

**PROCEEDINGS OF THE SYMPOSIUM* ON 'HILL AREA
DEVELOPMENT PROGRAMME IN AGRICULTURAL
AND ALLIED FIELDS'**

CHAIRMAN : SHRI B. C. NEGI

Financial Commissioner (Development), H.P.

CONVENER : DR. S.K. RAHEJA, SR. SCIENTIST,

I.A.S.R.I., New Delhi

The Chairman in his opening remarks gave a history of the development of Himachal Pradesh which was created in 1947 by merging 35 states of the erstwhile Punjab province. He observed that the revenue from these states at that time was very meager being only around 3 to 6 lakhs from 7 states and less than Rs. 1 lakh from the rest *i.e.* the total resources of the state were less than Rs. 1 crore annually. The total mileage of roads in the state was less than 350 kilometers in 1947 and the only means of transport to the interior parts of the state was mule or goat. As against this back drop, the road mileage at present was more than 15,000 kilometers which was constantly being extended to cover more remote areas. The development process in the state started with the implementation of the Indo-German Development Programme in Mandi and Kangra districts involving introduction of new and improved varieties of cereals and improved package of agronomic practices. Vegetable cultivation was also introduced and this had now spread to large areas. Apple cultivation which was introduced by an American scientist was encouraged and propagated by the first Chief Minister of the State and had contributed significantly to the improvement of the state economy. As against negligible area under apple cultivation before 1950, it was more than 1 lakh hectares at present. The Chairman observed that on the basis of the topography and agro-climatic and soil conditions in the H.P., the state could be divided into three broad regions (i) valley and foot hills, (ii) mid hills and (iii) High hills. In the first

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region, field crops and fruits like orange and banana could be grown. In the second region some field crops, vegetables and fruits like peach and plum could be taken while in the high hills the most suitable crops were the apple and the nuts. Taking the other aspects of development the Chairman mentioned that the state at present had two universities, and a large number of schools, 25 colleges leading to good literacy rate which was higher than the national average. There were over 500 hospitals/dispensaries in the state. Some of the priority areas on which the present Govt. was lying greater emphasis were road development, agriculture, horticulture and hydel power generation. The Chairman was happy that the annual conference of the Society was being held at Shimla at a crucial stage of the development of H.P. and that the symposium on hill area development was being organised which was very timely and relevant in the context of accelerating the pace of growth of development of the state. The chairman hoped that the various papers would bring out salient features of the development of hilly areas and high light the gaps and problems so as to help in preparation of suitable development programmes on a scientific basis. He then invited Dr. Raheja, the Convener and Discussant, of the symposium, to present his report.

Dr Raheja mentioned that 16 papers had been received representing fairly broad specturm of developmental programmes in defferent fields like agriculture, animal husbandry, horticulture, forestry, etc. The topics covered also varied in the scope and converage including sampling procedure, estimation problems, cost of cultivation aspects, etc. Dr. Raheja then presented critical summaries on the various papers. This was followed by presentation of the papers by different authors. Of the 16 papers received, 10 papers were presented by various speakers.

The presentation of papers was followed by general discussion of various papers. Initiating the discussion Dr. Prem Narain, Director IASRI stated that the techniques for the estimation of area and yield of field crops, vegetables and fruits have been developed by the IASRI and these could be utilised for collection/updating the statistics of area and yield of crops in a region/state. The technique of pre-harvest forecasting of yield of a crop was now being developed at the Institute and studies could be undertaken for developing similar technique for forecasting the yield of fruits which was of great importance to the state of H.P. He also emphasized the need for

planning of development programme for animal husbandry improvement so as to improve the availability of milk and its products to the people of hilly areas. Dr. O.P. Bagai, Professor of Statistics, Punjab University felt that greater emphasis need to be given to the development of education and medical facilities in the state. Similarly drinking water and storage facilities also needed attention consequent to the intensive agriculture and fruit cultivation programme. According to him there was a need to strengthen the statistical staff in various departments both qualitatively and quantitatively for which a regular programme of teaching/training may be drawn up. Refresher training courses for the statistical personnel may also be organised at intervals to familiarise the statistical officers with the latest developments in the subject. A number of other participants gave their views and suggestions on various aspects of hill development programmes.

