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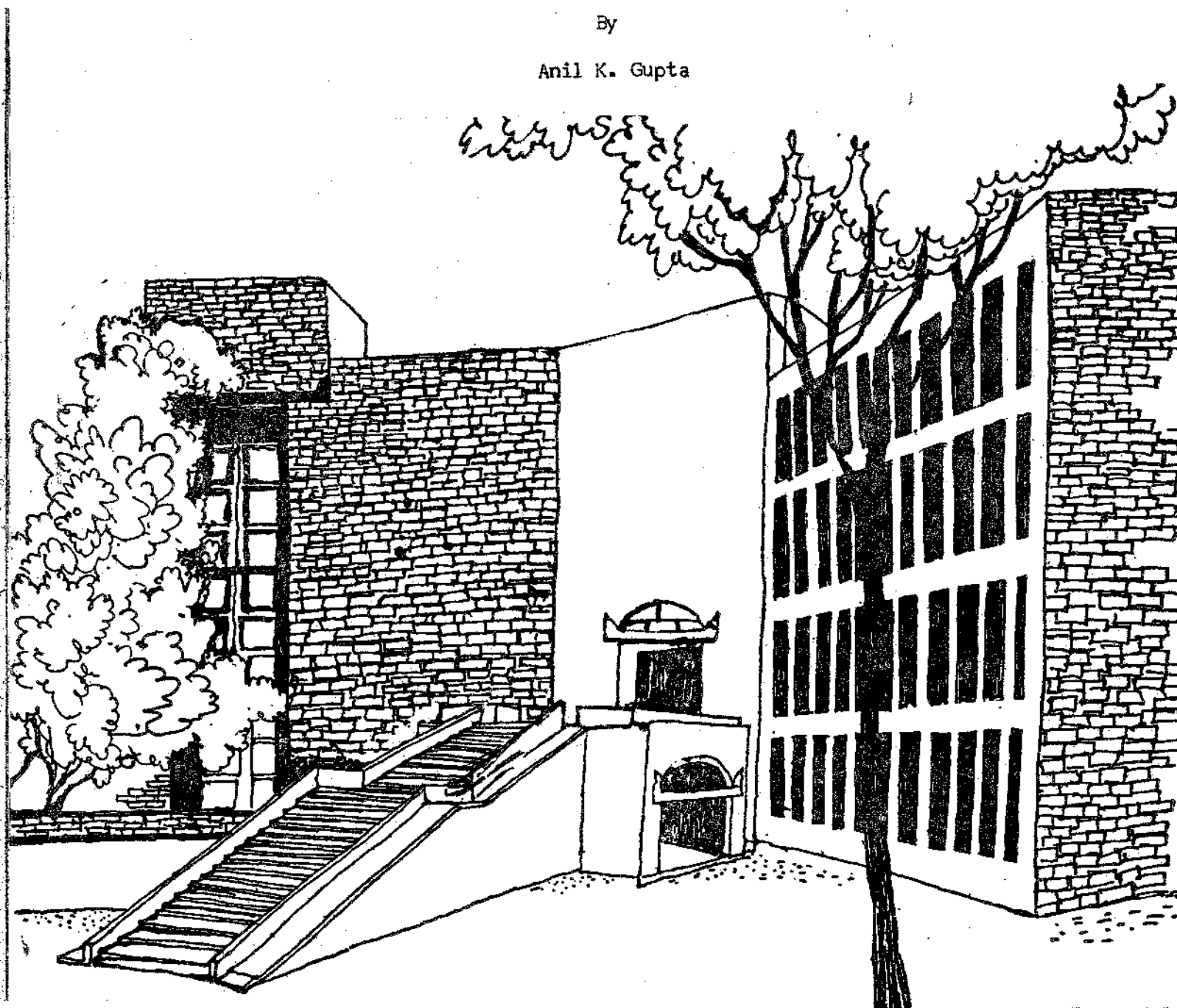
Working Paper

SOCIO-ECOLOGY OF STRESS: WHY DO CPR
MANAGEMENT PROJECTS FAIL?

A Case Study of Sheep and Pasture
Development Project in Rajasthan,
India

By

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SOCIO-ECOLOGY OF STRESS : WHY DO CPR MANAGEMENT PROJECTS FAIL?

