from Anil K. Gupta

(22)

Draft

Integration of Livestock with Agro-Climatic Zone Based Land Use Planning:

issues for follow up[1]

One day consultation was organised by Centre for Management in Agriculture in collaboration with Agro-Climatic Regional planning unit of Planning Commission, Government of India to discuss following issues requiring attention of the policy planners for integrating livestock with land use planning. It was agreed that there was an urgent need for incorporating livestock related concerns in the agro-climatic zone based land use planning process.

No papers were requested for the purpose. Idea was to collectively arrive at a common understanding of the concerns which needed to be studied. Some issues, as was expected, generated more discussion than others. This is a part of continuing dialogue on the subject. Readers are requested to send their comments and suggestions for incorporation in the final draft.

a) How should national policies for land use incorporate the changes in livestock population dynamics and attendant ecological and economic implications,

b) To what extent economic policies (prices of inputs and outputs) of domestic products vis-a-vis imported livestock products have affected the trends for land use,

c) What are the implications of sustainable livestock development for agro-climatic zone based planning in regions where livestock is a primary means of occupation vis-a-vis where it is a secondary means.

d) Whether policies for technology development and diffusion for livestock development are properly integrated with the similar policies for other agricultural technological interventions,

e) Are there some important areas of knowledge gaps which need to be filled up during Eighth Five Year Plan for answering the above questions properly.

Issues for the follow up

1. Systematic analysis of composition, growth rates, gender, and age compositions and other features of livestock population and productivity in different agro climatic zone and sub zones was necessary. It would be useful if taluk level data are used to draw up proper boundaries of the livestock niches and their relationship with land use, grazing, migration, feed and fodder practices, other animal health and nutrition infrastructure is worked out.

2. Location specific livestock development policies: It is well-known that bovine density is directly proportional to the extent of rainfall whereas the proportion of infant bovines is inversely proportional. Ecological niches for different crops, livestock, trees and grass species vary and therefore there is a need for tailoring developmental programmes to these niches. The land and livestock developmen policies can be integrated only when different users and uses of these niches are taken into account. The ethnic characteristics of people specializing in certain niches species reared in certain has socio-economic and political economic implications. For instance, it is generally known that sheep rearers have lesser political power than the cattle rearers within a given niche. While developing programmes and ascertaining peoples opinions such inherent features of policy articulation would need to be kept in mind.

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1. Workshop report prepared by Prof. Anil K Gupta, Centre For Management in Agriculture, Indian Institute of Management, Vastrapur, Ahmedabad-380015, on the basis of the discussion held at IIMA on March 4, 1991. This is a preliminary draft and comments are invited for addition, modification and sharpening of the research issues. The responsibility for any inadvertent omissions is entirely author's.

The productivity of livestock has varied across regions and species. For instance poultry though in private sector has achieved far more spectacular results than dairying in cooperative sector. The studies on productivity differentials and the bearing on cropping pattern or utilization of crop residues or other by-products needs to be worked out. Feed/ egg and feed/meat ration was found to much more favourable in the poultry industry than in other livestock sectors. Recent surveys (43rd round) by NSS had apparently shown that such small farmers who had gone for poultry had faced the poverty impacts much lesser. It was however, found that animal population per household was higher among the larger farmers. Small farmers benefited also through employment and consumption route.

There was need for regionalization of livestock development programmes. Given the variation in climate and soil, the crop, tree, grass, shrubs composition varies from region to region. Same development goal would not be appropriate for all the regions. For instance, dairying would not be a priority in Assam just like sheep rearing cannot be a priority in Karnal.

The livestock related diversification was not necessarily higher in the high growth regions. There is a need for studying this by looking at the annual livestock survey data. In addition, the livestock census data needed to be analysed for understanding crop livestock interactions in different regions.

While justifying taluk level disaggregation of the livestock endowment examples were given about loca tion of dairy infrastructure in North Karnataka and Krishna district in Andhra Pradesh, oilseeds infrastructure in Bijapur and Dharwad. It was suggested that the agro and zoo climatic regionalisation would be more useful if the unit of measurement was taluka level instead of district.

The nature of data availability on the productivity and production of the unorganised milk and other such livestock products was considered to be highly unsatisfactory. There is a need to strengthen data collection and analysis system in this regard.

3. In most of the programmes of waste land development far more emphasis has been given on trees rather than on grasses and shrubs. The problem of developing pasture land and cultivation of fodder on marginal land requires study in the land use planning frame work.

