change. He must find a market for the additional production and be able to deliver the crop to that market. These are but a few of the "new" problems for which the farmer must find solutions. A change involving only one crop illustrates rather clearly the need for improved farm management. Once the grower has decided to grow an improved crop variety he has many more decisions to make. Decision such as (1) what variety of seed to buy ? (2) what amount and what analysis of fertilizer to apply ? (3) what amounts and kinds of chemicals to apply ? , and (4) how much water and when to apply it ? If these decisions seem to be difficult to make, they are :

As additional crops are included, crops in addition to paddy during the same crop season, the management problems become even more complex. Now the farmer, assuming his major objectives are maximizing his income as well as feeding his family is faced with many, many more alternatives. He must decide what crop and how much of each crop to grow. Decisions which may seriously affect his gross production of Foodgrains so vitally needed for human food and his own net returns. Farmers who do not, or cannot, adjust their farm organisation to changing conditions, will find that agriculture is not a profitable proposition for them.

Planning and Management

The farm firm, just as any economic firm, is made up of four basic resources (1) land, (2) labour, (3) capital, and (4) management. The manner in which these resources are combined usually reflect in both the short and long-term income of the farm.

Let us assume that we have two farms with identical soils and identical amounts of water available. One of these farms shows a profit of Rs. 500 per acre and the other Rs. 100 per acre. Here we have assumed land and water resources to be equal and yet one farm yields a net profit of 500% more per acre than the other ! This great difference may be due to many things, but may well be due to the improper use of available resources. Inadequate labour, either in quantity or in quality may be a major reason for the difference. A shortage of working capital may be another reason. The management of the high income farm may be strong whereas the management of the lower income farm may be weak. The two managers differ greatly in their ability to maximize the use of resources available to them. One understands that an improved crop variety requires more fertilizer, of a given analysis, to produce to its potential than the traditional variety requires. The other operator does not realize this and hence makes very little net profit per acre. One may be short of high quality labour at critical times and hence greatly reduces his yield potential. One may not plan and budget his operation adequately

and does not have sufficient working capital available when he needs it. These are but a few reasons why one farmer exceeds the profit per acre of the other on identical soils, by 500%.

Let us now direct our attention to a farm firm producing multiple crops. Two or more crops on this farm are produced on the same land during the same year. The farmer now in addition to deciding how much to invest in seed, in fertilizer, pesticides for one crop must make decisions on what crops to grow and how much of each crop, how much to spend on fertilizers, seeds and pesticides for all crops, the most profitable mix of crop for one season and the most profitable mix for the entire year.

A study by Singh and Pandey illustrates how the changing of the crop mix on a 27 acre farm in Utter Pradesh increased both food crops and net profit. The net income from the farm for 1964-65 was Rs. 15,273. Two years later, 1966-67, following the development of an optimum farm plan the actual net farm income was Rs. 41,669. This is an increase of nearly 173% in total income or an increase of Rs. 611 net income per tillable acre.

During the 1964-65 year there were eleven crops produced. During the 1966-67 year there were nine crops produced. Four crops were dropped entirely. Two were added. Peddy acreage increased from four to fourteen and one-half acres, wheat increased from 10 acres to 20. In other words the "crop mix" was changed. Food crops produced increased from 178 quintals during the 1964-65 year to 387 quintals during 1966-67 year. Corpping intensity increased from 140 to 180% value of crops per acre (in Rs.) increased from *779 to 1613 ;* value of output per 100 rupees of investment in fixed capital increased from Rs. 215 to Rs.324.

One should not assume that all of these improvements were due to changing the crop mix. A part of them were, but in addition, there was good planning and good execution of plans. Both are essential in good farm management.

Summary and Conclusions

Shifts in farming programs such as illustrated above, however result in an increase in the number as well as in the magnitude of management problems that will be encountered by the farmer. His ability to anticipate these problems well in advance is an ability that all managers should strive for. "A problem well anticipated seldom occurs".

By increasing acreages of paddy and wheat, for example, labour requirements will increase—peak—at both planting and harvesting periods. How to meet these increased peak labour requirements becomes more difficult. Having the labour available at the right time is one problem. How to utilize it when not being used in planting and harvesting is another. Late planting and late harvesting often results in reduced yields. More power, either animal or machine, may be required. Making it available may be difficult because (1) it may be in short supply and/or (2) making capital available to buy it may reduce available working capital. Procuring other inputs in larger amounts may also become more difficult.

Yes, farm management problems are becoming increasingly complex as cash inputs increase and they also increase with multiple cropping. Helping the farmer find solutions to these problems should be a major objective of agricultural colleges and universities working in close collaboration with farmers, agri-business firms, state and central governments, commercial banks and cooperatives. Much problem solving research is needed. Collaborative research work involving the farm management research worker with (1) : the agronomist, (2) the animals scientist, (3) the agricultural engineer, (4) the farmer (5) the bankers and the agri-business firms. It then becomes the responsibility of the teacher and the extension worker to interpret these research findings to the farmer or manager. The jobs of the farm manager are becoming so complex that these require the efforts of many people and many disciplines to aid in their solution.

Role of Storage . . .

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savings rendered possible are many times this cost.

In this connection it needs to be remembered that treatment of grain with any insecticide is fraught with man dangers than the remedy. Every insecticide is injurious to human consumers of grain, the magnitude varying with the chemical used. Some of the chemicals produce immediate ill effects whereas, some affect the health of man over a very long period. Mixing of insecticides other than fumigants which vapourise and leave no injurious residue behind is, therefore, not allowed under the provisions of the Pure Food Act or commonly known as Prevention of Food Adulteration Act.

Rats that cause damage to growing crops and stored grain are generally different in India. A survey in the U. P. villages has shown the population of domestic rats as 7-8 per house. This is probably the highest in the world. In Europe a rat in 7-8 houses is considered a health hazard. The type of houses, unhygienic conditions in the residential areas and plentiful supply of food facilitate built up of high populations. Storage of foodgrains in rat proof containers is a long term simplest and most effective remedy for preventing food loss through rats. In addition, use of anticoagulant or multidose raticides like ratafin and rodafarin will help not only wiping out this pest completely but also keeping the area free of it over long durations. No other raticide has given such desired results against this pest as the anticoagulant rat poisons. These have been extensively used in different parts of the country with great success. Ready availability even as ready to use material, stability, safety for higher animals and a low cost of about Rs. 5/- per house per year are added advantages of this type of raticides.

Birds particularly sparrows and pigeons though apparently lift small quantity of grain each time they visit store, in the long run, a sizeable quantity is lifted by each individual.

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FERTILISERS AND FARM REVOLUTION

By V. K. Saolapurkar and S. V. Balkundi

The Fertiliser Association of India, New Delhi-11

I am happy to get this opportunity of sharing a few thoughts with all of you. My pleasure is heightened by the fact that we have all gathered here under the aegis of the renowned Bharat Krishak Samaj. The Samaj has been rendering yeoman service to the farmers of India by contributing substantially to the development of agriculture in India.

The Samaj is to be complimented for organising a comphrensive seminar on the subject of 'Farm Revolution.' A better setting for an exchange of views between scientists and farmers on this important topic could not have been provided than this splendid exhibition attractively displaying the recent advances made in India in different disciplines of agriculture.

Agriculture in India, particularly the cultivation of food crops has undergone dramatic and far reaching changes in the recent past. It has been revolutionised, This welcome change in crop technology has been the result of continuous and careful planning. It may be useful to outline here briefly the recent history of the development of Indian agriculture.

A beginning in the direction of intensive farming, which has now become somewhat widespread, was made in the late fifties. Progressive and educated farmers as well as planners and administrators began to appreciate the role of fertilsers in increasing crop yields quickly and especially their value as a lead practice which, when adopted, would also encourage the farmers to take to other improved practices of cultivation. Use of fertilisers was then taken up on a more extensive scale than had been the case in the past. As a result of this, the yields of crops increased substantially, at least in pockets.

Need of Inputs

However, it was soon realised that the benefits from fertiliser use could be maximised if it was applied in combination with other inputs like good seed of an improved variety, improved cultural practices, adequate supply of water and plant protection measures. This thinking led to the evolution of the 'package of practices' concept and it is well known that this idea was introduced first on a large scale in the form a 'package programme' in 1961 and then, after it has been successfully operated for three years, it was extended over larger areas under the 'Intensive Agricultural Areas' programme.

These two programmes did create an awareness in the minds of farmers of the benefits of improved agricultural practices and thereby helped in boosting further the yields of crops. Nevertheless, it was seen that the varieties of food crops, improved and good yielding though they were, were inefficient users of heavy doses of fertilisers. Beyond certain limits, application of nitrogen brought about negative effects by way of weak tall stumps of plants susceptible to lodging and disease and pest attack. In order to get more yields than our improved varieties could provide, it became necessary to introduce high yielding varieties capable of utilising higher doses of fertilisers efficiently.

High Yielding Varieties

The most significant development of Indian Agriculture took place when we adopted the High Yielding Varieties Programme on a massive scale by using imported varieties of rice and wheat and indigenously developed hybrids of maize, *jowar* and *bajra*. The success achieved by these varieties so far is remarkable considering the fact that at least in the case of rice the varieties were introduced with only limited background knowledge and trials under Indian conditions. The succeess of this programme in the 1968-69 season which has just ended is particularly significant. The rain-fall distribution in this year was not so favourable as in 1967-68 and drought was experienced over large areas in some States. However, the loss of yield in such areas has been more than compensated by the higher average yields obtained in the other areas and we have been able to harvest almost the same overall yield as in 1967-68.

The most significant contribution of this programme has been, apart from further popularising the package approach, the spreading of better farm management practices. Without up-to-date management techniques these varieties do not prove themselves as heavy yielders. This has, therefore, more or less compelled farmers to be precise in basal cultivation, sowing, intercultural practices and harvesting.

The willingness and enthusiasm with which farmers have taken up this programme, especially the use of good seed and adequate dose of fertilisers, is to be lauded. If this tempo is kept up and there is no reason why it should not be – then it would be reasonable to expect that within the next ten years over 90 per cent of the cultivators will be actually practising the modern crop technology.

Small Farmers be encouraged

To ensure that this expectation becomes a reality, special efforts seem necessary to popularise the improved agricultural practices among small farmers with holdings of one to two hectares and having very limited resources for investment in the agricultural inputs. By and large, progressive farmers in India are largely also well-to-do farmers

with large holdings. If modern farming is popularised amongst small cultivators, it will therefore also help in narrowing the gap between rich farmers and poor farmers.

Perhaps the best way of popularising modern farming amongst small farmers will be to present them with small kits containing all the inputs required to sow an area of 500 sq. meters together with a ready guide written in the local language and explaining clearly the steps to be taken at each stage of the crop's growth. I might mention that this practice has been just recently introduced by the International Rice Research Institute in Philippines in cooperation with the College of Agriculture and the fertiliser Industry in that county. The mini-kit, as it is called, is strictly meant for the farmers with small holdings and we can also follow the same pattern in India. I feel that the Bharat Krishak Samaj, in collaboration with scientific institutions and agro-industries, can very well take up this programme of developing and popularising 'mini-kits'. Not only has it direct contacts with the farmers; it also has branches in all the States of India. The Fertiliser Association will be glad to cooperate in this project in any way it can. I hope the National Seeds Corporation and the Pesticides Association of India also will come forward to assist the the Samaj in this important step. Whenever, irrigation facilities are available, accent in these mini-kits should naturally be on multiple or relay cropping. It has been experienced both on the farms of the Indian Agricultural Research Institute, New Delhi and also on the farms of cultivators in villages around Delhi that if four crops of *baishakhi moong*, maize potato and wheat are taken in one year, profits as h igh as Rs. 4,000 per hectare could be made. This means that a family of five can convert even a small holding of one hectare (2.47 acres) into an economic one.

Mini Kits

The effort involved in developing 'mini-kits' is tremendous, particularly when we note that different kits will have to be developed for each class of crops such as cereals, oilseeds, pulses, vegetables, commercial crops, etc., 'Mini-kits' will help us in emphasising the importance of increasing yields of oilseeds, pulses and vegetables all of which have an important place in our diet.

In a way development of these mini-kits will also help us in increasing the fact that the package of-practices should be different for different class of farmers. The package of practices recommended for a progressive farmer aspiring to push up his average yield from 40 Q. per hectare to 60 Q. surely be different from the package needed by a farmer whose present yields are but 10 Q/ha and whe can aspire in the first place to push them to only 20 Q/ha. This fact has been recognised and practised in the United States of America and will constitute an advance when we adopt it.

While the importance of the package approach can thus be brought out, it will be worthwhile in the meantime also to popularise individual inputs of this package. I can not speak with authority on popularising use of good seed and plant protection measures. I shall therefore confine myself only to fertiliser use and how best to spread it.

As you know, farmers in India have become aware of the good effects of fertilisers on crop yields. However this is just the beginning. We will have made real progress only when most of the farmers know how to use the fertilisers efficiently.