A Case Study of Sheep and Pasture Development
Project in Rajasthan, India

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SOCIO-ECOLOGY OF STRESS:

Why do CPR Management Project fail?

In a stratified rural society, different classes of landless pastoralists or cultivator cum pastoralists are expected to have varying stakes in the protection of environment.

Institutional arrangements to coordinate varying expectation of behaviour of different classes in supply of restraint in

resource use can be partly understood through the assurance
Sen 1981)

mechanism (Rwenge, 1983). However the time horizons in

which various classes may appraise different options of use

of commons vis-a-vis the private lands would vary not merely

because of differential vulnerability to environmental risks

but also because of accumulated deficits or surplus in

household budgets, mobility patterns, simultaneous operations

in factor and product markets etc. Given these differences

the ration of insurance that different classes seek about

risks in future supply of common resources augmented through

present restraint may also vary. The implication is that

institutions providing varying assurances to different classes

coupled with differential premia obligations do not emerge or

get innovated through changes in the factor prices alone.

The central question thus is to find out how such assurance

was provided in some of the traditional societies in past and

why modern projects in this regard fail to provide it now.

Using Okerson's framework, a case study is presented after a brief discussion of the socio—ecological perspectives for explaining differential stakes of various classes in environmental management. Later, some tentative policy implications as well as questions for further research are listed.

The framework in which the environmental stress in arid regions and risk adjustment mechanism of various classes of farmers can be analysed is described in figure 1 given in Annexure. The key ecological and institutional characteristics of drought prone regions are listed below:

3 Low Population density

- : High risks inherent in various crop, livestock, craft enterprises
- : Current level of farmers' technology generally geared towards risk minimization rather than profit maximisation-
- : Uncertainty of rainfall and lack of local employment opportunities invariably lead to seasonal or to some extent permanent migration with the implication that often the households are managed by the women or the old people.
- : The capital absorption capacity is very low with the result that the institutional infrastructure is very poor.
- : Social and cultural networks are characteristically different from the irrigated regions, particularly with regard to the extent of traditional forms of cooperation and pooling of resources that exist in such regions besides the extended family system.

The key elements of the socio-ecological perspective is that the ecology defines the mix of economic enterprises that different classes of farmers find historically sustainable in that context. The scale at which different classes operate different enterprises is influenced by the respective access to credit, product and labour markets. Thus, if we find bigger farmers owning predominantly high value grazers and poor owning browsers, the implications for respective access and resource use options can be easily drawn. The mean and variance matrix of this mix generated different perceptions and responses to risks. It appeared thus that different classes of farmers used different discounts rates and different time periods to appraise the returns in various resource markets depending upon the accumulated knowledge, skills, resource advantage, and future expectations; besides surplus,, subsistence or deficit budget conditions. The cash-flows resulting from the risk-return trade-offs might be more unstable for some and less others. Finally some households accumulated surpluses while others became chronically deficit budget. The decision making options of such farmers were obviously different. Therefore the stakes which different classes will have in environmental protection also would vary:

One of the characteristic responses of different classes to changes in the environmental context (in other words, availability of dry matter from common grazing lands besides the fodder from

private lands) would be to modify the livestock space-mix which in turn exacerbates ecological imbalance. Studies have shown that, in the event of drought; farmers-cum-pastoralists tried to dispose of heavy grazers like cattle and buffaloes first and browsers the last.¹ Thus if a region has faced successive droughts than specie-mix can potentially become biased in favour of browsers, i.e., sheep and goat instead of cattle particularly if large scale migration of population is prevented through public investments in drought relief,, life may summarize the important bearing of this framework of Okerson's models such that the policy implications become richer.