4. **Within livestock excessive emphasis has been put on dairy and within dairy on milk rather than on draft power. Research on small ruminants, camel, yak, etc has not received as much attention. The Eighth Five Year Plan working group on livestock also did not give much attention to smaller ruminants like sheep and goat. In certain regions higher growth of sheep and goat compared to cattle was both a consequence as well as cause of soil erosion. In the absence of proper incentives in the form of prices of inputs and outputs as well as other supporting infrastructure the pastoralists were forced to hedge the risks more by increasing the number of livestock rather than improving the productivity.**

There is a need for the study of the role that livestock plays in survival of the households in marginal regions so that proper integration of land and livestock economy can take place in the long time frame. In the given crisis of energy particularly the non-renewable one, the importance of draft power does not have to be over emphasized. The study of draft power together with the study of harness efficiency may help in developing proper farm draft energy policy.

5. Since livestock provides more regular and larger employment per unit of resource than land, the employment planning study should include land livestock interactions. The sustainability of the employment should also be studied so that short term maximization does not affect long term developmental goals.

6. The overall economic policy for livestock development must be looked at from the perspective of legal, economic and socio ecological factors. For instance, while country may like to increase foreign exchange earning through export of meat, the Ministry of Commerce requires that only such animals/cattle should be used for meat which have exhausted their economic life. At the same time, the by-products of the meat industry are treated as residual. Likewise, different departments in the government deal with leather, meat livestock productivity, feed and fodder, etc. Proper integration of policy for land and livestock development would require a comprehensive review of domestic policies vis-a-vis international trade in various livestock products or inputs.

7. Demand of some of the livestock products such as leather was increasing abroad because of the ban on highly polluting leather tanning industry there. We should look at the ecological implications of the tanning industry and efforts should be made to develop environment friendly technologies. The quality of leather was affected also by the quality of livestock management and technology used in abattoir. The slaughter houses need to be modernised and the carcass collection centres should be strengthened. The proportion of income flowing to the owner of the livestock and flayers was low vis-a-vis the owners of the value adding enterprises. The studies of the successful leather units should be undertaken to identify lessons for other units. Similar studies are required in the carpet making and other value adding units so that livestock markets provide proper incentives to the livestock rearers.

8. The price and productivity indices have not been developed for livestock and related inputs and outputs. In the absence of such indices, the terms of trade analysis is difficult. The hypothesis that because of adverse terms of trade, the livestock owners in western region are shifting their portfolio towards extensive management rather than intensive one needs to be tested rigorously. In some of the selected areas, the total biomass supply should be looked into along with the study of institutional changes. Perhaps a similar study of composition and nature of growth needs to be done for livestock sector as was done in agricultural sector by Bhalla and Tyagi.

9. Some have viewed pastoral nomadism as a vanishing occupation. Others have argued that in the given ecological system this was the best socio technological arrangement which was sustainable in the long run. But for a few studies of migration pattern, rigorous analysis of the ecological and economical implications of pastoral nomadism over a period of a time in a region remains to be done.

10. The study of land, livestock relationship cannot be pursued meaningfully if the ethnic composition of the people owning different species is not taken into account. The cultural dimension of land livestock relationship will provide understanding of the reason for persistence or decline of various livestock technologies. For example, shepherds in the coastal regions take the animals to some islands where highly salt tolerant but nutritious grasses and trees are found. These grasses are washed and fed to the animals. In the evening entire island is covered by a thin layer of sea water. Various other systems have similarly evolved in hill areas or other arid regions where ecological features have been incorporated in the locally adopted management systems. Particular communities specialize in these occupations.

11. The potential of livestock products varies in different regions and therefore need for specially targeted policies and programmes is necessary. For instance, Chittoor in Andhra Pradesh abounds in cows and therefore, cows' milk is used for special quality of cheese. Likewise, buffaloes milk can be used for making white cheese. In Bikaner in Rajasthan the quality and quantity of carpet wool has declined after the onset of crossing programme. In Karnataka there are pockets of red skin sheep which are available only in India.Similar specialization of livestock with special characteristics must be looked into for the purpose of developing agro climatic zone based land livestock development programmes and policies. In the process attention towards local breeds must be given so that their potential is properly recognized.

12. The rotational grazing practices for enabling regeneration of the rested grazing lands needs to be tried on action research basis.

13. Strengthening of livestock breeders association for taking up such activities is very necessary. The associations can also help in documentation of local germplasm and maintenance of pedigree record and record of productivity performance.

