



सत्यमेव जयते

INTERIM REPORT
OF THE
NATIONAL COMMISSION ON
AGRICULTURE

ON

ESTABLISHMENT OF AGROMETEOROLOGICAL
DIVISIONS IN AGRICULTURAL UNIVERSITIES

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GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
NEW DELHI
(DECEMBER 1971)

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Summary of Recommendations

1. The Commission has already recommended, in its Interim Report on 'Some Aspects of Agricultural Research, Extension and Training', the setting up of a Division composed of the three wings of teaching, research and extension for every subject in the Agricultural Universities. The same recommendation should hold good for agricultural meteorology and a Division for this subject should be started in every Agricultural University and certain other selected universities and central institutions having the requisite facilities. Action in this regard should be phased consistent with the availability of qualified staff. To start with, the Division should comprise one Professor, one Assistant Professor and two Lecturers and other necessary supporting staff. The staff should be augmented in consonance with the development of teaching and research in the subject in the universities and institutions concerned. (Paragraph 3.14)
2. Agromet Divisions should deal with meteorological research of biological nature, take steps to start teaching agricultural meteorology at all levels and infuse meteorological awareness in various agricultural activities. (Paragraph 3.15)
3. The ICAR should take immediate steps to establish and finance Agromet Divisions and draw up qualifications for staff and syllabi for various courses in consultation with the Agricultural Universities, India Meteorological Department and other relevant institutions. (Paragraph 3.16)
4. Each Agromet Division should have a well equipped first class field observatory. Such observatories at the universities which fall within the network of the India Meteorological Department should be equipped, installed and maintained by that Department at its own cost. For other observatories, the cost of equipment should be borne by the ICAR, but it should be made available, installed and maintained by the India Meteorological Department. (Paragraph 3.17)

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SECTION I

Introduction

1.1 One of the terms of reference of the National Commission on Agriculture pertains to "Achievements, deficiencies and potential of the development of agricultural research and steps needed for promotion of agricultural research and its application to field conditions in the context of fast developing technology..." If there is one single natural factor which can undo the progress of agriculture despite all the best inputs, management and technical knowhow, it is weather. Farmers have always been weather-wise, but it was the Royal Commission on Agriculture (1928) which was responsible for introducing meteorological thinking in the science of agriculture in India. The Royal Commission had pointed to the need for the use of meteorological data, instruments and methods of recording and interpreting observations in the field of agriculture and had stated that there were two directions in which scientists interested in agriculture should undertake investigations of meteorological nature. The first was statistical and the second biological. The Royal Commission had also mentioned that the Meteorological Department might offer facilities for postgraduate students wishing to familiarise themselves with meteorological methods in order to undertake research on the relationship existing between weather and crops.

1.2 Progress in the field of agricultural meteorology in the country has been mostly in setting up of observatories in agricultural farms. Meteorological research in close association with agriculture* has been limited. The teaching of agricultural meteorology at graduate and postgraduate levels has yet to be developed. For this purpose, it appears very necessary to start Agrometeorological Centres in the Agricultural Universities. The Commission therefore felt it desirable to examine this aspect and bring out an Interim Report for immediate consideration and

*The term agriculture here includes horticulture, animal husbandry, fisheries and forestry.

action. The view of the Agricultural Universities, India Metecrological Department and certain other institutions or individuals have been obtained. The questionnaire issued and the list of individuals and institutions from whom replies have been received are attached as Appendices I & II respectively. In the light of replies received, the Commission thought it more appropriate to broaden the scope of the subject and give the Agrometeoro-logical Centre the status of a Division as recommended in the Interim Report on Some Aspects of Agricultural Research, Extension and Training.



SECTION II

Present Position

Historical

2.1 In pursuance of the recommendations of the Royal Commission on Agriculture (1928), a Division of Agricultural Meteorology was set up in 1932 in the India Meteorological Department at Poona. It established the Central Agricultural Meteorological Observatory in the precincts of the Agricultural College at Poona. An all-India Crop Weather Scheme was started early in the forties. As a part of the Crop Weather Scheme, many agrometeorological observatories were opened in the country in the experimental farms of the States or the Centre and observations were started relating to the five principal crops of the country, viz. wheat, paddy, jowar, cotton and sugarcane. The Indian Council of Agricultural Research (ICAR) financed these programmes to begin with, but these were, in course of time, taken up as a part of the normal routine duties of the India Meteorological Department. The farm observatories and their staff are being financed since their inception by the Central or State Governments concerned.