Choice of Fertilisers

Among the steps which could be taken to popularise efficient use of fertilisers, dissemination of popular non-technical literature containing fertiliser recommendations for crops grown in the area is important. The fertiliser recommendations consist of the quantities of different nutrients to be applied to each crop and the time and method of their application. These are evolved by the State Departments of Agriculture in each State and by the Central Institutes in the case of Union Territories. Some of the States hold periodic fertiliser workshops where scientists, administrators and the representatives of the fertilizer industry discuss the recent results of research on fertiliser use and modify the fertiliser recommendations accordingly.

The Fertilizer Association of India publishes annually up-to-date fertiliser recommendations for each State in its book "Fertiliser Statistics". However, this book has a limited circulation and does not reach many farmers. We are now thinking of publishing separately a booklet giving fertiliser recommendations for each State. Even if this is done, it may not be possible to print a larger number of copies in different languages due to paucity of funds. I wonder whether it would be possible for the Samaj to collaborate with Fertiliser Association and take up this work on a State-wise basis. This will help in popularising fertiliser use among common farmers. Perhaps similar literature on plant protection measures and improved varieties could also be prepared and distributed on a mass scale.

In conclusion, I wish to assure the farmers that as in the Bharat Krishak Samaj, they have a friend in the Fertiliser Association which will be happy to help them in promoting their economic welfare.

Role of Storage . . .

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With availability of food easily further they multiply fast and to that extent the loss to grain continues to mount. Keeping grain in bird proof containers is the sure and cheap remedy.

It can be stated in conclusion that technology of grain storage is fairly well developed and in the context of the progress made by agricultural technology, adoption of grain technology is inevitable. In case the process is accelerated a large quantity of food (about nine million tonnes) can be rendered available for human feeding in addition to what is available now. The fears that better storage means only huge silos with sophisticated arrangements involving sizeable investment are illfounded, Scientific modern storage on the farm can be very simple, easy of operation by uneducated agriculturists and relatively economical in relation to prevalent methods.

Farm Revolution Through The Agricultural Universities

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&

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While talking about the "Farm Revolution" one may recall one of the old slongans "We must educate our masters" which was raised when the British Govt. became conscious for the first time of its responsibility for educating its masses in the middle of 19th century after realizing the fact that the grant of vote to the people does not automatically result in the improvement of their standard. It was about a century back when in Englnad the social conditions were deplorable and the great political reforms of 1867 were in the offing, and which later revolutionized their society.

What is Revolution:

Thus the word "Revolution" necessarily implies a change—rather a "social change" which refers to the development of different and new meanings and values or the substitution of new ones for old, involving changes in the characteristic behaviour pattern of society. And it is only a truism to say that change is the law of nature. "The only thing constant in nature" says an Urdu poet, "is change itself. It is in the nature of man to stick to the past. If he can not stick to it in practice he clings to it in imagination. This is the derogatory tendency which hinders progress. We look for inspiration to the past and its achievements. But the elements of decay lie closer to things which have approached perfection in the form of poise, lethargy and ease, which eat up the vitals of society. Lest it should be so, nature has devised the law of change.

What it ought to be for Us:

In our own country we look back with administration on the Aryan ages adorning great achievements to their credit. We learn from the epics how advanced their culture and civilization was. When others were still at the stone age they cultivated fields, and gardens and reared cattle. So much so was the perfection attained in agricultural production by them that we hear of milk and butter literally flowing through the streams. But constantancy was not the thing that nature would bestow even upon the most perfect, and therefore we are here at cross roads passing through the ages we have passed. Change has made us to see this all; and the same is the consoling thought for us that the evils too do not persist. Change is a cyclic process. We had the brightest start, a bitter past, but are confident of a bright futrure—by the same law of nature. The old order changeth yielding place to new.

Problems:

After centuries of foreign domination and exploiation we became a free nation free for the first time to plan for our own improvement. Nothing for the development of Indian agriculture was done before independence. It is only since independence that carefully planned, large—scale programme of improving agriculture was launched at the beginning of the last decade.

The problems facing this young democracy are many and great. We have to provide work for the teeming millions and produce goods so badly needed by the people. Transportation and communication must be made efficient and improved. Irrigation and drinking water and eletricity be furnished to all Health and medical services be multiplied and epidemics be eradicated. Schools be built at all levels and teacher's be trained to literate the people. These needs are great, but there is one need basic, most urgent and greatest of all –sufficient food to feed all the people, a full, wholesome and balanced diet.

Magnitude and Complexity of the Problem:

Development of agriculture in India is not only a complex process, but is also one of enormous magnitude. Farming as an occupation is loosely organized. Its geographical spread is almost an extensive as the country itself. There is an enormous diversity in farming due to variations in natural conditions necessitating varied cultural patterns.

The problems of agricultural production and the rate of growth in the agriculture have been worrying all since long. Despite considerable investment of resources in farming, irrigation and agro-industries during the three five year plans, the output has not been upto expectations. The fact that how important agriculture is in the Indian economy is brought out by the point that we, nowadays; are having a plan holiday just because the trend of agricultural production during 1965-67 has been reversed disturbing whole of the economy. During the first two plans we had about 4.25% increase per

year i.e. about 45% increase in agriculture production but the productivity of farms has increased only by about 20%. But during the third plan the agricultural production has gone down by 7.4% i.e. @ 1.1% per year. During all these years productivity of foodgrain has increased on an average @ 2.6% per year whereas that of non-food produces which are mainly the industrial raw material has increased only at a rate of 2.5% per year. The increase during the first two plans was just enough to feed the increasing population and not more. Therefore, when the production went down whole of the economy was disturbed, spiralling up the prices of all the essental commodities.

Problems of producing sufficient food and agricultural out-put are varied and many. We have only 5% (35% of the 8.3 mil. acres) of the worlds' Cultivated area. The intensity of population came to about 800 per square mile cultivated land giving about 0.9 acres farm land per capita. The present Indian diet is poor and inadequate giving only about 1683 calories as against needed 2600 calories per day for vigorous health. Our per acre yields are one of the lowest in the world. The same is the plight of production per unit animal.

Thus the conclusion is clear; the gap between needs of foodgrains and the supplies as indicated by the production trends had been growing wider. Relatively favourable reasons did have their impact but failed to reach the targets. Whatever the increase in agricultural production during last years, that has been made possible by the constant untiring efforts of hundreds of scientists and the sons of the soil working in teaching, research and extension of agricultural technology in the agricultural institutions, a whole complex of which has come in to being particularly during last one decade all over the country. In order to achieve the required foodgrain and agricultural production the targets rate of production increrse must average 8.2% per year or above. This compares with an annual average of 2.6% per year thus far. The task is over whelming.

What Can be Done to Increase Agricultural Production:

Apart from the complexity and size of the task it has an element of urgency; the sense of which has steadily grown since independence. What was done before independence was not enough. Therefore, drastic changes in the Agricultural production technology have become necessary to meet the challenge. We believe this could be most appropriately done by vigorous and constant efforts over a period of years. The alternatives before us are:

1. Increase in cropped area, including expansion to multiple cropping of 30 million acres, which alone would increase food production by 3.4 million tons per crop per year.

2. Provision of irrigation facilities to 40 million acres with a resultant increase of 6.9 million tons of food.

3. Improvement in methods of crop culture including soil preparation, healthy seeds, better varieties, use of fertilizers and organic manures, plant protection measures, improved farm implements and soil and water management practices to boost production by 10.3 million tons.

Adoption of all these three methods to increase agricultural production is possible but with a certain limitations. The cultivable area may be expanded but within a few years all cultivable land could have been under the plough. Irrigation too can be extended but again within a few years all possible sources of irrigation would have been utilized.

Then the only method by which agricultural production can always be increased and the lot of the tillers can be improved is the application of the improved scientific methods developed by research workers and proved by trials. The development and flow of new scientific discoveries in factors of agricultural production would never end so long man becomes perfect or otherwise.

The Responsibilities

Thus the hope for ever increasing Agricultural production for all years to come rests largely on the most rewarding factors of production in the form of technical know-how arising out of constant search and research.

This technical know-how must be scientifically valued, practically adoptable under field conditions, comparatively profitable over existing practices, and substantially rewarding enough to make an impact. This becomes the responsibility of research workers to develop ever never and more efficient technical know-how of crop production.

Such valid, practical, and profitable knowledge is of no good if it is merely accumulated in papers and libraries. It has to be put to use and propogated. One method of propogating it is to prepare better students in agriculture by teaching most efficient methods of farming through formal course instruction to young men to prepare them for further research, teaching or extension of knowledge. This is the responsibility of colleges of agriculture and allied faculties.

The other method of utilization of this knowledge is through the extension of this information to the 60 million farm families living in more than half a million villages who actually are to put the new knowledge to practice for the benefit of all. Best utilization of the increasing knowledge occur when the barriers to it are removed. This becomes the responsibility of an extension organization who have to shoulder the great dual responsibility of constantly teaching the new scientific knowledge to the farmers and feeding back to the researchers with the problems faced by the farmers in putting the knowledge to use.

Therefore, drastic changes have become necessary to meet the new needs. This is most keenly felt in the institutions dealing with agricultural research, education and its extension. Institutions and procedures, developed decades ago and oriented to the needs of pre-independence days can not meet the challenges of the present day.

Some basic Principles Underlying Change :

Public education is the basis of all progress. This is no less true

of agriculture than it is of other sectors of economy.

Education to be most productive must be based on the needs of the country and developed with a clear understanding of the objectives to be achieved.

Greatly increased agricultural production is an absolute necessity and most out standing problem of India. Therefore, all agricultural education from primary grades to the University level should be so organized as to make maximum contribution towards increasing agricultural production. The educational process should produce specialists who have a clear understanding of all aspects of agriculture and the place of their specialization & contribution expected of them in the field.

Agricultural education must be based on need-oriented research where in facts are the hallmarks. The facts of present day agricultural technology must be translated into action and constant search must be made to discover new facts so that Indian agriculture in all its aspects may continue to progress.

To ensure this progress we, tried from time to time to develop a well defined pattern of agricultural education in our country so that each part of it has a special function to perform, and each is complimentary to the whole.

The new Emerges from the OLD

When India attained independence in 1947, there were 17 agricultural and Veterinary colleges. While these colleges were largely responsible for training agricultural graduates, the Deptts. of Agriculture exectued the programmes of research and extension. The relationship between agricultural colleges and State Deptts of Agriculture was not close cnough to ensure maximum utilization of research findings in extension.

Higher agricultural education was extremely costly neverthless a large number of new agricultural colleges sprang up during early post independence period. This rapid multiplication of agricuitural colleges affiliated to traditional Universities inspite of inadequate financial support led to a certain degree in the sliding down in standards of education and soon became a serious problem. Accordingly the pace of progress remained slow and the production technology could not keep pace with the fast changing requirements of our agriculture.

Moreover, this expansion took place along traditional pattern which was not need oriented for economic progress and change that was overtaking the country. It was soon realized that both the system of agricultural education as well as the set up of their institutions needed to be reorganized to serve as effective vehicles of agricultural progress and development.

Recognizing the weakness of the then existing agricultural education system and the need for linking programmes of agricultural education closely with prodnction the University Education Commission (1948), headed by Dr. S, Radhakrishnan suggested the establishment of rural Universities. The commission pointed out the necessity for modifications in our educational system. It therefore, suggested far reaching institutional changes leading to the establishment of "Rural Universities".

The concept was further elaborated and the birth of the idea of agricultural Universities can be traced back to the First Joint Indo-American Team which was set up on the advice of Dr. Frank W. Parker, formerly T.C.M. adviser to the Minister of Food & Agricnlture, Govt. of India. The report submitted by the Team in Sept., 1955, laid the foundation of scheme the immediate result of which was the expansion of Extension section of the I.C.A.R. and its consolidation into a separate wing under Extension Commissioner. The most important landmark in agricultural education was the establishment of the first Agricultural University in India at Pantnagar (Rudrapur) in 1960 on the recommendation of this team for setting up of such University which based on the blueprint on Agricultural Universities prepared by Dean D.W. Hannah in 1956.

The second joint Indo-American Team was appointed in 1959 to evaluate our progress pertaining to Agriculture. Education Research and Extension and make new recommendations as deemed essential by it. The team submitted its report on July 11, 1960 and recorded the widespread demand for the establishment of agricultural Universities in different states and recommended that these should be established only if the following basic principles are adhered to such as : (1) autonomous status, (2) location of Agricultural, Veterinary & Animal Husbandry, Home Science, Technological and Science Colleges on the same campus, (3) integration of teaching by offering courses in these institutions, and (4) integration of education, research and extension.

In 1961 the Govt. of India accepted the need for a few more such Universities and since then nine Agricultural Universities have come into existence in the states of U.P., Punjab, Rajasthan, Mysore, A.P., Orissa, Maharashtra, M.P. and West Bengal.

