

ROYAL COMMISSION
ON
AGRICULTURE IN INDIA

Volume IX

EVIDENCE

TAKEN IN THE
North-West Frontier Province



CALCUTTA: GOVERNMENT OF INDIA
CENTRAL PUBLICATION BRANCH
1937

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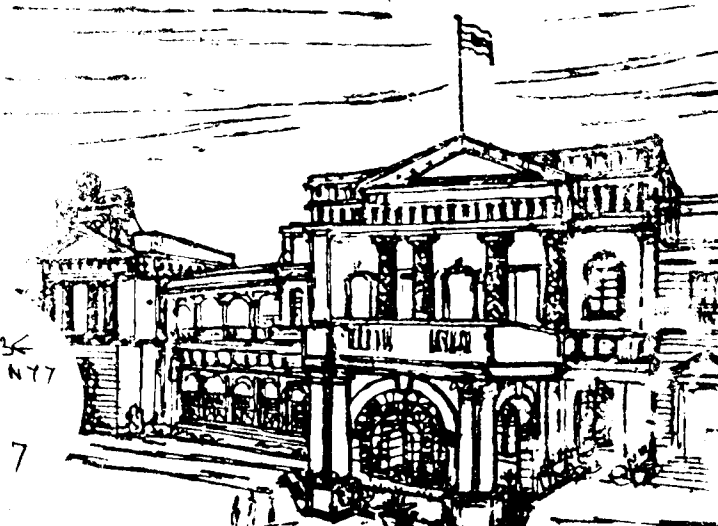
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Volume IX

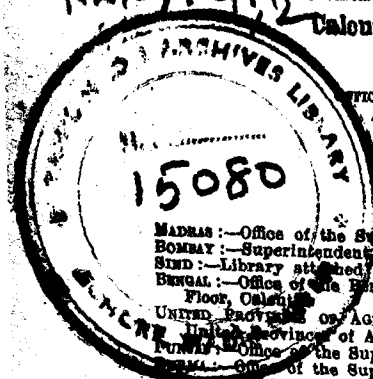
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North-West Frontier Province



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INTERIM REPORT.

To

THE KING'S MOST EXCELLENT MAJESTY.

May It Please Your Majesty,

We, the Commissioners appointed to examine and report on the present conditions of agricultural and rural economy in British India, and to make recommendations for the improvement of agriculture and to promote the welfare and prosperity of the rural population; in particular, to investigate:—(a) the measures now being taken for the promotion of agricultural and veterinary research, experiment, demonstration and education, for the compilation of agricultural statistics, for the introduction of new and better crops and for improvement in agricultural practice, dairy farming and the breeding of stock; (b) the existing methods of transport and marketing of agricultural produce and stock; (c) the methods by which agricultural operations are financed and credit afforded to agriculturists; (d) the main factors affecting rural prosperity and the welfare of the agricultural population; and to make recommendations; availing ourselves of Your Majesty's permission to report our proceedings from time to time, desire to submit to Your Majesty the minutes of the evidence which we have taken in respect of the North West Frontier Province on the subject of our Inquiry.

All of which we most humbly submit for Your Majesty's most gracious consideration.

(Signed) LINLITHGOW,
Chairman.

(„) H. S. LAWRENCE.
(„) T. H. MIDDLETON.
(„) J. MACKENNA.
(„) H. CALVERT.
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(„) L. K. HYDER.
(„) B. S. KAMAT.

(Signed) J. A. MADAN,
(„) F. W. H. SMITH,
Joint Secretaries.

25th July, 1927.

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TERMS OF REFERENCE

Generally,

To examine and report on the present conditions of agriculture and rural economy in British India and to make recommendations for the improvement of agriculture and the promotion of the welfare and prosperity of the rural population ;

In particular to investigate—

- (a) the measures now being taken for the promotion of agricultural and veterinary research, experiment, demonstration and education, for the compilation of agricultural statistics, for the introduction of new and better crops and for improvement in agricultural practice, dairy farming and the breeding of stock ;
- (b) the existing methods of transport and marketing of agricultural produce and stock ;
- (c) the methods by which agricultural operations are financed and credit afforded to agriculturists ;
- (d) the main factors affecting rural prosperity and the welfare of the agricultural population ;

and to make recommendations.

It will not be within the scope of the Commission's duties to make recommendations regarding the existing system of landownership and tenancy or of the assessment of land revenue and irrigation charges, or the existing division of functions between the Government of India and the local Governments. But the Commission shall be at liberty to suggest means whereby the activities of the Governments in India may best be co-ordinated and to indicate directions in which the Government of India may usefully supplement the activities of local Governments.

QUESTIONNAIRE

PART I

Question.

1. Research.
2. Agricultural education.
3. Demonstration and propaganda.
4. Administration.
5. Finance.
6. Agricultural indebtedness.
7. Fragmentation of holdings.