14. **Just like agro climatic regions <u>ZOO-CLIMATIC REGIONS</u> need to be identified. It should be noted that agro climatic boundaries are essentially drawn on the basis of length of growing period. While Zoo-climatic regions will have to be defined on the basis of carrying capacity, specie preference and ecological niches looking into various sources of biomass such as trees, shrubs, crops and grasses.**

It is possible that new livestock uses may appear in regions where traditional niches did not exist but even these should be seen in zoo-climatic or eco-sociological perspective. For instance, camel carts have become popular in recent times in North Gujarat for long distance haulage. The implications for camel economy would have to be drawn keeping in mind such uses.

15. The energy use in agriculture has been increasing over the years. As against the need for 1.5 h.p. per hectare, only 0.7 h.p. was reportedly available at present. It was suggested that role of bullock and camel as a source of energy needs to be investigated afresh in the light of continuing energy crisis and the worsening balance of payments position.

16. **The emphasis in the agricultural extension programmes has been far too much on the agriculture and with in agriculture on crops. The transfer of technology relating to the animal husbandry has not been strengthened. The training of proper manpower and development of eco-specific models of technology transfer in livestock sector would be very necessary. The obvious need for integrating these extension system was felt because of the trade off inherent in some of the fodder and other oil seeds and other crops.**

17. In the context of western Rajasthan, the issue of appropriate unit of planning for livestock in the context of watershed based planning unit for land use needs careful study. Given the very low level of rainfall and limited scope of agriculture, the emphasis on livestock was inevitable. However, if the public distribution system(PDS) for foodgrains remained weak as at present, farmers would be forced to cultivate the marginal lands. The studies of survival system in such ecologically fragile regions were necessary so that ecological balance did not become worse because of absence of policy coordination. In some areas the land under cash crops was increasing at the expanse of food grains and residual fodder. The objectives of agriculture development in such regions could not be set without looking at the sustainability of the land-livestock interactions.

18. The mechanization as a developmental goal for arid regions was considered a controversial issue. Some believed that tractorization in marginal regions affected the long term sustainability of land use by (a) loosening the light soils becoming so exposed to soil erosion by wind and other agents, (b) preventing spontaneously sprouted tree seedlings which bullock or camel ploughing can bypass in the cultivated fields, and (c) uprooting the root stock of grasses and shrubs which provided for grazing in the bad years and also helped in the conservation of soil. It was also suggested that advantages in the timeliness of sowing and consequent increase in the yield in the short run have to be weighed against the long term implications for land use capability. Others argued that the supply of work animals has in any case declined and there was no alternative to increased tractorization. Some viewed that livestock and pasture development must have priority over maximization of food yield in these regions. Studies are required to assess the relative contribution of tractorization to the long term sustainability of land use in marginal regions.

19. **Suggestion was made that livestock development policy should be differentiated not only on the basis of zoo-climatic regions but also on the basis of level of inputs applied. For instance, HIP (high input production system), LIP(low input production system) and ZIP(zero input production system) could be three categories for developing the management system for livestock and land.**

20. Policy changes, it was argued could not be expected to change the people's expectations and preference for resource use unless relevant assurances were provided to the people and reasons for their present resource use were scientifically analysed. In this regard it was very necessary that people's own knowledge of environment and technologies was appropriately used. Many experts earlier criticised the use of cotton seed cake by the farmers as a part of livestock feed rations. Later research showed that such a source of protein was actually very useful and it was called bypass protein. Likewise the use of mahuwa flowers as cattle feed was another good use of the locally available rations. Studies had shown that by mixing leaves of certain trees with the fodder comprising crop residues, fermentation in the rumen improved. There was a strong need for comprehensive study of indigenous systems of livestock management including veterinary medicine, feed and fodder, upkeep etc. Planning Commission had already commissioned such studies for indigenous water management systems. It was felt that such studies will throw useful light over land-livestock interactions.

21. **There is a need for comprehensive review of research linkages between livestock and land use in ICAR and SAUs. For instance, it was pointed out that varietal variation in fodder quality has not received as much attention as it deserved in crop breeding research. Fodder was always preferred from dry regions because of more nutritive quality of the same. It was felt by some that with in livestock research system, health and breeding had received some attention but feeding had not. Farmers needed to be told about the strength of their own practices in cases where such practices were scientifically valid.**

Crop breeding objectives have to matched with livestock development objectives in at least dry regions. The preference for low harvest index varieties of millets and sorghum is well known. However, proper linkages between the coordinated research programmes of different rainfed crops and the livestock development programmes remain to be developed. There are cases where the results of dryland technologies are appraised only on the basis of grain yield rather than on grain as well as fodder yields. The result is that some of the technologies which might be suitable on the criteria of their compatibility with livestock predominant households, do not get a fair trial. Higher calcium and lesser fibre content of the rainfed crops has been found to be suitable for breeding livestock in dry regions. Systematic programmes for strengthening local breeds and evaluating their overall efficiency need to be developed during Eighth Five Year Plan.