Winding up the discussions, the Chairman mentioned that although the agricultural production in the state had increased substantially during the past few decades, this was mainly on account of increase in the cultivated area. The increase in productivity was not significant and this needs to be studied intensively so as to identify and isolate factors which serve as constraints in the improvement of productivity. This would help in formulation of specific development programme. This aspect assumed crucial importance since there was not much scope for further increase in the cultivated area and production could be increased only by improving the productivity of various commodities. Another approach which had been found promising in the state was the establishment of community gardens by forming a cooperative of small farmers. This would help in bringing under fruit cultivation a large number of small and marginal holdings which were otherwise uneconomic. The Chairman mentioned that immediate bottleneck in the successful cultivation of fruits and orchards was the marketing of the produce and this had been overcome to some extent by establishing H.P. Marketing Corporation. Apart from undertaking marketing of the produce from different remote areas, it also eliminated the middle man thereby enabling the grower to obtain larger income. The Chairman felt that the symposium had served a very useful purpose by presenting different aspects of development of hilly areas and highlighting the problems and difficulties. He was confident that the papers presented and discussions would be of great help in the formulation of the development programmes on a scientific and realistic basis.

Summary of Papers

1. 'Problems of hill farming'

BY

SHRI I.S. KINGRA

Director of Agriculture, Himachal Pradesh.

The state of H.P. has been divided into four agroclimatic regions on the basis of height and climate (i) Shivalik Hills (upto 800 m.), (ii) Mid Hills 800-1600 m.), (iii) High Hills (above 1600 m.) and (iv) Cold and Dry region of Lahaul Spiti and Kinnaur districts and Pangi tehsils of Chamba district (above 2700 m.). The soil type, rainfall and main crops grown in these regions have been given. The land use statistics of the state shows that the net sown area is only about 20% of the geographical area while the irrigated area is about 20% of the net sown area (*i.e.* less than 4% of the geographical area). The main problems of hill farming area listed as (i) soil erosion resulting in low soil productivity and destruction of vegetative cover (ii) inadequate communication and transport (iii) lack of irrigation facilities (iv) small and scattered holdings (v) inadequate means of communication of farming technology (vi) lack of marketing facilities (vii) inadequate credit facilities (viii) poor risk bearing capacity of the hill farmers (ix) high cost of agricultural inputs (x) inadequate research support. To overcome these problems and constraints, various measures like soil and water-conservation, use of fertiliser and plant protection chemicals, easy and cheap credit supply, reduction of over grazing, mixed farming, solving fuel problems by providing/promoting bio-gas plants, suitable marketing facilities, irrigation development, effective agricultural extension and research support have been suggested.

2. 'Horticultural development in Himachal Pradesh'

BY

SH. R.S. RANA

Director of Horticulture, Himachal Pradesh.

The approach to crop planning in hilly regions has been described with special reference to Himachal Pradesh. The paper also highlights the relatively better performance of horticultural crops

in comparison to cereal crops under the conditions obtaining in hilly regions. The present status of the horticultural developmental activities in H.P. as also the different problems that need to be looked into for the planning of similar programmes in future are discussed. The achievements made in respect of the area brought under fruits and production of fruits as a result of the various developmental programmes are also listed. Finally, the problems relating to the statistical and economic aspect of the fruit industry are mentioned. It has been suggested that (i) periodical horticultural census may be carried out to provide data on different horticultural parameters (ii) appropriate methodology may be developed for pre-harvest forecasting of yields of fruits (iii) studies may be undertaken for estimating cost of cultivation of fruits.

3. 'Hill area development programmes in agriculture and allied fields'

BY

DR. H.R. KALIA

Vice-Chancellor, H.P.K.V.V., Palampur.