PART II

8. Irrigation.
9. Soils.
10. Fertilisers.
11. Crops.
12. Cultivation.
13. Crop protection.
14. Implements.

PART III

15. Veterinary.
16. Animal husbandry.

PART IV

17. Agricultural industries.
18. Agricultural labour.
19. Forests.
20. Marketing.
21. Tariffs and sea freights.
22. Co-operation.
23. General education.
24. Attracting capital.
25. Welfare of rural population.
26. Statistics.

QUESTIONNAIRE

PART I

1. Research.

(a) Have you suggestions to advance for the better organisation, administration and financing of—

(i) All research affecting the welfare of the agriculturist, including research into the scientific value of the indigenous theory and traditional methods of agriculture,

(ii) Veterinary research ?

(b) If in cases known to you progress is not being made because of the want of skilled workers, or field or laboratory facilities for study or by reason of any other handicaps, please give particulars. [Suggestions of a general kind should be made under (a) ; answers under this heading should relate to specific subjects. The purpose is to secure a list of the problems met with by scientific investigators in the course of their work which are being held over because of lack of resources or deficient organisation.]

(c) Can you suggest any particular subject for research not at present being investigated to which attention might usefully be turned ?

2. Agricultural Education.

With reference to any form of agricultural education of which you may have experience, please state your views on the following :—

(i) Is the supply of teachers and institutions sufficient ?

(ii) Is there an urgent need for extension of teaching facilities in any district or districts known to you personally ?

(iii) Should teachers in rural areas be drawn from the agricultural classes ?

(iv) Are the attendances at existing institutions as numerous as you would expect in present circumstances ; if not, state reasons. Can you suggest measures likely to stimulate the demand for instruction ?

(v) What are the main incentives which induce lads to study agriculture ?

(vi) Are pupils mainly drawn from the agricultural classes ?

(vii) Are there any modifications in existing courses of study which appear to be called for ; if so, what are they ?

(viii) What are your views upon (a) nature study ; (b) school plots ; (c) school farms ?

(ix) What are the careers of the majority of students who have studied agriculture ?

(x) How can agriculture be made attractive to middle class youths ?

(xi) Are there recent movements for improving the technical knowledge of students who have studied agriculture ?

- (xii) How can adult education in rural tracts be popularised ?
 (xiii) In suggesting any scheme for better educational facilities in rural areas, please give your views for (a) its administration and (b) its finance.

3. Demonstration and Propaganda.

- (a) What are the measures which in your view have been successful in influencing and improving the practice of cultivators ?
 (b) Can you make suggestions for increasing the effectiveness of field demonstrations ?
 (c) Can you suggest methods whereby cultivators may be induced to adopt expert advice ?
 (d) If you are aware of any striking instances of the success or the failure of demonstration and propaganda work, please give particulars and indicate the reasons for success or for failure.

4. Administration.

(a) Do you wish to suggest means towards the better co-ordination of the activities of the Governments in India or to indicate directions in which the Government of India may usefully supplement the activities of the local Governments ?

(b) Is it your opinion that the expert scientific knowledge required in the development of agriculture in the different Provinces could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India ? If so, indicate the types of work which would benefit by pooling the services of experts, and suggest how that work should be controlled.

(c) Are you satisfied from the agricultural standpoint with the services afforded by—

- (i) The Agricultural and Veterinary Services,
- (ii) Railways and steamers,
- (iii) Roads,
- (iv) Meteorological Department,
- (v) Posts, and
- (vi) Telegraphs, including wireless ?

If not, please indicate directions in which you think these Services might be improved or extended.

5. Finance.

(a) What are your views as to the steps that should be taken for the better financing of agricultural operations and for the provision of short and long-term credit to cultivators ?

(b) Do you wish to suggest means whereby cultivators may be induced to make fuller use of the Government system of *taccavi* ?

6. Agricultural Indebtedness.

- (a) What in your opinion are :—
 (i) the main causes of borrowing,
 (ii) the sources of credit, and
 (iii) the reasons preventing repayment.

(b) What measures in your opinion are necessary for lightening agriculture's burden of debt ? For example, should special measures be taken to deal with rural insolvency, to enforce the application of the Usurious Loans Act, or to facilitate the redemption of mortgages ?

(c) Should measures be taken to restrict or control the credit of cultivators such as limiting the right of mortgage and sale ? Should non-terminable mortgages be prohibited ?

7. Fragmentation of Holdings.

(a) Do you wish to suggest means for reducing the loss in agricultural efficiency attendant upon the excessive subdivision of holdings ?

(b) What are the obstacles in the way of consolidation and how can they be overcome ?

