

unfortunates—and they are luckily few—for whom eugenic reasons, or economic reasons of a serious character, dissuade normal

generation, we counsel periodic continence—and we believe the counsel is good and praiseworthy.

## Fruit Research in India : Its Importance, History and Scope.

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### INTRODUCTORY.

**J**UST as the Department of Agriculture forms a minor subject in the administrative classification of the Government of India, the development of fruit industry forms indeed a very small part of the activities of the Agricultural Departments in India, in spite of the fact that India claims to have more than five million acres under fruit and vegetables. Consequently this country, which has great potentialities for development, imports annually fruit worth about twenty million rupees from foreign countries. Not only is this so, but while the acreage under fruit and vegetables has remained practically stationary for several years past, the imports of foreign fruit have increased by leaps and bounds in recent years. The steady acreage under fruit and vegetable and the increasing imports indicate that the total consumption in the country of these commodities has increased but it has not been followed by any extension of fruit and vegetable cultivation.

The importance of the development of the fruit industry is, however, recently attracting the attention of the Agricultural mind in various parts of India, which is indeed a welcome sign of awakening in the right direction. The Imperial Department of Agriculture is now financing some fruit schemes in the different provinces with a view to develop this industry. It is generally recognised that in the economic uplift of rural areas, in the financial success of large irrigation projects which are undertaken at the cost of huge amounts in the Deccan, Sind and other parts of the country, and in the successful development of vast tracts of countryside, where the ordinary agricultural crops are not a financial success, the fruit industry will play a very important rôle. It is then natural that the question of fruit research should play as much part in the agricultural development of the country as any other branch of agricultural science, this being an important and valuable source of income to the peasant. The present time

is, therefore, most opportune to stress upon the minds of the general public the great importance of fruit research in India, and this note will have fully served its purpose if it does so.

### HISTORY OF FRUIT RESEARCH.

The fruit research dates back to the middle of the nineteenth century. Ferminger (1863), Woodrow (1877) and Bonavia (1890) have made valuable contributions to the limited volume of literature on the subject in India, by their attempts to describe the existing varieties of fruit and to classify them as far as possible.

The records of the work done under the auspices of the Pusa Institute of Agriculture show but very little headway made in this direction. This work chiefly deals with the establishment of a Fruit Farm at Quetta, and some work on the drying and packing of vegetables.

The United Provinces Department of Agriculture have restricted its activities to the establishment of farms and variety trials of exotic fruits. The Saharanpur Botanical Gardens have contributed substantially towards this work from the early years of the nineteenth century.

The Tarnab fruit farm has shown active interest in the development of the fruit industry in the North-Western Frontier Provinces. The introduction of improved varieties of plums in this Province is perhaps one of the few important projects which this Farm has carried out successfully. Some observations on the improvement of fruit stock have also been recorded in the reports of this Farm.

The Punjab and Central Provinces Departments of Agriculture have also done some work in this line. In the Punjab, a regular Department of Horticulture has been recently organised, and fruit work is making progress.

The Bombay Department of Agriculture organised their horticultural work as late as 1908, when the investigations on fruit trees were allied with botanical research. The



records show that a fair attempt was made to study the needs of the industry in the various parts of the Presidency, and to indicate possible lines of research to be adopted to solve the problems of the fruit grower.

It was in 1921, that the Bombay Department of Agriculture took the lead and organised a special horticultural branch with a view to solve the various problems of fruit growing in the Presidency. A great effort is made to bring the work of the Bombay Department of Horticulture in line with the recommendations of the Royal Commission on Agriculture in India. Their activities to evolve improved strains of fruit by selection, the study of the soils and their relations to the growth of fruit trees, and the marketing investigations are now well in hand. This department has also attempted successfully for the first time in the history of Indian fruits the problem of Export of Indian Fruit to the European markets.

The Madras Presidency, Bihar and Orissa and Bengal are yet studying the means to establish their fruit farms and to stimulate researches in this direction in the near future.