The importance of development of hill areas for the overall economic growth of the country has been emphasized. The chief maladies and constraints like deforestation, soil erosion, lack of inputs for land use, poor water management, misuse of mountain resources as mainly responsible for backwardness of the hill areas has been given. The need for agricultural, forestry and horticultural development has been underlined and efficient administrative agency for their implementation has been suggested for conserving forestry resources. An important measure suggested is the generation of electricity by tapping water energy of the region. The need for undertaking social and community forestry has been emphasized particularly in the uncultivated areas. A 'system approach' for solving of the hill problems in an integrated manner has been advocated.

4. 'Agricultural Development in the plateau Region of Bihar'

BY

I.C. MAHAPATRA AND R.B. PRASAD,

Birsa Agricultural University, Ranchi.

The paper deals with the problems of land and crop management of the region. The forest area is 27% of the geographical

area, the net sown area is 31% while fallow land as high as 21%. Taking into account other unused land, 1/3rd of the geographical area is not being put to any productive use. Attempt should be made to bring as much of this land under forest and other similar use as possible. The main problems faced in arable agriculture are high rain intensity and undulating topography leading to soil erosion and poor land productivity. Bringing such lands under plantation/horticultural crops would solve the problem to a considerable extent but the farmers do not have adequate cash resources and accordingly subsidy has been suggested. Development of irrigation and promotion of fertiliser use both of which are severely limited at present have been strongly advocated. Appropriate choice of crop varieties with proper agronomic and management practices would further help to improve the poor economic condition of the farmers. Fortunately, dry land technology suitable for hilly areas has been developed and can be gainfully adopted over a wider area. A two-pronged approach of inter-cropping in the low lands and sequence cropping in the medium lands is suggested by adopting appropriate crop sequences particularly vegetables for which necessary wherewithals need to be provided.

5. 'Development ranking of districts in Himachal Pradesh'

BY

R. SWARUP AND C.S. VAIDYA

*Agro-economic Research Centre,
Himachal Pradesh University, Shimla.*

An attempt has been made to rank the various districts of Himachal Pradesh according to the level of development achieved on the basis of a set of selected indicators of development in the socio-economic and ecological fields like area sown, area under forests, area under HYV, fertiliser consumption, cropping intensity, literacy rate, credit deposit ratio, etc. The analysis has been done at two points of time 1975-76 and 1979-80 to find out if there had been any change in the relative ranks of the districts during the period. The technique adopted for deriving the composite indicator has also been discussed. It has been shown on the basis of the indicators that only four districts improved their rank, six registered a decline while in two districts there was no change.

6. 'Controlled sampling techniques—An aid to hill area surveys'

BY

BIKAS KUMAR SINHA

Conducting surveys in hill areas may pose peculiar administrative and allied technical problems. It is indeed possible to identify and overcome some of these problems by applying the technique of controlled sampling. Roughly speaking, this technique enables the sampler to validate (in probabilistic sense) the use of sample mean and variance (as estimates of population mean and variance) while the sampling procedure is quite different from simple random sampling and is designed to take account of organisational and technical field survey problems.

7. "Estimation of area and yield of crops in hilly regions"

BY

S.K. RAHEJA AND P.C. MEHROTRA

I.A.S.R.I., New Delhi.

Some of the methodological aspects involved in the estimation of area and yield of crops in hilly areas have been discussed. In terraced lands where accessibility to fields is a problem, basic information regarding agricultural parameters like total cultivated area, area under specified crops at different levels, etc, needed for the estimation of area and yield of crop (s) at the district level is generally not available, pointing to the need of developing suitable statistical procedures to build up the estimates of area and yield of crops without such information. This aspect has been discussed in the paper with appropriate formulae for estimation of different parameters.

8. 'Estimation of extent of cultivation and production of fruit crops in hilly areas'

BY

S.K. RAHEJA AND A.K. SRIVASTAVA

I.A.S.R.I., New Delhi.