(c) Do you consider legislation to be necessary to deal with minors, widows with life interest, persons legally incapable, alienation and dissentients, and to keep disputes out of the courts ?

PART II

8. Irrigation.

(a) Name any district or districts in which you advocate the adoption of new irrigation schemes, or suggest extensions or improvements in the existing systems or methods of irrigation by—

- (i) Perennial and non-perennial canals,
- (ii) Tanks and ponds,
- (iii) Wells.

What are the obstacles in your district or Province to the extension of irrigation by each of the above methods ?

(b) Are you satisfied with the existing methods of distributing canal water to cultivators ? Describe the methods that have been employed to prevent wastage of water by evaporation and by absorption in the soil. What form of outlet for distribution to cultivators at the tail end do you regard as the most equitable and economical ? Have these methods and devices been successful, or do you wish to suggest improvements ?

(N.B.—Irrigation charges are not within the terms of reference of the Commission, and should not be commented upon.)

9. Soils.

(a) Have you suggestions to make—

- (i) for the improvement of soils, whether by drainage or other means, not dealt with under other headings in this questionnaire.
- (ii) for the reclamation of Alkali (Usar) or other uncultivable land,
- (iii) for the prevention of the erosion of the surface soil by flood water ?

(b) Can you give instances of soils known to you which, within your recollection, have—

- (i) undergone marked improvement,
- (ii) suffered marked deterioration ?

If so, please give full particulars.

(c) What measures should Government take to encourage the reclamation of areas of cultivable land which have gone out of cultivation?

10. Fertilisers.

(a) In your opinion, could greater use be profitably made of natural manures or artificial fertilisers? If so, please indicate the directions in which you think improvement possible.

(b) Can you suggest measures to prevent the fraudulent adulteration of fertilisers?

(c) What methods would you employ to popularise new and improved fertilisers?

(d) Mention any localities known to you in which a considerable increase in the use of manures has recently taken place.

(e) Has effect of manuring with phosphates, nitrates, sulphate of ammonia, and potash manures been sufficiently investigated? If so, what is the result of such investigation?

(f) What methods would you employ to discourage the practice of using cowdung as fuel?

11. Crops.

(a) Please give your views on—

- (i) the improvement of existing crops,
- (ii) the introduction of new crops including fodder crops,
- (iii) the distribution of seeds,
- (iv) the prevention of damage by wild animals.

(b) Can you suggest any heavy yielding food crops in replacement of the present crops?

(c) Any successful efforts in improving crops or substituting more profitable crops which have come under your own observation should be mentioned.

12. Cultivation.

Can you suggest improvements in—

- (i) the existing system of tillage, or
- (ii) the customary rotations or mixtures of the more important crops?

13. Crop Protection, Internal and External.

Please give your views on—

- (i) The efficacy and sufficiency of existing measures for protection of crops from external infection, pests and diseases.
- (ii) The desirability of adopting internal measures against infection.

14. Implements.

(a) Have you any suggestion for the improvement of existing, or the introduction of new, agricultural implements and machinery?

(b) What steps do you think may usually be taken to hasten the adoption by the cultivator of improved implements?

(c) Are there any difficulties which manufacturers have to contend with in the production of agricultural implements or their distribution for sale throughout the country? If so, can you suggest means by which these difficulties may be removed?

PART III

15. Veterinary.

(a) Should the Civil Veterinary Department be under the Director of Agriculture or should it be independent?

(b) (i) Are dispensaries under the control of Local (District) Boards? Does this system work well?

(ii) Is the need for expansion being adequately met?

(iii) Would you advocate the transfer of control to Provincial authority?

(c) (i) Do agriculturists make full use of the veterinary dispensaries? If not, can you suggest improvements to remedy this?

(ii) Is full use made of touring dispensaries?

(d) What are the obstacles met with in dealing with contagious diseases? Do you advocate legislation dealing with notification, segregation, disposal of diseased carcasses, compulsory inoculation of contacts and prohibition of the movement of animals exposed to infection? Failing legislation, can you suggest other means of improving existing conditions?

(e) Is there any difficulty in securing sufficient serum to meet the demand?

(f) What are the obstacles in the way of popularising preventive inoculation? Is any fee charged, and, if so, does this act as a deterrent?

(g) Do you consider that the provision of further facilities for research into animal disease is desirable?

If so, do you advocate that such further facilities should take the form of—

- (i) an extension of the Muktesar Institute, or
- (ii) the setting up, or extension of, Provincial Veterinary Research Institutions?

(h) Do you recommend that special investigations should be conducted by—

- (i) officers of the Muktesar Institute, or
- (ii) research officers in the Provinces?

(i) Do you recommend the appointment of a Superior Veterinary Officer with the Government of India? What advantages do you expect would result from such an appointment?