Present status

2.2 The Agricultural Meteorological Division of the India Meteorological Department has played a major role in the progress of agricultural meteorology in the country so far. A first class, well-equipped field observatory is attached to this Division for observational and experimental work. It conducts meteorological experiments as applied to agriculture. It has a programme of training in agricultural meteorology for the nationals of this country as well as of other developing countries. The Division of Agricultural Meteorology at Poona collates and analyses the crop-weather data received from the agromet observatories. It has also been working as a liaison between the meteorological and agricultural organisations. A regular weather service for farmers on a regional basis was started by the India Meteorological Department.

logical Department in 1945. This service consists of bulletins of actual and expected weather for each district for 2 or 3 days issued by the department's five Regional Meteorological Centres at Bombay, Calcutta, Madras, New Delhi and Nagpur. In order to expand the network of Meteorological Centres for more efficient service, the India Meteorological Department is at present establishing one such centre in each state. Two of them have already come into being at Jaipur and Gauhati. The Farmers' Weather Bulletins issued by these centres are translated into regional languages and broadcast by All India Radio in their rural programmes, usually every evening. Absence of quick dissemination of weather Bulletins among farmers and their proper interpretation constitutes a serious lacuna in this programme. Medium range and long range forecasts which can give farmers information on weather for longer periods are limited. These and other related problems of weather forecasts for farmers (e.g., incidence of pests and diseases and intensity of locusts) are engaging the attention of a Working Group of this Commission.

2.3 The progress in the country in general in the field of agricultural meteorology has chiefly been confined to the establishment of agricultural meteorological observatories. There are about 125 observatories in the country at present. These are mostly situated on crop farms. The Indian Agricultural Research Institute at New Delhi has recently strengthened its agricultural meteorological section by the addition of a few meteorologists. Some of the central research institutes like the Forest Research Institute at Dehradun and Indian Veterinary Research Institute at Izatnagar/Mukteshwar have also been conducting meteorological research relevant to their disciplines. But, observatories on animal farms, horticulture, forest or plantation surroundings are few.

2.4 The teaching of agricultural meteorology is yet in an initial stage. Elementary course in agricultural meteorology has been a part of the syllabus of some Agricultural Colleges. There are very few institutions in India which have well developed undergraduate or postgraduate courses on this subject. The Agricultural Institute at Anand imparts training in agricultural meteorology both at the undergraduate as well as postgraduate levels. Punjabrao Krishi Vidyapeeth of Akola has also recently instituted such courses. Andhra University has got a full-fledged Department of Meteorology and Oceanography; it has introduced Agricultural Meteorology as one of the elective subjects for M.Sc. (Tech.) course.

Scope

2.5 But for the recording of routine meteorological or crop observations, meteorological research on a wide variety of biological problems conducted in intimate biological surroundings is still to be developed on a scale which can lead to reasonable statistical conclusions. Teaching of agricultural meteorology in general has yet to be developed. The Agricultural Universities in the country can now provide the opportunity to derive full benefit from the science of meteorology. It is thereby possible to develop meteorology in the very environment in which research on the subject is required to be made. The universities provide the right type of atmosphere where meteorological problems in all the following branches can be studied:—

- (i) agronomy
- (ii) plant breeding
- (iii) crop physiology
- (iv) entomology
- (v) plant pathology
- (vi) horticulture, forestry and plantations
- (vii) animal husbandry (including animal diseases)
- (viii) fisheries.

For this purpose, establishment of a full-fledged Division of Agricultural Meteorology in every Agricultural University is imperative.

SECTION III

Establishment of Division of Agricultural Meteorology in Agricultural Universities

3.1 All the Agricultural Universities, to whom a reference was made regarding the need for setting up agrometeorological centres, are agreed that there is an immediate need for introducing agricultural meteorology in the Agricultural Universities. One of the universities has suggested that this subject can form part of the faculty of Agricultural Engineering. Other universities feel that it could be given the status of a separate faculty altogether.

3.2 We have already recommended the setting up of Divisions for different disciplines in the Agricultural Universities in our Interim Report on Some Aspects of Agricultural Research, Extension and Training. A Division will integrate within itself all the three aspects of teaching, research and extension pertaining to a particular subject. Realizing the importance of meteorology in agriculture, there is a strong case for the establishment of a Division of Agricultural Meteorology, whether for propagation of high yielding varieties; or development of better land and water use techniques; or revision of cropping patterns and techniques for boosting production; or control of pests, diseases and pollution; or attuning farm operations to most favourable times; or for problems of animal sanitation, health and production etc., all of which envisage an integration of teaching, research and extension.

Functions

3.3 For research activities, the Agromet Divisions will be responsible for collecting basic meteorological data in agricultural environments and establish exchange of similar data with the India Meteorological Department. They will conduct researches in the field of agricultural meteorology with emphasis on biological topics and assist the various other Divisions of the universities in planning and executing research programmes and interpreting results of their research.

3.4 In the matter of education, the Agromet Divisions should be responsible for teaching the subject of agricultural meteorology upto postgraduate levels. They may make a start with undergraduate level and extend it slowly to higher levels in stages in conformity with the demand for higher cadres of agromet personnel.