It is observed from the survey of work done that the earlier attempts at horticultural research were spasmodic and lacked continuity—a factor which is essential to build up a really scientific structure. It may be true that these attempts have but poorly subscribed to the industrial benefit of the country, but the importance of the work cannot be belittled, as a beginning had to be made perhaps in this very manner.

It may be clearly stated here that although the fruit industry and researches towards its development, now form the major part of the activities of most of the agriculturally advanced countries of the world like Italy, France, and various states of the United States of America, almost every country started her work under equally undeveloped conditions. It is only with steady and thorough research and organisation that they have built up their modern industry. Italy could not have held the monopoly of fruit products if she had not staked millions of liras in finding ways and means to improve the quality of their fruit crops and developed a system of handling and marketing them efficiently. The United States of America could not have developed their fruit industry to the present high level, if

they had not spent millions of dollars in fruit researches, nor could the French have boasted of their high efficiency if their Government were holding back the expenditure of their gold. The same principles hold good to the conditions of the present-day India. It is feared that no developments in this direction are possible, without properly organising and following up researches on fruit.

It is surprising to note that in India the majority of the Provinces have not as yet established even a fruit farm where such researches can be carried out. But it is recently announced that the Imperial Council of Agricultural Research has taken the initiative in this direction and has agreed to finance some of the Provinces in establishing their fruit farms.

The importance of fruit researches till recently was not fully recognised by any Department of Agriculture in India, and probably it is this fact which largely accounts for the neglect of these researches.

#### SCOPE FOR WORK.

Even at present as explained above, almost every branch of the Indian fruit industry remains still to be explored fully and the Science presents a wide field for active research. The chief lines of work for the development may be classified under the following heads:—

1. Improvement in the quality of seeds and nursery stock and their standardisation.
2. Improvements in the methods of cultivation and the control of diseases.
3. Efficiency in transport and safety in delivery of fresh fruit.
4. Improvement in the system of marketing and storing fruit.
5. Proper utilisation of the surplus produce.

The Royal Commission on Agriculture in India have devoted a chapter in their report to horticulture and plantations, and have indicated the possible lines of research to be conducted for the development of the fruit industry. The Commission report: "There is, however, much important research work to be done, notably in selecting and classifying root stocks. The aggregate number of fruit trees in the country is very large and an improvement in quality alone, quite apart from the increase in number, would confer great benefits on the people." The Commission further proceed to state that investigations into transport and markets



must form an essential part of any policy of active encouragement of either fruit or vegetable production. They also suggest that the possibilities of the home market for preserved and dried fruit and vegetables should be explored.

In fact researches in all these directions must be conducted simultaneously, or else the immediate benefit of any investigation in any particular line cannot be felt. For example, it is now found possible to export mangoes to European countries, but it is not possible to make this a commercially practicable project until and unless suitable and more economical transport facilities are secured for this trade. Comprehensive researches in all allied lines are, therefore, essential to succeed in the development of an industry.

(1) Now turning to the lines of research indicated above individually, it is felt that a great deal of investigation is required in selecting and standardising our fruit and vegetable before a desirable quality for the market is obtained. It is really not known if any definite effort is already being made in this line in India, as yet. References, however, are available giving expression to the necessity of these investigations and reporting about certain abortive attempts made here and there. The disjointed nature of these accounts seems to be due to lack of funds and policy and perhaps necessary amount of patience so essential in following up research. Investigations to improve the quality of seeds and nursery stock are imperative as they form the basis of the whole structure on which the industry can be built.

(2) Improvements in the methods of cultivation of our fruit trees, and the control of diseases and pests form another important aspect of this industry. A very fruitful research work can be undertaken to find out the suitability and adaptation of various varieties of fruit to soil and climatic conditions of different tracts. The physiological effects of various soils on the growth of commercial strains also require a careful and detailed investigation. The present tendency is to refer to foreign literature and to advise prospective growers to follow foreign treatments. Such advice is often found to be far from satisfactory, and in many cases it is found disappointing and ruinous. There are instances where hurried observations seem to establish facts which do not stand later

tests. There are also instances where application of foreign treatments has completely destroyed plantations. There are also cases where money spent on treatment is not economical and the benefits which accrued discourage to follow such remedies. Most unfortunately, however, a disregard of these points even on the part of high authorities has already proved a ruinous policy. Research in this line is expected to be as profitable as in any other line and presents a very great scope for work.