16. Animal Husbandry.

(a) Do you wish to make suggestions for—

- (i) improving the breeds of livestock,
- (ii) the betterment of the dairying industry,
- (iii) improving existing practice in animal husbandry?

(b) Comment on the following as causes of injury to cattle in your district—

- (i) Overstocking of common pastures,
 - (ii) Absence of enclosed pastures, such as grass borders in tilled fields,
 - (iii) Insufficiency of dry fodder such as the straw of cereals or the stems and leaves of pulses,
 - (iv) Absence of green fodders in dry seasons,
 - (v) Absence of mineral constituents in fodder and feeding stuffs.
- (c) Please mention the months of the year in which fodder shortage is most marked in your district. For how many weeks does scarcity of fodder usually exist? After this period of scarcity ends how many weeks elapse before young growing cattle begin to thrive?
- (d) Can you suggest any practicable methods of improving or supplementing the fodder supply that would be applicable to your district?
- (e) How can landowners be induced to take a keener practical interest in these matters?

PART IV

17. Agricultural Industries.

- (a) Can you give any estimate of the number of days of work done by an average cultivator on his holding during the year? What does he do in the slack season?
- (b) Can you suggest means for encouraging the adoption of subsidiary industries? Can you suggest any new subsidiary industries to occupy the spare time of the family which could be established with Government aid?
- (c) What are the obstacles in the way of expansion of such industries as beekeeping, poultry rearing, fruit growing, sericulture, pisciculture, lac culture, rope making, basket making, etc.?
- (d) Do you think that Government should do more to establish industries connected with the preparation of agricultural produce for consumption, such as oil pressing, sugar making, cotton ginning, rice hulling, utilisation of wheat straw for card-board, utilisation of cotton seed for felt, fodder, oil and fuel, utilisation of rice straw for paper, etc.?
- (e) Could subsidiary employment be found by encouraging industrial concerns to move to rural areas? Can you suggest methods?
- (f) Do you recommend a more intensive study of each rural industry in its technical, commercial and financial aspects, with a view to, among other things, introduction of improved tools and appliances?
- (g) Can you suggest any other measures which might lead to greater rural employment?
- (h) Can you suggest means whereby the people could be induced to devote their spare time to improving the health conditions of their own environment?

18. Agricultural Labour.

(a) What measures, if any, should be taken to attract agricultural labour from areas in which there is a surplus to—

- (i) areas under cultivation in which there is a shortage of such labour?
- and
- (ii) areas in which large tracts of cultivable land remain uncultivated?

Please distinguish between suggestions designed to relieve seasonal unemployment and proposals for the permanent migration of agricultural population.

(b) If there is any shortage of agricultural labour in your Province, what are the causes thereof and how could they be removed?

(c) Can you suggest measures designed to facilitate the occupation and development, by surplus agricultural labour, of areas not at present under cultivation?

19. Forests.

(a) Do you consider that forest lands as such are at present being put to their fullest use for agricultural purposes? For instance, are grazing facilities granted to the extent compatible with the proper preservation of forest areas? If not, state the changes or developments in current practice which you consider advisable.

(b) Can you suggest means whereby the supply of firewood and fodder in rural areas may be increased?

(c) Has deterioration of forests led to soil erosion? What remedies would you suggest for erosion and damage from floods?

(d) Can you indicate any methods by which supply of moisture in the soil, the rainfall and supply of canal water can be increased and regulated by afforestation or by the increased protection of forests so as to benefit agriculture? Would the same methods be useful in preventing the destruction by erosion of agricultural land?

(e) Is there an opening for schemes of afforestation in the neighbourhood of villages?

(f) Are forests suffering deterioration from excessive grazing? Is soil erosion being thereby facilitated? Suggest remedies.

20. Marketing.

(a) Do you consider existing market facilities to be satisfactory? Please specify and criticise the markets to which you refer, and make suggestions for their improvement.

(b) Are you satisfied with the existing system of marketing and distribution? If not, please indicate the produce to which you refer and describe and criticise in detail the channels of marketing and distribution from the producer to the consumer in India (or exporter in the case of produce exported overseas). State the services rendered by each intermediary and whether such intermediary acts in the capacity of merchant or commission agent, and comment upon the efficiency of these services and the margins upon which such intermediaries operate. Please describe

the method by which each transaction is financed, or in the case of barter, by which an exchange is effected.

(c) Do you wish to suggest steps whereby the quality, purity, grading or packing of agricultural produce may be improved, distinguishing where possible between produce destined for—

(i) Indian markets ?

(ii) Export markets ?

(d) Do you think that more effective steps might be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas ; crop returns ; complaints as to Indian produce from wheresoever originating ; and agricultural and marketing news in general ?

21. Tariffs and Sea Freights.

Do existing (a) customs duties, both import and export, and (b) sea freights adversely affect the prosperity of the Indian cultivator ? If so, have you any recommendations to make ?