In 1960 the Govt. of India appointed a committee headed by Dr. Ralph W. Cummings to advise on the legislation for establishing such Agriculture Universities. The main idea was that the new Agricultural Universities should have the essential features that characterise the system and that they have a uniform base to carry over the functions with which they were charged. The report published in 1962, spelled out the distinctive features of such Universities and provided guide lines for their development. To these and many other bodies we owe the Agricultural Universities of India.

If the recent recommendation of Dr. Kothari's Education Commission are accepted, each of the state in the country will soon have one Agricultural University with a statewide jurisdiction for teaching Research & Extension education.

Agricultural Universities are thus an outgrowth of our own institutions. They have been conceived and developed to meet situations never before confronted by the nation. Their role is to serve as

new instruments to meet new demands.

Their essential purpose is to supplement and complement existing institutions; to take over where the old institutions leave off; and to answer those calls that institutions of the past were not designed to answer.

They have been influenced by ideas and experiences from elsewhere in the world, in the same manner as our educational organisation, our agricultural administration and our system of government have been influenced.

Features of Agricultural Universities:

Summarily the distinctive features of Agricultural University as envisaged by the Cummings Committee are as follows :

1. The Agricultural University recongizes a responsibility and is responsive to the needs of the cultivators, in contrast to being only a seat of learning and scholarship. It assumes a responsibility for working the economic development as well as the improvement of the living standard of the people of the state.

2. The teaching staff, in addition to having a responsibility for resident instruction, will also have a responsibility for applied as well fundamental research in agriculture.

Such research is not merely limited to the laboratories and experiment stations, but goes beyond, into the fields and homes of the rural people living under varied conditions in different parts of the state.

3. The curricula and the training programmes in the Agricultural Universities are modelled in a manner as to be in keeping with the needs of the state on one hand, and with aptitudes and needs of the students, on the other. Thus the curriculum is flexible covering wide ground of subjects.

4. The Chief medium through which the farmers derive the benefits of progress in Agricultural research and education under the Agricultural Universities, is the extension organization of the University which is for that purpose fully integrated with the teaching and research organizations.

This ensures a smooth and effective flow of the results of research and the benefits of the training programmes to the farm population, and in return, ensures easy transmission of the problems of the farmers to the research staff so that they are tackled promptly and effectively.

5. The territory of the Agricultural Universities in respect of agricultural and related sciences includes the entire state in keeping with the principles and responsibilities stated above.

What we aim at?

Thus the main features as envisaged by the Cummings Committee clearly bring out that the agricultural Universities should be able to develop a programme to maximise the quantity and quality of agricultural production and improve the economic status of the cultivator through teaching, research and extension.

Graduates of these Universities through its Extension Education Service should be able to provide leadership in all phases of agricultural production, marketing, processing and distribution. They should shoulder the responsibility of teaching & research at all levels.

Each Agricultural University has been envisaged to be a fully autonomous body with an integrated programme of teaching, research and extension over the jurisdiction of the whole states.

To have real impact and expected contribution in progress the knowledge gained by the students through research and learning has to be transmitted to the cultivator and put to practice. Extension services should get the education to the field working directly with those whom they want to help.

What The Reality Is ?

Thus we have a chain, improved methods developed in research are taught to students, who in turn, through extension education bring the methods into actual employment by cultivators. If one link of the chain is weak, the goals can not be attained.

As we study organisation and functioning of a agricultural research, teaching and extension in our country certain weakness become apparent :

1. Except in a few states agricultural research is managed by the State Deptt. of Agriculture, the agricultural education is under the control of traditional Universities and agricultural extension is carried out by community development organization. The three are two widely dispersed for effective interaction to achieve the goals.

2. Research workers are secluded. Their results are of value only when they are taught to the students in the class and to the farmers in the fields.

3. Research scientists have too little contact with actual farm conditions and farmers. They are too divorced from farmers' problems. If they become an extension subject matters specialist they learn of farm problems and immediate needs for researeh. Lack of integration does not give the returns and too exhaustive research on problems of little value results.

4. Research is sometimes too departmentalized so that there is lack of cooperation among research disciplines. A research scientist would be greatly benfited if there is full cooperation. Need oriented research is a team project rather than an individual responsibility.

5. Teachers without having any research or extension experience gets into a rut repeating the same course year after year. Successful teaching is something more than repetition of notes taken years back and cannot be divorced from the farms of cultivators.

6. Extension workers do not have close continual contact and guidance from college of Agriculture & research. Their knowledge becomes obsolete and they become only the agent of supplies.

It is so easy for each agency to adopt "hands off" attitude with others, developing jealousies and rivalries. This greatly lowers the effectiveness of all. This is so because in most of the states the agricultural research is largely managed by the state Deptt of Agriculture, the agricultural education is or has been under the control of the Uni-

versities, and agricultural extension is carried out by the Community Development department. The three functions have been too widely dispersed for effective interaction. Whatever coordination that exists is only an administrative supervision of the three separate agencies. It will be only through unselfish teamwork between teaching, research and extension that the sacred goals be achieved.

Integration of Research, Teaching & Extension

The three great departments of agricultural learning are the agencies that must carry the responsibility for bringing about ever increasing agricultural production. This is the central feature of the Agricultural Universities that they bring about an integration of all the three to achieve a team-work, If any of the three fail in their role, it will be as though all the three had failed. They are symbolic and only their sum total efforts can develop greater food production. Under the Agricultural Universities system their integration takes place at the level of the subject—matter departments.

In a University department men concerned with research, teaching, and extension work together as a team, every day under one department head. The new findings of research in such a situation are incorporated in class-room instruction, and into field extension work without loss of time or content. Similarly, the experience arising out of the application of research results under field conditions is fed back to research, so that further progress is made in research investigations. As the research and extension progress the class-room teaching of students is progressively improved.

Research

Under the Agricultural Universities at Agricultural Research Institutes of Experiment Stations our best scientists are working daily to learn more of the laws of nature and through an understanding of these laws, direct the processes of production to greater efficiency. Nearly all we know to day of advanced production methods was discovered and proven by research scientists through careful, painstaking study and experimentation. Research never ends as we so far have scarcely searched the surface of what can be known. Almost every day something new in the knowledge of agricultural production is discovered.

The end goal of all agriculture research in this set-up is the widespread adoption of the new process by cultivators with resultant increase in production. Thus here it is need-oriented research which the scientist by himself cannot bring about without the help of extension which feeds it with the problems faced. University researches are not simple academic. Before investing remedies all facets of the problems are studied as they exist at the farmers level. Then the problem is attacked from all aspects by a team of scientists from different disciplines of agriculture involved in the problems so that research is not repeated or duplicated by different Universities to eliminate wastage. To achieve unquestionable accuracy all critical phases of research are supervised by the expert research specialists. To utilize the services of scientists to the maximum their personnel evalution and promotions are largely based on their research competence & productivity. The research and teaching components help in adequate training for research personnel.

Teaching

The next step in team work is by the college of Agriculture under the University. To the college come each year some bright young men in the country. Here they are trained in the science of agriculture by giving them some courses in basic sciences so that they understand and appreciate at later stages the studies in all agricultural disciplines wherein they are taught the latest and most scientific methods of agricultural production. These methods are developed by research.

Thus the latest findings of research become the studies of young men in the classes, and the courses naturally become oriented to the needs of the country. The understanding that objectives of countrys' agriculture are to be achieved always remains clear before the University authorities. Simultaneously care is taken that teaching meet the requirements for both extension and research personnel. To prepare the cadre of research workers some are given specialized courses to prepare them for research and teaching. Those going for extension are given clear background of research and some other courses related to working with the masses. Thus teaching fulfils the requirements of both research & extension.

Extension :

The third step in team-work in bringing the results of research into actual practice on the land is Agricultural Extension. Students trained in colleges in the latest scientific methods in agricultural production, and methods of extension as well go to villages and through personal contacts with cultivators and all other extension methods teach the cultivators scientific methods in agricultural production and influence them to employ these. Only when scientific methods are actually employed by cultivators can the final goal of Research, Teaching and Extension and thereby that of Agricultural University is achievad.

Extension has one other very important role. Extension workers see at the first hand the problems perplexing the farmers and him, so it is his opportunity to bring to the attention of research agencies new problems facing the cultivators that can be solved only by research study.

The Extension orgrnization is the unique feature of Agricultual Universities. It makes available to farmers the practical and economic results of research and in reverse to recognize, foresee and transmit to research the practical problems of farmers. In essence the Extension Edueation carried out by Universities in bringing about the farm revolution is cooperative in character. Considering the vastness of work, the magnitude of agricultural improvement that should be rapidly brought about, and the inability of any single agency to do the job by itself, this cooperative type of work is urgent. The Agricultural Universities supplement the work of other agencies, Extension achieves its

objectives of bringing about a change in peoples knowledge and practices, through its integration with research and teaching. They have adequate staff in number & quality. While selecting the staff care is taken to see that the personnel have rural background and aptitude to work in the villages. The extension programmes are based on the needs of the people and are built around the objectives and goals set for the period. Peoples are involved in framing the programmes.

A New Orientation :

Thus the central feature of the Agricultural Universities is that they bring about an integration of three vital agricultural functions of research teaching and extension. Till the recent past all these three functions were too widely dispersed for effective interaction. Their integration was merely administrative supervision of separate agencies. Under new Agricultural University system integration takes place at the level of the subject-matter departments. As a result of team work by the three the new findings of research are incorporated in class-room instruction, and into field extension work without loss of time and content. The experiences arising out of the application of research results in extension are fed back to research enabling further progress. This progress in research and extension enriches constantly the class-room instruction. The students thus better trained and oriented provide a superior cadre for the both research and extension when they come to serve them. Thus the integration at subject—matter level is vastly superior than merely an administrative control of the three functions at state level.

Apart from this kind of integration, another important feature of the Agricultural Univeesities is the orientation and attitude that is built into the three organizations of research, teaching and extension.

Research is linked as closely as possible to the needs and problems of the farmers. Research for only academic accomplishment is not oriented to the practical needs of the state. Extension Education transmits scientific and practical knowledge in agriculture ultimately for the benefit of the farmers' community.

Achievements of Indiain Agricultual Universities :

The concept of integration of teaching, research and extension has already proved its worth through remarkable progress made in all the three fields by the new Agricultural Universities.

(1) Progress in Education (Teaching)

In the field of agricultural education through the new Agricultural Universities there is perceptible improvement in the quality of education. There are more competent teachers, better equipped libraries, laboratories and farms. They have adopted some innovations over the traditional system. Institution of "trimester" & "semester" system of course instruction and the internal examination system is geared for continuous preparation on the part of both the students and the teachers. A large number of courses is developed and offered under this system so that a student can have a choice among courses suitable to his needs. The courses are of shorter duration and do not rely upon examination system. The student is examined while taking the course and is finally evaluated on his performance not at the end but throughout the course. Both the student and the teacher are required to do a wide range of library work ; more thorough prepartion ; and more effective assimilation of subject-matter. Thus the student is better prepared.

The teacher is given a special status in Agricultural Universities. He is not only required to develop and offer courses in his field of specialization, but is also given freedom in the evaluation of students. The working conditions and incentives that are offered by these Universities to the faculty and students are providing opportunities for productive work and are fostering team spirit and a healthy change in the outlook of all the teachers, researchers and the state administration. The collaboration with U.S. Universities of these Universities aims at advanced training of University personnel at institutions of repute in the U.S.A and securing subject matter specialists for helping to raise standards of teaching and research at these institutes. The amount of responsibility and confidence placed in the teachers make a good teacher strive to be better one.

Besides improvement in quality, the new system of education has reduced the wastage in higher education. This not only saves cost but provides training opportunities for more students.

Most of the Agricultural Univerities have instituted post-graduate studies in various disciplines, This has certain advantages. It builds up an element of expectation in the aspiring students who endeavour to attain better academic standards, even at the under graduate level. It also provides the teaching staff with more fields of specialization demanded by post-graduate education. Apart from this it accomplishes additional research work as every stndent completes one research project for his degree. Most of these projects over problems, solutions of which is important for further agricultural progress. Thus it provides professional man-power to conduct urgent and important research work under export guidance of highly trained scientists.

2. Progress In Research

In the field of research considerable work has been reported from the Agricultural Universities. They are largely responsible for the development of the high-yielding varieties of wheat, maize, jowar, and bajra. Agronomic and plant-protection practices to exploit maximum yield potentials have been developed. These institutions today are serving as fountain heads of new knowledge earned through purposeful, problem-solving research. Their direct contribution to programmes like pedigree, seed-production is highly impressive. In this connection the inter-institutionnal collaboration within the country and the international collaboration with the U.S. Universities need a special mention. Agricultural Universities are participating most effectively in the execution of the various coordinated programmes of agricultural research initiated

by theIndian Council of Agricultural Research.