- a) The fact that livestock specie-mix is class and eco-specific implies that in any region the technical and physical conditions of resources endowment would be defined differently by different classes. In other words, the catchment area where from the dry matter is derived for sustenance of the livestock would vary in a characteristic manner for different classes.
- b) In view of the above the vulnerability on account of degradation of the village common lands would also be different. At the same time disinterestedness in the protection of common land amongst rich and poor may

1. Gupta Anil K. 1984

Small Farmer Household Economy in Semi-Arid Regions, CMA, IIM Ahmedabad, Mimeo P 478

emerge on account of very different motivations. In the former case dry fodder availability from crop residues together with predominant ownership of grazers with very little migration would imply lesser dependence on commons. In the latter case because of smaller individual herd size biased predominantly in favour of sheep and goat with extensive labour mobility will imply lesser pay off from the increased dry matter supply from the village commons. However, in case where male members migrate away and the households are headed by females or the old people (which is quite predominant in drought prone regions) the degradation of commons may lead to high vulnerability. And yet disinterestedness may emerge because at low mean—high variance of household cash flow, significantly higher pay off should be required to call for alternative technology of resource management of supply of restraint.

- c) The contradictions in access to commons as well as private lands such as private fallows (which was generally used as common grazing land in the dry season) require that Okerson's framework was applied from the specific point of view of those who are losers in the game instead of taking a holistic or a community perspective.

Sheep and Pasture Development Plots: A Case Study

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Under a World Bank project for drought prone area development, 100 Hct. sheep and pasture development plots were established in Dodhpur district in Rajasthan state in year 1974-75. The key objectives were conservation of lands not used for agriculture maximum utilisation of rain water, prevention of migration of people and animals in famine years and to organise the cooperative of the weaker sections of sheep breeders to achieve above purposes. These plots thus were to provide demonstration of technological alternative for better rangeland management and possibilities of group action through organisation of sheep growers cooperative. In all 49 plots of 100 hectares have been developed during the period 1974-75 to 1983-84.

Even though the pasture plots were to cover fraction of total waste common lands in the district, the expectation was that, once convinced of the utility of restricted grazing, the people might like to evolve institutional alternatives for conserving both the village common land and private wastelands. In general type 6 or 7 land were to be selected so that the most degraded land could improve first. ^{total} The cost of developing a plot was expected to be around Rs. 89,000 (approx. US\$ 7400 dollars) including the cost of wire fencing, water for providing drinking

or the other god or goddesses respected in the region. Any water source in these lands was also used for restricted purposes. The land on which plot was developed was considerably degraded and 87.8 per cent of the land belonged to class 7, remaining being evenly distributed in classes 6 and 8.

The soils are shallow, poorly drained, severely eroded, saline and alkaline in nature with very low organic matter. The temperature varies between 2°C and 45°C and the rainfall pattern was extremely erratic with the average being around 300 mm. Because of excessive grazing pressure the coarse grasses like Aristida sp. and other useless shrubs like Tephrosia sp. were dominant in the area.³ Cenchrus ciliaris specie of grass was seeded in the plot. In general the carrying capacity of plot could never increase beyond 33 adult cattle units because of successive droughts. It may be mentioned that this plot was located at the interreaction of 2 different ecological units in the district. The southern part of the district had a high aridity index, shorter crop sowing season and lesser rainfall probability with the result that the cultivable area was suitable generally for short duration pulse crops. On the other hand, in the northern ecological unit long duration millets could be cultivated. The implication of ecological context was that population density,

³ Joshi BR and HK Jain 1979, Structure, Function and Economics of 100 hectare pasture plot in village Bhawad, District Jodhpur and its impact on village community - A case study, District Project Planning Cell, DPAP, Jodhpur pp.19.

amongst economic classes and ecological regions whereas sheep was restricted more to the poor in arid west.⁶

Decision Making Arrangements

We will try to contrast in this section the logic of decision making arrangements which were formally institutionalised vis-a-vis the ones that have characterised traditional forms of cooperative behaviour in stress prone ecologies. Membership of sheep and pasture development project required a person to be a resident of the village in the area of operation of the society ^{himself} **and** a sheep breeders' his written application should be approved by the majority of the management committee, he should have purchased at least one share and should not have been convicted on any criminal charge as per the provision of Rajasthan Cooperative Society Act and Rules. Preference was to be given to small and marginal farmers, agricultural labourers such as sheep owners who would like to purchase equity with specified livestock. A guaranteed return of 25 per cent was assured to every shareholder. Individual members were to provide a sheep in lieu of the share capital so that they would have greater attachment with the project. The sheep and wool department of the State Government had appointed stockmen at each plot to take care of the health of the animals besides protecting against unauthorised intrusion. Even though each plot was fenced with barbed wire it was not uncommon to find the fence broken at different times.