The results of series of surveys conducted by the Indian Agricultural Statistics Research Institute in hilly areas of U.P. and

H.P. for evolving suitable sampling techniques for estimation of extent of cultivation and production of fruit crops have been discussed. The survey in different regions were conducted in 3 rounds of one year duration each. Alternative sampling plans involving different methods of stratification, choice of sampling design, methods of selection of units within round and retention of villages from one round to the other were studied. The sampling design adopted was stratified multi-stage random sampling. The stratification approach finally adopted was the one with major strata formed on the basis of geographical continuity. For stratification of villages within a region, the approach given by Dalenius for getting optimum points of stratification leading to minimisation of variances was adopted. The villages were classified into groups (i) reporting villages *i.e.* villages growing temperate fruits, and (ii) non-reporting villages not growing fruits as per the records. Selection of villages from the first set was done with probability proportional to area under temperate fruits while in the other set the selection was done with equal probability without replacement. The selected villages were completely enumerated for the extent of cultivation of temperate fruits while for yield study five bearing orchards were selected in the reporting villages and in each of these orchards, three clusters of four fruit bearing trees were selected for collection of data. Data on cultivation practices were collected from the bearing orchards as well as young orchards. The results of the survey provide the necessary statistical methodology for determining the extent of cultivation, the yield and the cultivation practices for fruits in hilly areas and can be utilised with advantage for study of these aspects in the planning of development programmes for fruit cultivation in hilly areas.

9. 'Economics of apple cultivation and its role in development of hilly areas'

BY

S.K. RAHEJA AND S.D. BOKIL

I.A.S.R.I. New Delhi.

The relative contribution of different cost components like human labour, manures and fertilisers, plant protection chemicals, rental value of land, depreciation of farm structure and implements, etc. in the over all cost of cultivation of apple in selected districts of U.P. have been given and discussed. Under the cost price structure of

the mid 70's, the cost of raising an apple orchard (the period of first six years) is a little over Rs,5000.00 per hectare or about Rs. 2140 per 100 trees of which more than 60% is incurred during the first year itself. Apple cultivation thus involves fairly heavy expenditure in the first year with a long gestation period before the trees come to the bearing stage. The labour component accounts for about 70% of the total cost of raising an apple orchard. After the trees start giving fruit, the cost of maintenance of an orchard is estimated at about Rs. 1300.00 per hectare or Rs. 660 per 100 trees. As against this, the average yield of apple was of the order of 1.4 tonnes per hectare which gives the cost of maintenance of the apple orchard at about Re. 1 per kg of produce. Considered with the initial cost of Rs. 3000.00 per hectare spent in raising the orchard, the cost of cultivation per kg would be of the order of Rs. 2.00 per kg. The harvest price of apple was observed to be of the order of Rs. 2.50 to Rs. 5 per kg which shows that after paying for the family labour and other costs, there is little margin left for the farmer as profit. Provision of credit and marketing facilities and subsidizing the initial expenditure would solve the problem to some extent

10. 'Hill area development—Some considerations for immediate action'.

BY

N.M. NAYAR AND V.P. MALHOTRA

C.P.R.I. Shimla.

The hill area of the country comprising himalayan region consisting of states of J & K, H.P., Manipur, Meghalya, Mizoram, Sikkim, Tripura and parts of U.P., West Bengal, Assam and a few other states are relatively backward regions and need special development programmes. Hill areas generally receive high rainfall and also have other water resources. This results in variable water availability situation in the valley areas with corresponding variable potentialities of crop production. Similarly, the natural forests and scope for afforestation also vary widely from one hilly region to the other. A common programme for hill area development would, therefore, be neither desirable nor practically feasible. Furthermore hill soils are rather fragile and therefore increased human activity in these areas may bring about land slides and other disturbances in the eco-system. It, thus, becomes important to carry

out a detailed study to determine the extent of population which the hilly regions can sustain and support. Utilisation of land resources for credit and other human activities also needs to be regulated for which hill lands should be suitably classified. Similarly, use of pasture lands for livestock population also needs to be regulated since otherwise it may lead to serious soil erosion problems. Basic statistics on these various aspects of hill development, therefore, need to be collected for planning appropriate programmes.

11. 'Hill area development programme in Shivalik foothills—A success story'

BY

A. AGNIHOTRI, S.P. MITTAL AND R.M. MADHUKAR

C.S.W.C.R.T.I., Chandigarh.