To quote some of the specific contributions made by the Agricultural Universities we may mention the development and release of new promising varieties which have enabled this "Farm Revolution" in recent days. The Agricultural Universities of U.P., Punjab, Andhra Pradesh and Banglore have significant contributions in the cereal improvement progammes by evolving high-yielding or hybrid varieties of dwarf wheat, maize, jowar, bajra, Bengal-gram, Nawane, Sugar cane, ragi, soybeans, etc.

The soybean projocts operating at the Pantnagar & Jabalpur, have demonstrated that a number of soybean varieties are highly adapted to these areas and the crop can be grown successfully. Introduction of sugar-beet in the eastern U.P. and Ganganagar area of Rajasthan is another example of a new crop having been adopted successfully in these region.

Work is also reported on new system of multiple cropping, development of new farm-machinery, and techniques of better farm management. Also in the field of animal sciences the technique of preserving semen in coconut milk medium has been evolved and has enabled long distance transport of semen in the states of Mysore, U.P. and Andhra. The Poultry feed projects of the Punjab Agricultural University and the University of Udaipur as well as the animal cross-breeding project of the PAI at Palampur are other noteworthy examples of rescarch work.

3. Progress in Extension Services :

The Extension organization of the agricultural Universities is its most distinctive feature. In essence, the extension work carried out by the Agricultural University is of a cooperative character. There are several agencies in the field conducting extension work in the country. Looking at the wast magnitude of the work to be done, the inability of a single agency to do the job and the easy availability and fullness of the technical know-how at its command the Agricultural Universities supplement the work of other agencies.

The Agricultural Universities are ceaselessly providing information on modern agriculture to those who need it through pamphlets, newspapers, and the radio. They disseminate latest possibilites in agriculture so that they are adopted. This is done at a level where the farmers can easily follow it, in the form of folders, leafiets, bulletins and radio-talks or discussions.

Then the Universities have Farm Advisory Service manned by extension subject-matter specialist in crop-production, plant protection, horticulture, farm-machinery and soil and water-management. They are assisted by the professional staff and research scientists. They correspond with the farmers to reply their queries and receive farmers for consultation on the campus, laboratorios and research farms. The extension staff visit the fields and villages of the farmers to guide them right there. They identify their problems and bring these back for the research investigations.

Due mainly to these Extension services unprecedented high crop yields have been reaped by the farmers. Agronomic and plant protection techniques to enable maximum yields have been effectively extended to farmer bringing about "green-revolution". The Universities have become main centres of dissemination of useful knowledge to farming community. The functional specialists have gained confidenced through experience in successfully applying scientific knowledge to the solution of practical farming. problems. They have assumed leadership in extension and their contribution in programmes like fertilizer use and National Demonstrations is highly impressive. The popularisation of new high yielding varieties by universities all over the country, in production and adoptation of new crops like soybean and sugarbeet etc., by U.P. and M.P. Universities, the Tungbhadra fertilizer use project executed by Mysore Agricultural University are some of the outstanding examples of effectiveness of Agricultural Universities in Extension services. The Mysore University took up the development of intensive farming in 10,000 acres of irrigated land under the project with the help of U.S.A I.D. and OXFOM and has been highly successful. The Punjab Agriculture University with the help of Ford Foundation, has provided much needed technical guidance to concerns in developing and manufacture of agricultural implements, such as fartilizer-cum-seed drills, threshers, water-lift pumps, sprayers and dusters. They also have taken up the programme of rural electrification and are energising tube-wells at the rate of 20,000 per year. This is a major development in the utlisation of ground water.

In the field of training the personnel, some of the best trainings are offered by the Agricultural Universities. Farmer'Training Centres, Extension officials and workers trainings. Applied Nutrition trainings, Bakers trainings, Food, vegetable and fruit preservation trainings in-service trainings for field staff etc., are being organized by these Universities.

Thus the extension organisations of the Agricultural Universities contribute much towards improving agriculture by providing specific technical information ; by illustrating more effective way of conducting extension work for achieving greater results ; and by training the extension personnel thereby improving their technical competence.

Serving the Nation

Thus the Agricultural Universities are playing a leading role in transforming the Indian agriculture and thereby bringing about the Farm Revolution "through agricultural research, agricultural education and agricultural extension".

In the words of James A. Perkins, 'The acquistion of knowledge is the mission of research ; the transmission of knowledge is the mission of public service'.

The Agricultural Universities are just doing the same. It constantly acquires a new and practical knowledge in agriculture ; provides more purposeful and up-to date education enriched by latest innovations to the students and strives to see that the

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The Role of Farmers' Training in Increasing Agricultural Production

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No one will disagree that as agriculture modernises, farmers need to learn new ways of doing things related to farming. However, in a developing and changing situation it is frequently difficult to decide what it is that farmers need to know and learn and to provide adequate means for them to learn. The answer to these questions rests, at least partially, in a better understanding about the complex process of agricultural development. Let us, therefore, deviate from the main topic for a few minutes and examine through a picture story some of the key factors affecting agricultural development.

Agricultural Development Process

Agricultural development is a complex process because so many different conditions have to be created or modified, by different persons and groups of people. We are frequently misled by the greater success of a few farmers into thinking the task of development is easier than it is. Examples that stand out usually are due to a combination of especially favourable circumstances and to a farmer of exceptional skill. It is foolish to think that thousands of other farmers lack only the will to get similar results on their own farms. That certainly is needed. But it will never be possible for every farmer to be located on the best land, with the greatest access to markets and farm supplies and equipment. Nor is it possible for every farmer to have the highest skill. There always will be differences in farming ability as well as in agricultural resources. One of the main tasks in agricultural development is to find ways of farming that farmers of typical ability can use effectively if only they will learn a little more and develop somewhat better skill. Another is to find more productive uses for farms of only moderate productivity alongwith practicable means of increasing the land's fertility. Other tasks are to create resourses of education, farm supplies, credit and market outlets that make it not too difficult for all farmers who are willing to work at it to raise the productivity of their farms.

The first part of our picture story is to recognise that agricultural development is a process, that it takes place overtime, that it is influenced by several factors, and that it does not just involve the techniques of production. Too frequently we fall into the error of seizing on one or another single activity or type of program as being a panacea for all the ills of agricultures. On the other hand a catalogue of *all* the factors affecting agricultural productivity can lead to such confusion that little is or can be accomplished. What we can try to do is to identify the major elements that go into making agriculture more productive and to understand better how these elements effect each other and depend on each other.

The Elements of Agriculture: The first step in the agricultural development process is to achieve a clear and full understanding of what agriculture is. Agriculture is a special kind of production based on the *biological production processes*—the growth processes of plants and animals.

Plants are the primary factories of agriculture using the energy of sunlight to make seeds. fruits, fibres and oils man can use, Livestock are important secondry factories of agriculture. Depending on plants for food they transform plant materials into still other products of use to man or into energy for draft purposes.

The growth of plants and animals goes on in nature without any participation by man. Agriculture arises when man begins to *take control* of these growth processes. While man cannot control all facets of the biological production process he continues to discover through scientific research ways of controlling the process for his own benefit. This increasing knowledge provides the technical basis for the changes that add up to agricultural development.

Although the Ford Foundation at the request of the Government of India made available the services of Dr. Donald G. Green, the views expressed by him in this paper are his own.

An important implication of man's ability to control the biological production process is that a progressive agriculture is always changing. Parts of it are always becoming obsolete. Each step forward makes other forward steps possible.

Certainly what has taken place on Indian farms over the past 10 years is initial testimony of this kind of evolution, as well as revolution. The Intensive Agricultural Districts Program, with which the Ford Foundation has been associated since its inception, is a continuing experiment to learn under Indian conditions what it takes to bring a package of technological practices and a package of supporting services to the farmer's doorstep. The High-Yielding Varieties Program has provided seeds with a high-yielding potential. This program has further high-lighted the importance of the application of a package of practices which will allow the seed to attain its genetic potential. The more recent emphasis on multiple cropping is recognition of the new possibilities for crop combinations that now exist with earlier maturing varieties, Thus, in few short years the Indian scientist and the Indian farmer have been launched into the dynamics of a changing, progressive agriculture.

Much still remains to be done, however, in the evolving process of agricultural development. Therefore a part of agricultural development is to increase our understanding of plant and animal growth and to help the farmer learn how to improve his control over the biological production process.

The farmer : The second element of interest to us if we are to understand agriculture is the farmer himself. The basic difference between vegetation and wild animal life on the one hand, and agriculture on the other, is the presence of a farmer. It is the farmer who makes the final decision about and takes action to control plant and animal growth. The farmer plays two roles in the operation of his farm. He is at the same time a cultivator and a manager.

As a cultivator he must husband his crops and animals. As agriculture develops he has to learn to do the old operations of ploughing seeding and weed control in new ways.

The farmer's other role, that of manager, becomes increasingly important as agriculture develops. Whereas the skills of cultivation are mostly skills of the hand, the muscles, and the eyes, the skills of management involve activities of the mind backed up by the will. They involve the making of decisions, or choices among alternatives. In factory production different persons perform the functions of buying, managing, selling, bookkeeping, machine operator, etc. In agriculture each farm operator must perform all of these functions. As agriculture progresses the farmer must make more and more management decisions, not only about field tasks related to cultivating crops, but also about the commercial tasks of purchasing more production supplies and equipment and in selling more products in the market.

If there were not so many variations from place to place a standard "recipe" for the most productive use of each field could be developed and an expert could give the farmer instructions on what to do and how and when he should do it. But in the real world of widely varying agricultural conditions even within short distances, including differences in local prices of farm supplies and farm products, most of the managerial choices about the operation of each farm must be made by the operator of that farm.

Part of agricultural development therefore is to find ways to understand the farmer better and to help him grow in managerial ability so that he can make wise choices among alternatives resulting in an increasing margin between the cost and the return of his farming operation.

The Farm : The third element of agriculture about which we must be concerned is the farm. A farm is simply the unit of land on which a farmer attempts to control the biological production process. It consists of those resources for agriculture production that are found in that place : the sunlight, the soil, the moisture, the improvements that have built upon it. An important implication of these characteristics is that no two farms are exactly alike. As a result what will work on one farm with one farmer will not necessarily work in exactly the same way on another farm with another farmer.

From the standpoint of agriculture development, the most important point about farms is that they need to change, both in size and in arrangement, in order to make it possible to utilize changing methods of farming more efficiently. The form, the arrangement and the size of farm need to be different in different parts of the country, depending on the local nature of the land and the type of cultivation for which it is suited. These characteristics of farms need to change overtime with changes in methods of farming if agriculture is to be most productive.

Part of agricultural development is to keep studying the nature of farms and the influence that this has on productivity and to make appropriate changes in our education of people involved in agriculture so that new arrangements in farms will be possible.

The Farm business : Each farm operator, on his farm carries on a farm business. It is a business because each farmer's purpose is economic : to produce products either for sale or for use by his family.

As agriculture becomes more developed, the business of farming becomes more complicated. However, the farmer still thinks in terms of his costs and returns just as he did when his methods were more traditional. The difference is that more and more of his costs or cash costs, not just hard work and skill. More and more of his returns are in money, not just food enough for his family.

The fact that farming is a business has important implications for agricultural development Costs and returns are important. The farmer very properly looks at

new practices not only in terms of, "Will it be effective?" but also, "Will it pay me to use it?" Secondly, large farm businesses can be developed on small farms. Some farmers have already discovered this but many more must be helped to recognise the difference between the size of farm and the size of farm business. The current emphasis on multiple cropping is one way of increasing the size of the farm business as well as production. Lastly, different types of farm businesses require different programs for development. Uniformity of development programs over a whole country or even a district may be attractive from the standpoint of case of administration, but it is not the way to achieve the most rapid agricultural development. The wide variation in sizes and resources of farms, the types of cropping system possible, and the managerial ability and progressiveness of farmers requires that the content of programs for development vary from locality to locality if they are to be most effective.

Farmers may not be as good businessmen as we would like them to be, but this is true of other types of businessmen also. Part of agricultural development is to help farmers become better businessmen.

These four elements of agriculture—the biological production process, the farmer, the farm, and the farm business are what we are trying to develop. Each of these elements must keep changing for agriculture to keep advancing and developing. Any measure for agricultural develpoment must affect one or more of these elements.

The Essentials for Agricultural Development

Agricultural development cannot be brought about by farmers alone. Agriculture cannot develop without appropriate development in other parts of the life of the nation within which it is carried on. Let us therefore consider five facilities and services that must be available to farmers if agriculture is to develop. Each of these is essential. Without any one of them there can be no agricultural development. With all of them there will be some, even in the absence of any of the accelerators discussed later.

Markets for farm products: Agricultural development increases the output of farm products. One essential therefore is a *market* for these products. Three things are necessary. First, there must be a demand for the products—someone, somewhere who wants to buy them. It is not very reasonable to ask a farmer to raise something which he may have difficulty in selling.