6 Gupta, 1984, op. cit

The specific village which we have studied (Bhawad) was situated in the Eco-unit-one. This region is the boarder dividing the two ecological units. The main village and its hamlets are distributed over 4739 hectares with only about one-third of the households living in the main village and the rest in hamlets. Even though the fallow land, cultural waste etc. amounting to about 2026 hectares are used as common grazing lands the animals of this village do not graze only on the fallows or the common land of this village. The total livestock population i.e. 480003 (2022 adult cattle units) include cattle, very few buffaloes, sheep, goat, camels, and donkeys. It must be appreciated here that the general tendency to aggregate the livestock in terms of the adult cattle unit so as to derive the fodder budget of a region or common land with implications for carrying capacity is highly erroneous. As is obvious, different species of livestock have varying mobility patterns and catchment areas from where they draw their fodder. It has been separately shown that livestock

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specie-mix is not only eco-specific but also class specific. In this village the ratio of cattle, sheep and goat is 1.1 : 1.6 : 1.0. The implication is that with higher incidence of aridity not only the proportion of sheep increased but also depending upon the ownership pattern, the resource exploitation practice evolved. Traditionally the private fallow lands were also treated as common land although this practice was becoming

more and more restricted, Cultivators had started objecting to use of their fallow lands by other pastoralists. It had even triggered violence in many parts of the country.

The president of the management committee of the pasture plot was one of the richest persons in the area. The family members of this person owned about 25 per cent of the total land and 45 per cent of the cultivable land. They also had the highest number of livestock, in particular the cattle. There were only six tubewells with good water in the village and all these six wells belonged to this family. The president of the sheep and pasture development society was also the village headman and Vice-president of the dairy cooperatives, and exercised influence over almost every other social activity. Ha belonged to the Rajput caste which is not the one that keeps most of the sheep.

In the beginning when the spearhead team was organised by the department of sheep and wool development, the idea was that this team would try to communicate to people in particular those who own sheep and goat, the advantage of developing common land into pastures through cooperative societies. It was found that major sheep rearing caste i.e., Raikers had only 10.4 per cent share in the membership. This itself indicated that in the

8 Gupta Anil K 1984, Dynamics of Access Differential in Semi-Arid Regions Paper invited for 2nd International Range land Congress, Adelaide.

was no clear explanation about the reason for restricting membership to only 34 or for not persuading the majority of the Raikars to become members. It was learned when further pursued ^{/that} many of those who were eligible to become members did not even know about the society or when it was started. There were some who were not sure as to whether the benefit of participation from a small project was worthwhile at all. In their view even if the plot could carry 400 sheep belonging to 34 members, it could only deal with a fraction of the problem. It also was mentioned that the village did not agree for fencing of the common land through collective decision making. The political dominance by the Rajputs had ensured that regardless of any opposition the plot would be established.

It was noted that the fence which was intact in the earlier years had broken down at several places. Several explanations were put forwards

- a) There were many people in the village who were upset because they had not been included in the cooperative society even though they felt they deserved to be included.
- b) The two watchman posted at the plot could not effectively guard the 100 hectare plots.
- c) Since the plot was located just next to the village, the farmers who had their fields on the other side of the plot had to take a much longer route to reach their fields. They felt that they did not gain anything by co-operating.

- d) There were some people who felt that before the plot was fenced everybody grazed their animals on the common lands: however, with the development of the plot, the benefits accrued only to the members.

It is difficult to isolate the contribution which each factor mentioned above made to the breaking down of the fence. It is important nevertheless to note that most of the plots where the fence did not break were located, as mentioned earlier, in the ecological unit No.2 having a higher environmental stress. It should be noted that the 'auran' land also had been protected in such villages much better. It is worthwhile therefore to relate the traditional norms of cooperation and response to modern cooperative interventions. Inference should not be drawn that in the latter case, the cooperative plot survived despite similar decision making arrangements. The reason perhaps was that the grass cover from the 100 hectares provided the infinitesimal small share of the total fodder requirement of the livestock in that region. Because of higher stress inherent in this ecological context the mobility pattern was also more distinct. The result was that very few people who stayed behind were mainly the cultivators and only a minority was pastoralist. Though the formal decision making arrangements as we would argue later were not conducive to foster cooperation among different classes yet the fence survived in spite of these rules and not because of them.

a particular level mere conservation or supply of restraint would not be able to provide the necessary regeneration of perennial and desirable grass species. It would be necessary to bring about a technological change by seeding proper species. Therefore, for management of such commons the patterns of interaction must not merely reinforce the controlled grazing — but should also involve sharing of the costs involved in bringing about technological change.