22. Co-operation.

(a) What steps do you think should be taken to encourage the growth of the co-operative movement—

(i) by Government,

(ii) by non-official agencies ?

(b) Have you any observations to make upon—

(i) Credit societies ;

(ii) Purchase societies ;

(iii) Societies formed for the sale of produce or stock ;

(iv) Societies for effecting improvements—e.g., the digging of wells and the construction of bunds, walls and fences, or the planting of hedges ;

(v) Societies formed for the aggregation of fragmented holdings and their redistribution in plots of reasonable size ;

(vi) Societies for the co-operative use of agricultural machinery ;

(vii) Societies for joint farming ;

(viii) Cattle breeding societies ;

(ix) Societies formed for any purpose connected with agriculture or with the betterment of village life, but not specified above ?

(c) Where co-operative schemes for joint improvement, such as co-operative irrigation or co-operative fencing or a co-operative consolidation of holdings scheme, cannot be given effect to owing to the unwillingness of a small minority to join, do you think legislation should be introduced in order to compel such persons to join for the common benefit of all ?

(d) Do you consider that those societies of which you have personal knowledge have, in the main, achieved their object ?

23. General Education.

(a) Do you wish to make observations upon existing systems of education in their bearing upon the agricultural efficiency of the people ? If you make suggestions, please distinguish, as far as possible, between—

(i) Higher or collegiate,

(ii) Middle school, and

(iii) Elementary school education.

(b) (i) Can you suggest any methods whereby rural education may improve the ability and culture of agriculturists of all grades while retaining their interest in the land ?

(ii) What is your experience of compulsory education in rural areas ?

(iii) What is the explanation of the small proportion of boys in rural primary schools who pass through the fourth class ?

24. Attracting Capital.

(a) What steps are necessary in order to induce a larger number of men of capital and enterprise to take to agriculture ?

(b) What are the factors tending to discourage owners of agricultural land from carrying out improvements ?

25. Welfare of Rural Population.

(a) Outside the subjects enumerated above, have you any suggestions to offer for improving hygiene in rural areas and for the promotion of the general well-being and prosperity of the rural population ?

(b) Are you, for instance, in favour of Government conducting economic surveys in typical villages with a view to ascertaining the economic position of the cultivators ? If so, what, in your opinion, should be the scope and methods of such enquiries ?

(c) If you have carried out anything in the nature of such intensive enquiry, please state the broad conclusions which you reached.

26. Statistics.

(a) Do you wish to make suggestions for the extension or improvement of the existing methods of—

(i) ascertaining areas under cultivation and crops ;

(ii) estimating the yield of agricultural produce ;

(iii) enumerating livestock and implements ;

(iv) collecting information on land tenure, the incidence of land revenue and the size of the agricultural population ;

(v) arranging and publishing agricultural statistics ?

(b) Have you any other suggestions to make under this heading ?

ROYAL COMMISSION ON AGRICULTURE.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON AGRICULTURE.

Friday, March 18th, 1927.

PESHAWAR.

PRESENT:

THE MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir HENRY STAVELEY LAWRENCE, K.C.S.I. I.C.S.	Sir JAMES MACKENNA, Kt., C.I.E. I.C.S.
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Mr. F. W. H. SMITH }

Mr. W. ROBERTSON-BROWN, Agricultural Officer in the
North-West Frontier Province.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) (i) *Organisation*.—Research in the fundamental principles of agriculture may be carried on chiefly at the Agricultural Research Institute, Pusa. As the need for improved farm practice and better workmanship in the fields is far greater than for strict agricultural investigation, the provinces should concentrate on the more practical farming problems. Too much attention is being given to teaching and research; the Indian cultivator is not ready to make use of the latest results of inquiry.

Administration.—Specialists should devote their lives to their chosen study. The appointment of experts to administrative offices is retarding progress in agricultural science.

Financing.—The views and estimates of agricultural experts might receive more consideration from Finance officers than they now do.

(ii) Veterinary research may very well be left to the Research Institute, Muktesar, until the cultivators have more knowledge of simple veterinary practice.

(b) As the cultivators are not yet acquainted with well-established modern methods of agriculture or animal husbandry it is surely not necessary to devote more attention to strict research.

(c) So great is the need for better practice in fields, and so numerous are the still neglected recommendations of the research-workers, that it seems hardly desirable to seek fresh subjects for investigation.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) As only a small proportion of those who receive instruction at the Agricultural College actually make true farming their life-work, the institutions for training would appear to be sufficient.

(ii) Apart from the demonstration farm, in no district is there need for more agricultural institutions or teachers.

(iii) Agricultural teachers should not be drawn from rural areas exclusively. Men with experience of the town appreciate opportunities in the country. The youths of so-called agricultural extraction who attend the agricultural colleges spend most of their young lives at a city school.