Secondly, there must be a marketing system—someone through whom to sell farm products. Most farmers must sell their products locally. The market system, thus must reach down to the farmer. It must offer him a price locally that is high enough to encourage him to produce more than he has been.

Lastly, the farmer must be able to have confidence in the marketing system. The farmer must first recognise that marketing provides certain esssential services (transportation, storage, processing, financing and management). These services are performed by the "merchant" (private, cooperative, or governmental). The farmer must understand that each of these services has a legitimate cost. If the system has a good record of performance in the past, as the farmer sees it, he will develop confidence in the system. Confidence is also developed if the system can reasonably stabilize the fluctuations in prices and thus enable the farmer to predict these prices far enough ahead for him to make appropriate production decisions.

The development of a marketing system cannot be left to chance if agriculture is to proceed rapidly and smoothly. Part of agricultural development is for the larger society to match the surplus product the farmer is asked to produce with the demands for those products through a marketing system which develops farmers' confidence.

Constantly changing technology: Increased agricultural production comes from new techniques or methods put into practice on farms. A second essential is constantly changing technology. It is simply not possible to get much increase by using the same old plant and animal materials and the same old soil in the same old way.

The "technology" of farming means "the way it is done". It includes the methods by which farmers sow, cultivate, and harvest crops and care for livestock. It includes the seeds, the fertilizers, the pesticides the medicines and the feeds they use, the tools, the implements and the sources of power. It includes enterprise combinations by which farmers seek to make the best use of their labour, their land, and their management skills. For agricultural development to proceed, these must constantly be changing. When they stop changing agriculture becomes stagnant.

Part of the agricultural development is for the larger society to provide for well-directed and competent research which can produce the constantly changing farm technology. Such research must increasingly probe into the specific technology nedeed to solve the problems which arise due to the wide variations from place to place within a district or state.

Local Availability of Supplies and Equipment: Most of the new methods that will increase agricultural production require the use of special supplies or equipment. A third essential of agricultural development is that these supplies be available at many, many local points in sufficient quantity to meet the needs of every farmer who may want to use them.

Each item of supplies or equipment must have five qualities if farmers are to buy it and keep on buying it year after year :

1. It must be technically effective.
2. It must be of dependable quality.
3. The price of it must be reasonable.
4. It must be available locally precisely when farmers need to use it.
5. It must be offered for sale in appropriate sizes or amounts.

Most farmers are reluctant to try a new input when it becomes available. Unless the material is

tested in many localities, under conditions practically identical with those on a farmer's land, the farmer can be justifiably skeptical as to whether it will work for him on his own farm or will be profitable even if it does work. Consequently, local testing almost becomes another essential in the salability of supplies and equipment.

Although the local supply of inputs is complex and difficult, part of the agricultural development process is to see that *it is accomplished.* Without a locol supply of input agricultural productivity cannot rise very rapidly. If it is to be accomplished, it must receive as much and as competent attention as research or the arrangements for marketing farm products.

Production Incentives for farmers —Another essential is production incentives for farmers. Farmers react to incentives just like any one does. We should not expect him to produce more just because the nation needs more. It is only through farming that the farmer can hope to improve his family's life. Incentives that have meaning to him are prices which allow his net income to keep increasing over time. If he is a tenant, a more reasonable share of the harvest is an incentive. The availability of goods and services (the amenities of living) that farmers would like to purchase for themselves and their families is an incentive for them to produce more. Public recognition for being a successful farmer can be an incentive. Part of agricultural development is helping find ways to provide the farmer with incentives to increase his production.

Transportation : There is a fifth essential for agricultural development transportation. Without transportation—efficient and low-cost—the other four essentials cannot be effectively provided.

The importance of transportation follows from the fact that agricultural production must be widely dispersed. Farms must be spread out over the countryside to use the sunshine, the soil and other climatic conditions that will support crop growth wherever these are found. A correspondingly widespread transportation network is required to bring supplies and equipment to each farm, and to take products from farms to consumers in the towns and cities.

Furthermore, to provide favourable incentives to farmers transportation must be as inexpensive as possible. The cost to a farmer of an input like fertilizer is its price at the factory *plus* the cost of getting it from there to his farm. His return for the wheat or rice he sells is the price in the central market *minus* the cost of getting the products from his farm to the market.

A part of agricultural development is the provision by the larger society of an integrated transportation system which links farms with central markets, with sources of inputs, and with the services of various agencies supporting agricultural development.

with these five essentials agriculture will move forward. Without any one of them it will not. Sometimes these are available in only small parts of a country or even a district. In such cases those places will experience agricultural development while the others will not. For agricultural development to take place in all farming localities all five of these essentials have to be present.

Accelerators of Agricultural Development

Wherever the essentials are present there are other kinds of activities or services which will help speed up the process of agricultural development. These are the *accelerators* of agricultural development. There is an important difference between these and the essentials". There can and will be some growth in agricultural productivity when all of the essentials are present but without *all* of them there will be none.

The case is different with the accelerators. Each of them is important but none of them is indispensible. There can be agricultural development without one or more of them. However, each accelerator can be of great help to bring more rapid progress.

Education for Development : Continuous *learning* is essential to development. Formal arrangements for education *acclerate* learning. Education for development means education that is appropriate for a society that wants to develop. Education for development introduces people to new knowledge. new skills, and new ways of doing things. It must be available for people of all ages so that conflicts between the younger and older members of the society can be reduced.

Provision needs to be made for four types of education for development :

1. Elementry and secondary education which encourages the development of an inquiring mind, develops confidence that new knowledge and skills can be mastered successfully, and provides stimulating knowledge of the world both within and beyond his village home.
2. Farmer education for development—special programs which encourage farmers to experiment with new ways of doing things by providing opportunities to learn new skills, become acquainted with new knowledge and develop decision-making and managerial abilities.
3. Training for agricultural technicians which provides continuous opportunity to keep learning and experimenting. None of us will ever know enough to do his job the way it ought to be done. The skills needed cannot be acquired early in one's career to last the rest of a lifetime.
4. Urban education about agricultural development which helps city people, who have substantial political influence. understand why agricultural development is important and what is needed.

A part of agricultural development is providing education and training that helps people keep growing, developing new skills and mastering new knowledge.

Production Credit : Efficient agencies extending production credit to farmers can be an important accelerator of agricultural development. To produce more, farmers

must spend more – on improved seeds pesticides, fertilizers and implements. Such expenditure must be financed either out of savings or borrowing for the period between the date when supplies and equipment must be purchased and the time when the harvest can be sold.

The purpose of production credit is to enable farmers to purchase productive equipment and supplies. Credit is therefore less important to agricultural development than is the ready availability of such supplies and equipment at convenient nearby markets. But where effective and profitable production supplies and equipment are available nearby, and where farmers have facilities for learning how to use them, production credit can accelerate the adoption of improved practices.

Part of agricultural development is to obtain a better understanding of the problems of extending production credit and the problems of farmers in learning how to use it and then to provide effective credit agencies.

Group Action by Farmers : Individual farmers make most of the decisions about what is produced on their farms and about the methods of cultivation and the supplies and equipment used.

At the other extreme, the actions of governments have an enormous influence on the opportunities open to individual farmers and on farmers' awareness of these opportunities, as they make their decisions.

Between these extremes of individual decision and government action there is a third kind of activity important in accelerating agricultural development. This is voluntary group action by farmers within local communities and often also throughout a region or even a whole nation.

Some examples of group action :

1. Construction of community facilities like roads, wells, simple irrigation and drainage channels.
2. Control of common pests which endanger production.
3. Formal cooperative organization which perform functions in the interest of farmers but which individual farmers cannot do alone.
4. Local self-government which gives farmers an opportunity to tackle jointly many things needed for development.
5. Political action by farmers to bring pressure on government to act on matters affecting the progress of agriculture.

Part of agricultural development is stimulating and assisting appropriate group action by farmers.

Improving and Expanding Agricultural land : Two additional ways to accelerate development are to improve the quality of land already in farms and to bring additional land into cultivation. Building new irrigation systems, developing better distributary channels, drilling wells and draining wet lands are examples. Land improvements and use of local manpower, and can have an immediate effect on production.

Part of Agricultural development is to channel investment into improvements of good land now being cultivated and to choose carefully and plan wisely the investment in costly projects for expanding agricultural land.

Planning for Agricultural Development : Continuous planning which provides for changes policies and programs to keep them pertinent to the changing needs of agriculture can accelerate development. Some suggestions for planning can be drawn from the facts reviewed in this picture story framework. If the analysis in the framework is correct then the highest priority in planning should be given to assuring that all of the essentials are present in the best agricultural regions of the country. Talking about accelerating agricultural development is useless unless these essentials are present. In too many cases, countries have undertaken elaborate programs of one or another of the accelerators without having provided for the essentials. However, the accclerators can help where the essentials are present. Small parts of almost every country may already be reasonably well supplied with the essentials. In these places the accelerators can help speed up agricultural development.

Planners should also recognise that not all of agricultural development can be planned. Farmers make the critical farm management decisions. Planning should be done by regions. Production and market possibilities must be considered jointly. Planning should be directed more at increasing the profitability of farming than at increasing production of specific commodities. The quality of each activity is more important than its quantity. These are a few of the considerations that planners must keep in mind if development is to be accelerated,

Part of agricultural development is careful, judicious, and continuous planning based on a critical assessment of what is already being done and which takes into account the nature of many agricultural problems and the desires and complaints voiced by farmers.

Our picture story is now almost complete. We have indicated that any effort in the agricultural development process must: (1) modify the process of agriculture, or (2) change the behaviour of the farmers, or (3) change the nature of individual farms, or (4) change the relationships between the costs and returns in individual farm businesses. Many measures for agricultural development affect more than one of these. All of these elements must keep changing if agriculture is to move forward.

We have seen that when we talk about a progressive agriculture we are not talking just about cultivating land and tending livestock. Instead, we are forced to speak of roads and price relationships and research organisation and trade and governmental policy. We must think of industrialization and the forms it takes, education and its contents, banking, laws, and administrative efficiency in governmental departments.

Some of these requirements are essential. They are like the five spokes of a wheel on which agriculture can move. None is useful without the other four. With this wheel agriculture can move. But it is a crude wheel. It can be much more efficient by adding the five accelerators. Each of these is like a ball-bearing or like grease that reduces friction at the axle. On a

wheel equipped with these accelerators agriculture development can move much more rapidly.

To complete our picture story we need a source of energy. We have seen that agriculture gets its energy from the sun. Where does agriculture development get its energy? Agricultural development is a social product; its energy comes from the efforts and activities of many people —farmers, law makers, teachers, administrators, credit agents, extension and research workers, merchants, manufacturers, high way engineers, editors, and every citizen who participates in the activities of the developing economy of his nation.

We are likely to think and talk of agricultural development as being valuable only because it makes more farm products available for human use. In fact, it has an additional, and perhaps a more important product; it changes the people who engage in it.

For agricultural development to occur the knowledge and skill of farmers must keep increasing and changing. As farmers adopt more and more new methods their ideas change. They develop a new and different attitude towards agriculture, towards the natural world that surrounds them, and toward themselves. The early successes in increasing production increase their self-confidence Their increasing contacts and, transactions with merchants and government agencies draw them into closer acquaintance with the world beyond their villages. They increasingly become citizens, full members of the nation.

A similar transformation occurs among research workers, extension agents, government officials, merchants, bankers, teachers and many others. The same changes that result in added agricultural production bring abont changes in the persons who participate in them.

Agricultural development thus is an integral part of general, social and economic development. It contributes to it, and it assures that the overall development shall be truly general including within its scope the large portion of people who live by farming—and who will for many years continue to live by farming.'

It is clear that these changes are now occurring in India. Many farmers have developed a new and different attitude toward agriculture, Many more need too. Research workers, extension agents, government officials, and many others who support the efforts of farmers are undergoing a similar transformation. More and more of these supporting personnel will change and continue to change as they becomc involved in the dynamics of the agricultural development process.

For those in the audience who would like to go into the detail of the framework presented here, they should obtain the little book, "Getting Agriculture Moving" by A.T. Mosher. This book is distributed in India by the India Book House, Bombay.

Farmers' Training—Content and Means

Let us now come back to the main topic. It is clear from the broad generalizations of the picture story that the role of farmers' training is an important factor in increasing agricultural productivity. It was listed as one of the five accelerators. Beyond that, however, there were many implications for the kind of content that farmers need to know and learn to help speed the process of agricultural development. Most of these can be grouped under three headings:

1. Farmers, and particularly farm leaders, need to know and unedrstand more about the *agricultural development process*—the factors that go into making agriculture more productive and how these factors affect each other and depend on each other.
2. Farmers need to know about and develop skills in applying the *new technology*.
3. Increasingly, farmers must become aware of the *new alternatives* open to them and must learn how to make appropriate *farm management decisions*.