Hill areas which have remained neglected for quite some time are now receiving serious attention at all levels. Sporadic efforts made here and there have not resulted in perceptible improvement either of the hills or of the socio-economic conditions of the people. How to integrate developmental efforts and total well-being of the hilly people has been successfully demonstrated in two Shivalik foothill vilages viz, Sukhomajri and Nada, district Ambala (Haryana).

Socio-economic survey of these villages revealed that their dependence on hills was out of compulsion. Until and unless the problems of local people are identified and the solutions sought with their total involvement, no amount of efforts for hill area development can be successful. With their involvement and by providing them viable alternatives with hill resources, like water and Bhabbar (*Eulaliopsis binata*), people have been motivated to protect hilly areas. This is called 'social fencing'.

An investment of Rs. 80,000.00 has generated extra wealth to the tune of Rs. 4 lacs annually in Sukhomajri. Introduction of smokeless chulha has reduced fuel consumption by 30%. Goats and cows are being replaced by good quality milk buffaloes.

To ensure proper management of hill resources and their equitable distribution Hill Resource Management Societies have been constituted in both the villages. For proper implementation of these programmes only one agency should be charged with the responsibility of hill area development.

12. 'Forest resources of Himachal Pradesh and Problems connected with timber and fuelwood supplies'.

BY

V.K. SHARMA, IFS.

Chief Conservator of Forests, Himachal Pradesh.

The paper presents statistics of forests, resources of Himachal Pradesh which account for 38.0 per cent of the total geographical area of the State. Of the total forest area only 40.90 per cent is wooded and the remaining area is either blank or carries only scrub growth. Further, all the wooded areas do not carry commercial forests. Thus Commercial forests in Himachal Pradesh are not as extensive as generally thought to be. Forests in the State are not uniformly distributed ; in lower thickly populated areas of the State the forests are not very extensive. As a result shortage of forest products, particularly of timber and fuelwood is already being felt in some parts of the state. The paper presents the magnitude of the problem and suggests measures to solve the same.

13. 'Horticultural development in Uttar Pradesh hills'.

BY

S.S. TEOTIA

Director of Horticulture, U.P.

The hill region of Uttar Pradesh is situated in the north western part of the state and it touches the international boundaries of Nepal in the east and Tibet in the north. This region comprises of 8 districts, viz. Almora, Nainital, Pithoragarh (Kumaon Division), Pauri, Tehri, Chamoli, Uttarakashi and Dehradun (Garhwal Division). The total area of the hill region is 51,12,500 ha. roughly 1/6th of total area of the state. Out of this area only 11,17,168 ha. is suitable for cultivation, of which only 6,97,672 ha. is under actual cultivation. The whole zone is considered to be highly suitable for growing horticultural crops due to varied agro-climatic conditions. The elevation ranges from 300 to 7000m above mean sea level.

With the establishment of the Directorate of fruit tilisation in 1953, the area under fruits in the hills has increased from 2531 ha to 1,14,650 ha. in 1981-82. This however, accounts only to 9.5% of

total area available and still there is a vast scope of increasing it under horticultural crops. At present the production of fruits is 2,70,000 metric tonnes which amounts to a return of about Rs. 40 crores.

In Uttar Pradesh, it is estimated that about 5.20 lakh hectares have been brought under fruits and vegetables by the end of Fifth five year plan. The production was estimated to be 28.15 lakh metric tonnes of fruits and 55.25 lakh metric tonnes of vegetables. Considering the population of 11 crores (1981 census) and keeping in view the minimum requirements of 60 g fruits and 120 g of vegetable/day/capital, there, however, remained a deficit of 2.18 lakh metric tonnes of fruits and 12.30 lakh metric tonnes of vegetables. To meet this deficit, an ambitious programme had been proposed for developing additional areas maximising yields per unit area through application of inputs in optimum and by providing better quality planting material and certified seeds. It is anticipated that by the end of Sixth plan, an additional area of 1.25 lakh ha. will be developed under fruits and 1.50 lakh ha under vegetables. Thus it is expected that the deficit will be minimised to 1.70 lakh metric tonnes of fruits and 0.20 lakh tonnes of vegetables.