(iv) As only those desiring to enter Government service study at the agricultural college, the attendance is great enough.

(v) Appointment in one of the Government services.

(vi) They are not all the sons of agriculturists, and this is as it should be.

(vii) The provincial agricultural colleges might be more useful, and perhaps more appreciated by those desiring to farm, if they were schools of agriculture, the students doing most of the work of the farms and the instruction being of a strictly practical kind. In agriculture, as in every other branch of Indian public service, the need of better workmanship is great. The Agricultural Research Institute at Pusa should insist, as is now done in Germany, on all men having not less than two years' practical experience before they are admitted for higher training. For appointment to the Indian Agricultural Service the most promising men in the schools of agriculture might be sent to the Research Institute for training. Excepting to study a special subject or to gain breadth of view it should hardly be necessary for anyone to go out of India for training. Appointment to the Agricultural Service, in all its branches, should be gained in open competition.

(viii) (a) Nature study should be an important subject in every school.

(b) School plots are rarely ever likely to be truly useful in a country which is mainly agricultural.

(c) There is no need for school farms; they are liable to become extremely unattractive; but scholars may with advantage be taken over well-run district agricultural stations and on to the land.

(ix) They enter or try to secure Government service.

(x) By demonstrating in each district that farming on a progressive demonstration farm is profitable; by Government marking its appreciation of worthy farmers in society.

(xi) No. Until the bigger land-holders themselves farm a part of their land, until they have "home farms" whereon good practice and well-bred stock may be seen, the technical knowledge of those desiring to farm in an up-to-date way cannot be improved. The need for home farms is great beyond anything else in uplifting Indian agricultural practice.

(xii) By showing on district demonstration stations and on the home farms that the life thereon is full and fascinating, and that the operations are profitable.

(xiii) Far above educational facilities is the need to show on the demonstration or home farms that good farm practice will enable men to pay for education.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) Demonstration of the good and, hardly less, the beautiful and fascinating on the Government agricultural experiment stations.

(b) Field demonstrations outside the agricultural experiment stations and demonstration farms can attain little compared with their cost and worry. The cultivators may more profitably be attracted to the demonstration farms.

(c) By showing that the practice recommended is practicable and profitable the cultivators can be induced to adopt expert advice.

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(d) Pusa No. 4 wheat, having proved the best of many varieties tried at Tarnab, is now the common variety over the greater part of 300,000 acres of irrigated land in the North-West Frontier Province. New varieties of the peach, plum, apricot and pear selected in the trials at Tarnab have almost entirely displaced kinds that were popular for many years at Peshawar. These are but two of many examples of the cultivators' willing acceptance of improved crops.

QUESTION 4.—ADMINISTRATION.—(a) The adjustment of the agricultural activities of the Government of India and the Local Governments appears fairly equitable; but the Agricultural Research Institute, Pusa, would probably best serve the country as an acknowledged training college, through which, alone, men might enter the Indian Agricultural Service.

(b) The scientific staff of the Government of India should most certainly be sufficiently manned and well enough equipped in every respect to train specialists for the Provinces, and to work on fundamental agricultural principles. The great purpose of the Agricultural Research Institute, Pusa, should be to train scientific workers in research.

(c) (i) *Agricultural*. No. Too much attention is devoted to teaching and research; too little to the improvement of practice—to uplifting those who labour in the fields.

Veterinary.—(i)—No. Who needs veterinary aid should pay for it, excepting in measures to prevent the spread of disease. The veterinary hospitals are used chiefly by the carriage-hirer or citizen.

(ii) Yes,—satisfied.

(iii) Yes,—the roads are as good as can be expected.

(iv) Yes,—the weather report is especially useful.

(v) Yes,—satisfied.

(vi) With telegraphs certainly.

Wireless has not so far been applied to agriculture.

QUESTION 5.—FINANCE.—(a) Only by the establishment on a sound basis of co-operative credit societies may the cultivators be helped financially. They are nearly all in debt, and cultivate less than 10 acres. On minute holdings or on land for which a high rent is paid, long-term credit on an economic basis appears impossible.

(b) *Taccavi* may most usefully be given to help land-holders to undertake some new work of improvement and then the scheme should be critically examined by an expert in the line of work contemplated. To relieve distress in agricultural misfortune *taccavi* is useful. The Department of Agriculture should be consulted on all the agricultural questions wherein *taccavi* is proposed.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) The desire without having the necessary capital to be an independent cultivator or farmer rather than labour for another: the practice of landholders who put tenants without capital to cultivate their land: the small size of the holdings of tenants and small landholders alike, are the chief causes of agricultural indebtedness. Compared with these reasons, the expenditure on birth, marriage and death ceremonies, and on litigation, although considerable, is yet comparatively small.