Let us examine each of these in more detail and do a little imaginative thinking about ways to bring more and more farmers into active involvement in the farm revolution.

Training on the Process of Agricultural Development—A difficult task in development is finding and channeling farmer leadership skills into activities that will benefit the present and future progress of agriculture. Too frequently the development of farmer leadership skills is left to the initiative of busy government agencies which serves farmers. However, with several years of organised life behind it and under the guidance of distinguished farm leaders. The Bharat Krishak Samaj is perhaps in a unique position to develop an increasing number of farm leaders who understand the factors affecting agricultural productivity.

This might be done through an organized series of *study forums* on the agricultural development process. A small group of farm leaders, selected on the basis of their *ability to work with other people*, might first study together the implications of the generalizations about each of the factors presented in the picture story of a few minutes ago. Each of these leaders could then be supported in an assigned task of planning, organizing and guiding local study forums which would actively involve local farmer leaders.

It should be made clear that the primary purpose of the study forums would be to improve understanding not to promote some type of action While action may ultimately result, it should be based on a clear understanding of what is involved in the local situation. Thus the focus of a study forum would be to study and critically discuss the essentials and accelerators of agricultural development in the light of local circumstances and experiences. Since agriculture itself and the other resources needed to support agriculture vary so much from place to place, the seminars might best be organized on a district basis or a small group of districts which have similar agricultu ral resources and problems.

The study forums might examine such questions as the following:

1. To what extent are each of the essentials or accelerators a limiting factor in this area?
2. What is the nature of the limitation?
3. How can farmers adjust their

farming activities in the light of the limitation?

4. What are the prospects for a change in the situation in the near future?

On a more specific subject like local availability of supplies and equipment, questions like the following might be examined:

1. What are the specific farm supplies and equipment that would increase farm production and that farmers would buy if they were available locally?
2. What might farm leaders do to encourage the sale of these supplies and equipment by local merchants (whether private, co-operative, or governmental)?
3. How many miles or kilometers from his farm can a farmer be expected to go to purchase supplies and equipment?

These are only brief examples of study forum content which would help farm leaders better understand the agricultural development process in which they will be increasingly involved as the farm revolution picks up speed. Other more sensitive and socially-oriented issues which must ultimately be faced relate to the inclusion of landless workers, tenant operators and the operators of small farms in the benefits of the farm revolution. An informed and understanding farm leadership can help prevent these issues from jeopardizing continuous rapid growth in agricultural production. Well planned and implemented activities along these or similar lines by the Bharat Krishak Samaj could influence the spirit of farm people as they face the inevitable stresses of change which the farm revolution will bring.

Training on New Technology—To be an active part of the farm revolution, farmers must become aware of the new ways to farm, must be eucouraged to experiment with the new technology, and must be supported in the learning of the skills that the new technology requires. Much is already being done, b ut more is needed if the majority of 50 miilion farmers are to be involved as they must be.

Valuable experience is being gained in providing a flow of information to cultivators about the new technology through the radio, the printed word, and demonstrations. Many farmers are aware of the new technology, but certainly many who are aware have not yet experimented with it. They need to be encouroged. At this crucial stage in shifting the attitude of the farmer, he must receive strong reinforcement and encouragement and he must have the opportunity to learn the requisite skills.

Each state has gramsevaks and agricultural extension officers who are encouraging farmers and helping them learn the skills. In addition, several states are now experimenting through a centrally sponsored scheme with Farmers' Training Centres or Institutes. A staff of five or so instructors hold production-cum-demonstration training camps to familiarize farmers with the new technology. The agricultural universities hold Kisan Melas. I understand that the Bharat Krishak Samaj is sponsoring farmer exchanges. All of these and other existing activities are helping change farmers' awareness, attitudes, and ultimately their farming behaviour—how they handle their farm operations.

While there is plenty of challenge in the immediate future to reach more farmers in an improved fashion, a larger challenge looms ahead. It is comparatively easy to get a farmer to use a high yielding variety of seed which returns two or three times the yield of local varieties. It is much more difficult to assist the farmer to learn the skills needed to maintain these yields or raise them slightly higher by more careful application of individual practices. For example a fifteen percent increase by proper insect and disease control, ten percent by better water management, or twelve percent by improved fertilizer rates and application. My point here is that as research develops the know—how and as farming becomes more progressive, farmers will need to know how to do these things if they are to maintain a reasonable margin between their costs and returns. The foregoing suggest current and future need to improve farmers' training both in terms of quantity and quality.

Farmers now have and will continue to have a growing interest in the training services provided to them. Research in India shows that farmers get encouragement and learn the needed skills primarily from nearby farmers and the extension workers.

A national study by the Indian Institute of Mass Communications indicated that 39 percent of the farmers first heard about high yielding crops from the gram sevak. Another 42 percent of the farmers first heard this information from neighbors and relations. When asked from which source they would like to get additional information, 33 percent of farmers said the gram sevak and only 10 percent said neighbors and relatives. Nearly 22 percent of the 820 farmers interviewed reported that they learned the various farming operations through the gram sevak[1]

A study by the National Institute of Community Development indicated that farmers are more likely to adopt new practices if the gram sevak is headquartered in or very near the farmers' village. Adoption practices was also higher if the farmers felt the competence of the gram sevak was high[2]

These data suggest that one way to speed up development would be to improve the quantity and quality of the training given to the field worker while on the job—in service training which keeps him up-to-date on both the knowledge and skills of the new technology. Most of the 58,095 gram sevaks and 6,329 agricultural extension officers did not receive during their formal training detailed and practical instruction about the new crops, new plant protection measures, new farm mechanization, new fertilizers and many other items of the new technology about which farmers are now asking. If the field worker is to continue to advice the new farmer emerging in the farm revolution, his competence

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[1] See "Agro-Information Flow at The Village Level", Indian Institute of Mass Communication, New Delhi 14.

[2] See "Two Blades of Grass" by Prodipto Roy, et-al, National Institute of Community Development, Hyderabad 30.

with the new technology should be at least one step ahead of the typical farmers'.

Refresher training is being given to gram sevaks. However, for a typical disitict with about 100 gram sevaks, each gram sevak would receive refresher trainlng once every four years. In addition he will receive some knowledge from his supervisors. Is this training sufficient for a modernizing agriculture? What are the high priority training needs of the gram sevak and the AEO? How can these be met? Where will the resources come from ? These are difficult questions to answer, but they arise because of the farm revolution.

Since farmers do receive encouragement from other farmers, well organized tours to other farms within a district or in a nearby district could encourage many farmers to try new ways. As a supplement to what agricultural officers may be doing leaders of a local farmers' organization could organize and manage such tours. A grass roots farmers organization would be needed so that local leadership would be involved. Such tours should not be just for the progressive farmer or the more well-to-do farmer. The cultivators who are uncertain about their opportunities or who have less financial means also need to be encouraged. A concerned farm leadership can help initiate and implement this or similar ideas designed to increase farmer interaction.

Training on Management Decisions—Agricultural development brings an increasing number of opportunities and alternatives beyond improving the production of a given crop. When this happens the farmer must decide which alternative is right for him and for his farm. To make these managerial decisions wisely the farmer must have knowledge about each alternative and the probable consequences. He must develop new skills of judgment and decision making. He must think about all his resources in a new way.

Many Indian farmers have already entered this phase of agricultural development. Many more must do so. For example, in Thanjavur District a new, shorter season rice variety made it possible to grow two crops of rice where one formerly grew. Fifty thousand or more farmers made this shift within three years. In north India thousands of farmers are growing the new wheat varieties. Because of the new wheats many of these farmers have made shifts in their cropping patterns. Shifts in cropping patterns bring all kinds of management decisions. First more cash costs are involved. Timing of field operations becomes crucial. The farmer will be tempted to purchase a piece of equipment to speed up operations. Then he may have a problem of getting rid of his traditional labour. One farmer near Delhi usually takes a summer crop. Last year his wheat harvest was so heavy he could not thresh in time to prepare the fields for summer crop so lost that crop. This year he put his wheat off the field so it wouldn't interfere with field operations.

Other difficult decisions frequently involve capital investments like land levelling to improve water management, a tube well to assure water supply, better distributories for irrigation water, or new equipment. Even more difficult managerial and production skills are involved in shifts into livestock production when demands for various animal products provide new alternative uses for farmers' resources.

Where is the knowledge to come from to help farmers make these and other difficult management decisions? Some of it will come from farm management experience of progressive farmers who keep records and analyze them. Some of it most farmers will gain through experience. Much of it must come from farm management research conducted by agricultural universities and other institutions in cooperation with farmers. Farmers must then be trained in the understandings and skills needed to use the knowledge in making management decisions.

Concluding Remarks

Agricultural productivity moves ahead only as various persons and groups improve their effectiveness in carrying out specialized tasks. Helping farmers understand the implications of new technology for their operations and helping them learn the skills they need to apply it is only one of these tasks. The ideas presented here are only suggestive of content farmers need now and in the future and of ways to provide it. Imaginative and concerned thought on the part of farm leaders can improve or supplement these ideas.

Farm Revolution . . .

(*Contd. from page* 51)

latest and practical knowledge of science and technology is applied to farming, for the benefit of the farmers and thereby the nation.

Impact they have made on the policy—makers is evident from the report of the Education Commission (1964-66) which had recommended the establishment of atleast one Agricultural University in each state. They have further recommded that all aspects of teaching, research and extension should be the concern of agricultural Universities in the respective states. That an Agricultural University provides a better environment for these services State Deptt. of Agriculture, however, is still to be realised in a number of states, where vested interests which believe in holding on to what you possess are still strong. Implementation of Education Commission recommendations would further enlarge the area under the control of these Universities enabling them to more effectively serve the nation.

Role of Extension In Agricultural Production

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Agricultural development in India depends upon millions of farmers of large, medium and small categories scattered all over the country. For true progress, people must know the new technology, must understand it and must act on it. How far the people progress depends largely upon their access to accurate and reliable information. The sources that are available for this information and a steady flow of these informations which links them with the scientists. This task of transfer of agricultural technology from research station to the farmers field depends upon an efficient and dedicated extension services, modern technology suited to different categories of farmers, package of services necessary to access the cultivators in adopting the modern technology, price credit and supply policy to provide incentive and to meet the production needs of the cultivators markets for farmers products, farmers training and education for agricultural development and effective and efficient communication system.

Strategy for Agricultural Development in India

It would be appropriated at this stage to have a brief discussion of the main agricultural strategies adopted in the country.

Community Development and National Extension Service

Before the start of the community development programme with the aim of socio-economic transformation of rural people, the first organized efforts to increase agricultural production was launched in the year 1947 and was called, "Grow More Food Campaign". But even after 4 years of experience of this programme, it was clearly observed that the cultivators response was very poor. A committee was set up to evaluate this programme. In brief the committee's findings were:

"The economic aspect of village life cannot be detached from broader social aspects; agricultural improvement is, in every respect linked up with a whole set of social problems —all aspects of life are inter-related and no lasting results can be achieved if individual aspects of it are dealt within isolation".

It was out of this background and experience and also as a successful experiment of Etawah Project that India's Community Development Programme was born—The programme was based on two fundamental promises :

1. The problems of rural development have to be viewed from a total perspective and the efforts to solve them have to be multifaceted.
2. The overall development of the rural community can be brought about only with effective participation of the people based by the coordination of technical and other services necessary for securing the best from such initiative and self help. In order to provide the necessary institutional structure and services emphasis was given to the development of basic democratic village institution especially Panchayat Raj, Cooperatives and village schools.

As mentioned earlier even though the programme was multipurpose in nature, there was emphasis on agriculture. In order to achieve the objectives of the Community Development programme, the National Extension Service was inaugurated on October 2, 1953. Under this new set up, the Institution of Community Development Blocks was created and by 1963 the entire country was covered with about 5,263 blocks. In addition there were over 101 special Tribal Development Blocks. The team consisted of a Block Development Officer (Coordinator and team leader), 8 Extension officers including agriculture, animal husbandry, cooperation and Panchayat, 10 village level workers and 2 women village level workers. The block was treated as an administrative unit of all development departments and the village level worker was the contact person between technical advisory department and the people. We are all familiar with this set up and it is not necessary to elaborate about its functioning.

It may be stated that this new programme aims at socio-economic transformation of people in 5,58,000 village from traditionalism to acceptance of modern science and technology, economic and social transformation and transformation of administrative bureaucracy created to carry out law order and regulatory function to an effective dynamic developmental administration with a driving force to give direction to change. In order to bring about this change the extension education was chosen as the means.

Even though agriculture was very much emphasised in this programme, the agricultural production did not move up in any impressive way and by 1963-64 there was general condemnation of community development programme. It was not appreciated that a gigantic programme of this nature and for a country of the size of India with all the com-

plexity it possesses will require more time than just one or two plan period.

The Community Development Programme certainly created conditions for socio-economic transformation of rural people and adoption of modern practices for improving their farm, home and families in an integrated manner.