(3) The conditions with regard to cost and efficiency of transport and the safety of goods during transit are at present extremely unsatisfactory in India. This line of development embraces a wide field. The proper packing materials to suit the requirement of the present means of transport is yet to be designed. Researches are needed in the ways and means of stocking and hauling packages and economically transporting them from the place of cultivation to the distributing centre. Researches in this direction appear to be of an inter-provincial nature and one can easily find reason why they are neglected. There is no inter-provincial activity at present so far as this aspect of fruit trade is concerned. All provinces are carrying on their work in a very air-tight compartment manner. But no one can deny that this line of research forms a very integral part of the development of the industry as a whole. It is no use having a good quality of fruit if it cannot be exported or transported to places of demand. It is no use opening up large plantations and spending money if the produce cannot be economically distributed.

(4) The part which the system of marketing plays cannot be sufficiently emphasised. A small amount of research work in this direction has been done in India, but the findings could not be put into effect as several other allied agencies and factors such as transport, packing materials and freights, are not suitably harmonised. The Bombay Presidency, undoubtedly has taken the lead in this direction. The Government of Bombay have appointed a committee to investigate this subject. It is anticipated that the line of development which this Committee will suggest will be worth following. These researches will be useful for inter-provincial work. But there is a need for undertaking such researches in other Provinces to solve their local difficulties.



(5) The utilisation of surplus produce of the season is another line where researches lack in India. Recently a couple of schemes such as the Manufacture of Lime Juice in the Bombay Deccan and the Establishing of a Canning Laboratory in the North-West Frontier Provinces have appeared before the public. Beside these schemes, there does not seem to be anything else of much interest. The failure of Koonoor Laboratory of course has caused some setback in this direction. Of course, the best way to get over such a difficulty is to have well-considered projects before money is invested and effort is made to carry on the work. The failure of one scheme should not necessarily discourage the carrying out of another. There is no denying of the fact that failures in researches will be as common as successes if not more.

The above outline will show that practically every aspect of fruit industry remains to be studied. Considerable preliminary experimental work must be conducted probably at considerable expenditure to organise researches in this direction. It will not be out of place to mention at this stage the chief ways by which fruit researches can be successfully carried out. It is suggested that the fruit researches must be classified as the *Central Subjects* and the *Provincial Subjects*.

The following research work may be included in the list of *Central Subjects*:—

- (a) Researches relating to the import and export of fresh fruits and fruit products.
- (b) The problems connected with the marketing of fruit including transport.
- (c) The investigations relating to the preservation of fruit and the manufacture of their products.

Other researches are more of a provincial nature and may be left to the Provincial Departments to follow. These can be grouped as follows:—

1. Investigation connected with the

formation, structural fertility and management of soils suitable for fruit culture.

2. The study of various climatic conditions, their suitability to the growth of various crops and the selection of suitable commercial varieties.

3. The work of propagation.

4. Problems connected with the lay-out and general cultural operations.

5. The extension of area under different crops.

Such a division of work in dealing with fruit researches is indispensable. As may be seen from the items put under the central subjects they involve an all-India and inter-provincial activity. The Central Government is the only competent authority that can handle questions and problems of such wide dimensions. The present administrative restrictions do not allow the Provincial Governments to pay any attention to these subjects. Even if they tried, they would find it not only an expensive affair owing to lack of facilities but also an irksome matter causing delay at every step. Then the Provincial Governments have not the necessary freedom of action in these matters. Necessary rules and regulations of Government in developing an All-India Industry can be framed and issued by the Central Government alone to make them effective.

The fruit industry and research in it are in fact in their infancy. Its importance is always overshadowed by other agricultural developments, thus throwing in the background these researches. It is anticipated that with the present awakening in Agricultural Department these researches will be given equal place as those relating to other agricultural industries. The effort which is required to be made to develop this industry and put it on a sound footing is not in any way less expensive and less cumbersome than other developments and these activities should not be considered of less importance as it is commonly understood.