(ii) The landholder, himself in debt, to some extent finances his penniless tenant: the moneylender finances the landholder: or the bania directly finances the landholder's tenant. The small landholder borrows, now that land alienation is prohibited, from the bigger debt-stricken landholder who in turn borrows money to acquire the small landholder's land. For the ceremonies at birth, marriage or death the Bania is the chief creditor. In all these cases the man who lends the money has little security; he is compelled to save his capital and gain a return on it by taking a high rate of interest. Under the circumstances, the moneylender is far from being the unrelenting usurious person he is commonly believed to be.

banks, plantations, pasture, &c., there is no doubt extensive areas of good land may be brought under cultivation; but for the present work should be conserved in saving the cultivated land of the Province that is being ruined by irrigation without drainage.

(b) (i) Whilst numerous small areas have shown marked improvement by drainage and good farm practice, no extensive tract has been improved. In fact, neither the soil nor the farming over most of the Province have improved in the past 16 years. Much land has markedly decreased in productiveness.

(ii) Due to the practice of irrigation without drainage, a very large part of the land on the Lower Swat Canal has certainly deteriorated within the past 16 years.

(c) The charges made for irrigation should be high enough to permit the allotment of money to drainage schemes, the maintenance of the more important water-courses, the supervision of every water-course.

Inefficiently or carelessly used irrigation renders land unculturable. There is no irrigated area in the North-West Frontier Province on which careless practice is not actually threatening to put land out of cultivation. On the other hand, there is no extensive area on which good crops can be produced without irrigation.

QUESTION 10.—FERTILISERS.—(a) The cultivators quite understand the use of natural manures, and use what they have with considerable skill and economy. The method of conserving the supply is by no means bad, bearing in mind the circumstances met in collecting the material.

(b) The few who may purchase artificial fertilisers are astute enough to request a statement of composition with the consignment. The chemists of the Department of Agriculture in the present state of progress might and probably do undertake to give, on payment, analyses of artificial fertilisers. Until there is a trade of some value in the manure, laws regulating it are hardly required.

(c) By demonstrating the advantages of fertilisers on the Government farms: by publishing information on their use.

(d) No artificial manure to speak of is used in the Province. Of farmyard manure everyone everywhere uses all that is available. The advantages of green manuring, the benefits following leguminous crops are well understood by the cultivators.

(e) On the Agricultural Station, Tarnab, the practice for some years has been to apply not more than 16 cartloads of farmyard manure per acre to any crop, and to supplement this with artificial manures. The phosphates, nitrates and potash manures have acted as they are expected to do, and have been found profitable, the farming being very intensive, the crops—wheat, maize, sugarcane, chillies, green fodders, extensive orchards and some pasture. Green manuring has also been practised at Tarnab and in all the irrigated country round. In India, where the holdings are small and often occupied for not more than three years, the use of artificial manures may hardly be safely encouraged.

(f) By encouraging the establishment of fuel—plantations, groups and lines of trees to supply fuel. In the North-West Frontier Province the practice of using cow-dung cakes does not prevail to a great extent. But almost anywhere the dung that goes to make the fuel is gathered from roads and places where it would otherwise be lost to the fields.

QUESTION 11.—CROPS.—(a) (i) By breeding and selection, improvement is proceeding on sound lines and quite fast enough.

(ii) The arable crops in favour meet the requirements very well. In maize, wheat, sugarcane, cotton, fruits, barley, gram, *arhar*, *moth*, *mung*, clovers, oil-seeds, etc., etc., there is a liberal variety all the year round. The great aim must be at growing these crops well. At the same time there

cost of maintaining it away from home: in most minor affections or afflictions the cultivators are able to adopt more or less suitable measures. So far as the farmers are concerned, it might be best if a man with some veterinary training were employed at each agricultural station or demonstration farm. At present the dispensaries are used chiefly by the carriage hirer, the mounted police, the citizens. The time has perhaps come when trained men might set up in private veterinary practice in the towns and cities.

(ii) There are no touring dispensaries in the Province, and it is hard to see how they may be really economical or truly beneficial.

(d) The life of the cultivators is communal; the animals come nightly into the village dwellings; segregation is impossible. Then those owners whose cattle are not stricken in epidemics elude having them treated. Legislation would inflict hardship greater than its benefits in the present stage of animal husbandry. Until the bigger landholders have herds of well-bred cattle impelling them to resort to preventive measures, legislation dealing with segregation, notification, and other measures in outbreaks of disease must be fraught with insurmountable difficulties.

(e) There is difficulty but this could no doubt be overcome if other circumstances were favourable to inoculation.

(f) Faith in the Great Creator, and the reasons stated at (e) above. It is not a fee that would stand in the way of popularising preventive inoculation.