Intensive Agricultural District Programme (Package Programme)

Under the Community Development Programme the Production efforts and available resources were widely diffused over the entire country. The educational and extension efforts among the millions of farmers to be tackled remained thin and restricted. By the middle of the Third Five Year Plan it became increasingly evident that agricultural development was not making satisfactory progress. As a result of report of Ford Foundation Team known as, "India's Food crisis and steps to meet it", a significant departure took place during the period and a new programme known as Intensive Agricultural Distric Programme, based on the principles of concentration and better management of resources and efforts in potential and responsive areas with assured water supply was started. Since 1960, one district in each state has been covered under this programme. The scheme not only involves adoption of package of new practices by farmers but also provision of package of services. Consisting of competent technical staff, availability of credit and production inputs, adequate research information, training and education of farmers and extension personnel, storage and marketing arrangements and price assurance which would evolve the farmers to adopt scientific methods of farming. Now about 10 per cent of the total cultivated area in the country is under I.A.D.P. and I.A.A. programmes.

High Yielding Varieties Programme

To make the country self sufficient by 1970-71 a new dimension has recently been added to the Intensive Agricultural District Programmes in the country. A number of high yielding varieties of wheat and paddy and hybrid of maize, sorghum and bajra have been evolved and introduced in the country. This programme aims at covering 32.5 million acres by 1970-71. This significant development has a vital bearing on increased agricultural production and this bumper harvest of over 95 million tons of foodgrain during 1967-68 clearly shows the impact of this new strategy.

Multiple Cropping Programme

Yet another strategy recently introduced is the strategy of multiple cropping which aims at maximisation of production per unit of land by taking 3 or 4 crops in a year.

It is obvious from the brief discussion that after years of trial and experimentation India is now passing through an era of agriculture revolution. The traditional methods of production are giving place to new methods based on science and technology.

Education and Training for Implementing Agricultural Strategy

The acceptance of a progressive democratic approach based upon science and technology implied that the extension workers as well as the farmers in the whole process of change should work as equal partners. The training of extension workers as well as farmers was, therefore, emphasised from the very beginning of this programme and a number of special kinds of institutions such as Gram Sevak, Gram Sevikas Training Centres, orientation and study training centre, extension wings in the agricultural, veterinary and Home Science Colleges, Extension Education Institutes, National Institute of Community Development, Panchayati Raj Training Centre etc. The principles and concepts of 'selective areas pattern and intensive agriculture pattern' threw a new challenge and an integrated training programme for the farmers, farm women and young farmers has recently been initiated and it is proposed to train 5 million farmers by the end of 1970-71.

Role of Extension Education

In socialistic pattern of society like ours, the decision to accept new technology and transform the subsistance agriculture into scientific one, are to be made voluntarily by millions of farmers. For this the extension education has been recognized as the most vital means to bring about these changes.

Extension Education seeks to secure these desired changes by initiating stimulating and guiding people through the process of education and motivating them to take desired action. Associated with bringing about technical and material change, extension also helps in bringing different corresponding changes in the attitude, thoughts, values, belief and other aspects of human life. The important role of extension education, therefore, with respect to both these aspects i.e. bringing about material and non-material changes are summarised below :

(1) Help in adoption of new technology

The first and foremost role of extension education is to help farmer accept new agricultural technology for bringing about higher yield and changing old age concept of low yield. This is being done remarkably well as is evidenced by the fact that the new technology in general has received acceptance by the farmers of different categories. The willingness to augment their farm income by adopting sophisticated improved agricultural practices is to be regarded as a most remarkable change in the behaviour of Indian farmer. The farmers are now clamouring for still better varieties of seeds, fertilizers and other inputs which has driven the scientists to a continuous search for high yielding varieties.

(2) Help farmers to visualise farming as a porfitable occupation

The extension helps farmers to understand their own situation resources and after critical analysis helps farmer to make rational decision for the best use of the available resources.

(3) Extension shows cultivators how to get what they want

Once it is determined what cultivators need and want, the main contribution extension makes is to help them how to get the necessary technical know how as well as inputs and how to apply the new techno-

(*Contd. on page* 63)

Presidential Address by Shri L.P. Goswami

Minister of Agriculture, Assam

The necessity increasing the food production is not a problem of one country alone today—it is a problem of the whole world. The world today is faced with a serious food shortage ever increasing. The developing countries are increasingly finding it difficult to feed the fast growing population. The arithmetic of food and population projected to the future is one of frightfully a big gap. By the end of cenutry, the world population is estimated to be increased from its present level of about 3.5 billion to its double and that of India from five hundred million to one billion, i.e. in India every year we add more than the population of the State of Assam.

The most critical problem facing India is how to modernize her agriculture, for it is on subsistance agriculture that a majority of the population in India depends. The present crisis faced by us is in the pursuit of India's goal of adequacy, if not modest affluence, over the next 25 years due to the rise between population growth and food production. Economists have estimated that just to keep man, woman and child with their present level food, clothing and shelter, output must grow at least as fast as population i.e. 2 to 3 percent per annum. But the growth rate for agriculture output at 2 to 3 percent makes no provision for a higher level of income and improved nutrition. We also seek to achieve a growth in per capita income of about 3 percent per year. If we are successful part of the additional income will cause an increase demand for food, since this is the commodity that keeps the largest proportion of income increases at low levels. If per capita income in India rises at 3 percent a year, about two—thirds of this increase will be transfered to the food producing sector. Thus about 2 percent incrcase in the demand for food due to growing income must be added to the 2 to 3 percent increase due to population growth. These two elements imply that India must have her agriculture growth at a compound rate of 4 to 5 percent per year. Consequently, the strongest pressures for development performance will fall upon agriculture. We cannot go on begging from the foreign countries to solve this most vital national problem. If we even intend to do so, can the developed countries afford to feed us. What is the exact position of these countries today in their food front. Taking the case of U.S.A.—early in sixties U.S.A. had excess of 50 million tons of grains over and above the normal reserve and keeping about 50 to 60 million acres of land idle. Now there is hardly any surplus of the kind as was the case before. There is progressive dimunition of world food reserve.

The current shortage of about 16 million tons which will go to 42 million tons by 1975 and that will be more than one year harvest of United States. By 1985 additional requirement may go up to 58 million tons. The developing countries, therefore, must augment the production of their own.

In the past the increase in population brought about its ready solution by corresponding increase in the area under cultivation. In most of the developing countries today the frontier of available cultivable land has already reached. In India, for example, the increase in area is hardly one percent per annum. In case of some developing countries, however, particularly Africa and Latin America, there is yet a substantial cultivable area. In most of the developing countries in Asia, the pricture is entirely different. Here the production has to be increased within the limitation of inflexible land area and the only course left open is to increase the productivity. The productivity of the developing countries is very low compared to the developed countries, where the average yield is almost 3 to 4 to times in most of the major crops. In the developing countries as well, the productivity can be stepped up substantially. What is called for a a change are necessary i.e. new variety of needs intensive use of fertilisers, pestisides, tools and implement, irrigation and land development etc. But above all these the first and foremost requirement for these change over from the traditional to scientific farming is the change in the attitude of the farmer and his society. Thanks to the Indian agriculturists that inspite of their conservation and traditionsal backwardness, they are adapting themselves to the new technique of production. This revolutionary outlook of our farmers has to be assisted by making adequate arrangements for making available the facilities of personnel and extensive service to the farmers. Technology of the advanced countries can be transferred to a large extent, but it is the principles and not adjust the technology with the soil-climatic complex of a particular area.

Progressive land policy is the basic need so that farmer gets major share of the additional return. The absentee land lord is a great hurdle. In order to enthuse the farmers, the farmer has to be assured of full return of his labour and inputs in his farm. The legislation for making the farmers owners of the land is long over due. All our attempts to bring about self sufficiency on food front is not likely to be materislised unless and until a revolutionary change in the tenancy laws giving security of tenancy right to the farmers is brought about quickly.

Quick generating and hight yielding seeds must be made easily

available to the farmers. In the struggle for food production, fertiliser has singular importance. As has been already stated, having well high reached the limits for further expansion of areas under cultivation, there is absolutely no way out for increasing the production excepting by way of increase in productivity. This can be done by intensive cropping and scientific method of cultivation, in which fertiliser plays most important role. wherever productivity has gone up, that is mainly due to larger and larger use of fertiliser. The farmers are by and large convinced of the benefits of the use of fertiliser. The rise in price of fertiliser causes a set back, particularly when it is at a time when the farmers have just started. Although the price of agriculture, commodities has gone up, that is not a real answer to the problem, particularly to the small farmers who have very little of marketable surplus.

The stress on increase in food production call for a revolutionary change in the credit strucuture for providing means to the farmer for the inputs a net work of distributory system, substential investment in irrigation, liberal farm oriented and not consumer oriented price policy, development of storage facility, processing and marketing. All these factors must simultaneously play effectively to produce the impact as an answer for self generating force. Wherever agriculture has advanced, all these factors have played favourable roles, and wherever it has failed, it is due to severe handicaps of the farmers in one way or the other.

Indian farmers today have advanced faster than we have been able to appreciate above, they can make India self sufficient within the time we have been able to envisage. I have no doubt in my mind that the experts participating in this Seminar will kindly consider this aspect of our programme and will suggest means how these problems can be quickly solved. To sum up these Problems are inadequate attention to research, insufficient supply and high price of agricultural inpets, ugrossly inadequate investment in irrigation, slow progress in land reforms, inadequate price support, lack of proper environment necessary for rapid technological change and increase in productivity. We are only at the starting point. Our all attempts should be aimed at not only for removing these problems, but also in doing it in a manner so that it can create an atmospher of confidence in the entire rural community.

Friends, let me express my deep and sincerest thanks for having given me this opyortunity to participate in the Seminar. I have only, in my humble way tried to place the problems whichare already in your mind. I am sure you, friends will be able to evolve some concrete formula, keeping in view our responsibility in this great job.

Role of Extension in Agricultural Production (*Contd. from page* 61)

logy in their own situations through various extension teaching methods. For this an extension worker is required not only to possess knowledge and skill of extension methods but also make right selection of the same for different categories of farmers.

(4) Extension helps in training the farm leaders. In any community there are always some farmers who are consulted by other farmers as a source of information. Extension job, therefore, is to identify such farm leaders, give them suitable training, encourage them to adopt modern farm technology so that through them the same may be diffused to other farmers. Besides training farm leaders, extension also helps in organising special training programmes for progressive farmers, farmers belonging to special interest group, young farmers and farm women.

(5) Extension helps in arranging all supply and services though the main job of extension is education in a developing country like India where supply and services are limited. Extension is also required to help in getting necessary inputs and other requirements needed for agricultural production.

(6) In addition to helping in these material, development extension helps in changing the attitude of the people. It is well known fact that a number of practices are not adopted by farmers because of unfavourable attitude towards them. In 1952 Sindri factory was unable to sell stock of Ammonium Sulphate mostly because of fear and unfavourable attitude of farmers towards use of chemical fertilizers. But now due to continuous educational efforts, farmers have started using different kinds of fertilizers and we are unable to meet total requirements. Many of the innovations are seen by the farmers not as a measure which would improve his security and economic position but as a system which would take away his freedom, familism and traditionalism, the cherished value in farmers frame of reference. It is, therefore, necessary to make efforts on agricultural reintepretation to enable the people to use the innovation in ways they are acceptable to them.

(7) Extension helps in the decision making process as a result of the introduction of high yielding varieties, multiple cropping. There is a growing emphasis now on individual farm production planning. Extension helps after studying individual farm conditions to make rational decision to farmers according to their need, aspiration and resources.

The introduction of high yielding varieties programme and its acceptance by farmers has also introduced certain problems like the problem of timely harvesting, threshing, storage and investment of additional income. The role of extension, therefore, is to see these problems and help farmers in solving them. These changes might also lead towards mechanisation and the extension has to bring this problem to the notice of researchers in order to find out suitable agricultural implements and tools.

At the end, it may be said that the main job of extension is to bridge the gap between the scientists on the one hand and the farmers on the other. This is done by taking new farm technology and innovation to the farmers door and help them to adopt them. Extension also helps them in bringing farmers' problems to the research station for further investigation and finding out solutions.The job extension is, therefore, quite challenging. It is more so at the present stage of fast developing agricultural technology and the growing thrust of farmers to know this rew technology and make use of it.

Shri B. Rachaiah.....

(*Contd. from page 4*)

larger areas of scarcity and uncertainty in areas destined to rely on rain-fed agriculture. Our goal is to reduce regional imbalance and social and economic inequalities, but this cannot be achieved by converting all cultivated areas into irrigated land. That would require resources neither we have, nor the rest of the entire world would be able to spare. Therefore, we have to be realistic by adopting a plan, by which both the irrigated simultaneously and with as uniform a pace as possible. This is the biggest challenge at present, for the Government and our agricultural scientists. Very much more intensified research on rainfed agriculture is obviously the need of the hour.