14. 'Need for integrated area development in Himachal Pradesh'

BY

DR. M.P. GUPTA

Himachal Pradesh occupies a pivotal position as the catchment of important rivers of Northern India. Many costly multipurpose River Valley Projects have either been completed or under completion. The benefits from such projects extend to more than one State. At present about 25% of the total installed hydro-electric power in India is got from Sutlej and Beas Rivers. The management of the catchments of these rivers is of paramount importance to ensure returns from the projects which have already been completed on long term basis.

Recently lot of concern has been expressed on the degradation which has been caused in the Himalayan eco-system due to various boitic influences like excessive felling of trees, excessive grazing, fires, quarrying, construction of roads etc. The necessity of restoring ecological balance in hills needs no re-iteration.

There is a need to demarcate the areas into self-contained sub-watersheds of about 4000 ha each. The land use and other socio-economic data in respect of each such area need to be critically examined. Based on the needs of the people and the productivity of the area, a detailed working plan is required to be prepared wherein each parcel of a land is required to be put under a use to which it is best suited so as to derive maximum advantage. This is possible only if all the disciplines work in unison and adequate funds are made available. There is a need to have proper monitoring and evaluation of works so executed.

The holdings of the people in hills are generally very small and the alternatives available to them for eking out a livelihood are also very limited. The change in the land use under these circumstances poses a serious problem unless equal returns can be ensured to the owners of land.

15. 'Agricultural situation in the north eastern region'

BY

DR. B.K. BHATTACHARYYA

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Jorhat-785013.*

The North Eastern Region consists of five states and two union territories. All the states and union territories in the region contain a large hill area. Any hill area development programme of our country must involve the North Eastern region. The hill areas of the region differ much from hill areas of the other parts of the country and certainly from the plains. Problems of transport, marketing and storage facilities etc. are some major constraints of development programme in agriculture and allied fields. While there is not a single kilometre length of railways route in two states and the two union territories, the other states also have a negligible length of railway route. The roads length also is small in comparison to the geographical area of the region. In the hill areas the age-old traditional agriculture is prevalent. Only a very small area has been brought under high yielding varieties. The area under crop is itself small in comparison to geographical area. Research should be oriented such that technologies appropriate to the hill areas are developed. In the paper an attempt is being made to focus new points related with hill area development programme in agriculture and allied fields in the North Eastern region.

16. 'The status of forestry statistics with specific reference to the development of hill areas of the country'

BY

O.P. KATHURIA AND H.V.L. BATHLA

I.A.S.R.I. New Delhi

The Economy of hill areas depends to a large extent on forestry since most of the landscape in these areas is under forest cover. Forests produce raw material for industries, defence and communications, etc., contribute to the country's exports and generate employment in the primary, secondary and tertiary sectors.

The requirement of forestry statistics may be studied under three broad categories :

(i) Statistics of forest resources including those on area, production, demand and supply of forest products, wild life distribution, number of animals grazed in the forests, manpower employed and revenue expenditure etc. These statistics are needed to know the present state of forests in the country and their contribution to the national economy.

(ii) Statistics of management of forest lands such as type and extent of vegetation, topography, soil mantle, stream channel and run off etc. in the forest areas and the soil conservation measures taken etc. to maintain the quality of forest lands. Availability of reliable statistics on these aspects is important for monitoring the progress of flood control programmes and for proper maintenance of irrigation and hydro-electric power projects.

(iii) Scientific data for management of forest resources—these data are required for research and preparation of working plans and include, amongst others (a) evaluation of forest resources, evolving and applying sampling techniques in forest surveys, (b) preparation of statistical designs for conduct of silvicultural experiments and analysis of data emanating therefrom, (c) preparation of outturn and volume tables for different species and site qualities and their projections based on suitable growth models.

This paper presents an overview of the available forestry statistics in each of the above three categories and points out some of the major gaps that need to be filled.