These costs many times were partly or fully subsidised by the State but without simultaneously providing any assurance to the people about

- a) alternative source of fodder and water during the stress period and
- b) guarantee that the value added through government investment and supply of restraint would be shared equitably amongst different classes and not merely equitably (i.e. in proportion to respective stocks) as is often done.

In the case of Bhawad the patterns of interaction as indicated earlier were obviously guided by some of the factors listed here. The marginality of gain from conserved commons as well as uncertainty of future returns from the investment contributed towards the cynicism which culminated in some cases in apathy, indifference and in either cases straight aggressive behaviour. When one contrasts these decision making arrangements and pattern of interaction with the traditional alternatives observed in 'auran' land one notes that the religious sanctity was used to apply a moral sanction to bring about that desirable

collective behaviour. Like in Godal's theorem, these sanctions were assumed and could not be questioned while evolving rules of the game.

OUTCOMES

Not disputing the fact that pasture plots did result in increased grass cover as UQ.11 as in conserving water in the underground tanks, an answer based on costly iron fencing and heavy investment of manpower to supervise the arrangement was difficult to replicate. In the last about 8 to 10 years only a fraction of total land could be conserved in this fashion and even in these plots wherever management was actually handed over to the people, the fence had broken down. As far as the equity considerations are concerned the question of reasonable and fair return to respective contributions could be answered in the following manner.

As Oakerson suggests "indeed the presence of inequity may lead to the collapse of collective efforts, resulting in inefficiency. The equity problems are exacerbated by asymmetries among users, creating opportunities for some to benefit at others' expenses". The issue thus was as to why such a result came about.

next

We will discuss the genesis of modern institutional arrangements and the contradictions which^{got} intensified due to market penetration and increase inequities.

11 Oakerson Ronald J. 1984, A model for the Analysis of Common Property Problems, paper prepared for steering committee, BOSIO National Research Council, Washington.

The basic purpose of 1 00 hectare sheep and pasture plots was, "to demonstrate to the farmers how the carrying capacity of the existing degraded land could be increased by adopting scientific methods and utilising the moisture for longer period thus increasing the productivity of same lands substantially. Side by side also to demonstrate the management of the sheep and (ways of) taking maximum advantage by adopting sheep husbandry practice and increasing the income without investing any further amount".¹² (Sic)

If the purpose of these plots and other extension measure was to demonstrate the merit of restricted grazing leading to increased grass cover one must acknowledge that the project succeeded admirably well.^{12A} However the fact that auran land in many villages was not only better conserved but still had much denser growth of trees, bushes and grass left, should have served as the natural analogy of this concept. The question that the sheep and wool department should have addressed itself was: Why did the traditional decision making arrangements generated outcomes like protected auran land in some villages and degraded common lands in other villages? Such a question was neither raised nor answered. It was assumed that people in arid regions did not know the advantage of restricted grazing.

Further, while there remained a case for improved veterinary practice and provision of better grass seeds to improve the common

12 Short Note on Pasture and Sheep Development Programme under DPAP, Jodhpur, 1974-75 to 1963-84, spearhead team, Jodhpur.