Changiag Technology

While talking of green revolution, we have also to remember that abrupt changes in agricultural technology create equally abrupt shortage in many directions. In Tanjore with record harvests of ADT. 27 paddy last year, shortages were experienced of mechanical driers to save the paddy on the threshing floors from the damages by rain. Similarly, but for big harvest combine the similar special steps to more wheat from the field to the Mandis in the Punjab and Hariyana, losses might have been so huge as to convert the record harvest into a deficit. While all these losses are avoidable and within the power of administration, the huge losses that result by crop pests and diseases or by failure of rains are not within the control of Governments. These can be handled effectively through problem-oriented research, of which the country can never have enough. The dramatic changes in agricultural technology have so far resulted in securing bumper harvest at only some centres; and our ability to obtain similar harvests over longer areas on a continuing basis depends on the availability of the new knowledge to deal promptly and effectively with any fresh situation caused by pests, diseases or abrupt changes in climate. All these can only be possible when scientific leadership and scientific know-how are available in adequate measure.

Farmer's Education

The provision for this know-how to become available to our farmers as a continuous stream is of critical importance. Miracles in agriculture do not just happen. The basis of agricultural progress is experiment. Most of the advanced nations have developed and achieved agricultural revolution because of sustained and systematic research. The Government of India through its coordinated research, schemes the Agricultural Universities who are operating in close collaboration with ICAR in this regard, and the State Government, through their Agricultural Departments where the Agricultural Universities are yet to be established, have all organised research in the public sector. But the stream of knowledge coming from all this research will be useless, if it is not promptly and effectively translated into the field of the farmer. Without this, the accelaration of our agricultural output will be impossible.

Wrong Notion

There is unfortunately a mistaken notion that agriculture is so simple that what you need is only a high-yielding variety to be grown on a good soil, with ample water and with adequate fertiliser and general supervision. It is only through production oriented research, through adequate training of extension educational personnel, and through changes in the outlook and attitude of the farmers that modern agriculture can be practised with success. A medieval or traditional farmer in a modern technological set-up is an anachronism. Without such a change tasking place in our farmers, our irrigation water made available at great cost will remain unused or partially used; our losses through pests and diseases will continue to be very high; and mistakes in many other directions will continue to mitigate the impact of the modern technology,

A stimulated agriculture therefore demands changes in all directions, including in the Governments and the farmers. No nation, however, will be willing to continue with the problems of deficit agriculture. They will all be willing and even anxious to take over instead the problems or surplus agriculture. As we move from deficit to self-sufficiency or even surplus let us not, however, relay on beliefs and methods which we had inherited from the past. Already the winds of change are in evidence all round us. Better credit facilities to farmers are being urged and provided. Better educations, research and farmer education methods are being practised; the public and the Governments are becoming increasingly alive to their responsibilities; and above all, our farmers are raising to the occasion by adopting avidly the new technology. All these are heartening.

In this seminar to discuss farm revolutions, which I have the honour to address, I can do no more better than to appeal to all of you not to take complacently the great spurt on croy yields which we have witnessed recently in our country. Those who are the Government, and all others who are interested in the development of agriculture and more particularly the farmers who form the lynchpine of agricultural development should combine their forces to maintain the tempo of increased yields. Revolutions do not occur as a mircale. They do not just happen. Even if a revolution is a fortuitous circumstances, its continuance requires the sustained and combined efforts of all of us. It is towards such well-informed, carefully prepared, plan that this seminar should focus attention. I am sure with the galaxy of people I see before me the success of this Seminar is assured.

I wish to conclude this address with the hope that Agricultural of Green Revolution will occur all over the Country, and when they do, they will stay with us, and that these revolutions may bring all-round changes that will support and speed up the transformation from the erstwhile deficit agricultural economy into a perennial surplus economy.

Recommendations Of Seminar On "Farm Revolution"

The Seminar on 'Farm Revolution' organised by the Bharat Krishak Samaj at Bombay has taken note of the fact that the agriculture in this country is perforce at a stage of breakthrough and the development envisaged are being talked of in terms of a green revolution. On the background of all the scientific know-how we have, still it is felt, that a lot of expansion work is necessary so that the 'Green Revolution' that is envisaged may materialise.

Freedom from Hunger is an apt saying that represents the goal we have in mind. Freedom from Hunger covers all aspects of agriculture and all the efforts that States and organisations have to put in. It means growing of crops, protecting of crops and reducing the wastage of agricultural produce, preserving of produce and improving human nutrition. But of all the wastages mentioned, the wastage of the most valuable of all assets, the human being is significant. Among the elements of this wastage, unemployment under-employment, lack of training, capital and supplies, had system of land tenure, absence of marketing arrangements and methods of co-operative actions—come in.

The Bharat Krishak Samaj can render a good service by keeping a record of their progressive areas to disseminate this valuable information for the benefit of all.

Keeping this view, the following recommendations have been made by the experts and progressive farmers who attended the Seminar on Farm Revolution :—

Group. 1.

SOIL AND WATER MANAGEMENT

Seeing that preservation of soil fertility and the proper utilization of water are basic to good agriculture, the work done along these lines is appreciated and needs to be strengthened. It is noted that the package of practices approach in the IDAP and other areas led to the maximisation of production. The fact remains that a large proportion of the land forms dry farming areas.

It is recommended that suitable package of practices developed and adopted in such areas. Better water practices have to be developed and disseminated for adoption on a large scale.

The water use demonstration farms are very educative and it is recommended that field days be arranged for farmers on these farms and their success be evaluated and made known to other farmers.

It is also recommended that a more extensive survey may be made of underground water resources and maximum possible lift irrigation projects be instituted.

Group. 2.

FARM MANAGEMENT

Farm Management is a sum total of many disciplines. It includes the manager of a good commercial farm and equally a self employed small farmer.

Instead of leaving it to personal fancies, it is recommended that a simple system of farm accounts be evolved and popularised among all farmers so that they may be able to keep track of the inputs, income and expenditure of every item of management.

Further, seeing that the profitability of agriculture depends on two factors. (1) What the States do for the farmers, and (2) What the farmer does for himself, it is recommended that regular technical data and information may be collected which will be a source of motivation to the farmers for making their farming profitable.

It is further recommended that steps towards developing and popularising the modern management techniques be undertaken by the Governments, Agriculture Ministries as well as the voluntary bodies.

Group. 3.

PLANT FOOD & IMPROVED SEEDS

It is to be appreciated that farmers have become more plant food conscious than before and that steps have been taken to ensure supplies by increasing domestic production and by inputs. It is hoped that temporary accumulation of stock due to various reasons should not lead to slackening of efforts for maintaining supplies in future years. One problem that needs attention is the supply of fertilizers at the farmers' doors at fair prices and at proper time. Another problem is to popularise a balanced fertilisation.

Soil testing as an instrument of food farming is to be recognised. While welcoming a more extensive establishment of soil testing service, it is recommended that a good follow-up programme on crop response be instituted. The experience of farmers who have benefitted from this service may be collected and

dissemination among other farmers for their benefit.

Considering that improved seed is an important input in raising agricultural production, utmost care should be taken about the quality of improved seeds.

The farmers should be given the basic knowledge of new varieties of seeds through agricultural Research Stations and Seed Farms.

It is recommended that packets of improved seeds may be distributed to the members of young farmer clubs, special recognition may be given to these members to raise recorded crop yields by using these seeds.

Group. 4.

PLANT PROTECTION

Since plant pests and diseases considerably damage the crop, proper Plant protection measures should be organised on the following lines :

(1) Early detection of pests and diseases attacks is necessary. The cultivators must be trained to detect and act on the first symptoms.

(2) Proper and timely supplies of agro-chemicals should be organised.

(3) Government efforts should be supplemented by custom-services.

(4) Local Bodies like Taluka Boards and Panchayats should stock agro-chemicals.

(5) Step may be instituted and trained for large scale operations.

(6) Steps should be taken to educate the farmers on the safe use of agro—chemicals.

It is recommended that efforts may be made by all the authorities concerned to sponsor programmes on these lines.

Group. 5.

RURAL CREDITS AND BANKS

It is a welcome sign that the Scheduled Banks have come forward to finance the agriculturists. A weak point that is often pointed out in a discussion on rural credit is the break down of the cooperative finance, the blame being often placed on defaulting borrowers. It has often ended in a dilemma, whether the difficulty is one of procedures or turnovers. Banks have to give considerable attention to the repaying capacity of the farmers before lending the loan.

It is recommended that Scheduled Banks may simplify the procedure of lending and intensify the programmes of crop loans in the interest of small farmers.

Group. 6.

FARM MECHANISATION

Considering all aspects of Farm Mechanisation it is recommended that (a) research be conducted on machinery to meet ths farmers' pockets and diesel power. (b) that service stations be established in agricultual areas where machines can be hired or repaired and spare parts may be made available to the farmers, and (c) education and training at all levels be given to the young and the adults farmers regarding the use of various agricultural machines, (d) The manufacturing of hand operating and bullock driven machinery should be given priority.

Group. 7.

DAIRY AND ANIMAL HUSBANDRY

That farming can be made more profitable raising live-stock and practising mixed farming.

Several new breeds of cows like Holstien-Fresien, Jersey, Red Dane, Brown Swiss have been introduced in our country. The artificial insemination tecnhique is fairly developed. It is recommended that artificial insemination may be fully utilised by the farmers for breeding pedigree cattle.

It is further recommended that the milk collection zones may be extended to the interior villages so that a large number of farmers could be benefitted.

It is recommended that whereever possible buffaloes and goats may also be raised for milk. Sheep and poultry birds may be raised with profit on these farms.

Dairying and poultry keeping courses should be organised at the training centres for young and adult farmers.

Group. 8.

FARMERS' ORGANISATION

The following suggestions are made for improving the programme of Bharat Krishak Samaj :

1. Organise conducted study tours of farmers on demonstration farms and Research Institutes.
2. The organisation should be strengthen by enrolling more members and making the organisation as programme—orientated.
3. Support and promote a farm youth and rural women's programme.
4. Encourage Inter-State and International Farm Youth Exchange Programme and utilise the experiences gained by the exchange participants.
5. National Farm Demonstration programme should be used for training the farmers.
6. Organise local farmers visits to the farms of successful farmers in the local areas.

Group. 9.

GENERAL

Agricultural Universities :

Agricultural Universities play an important role in improving our agriculture. Efforts should be made to bring the laboratories and their findings nearer to the farmer and the farm problems. Similarly Scientists in the Universities should come closer with farmers on the farms.

Horticulture :

Development of Horticulture is essential for getting balanced nutrition. Young Farmers and farm Women should be encouraged to take up vegetable growing, preservation and home canning.

Extension :

Extension work is based on motivation, which requires coordinated efforts by members of Government and Non-Government agencies in different areas. Therefore, it is recommended that both the agencies should evolve a cooperation and coordinated programme to promote the extension work.

Storage :

With the increase of farm production the need for adequate storage has become an imperative. It is recommended that storage facilities should be made available to the farmers at the convenient places and ware-houses facilities be extended to the maximum number of farmers.

FLOODS CAN BE TAMED

In our country, devastating floods occur year after year, causing untold misery to people and enormous damage to crops and property — the annual estimate being over Rs. 100 crores.

HOW TO AVOID :

- ★ by paying heed to timely warnings
- ★ by raising level of villages in flood zones
- ★ by desisting from unauthorised cultivation on river banks
- ★ by cooperating in flood protection work

STEPS TAKEN :

- ★ 7060 km (4410 miles) of embankments and 8720 km (5450 miles) of drainage channels already constructed.
- ★ 4580 villages raised above the flood level.
- ★ 100 towns and 5.4 million hectares (13.5 million acres) of land afforded protection against flood ravage.

FLOODS ARE NATURAL

BUT NOT ALL THE

DAMAGE THEY CAUSE

CENTRAL WATER AND POWER COMMISSION
MINISTRY OF IRRIGATION & POWER, GOVERNMENT OF INDIA

davp 68/601

Regd. No. 1092

Farmers & Farm-Leaders

Are you a member of

BHARAT KRISHAK SAMAJ

if not, Join one Join all

as Life member/Family Life Member to

- ☐ *make your voice more loud and forceful*
- ☐ *solve your day-to-day problems of farming through this organisation*
- ☐ *read Krishak Samachar (Hindi, English or Marathi) free of cost throughout your life*
- ☐ *meet the farmers of other countries and enrich your knowledge & uuderstanding for better farming & better living.*
- ☐ *make prosperous the farming community to build the affluent & rich nation.*

Bharat Krishak Samaj

is a non-political, non-sectarian association of farmers of India, dedicated to improving the welfare of the farmers. It speaks and acts for farmers. It deals with the farm problems, holds seminars, big fairs & exhibitions and promotes mutual exchange of farmers with foreign countries,

Write for membership form & other free literature to the—

Secretary

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