(g) (i) Not at present. Plain uphill work in establishing herds on modern lines is more to be desired.

(ii) The setting up of provincial research institutions is not necessary.

(h) (i) Yes,—by the officers of the Muktesar Institute.

(ii) The provincial veterinary officers surely have a wider field of work than they are able to overcome, in getting veterinary recommendations observed in the Provinces.

(i) In view of the opinions expressed above, a superior veterinary officer with the Government of India does not appear necessary.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i) By making it perfectly plain that the first duty of the bigger landholders is to their land and their tenants: by Government refraining from imposing duties on landholders that may take them off their land, cattle-breeding on home farms may receive more attention than at present.

(ii) No marked improvement in dairy cattle and dairying can be expected until the landholders maintain herds of pedigree cattle.

(iii) There really is no animal husbandry worthy of notice in the North-West Frontier Province. By paying premiums on registered pure-bred bulls the humble cultivators on certain tracts in the Punjab for example are encouraged to take interest in maintaining a few pedigree cattle. But the schemes appear rather to aim at keeping a number of animals pure for the good time when the bigger landholders shall take up cattle-breeding.

(b) (i) Excepting by the banks of certain rivers and streams, there is nothing that might be called common pasture in the Province, and no measure to prevent the overstocking of river-sides would be acceptable to the people.

(ii) Good farmers of course aim at having the common borders of fields as small as possible. When the bigger landholders breed good cattle they will surely make paddocks for them. Suitable grasses are available and other circumstances are not unfavourable.

(iii) The best cultivators usually secure a reasonable amount of dry fodder, catch crops, stalks of cereals, pulses, etc., etc. They depend far more on this kind of cattle-food than on pasture.

(iv) The cultivators of the North-West Frontier Province are fortunate in this respect. By growing the annual clovers called *shaftal* and *berseem*

hills whereon excellent material for making ropes, baskets, mats, etc., etc., is abundantly available, the business is well-established. By the rivers also a species of tamarisk yields unlimited supplies of withies suitable for making a great variety of cheap baskets. In short subsidiary industries can be established only where suitable raw material is plentiful and cheap. In the pursuit of progressive intensive farming there is work for every willing man in the North-West Frontier Province.

(c) No.—it should surely be better to leave the work to the enterprise of business men.

(d) No,—the effect would rather be to throw many men idle in the country over considerable parts of the year; to make those who at times cannot get work in the factory unfit for the employment which is nearly always open to them in the fields.

(e) Yes,—this would surely lead to some improvement provided the cost of the study were not too great.

(f) No measures can offer greater rural advantages than better farming.

(g) A beginning in this direction can best be made by the educated and well-to-do of the villages and towns. It would not appear that Government can do anything in the matter.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) (i) There is no shortage of labour on well-established cultivated areas in the Province.

(ii) There is a great shortage of settlers and labour on the new Upper Swat Canal, due chiefly to families being unwilling to move permanently, even so far as two days' journey, from the home in which they were born. Then the terms of tenancy or employment offered by the landholders are not attractive or favourable to pioneers. Not much of the new land is fertile and it is not yet levelled or adapted to irrigation. The fear prevails that, having worked and put the land into a more or less cultivated profitable state, the landholders may at any time offer it at an enhanced rent to new tenants. Without security of tenure why, it is asked, should men desert their old homes to undertake pioneering? It is the hope of acquiring possession that will tempt worthy men to part from their relations and a pittance. That "union is strength" is the faith of every frontiersman; the prevalence of feuds is due to allegiance to kith and kin. If the bigger landholders will put the more fertile tracts of the new canal area in a fit state for farming and offer this on lease for not less than ten years at a rent on which pioneers can live, the tract may be populated.

QUESTION 19.—FORESTS.—(a) Yes.—the forests on the hills are fully and suitably used.

(b) By establishing drought resistant trees and shrubs on the dry more or less unculturable areas; by encouraging the landholders to set out plantations on uncultivated areas, by planting copse-woods rather than big shade trees along the banks of the canals, road-sides and railways; by demonstrating on Government land that all this is possible; in short by giving some attention to silviculture on the plains.

(c) Yes,—most of the hills of the North-West Frontier Province are more or less bare of trees or even vegetation, yet certain areas clearly show that only protection is required to get them clothed again. The greater part of the Province has been rendered unculturable by forest denudation on the hills. And as reafforestation can only be gained by protection; and as most of the hills are in Independent territory, nothing can be undertaken at present. There are wide tracts within the Province which could be clothed, but at a great expenditure and with no prospect of a reasonably early and adequate return.

(d) Only by protecting wide areas of the hills, mostly in Independent territory, may the bare slopes be clothed and the land below saved from erosion and rendered culturable. The imperative need of forest conservancy

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