3.5 These Divisions can also be made responsible for instituting short-term courses for those who wish to prepare themselves for jobs of agrometeorological technicians at lower levels and for other staff of the agricultural and allied departments according to need.

3.6 The World Meteorological Organisation has drawn up various types of courses in agricultural meteorology. A few institutions have already introduced agricultural meteorology in their curricula. All these materials will be useful for drawing up syllabi for different purposes.

3.7 In the field of extension too, the Agromet Division will have to play the same role as has been contemplated for the other Divisions. It may begin by creating a meteorological awareness in various agricultural activities. It should receive the meteorological forecasts from the India Meteorological Department, interpret them and render suitable advice to persons concerned. It should also assist the Meteorological Department by offering comments on their forecasts in the light of actual experience and thereby improving the quality of forecasts.

Staff and equipment

3.8 It is essential that the Division of Agricultural Meteorology should have its full complement of staff. A start can be made with one Professor, one Assistant Professor, two Lecturers supported by a requisite number of ancillary office, laboratory and field assistants. The strength can be increased progressively in accordance with the development of activities.

3.9 A few of the universities have suggested in reply to our questionnaire that such Division could be manned and equipped by the India Meteorological Department, but the administrative and technical control should rest with the university concerned. This proposition is untenable because of the administrative difficulties involved. The India Meteorological Department is not in favour of taking the responsibility of staff. Most

of the universities are in favour of the idea that the staff of Agromet Division should be under their control.

3.10 Agromet Division of every university should have a well equipped first class field observatory for its effective functioning. The India Meteorological Department is prepared to equip, instal and maintain at its own cost such of the agromet observatories as are situated in Agricultural Universities and form part of the nation-wide network of the India Meteorological Department.

3.11 Some of the universities feel, and one of them very emphatically, that the staff of Agromet Divisions should have basic qualifications in agriculture; but, in reality there are few agricultural graduates available in the country who have post-graduate qualifications in agricultural meteorology. Thus, recruitment for immediate employment in the higher echelons will have to be mostly from amongst the basic science graduates who have had further professional or academic training in meteorology. The sources will be the India Meteorological Department and such universities which have got courses in meteorology, e.g. the Andhra and Banaras Hindu Universities. The India Meteorological Department is agreeable to lend its meteorologists on deputation terms. If pure science personnel are recruited, proper familiarisation training in agricultural sciences will have to be arranged for them by the universities concerned. If a few agricultural graduates are available with postgraduate qualifications in agricultural meteorology from the institutes like Anand, it will preferable to train them up in general meteorology in the India Meteorological Department.

3.12 Many Agricultural Universities are of the view that the ICAR or the Government of India should finance the Agromet Divisions on a cent per cent basis at least for five years to begin with. As the ICAR is really meant for financing research and teaching in agriculture, it is the most appropriate agency for financing these Divisions.

3.13 A mention has already been made about the Agricultural Institutes at Anand and the Andhra and Banaras Hindu Universities. Banaras is a central university and has a full-fledged Agricultural College. There are also central institutions like the Indian Agricultural Research Institute, New Delhi; Indian Veterinary Research Institute, Izatnagar; National Dairy Research Institute, Karnal; Central Inland Fisheries Research

Institute, Barrackpore; Forest Research Institute, Dehradun, which are engaged in research and teaching. All such and similar institutions can be treated at par with the Agricultural Universities for the purpose of creating Agromet Divisions.

Recommendations

3.14 The Commission recommends that a Division of Agricultural Meteorology should be started in every Agricultural University and certain other selected Universities and central institutions which have the requisite facilities. As paucity of qualified staff may be a constraint to begin with, a start should be made with a few representative universities; but, consistent with the availability of staff, an attempt should be made to cover all the Agricultural Universities, institutions, etc. as rapidly as possible. This Division should initially start with a complement of one Professor, one Assistant Professor, two Lecturers and requisite number of supporting office, laboratory and field assistants. Further augmentation of staff should take place in accordance with future developments.

3.15 The Commission also recommends that the Agromet Division should deal with meteorological research of biological nature, take steps to start teaching agricultural meteorology in all the stages of university education, impart training to concerned field workers and infuse meteorological thinking in various agricultural activities.

3.16 The Commission further recommends that the ICAR should take immediate steps to establish and finance the Agromet Divisions in the universities and institutions. The ICAR should draw up qualifications for the staff and syllabi for various teaching courses in consultation with the Agricultural Universities, India Meteorological Department and other relevant institutions.

3.17 We also recommend that each Agromet Division should have a well-equipped first class field observatory. Such observatories which form part of the network of agromet observatories of the India Meteorological Department should be equipped, installed and maintained by the India Meteorological Department at its own cost. The cost of equipment at other observatories should be borne by the ICAR, but even then the equipment should be made available installed and maintained by the India Meteorological Department.