22. **It was stressed that potential of biotechnological inputs in livestock development should not be underestimated. Studies in this regard already on in agricultural universities and ICAR institutes should be strengthened.**

23. In view of the fact the most livestock products are income elastic, the growth in their demand with the change in the income of the people was expected. It was found that with about 5 % increase in the income of the agricultural sector the increase in the demand of livestock products was found to be about 7-8%. Since the employment generation was much more in the livestock sector and it was also owned much more equitably compared to land, the growth implications of the growth in this sector were very positive.

24. It was felt that studies of price realization by the farmers in dairy sector was necessary since some feared that much of the gains of the development had been shared by the consumers. The institutional arrangements for development and diffusion of technology also needed a systematic study.

25. Price index for dry fodder: in dry regions the prices of dry fodder in drought years had risen to as much as 250 to 400 rupees per quintal. Lot of poor people had to dispose of their livestock at throwaway prices. Some had to abandon their livestock just like that. Even though various state governments spent hundreds of crores on transportation of dry fodder, the research and action on bufferstock/storage, transportation and distribution of dry fodder suffered for want of adequate resources and attention.

Productivity of rangelands: There was a well established system of sampling and measuring productivity of land in different regions as a part of cost of cultivation studies. Similar infrastructure remains to be established for recording productivity of rangelands, so-called wastelands, village common lands, forest and revenue grazing lands etc. There is a need to establish such a system in a cost effective manner so that cost of production and resource use in different regions is available periodically for deriving proper policy signals.

26. Stress feed, fodder and fuels: In dry regions the problem of combining various feed and fodder and fuels for feeding livestock in the drought stress years requires research on combining efficiency of locally available materials/inputs in different zoo-climatic regions. The impact of stress fodders on post-drought productivity and health of the animals remains to be properly studied. The relative advantages of using oil cakes as cattle feed and soil amendments domestically or exporting the same for earning foreign exchange remain to be properly analysed.

27. Crop-livestock product price interactions: The likely contravariance in the livestock and rainfed crop prices in dry regions and co-variance in irrigated regions needs to be studied to develop proper policies for insulating farmers from market induced vulnerabilities in bad rainfall years.

28. **Major data gaps identified in livestock studies: The data on morbidity, mortality, disease and disposal patterns of livestock is is quite weak. Likewise productivity of different species as well as value adding enterprises in different regions has not been monitored regularly. The resilience of different farming systems also needs to be carefully analysed so that policies for relief and rehabilitation after natural disasters like drought, flood and cyclones can be properly integrated with long term sectoral development policies.**

The regular surveys on input/output data for use in national income accounting and estimating changes in productivity over time for livestock performing different functions need to be initiated. on-going annual surveys, some believed, did not serve the purpose adequately. Survey on feed and fodder consumption per animal was necessary for different categories of livestock at regular intervals (after overcoming the limitations of CSO estimates) for determining nutritional gaps.

There was a consensus among the participants that livestock related issues have not received adequate attention from the policy planners over the years. With in the livestock, excessive attention has been focussed on cattle rather than on the sheep, goat, camel etc. The success of poultry in the recent years highlights the need for looking at the role of private sector afresh vis-a-vis cooperatives (the genuine and not so genuine ones) and public sector interventions. The institutional issues were important if sustainability of development particularly in backward regions had to be ensured. It was necessary that public policies for livestock development are distinguished among the regions where livestock is a primary means of survival and where it was secondary means of income. Landuse options are rightly being explored on the agro-climatic region basis. Similarly, the livestock development options must be explored on the basis of zoo-climatic basis and then integrated with the land use planning process. There is a need for studying indigenous knowledge system in livestock sector because productivity differences among local management systems are considerable. The role of livestock in the overall economy has to be seen from the users' perspective. The import and export policies of livestock inputs and outputs have to integrated with the overall developmental goals of livestock sector in the economy. It was feared that neglect of livestock economy may force people to increase their herd size of even uneconomic animals and graze them over public, private and village fallow lands excessively. The resultant ecological price will have to be paid by the present as well as future generations. The livestock development in hill areas and in the neighborhood of forest areas and sanctuaries deserves special attention if increasing conflicts around grazing issues have to be minimised and ecological balance has to restored. In high growth regions, the issue of involving farmers' organizations, private sector or public sector has to be decided on the efficiency grounds. It is unlikely that inefficient units even if controlled by the farmers will be able to serve them for very long. However, to answer these issues empirically, one needs properly collected data which everybody felt did not exist or if it existed, was not accessible to most researchers.