SECTION IV

Acknowledgements

4.1 The Commission is grateful for the ready response that has been shown to its questionnaire by the India Meteorological Department, Agricultural Universities, other concerned institutions and individual scientists.

4.2 The Commission places on record its appreciation of the valuable work done by Dr. R.K. Misra, Specialist, who assisted in the preparation of this report.

Sd/- B. Sivaraman

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Member Secretary

New Delhi;
30th Dec., 1971

NATIONAL COMMISSION ON AGRICULTURE

Questionnaire on the creation of Agromet Centres in Agricultural Universities

In India, situated as we are geographically, the profound influence of weather upon agriculture is self-evident. The subject of weather in relation to agriculture is at present dealt with in the India Meteorological Department. This Department has a separate Division of Agricultural Meteorology at Poona. This Division has been responsible for setting up of Agrometeorological Observatories conducting research and imparting training on Agrometeorological problems and providing meteorological data to agricultural scientists and administrators. The Forecasting Units of the India Meteorological Department have been issuing Farmers' Weather Bulletins as a part of their routine forecast.

- (1) Is time not ripe now to have a full-fledged Agromet Centre in every Agricultural University? Such a centre will be able to undertake experimental work on Agrometeorology which is of biological nature. Such a centre will also be useful for imparting education on Agricultural Meteorology. Such a centre will also assist various Divisions in Universities with regard to their requirements of weather forecast.
- (2) If the answer to question 1 is in affirmative is it not necessary that the composition of Agromet Centres in Agricultural Universities should be of a high order headed by Senior Meteorologists and provided with a sufficient complement of competent meteorological staff?
- (3) As meteorology is a highly specialised branch prospects of qualified Meteorologists and meteorological staff once recruited in University service, will be blocked for ever. In order to overcome this drawback, will it not be better if Agromet Centres of Agricultural Universities are under the administrative control of the India Meteorological Department so that they can belong to the main stream of that Department for all practical purposes, excepting the technical service for which they shall be responsible to University authorities?
- (4) If the answer to question 3 is in affirmative, what should be the role of the India Meteorological Department and the Universities for sharing expenditure on Agromet Centres?
- (5) Cannot such Agromet Centres as envisaged here start functioning with effect from the next academic session commencing with June 1972 or so?
- (6) Are there any other views on this subject?

List of Individuals and institutions who replied to the Questionnaire

Name	Designation	Address
1. Dr. P. Koteswaram	Director General of Observatories	Meteorological Department, Lodi Road, New Delhi-3.
2. Dr. C. Dakshinamurthy	Head of the Division of Agricultural Physics	Indian Agricultural Research Institute, New Delhi-12.
3. Dr. M. S. Randhawa	Vice-Chancellor	Punjab Agricultural University, Chandigarh.
4. Dr. G. S. Mahajani	Vice-Chancellor	University of Udaipur, Udaipur, Rajasthan.
5. Shri D. P. Singh	Vice-Chancellor	U.P. Agricultural University, Pantnagar, District Nainital, Uttar Pradesh.
6. Shri S. K. Chakraberthy	Vice-Chancellor	Rajendra Agricultural University, Bihar Veterinary College Campus, Patna, Bihar.
7. Dr. L. S. Negi	Vice-Chancellor	Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh.
8. Dr. C. N. Nanda	Vice-Chancellor	Orissa University of Agriculture and Technology, Bhubaneswar-3.
9. Shri B. R. Sawant	Registrar and I/c Vice-Chancellor	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra.

Name	Designation	Address
10. Shri B. A. Phadnis	Principal and Associated Dean, Faculty of Agriculture	Punjabrao Krishi Vidya-peeth, Akola, Maharashtra.
11. Shri O. Pulla Reddi	Vice-Chancellor	Andhra Pradesh Agricultural University, Dilkusha, Hyderabad, Andhra Pradesh.
12. Dr. K. C. Naik	Vice-Chancellor	University of Agricultural Sciences, Post Bag 391, Bangalore-3, Mysore.
13. Dr. Dharampal Singh	Director	U.P. Institute of Agricultural Sciences, Kanpur, Uttar Pradesh.
14. Dr. H. S. Rathor	Professor and Head, Department of Geophysics	Banaras Hindu University, Varanasi, Uttar Pradesh.
15. Dr. P. D. Mistry*	Head, Department of Physics	Institute of Agriculture, Anand, Gujarat.
16. Dr. R. Ramanadham	Professor, Department of Meteorology and Oceanography	Andhra University, Waltair, Andhra Pradesh.
17. Dr. K. Ramakrishnan	Dean	Agricultural College and Research Institute, Coimbatore-3, Tamil Nadu.

*Personal discussion.