12A A recent study has shown that when benefits from wool, compost manure, grass seed, sheep sales etc, were compared with the costs of establishing and maintaining the pasture plot, the positive net present value could be achieved at 13 per cent discount rate. The project pays back the costs within 6-8 years. The sensitivity analysis showed that the project had some capacity to withstand the fluctuation or enhancement of costs (about 5 percent) and reduction in benefits (about 10 percent). Dagdish C Kalla and BR Joshi, 1985, Economic Appraisal of a Sheep Cooperative Society in Arid Region of Western Rajasthan, CAZRI, Jodhpur mimeo. However the paper ignores an important issue relating to management of the plot. Assumed financial viability could accrue only when plot was managed by state for a limited period.. Recent developments cast doubt about accrual of such a cashflow given the various organizational weaknesses.

lands, the logical outcome of such an access to technology on reduced mortality should not have been missed. It is obvious that any iniquitous system without any mechanism to keep disparities in check ^{like} any technological change improving returns to the factor endowments like capital would only exacerbate income and inequities further. Neither the public distribution system of fodder was conceived as a necessary condition nor markets of various livestock products were made more efficient such that the uncertainties loading to individually optimal but collectively sub-optimal outcomes could be reduced or eliminated. It was interesting to note that in the official review on pasture and sheep development programme,¹³ it was acknowledged that

- a) "In the village there is a tough competition between cattle versus sheep for grazing. Because of lower socio economic status of the sheep breeders, most of the grazing facilities in the community grazing lands are utilized by the cattle breeders for their cattle and buffaloes. Sheep population is forced to the rocky and most un-productive areas and the Gochars & others productive pastures are allotted to them after they have been consumed by the cattle. In such a situation it is very difficult to teach whole of the village people to offer their community grazing land patches to be converted into sheep pastures(only for a particular society of livestock,"(SIC)

13 Short Note on P&S.D.P., 1984 op cit

- It is obvious that the contradiction recognised after 10 years of the project operation could have been anticipated right in the beginning. It was unfortunate that neither the World Bank report on the subject nor any other evaluation except by the author¹⁴ noticed this contradiction so as to modify the project design.
- b) Total production of 100 hectare was very low and could sustain a large number of animals. Further, because of low rainfall and longer periods of dry spell, establishment of perennial^{grasses also} posed the serious problem.
- c) In whichever case the plots had a better grass cover compared to the adjoining community lands, the fence was broken and frequent conflicts between pasture plot incharge and villagers ensued.
- d) Due to frequent drought the dominance of non palatable shrubs like Typhrosia have further reduced the grazing potential of these lands.
- e) Government was not sure whether it wanted to continue the scheme or expand it with any modifications. This uncertainty resulted in the hesitance on the parts of the member of the society to introduce their sheep in the form of share capital on the plot.

14 Gupta Anil K. 1981 Farmers' Response to Cooperative Project Implementation: Cases in Dairy and Pasture Development in Arid Regions, Paper presented at XIIUAES Congress, Amsterdam.

and waste land could be developed. In the scarcity prone areas the arrangements to be made for maintaining fodder banks,

- b) Migration of livestock to be stopped or the hardsman may be hold responsible for any damage caused to the agriculture fields and various plantations
- c) Nomadic tribes needs to be permanently **settled**.
- d) People need to be encouraged to adopt the system of stall feeding.
- e) The panchayats need to take responsibility for ensuring rotational grazing on common lands.
- f) Establishment of regional fodder depot
- g) Critical areas like catchment of major rivers need to be closed.
- h) The grazing by sheep, goat need to be completely stopped in the forest areas.
- i) Extension programmes to inculcate public awareness leading to cooperation.

It is obvious that while conceptualising various alternatives for grazing land management with specific reference to common, no attempt has been made to understand the contradictions which historic inequities in the pattern of resource ownership have generated with regard to management of commons. It has been assumed that the preponderance of sheep and goat was an irrational response of the landless communities to the degraded

commons and intensified use of private cultivated lands by the
It was ignored that

landed communities. The reduced access to private fellows as well as increasing price of dry fodder due to lesser dry matter production by dwarf varieties of cereals had further aggravated the situation.

It is not possible to conceptualise the problem of degradation of commons in isolation of changes in private lands as well as in the dynamics of dry fodder movement across the regions.

Emergence of dry fodder market in the last few years consequent to the large scale efforts made to encourage livestock development in non-traditional irrigated cash crop regions has led to movement of dry fodder. This restricts the local supplies of dry fodder in otherwise deficit regions in the north-west of the country, particularly in drought years. The recent efforts by the government to take up afforestation by closing the road sides or other areas where moisture retentions may be higher because of depression has further increased the pressure on the degraded commons.

FUTURE OPTIONS

Basically there are three parameters which influence the extent to which any value adding cooperative enterprise will generate socially desirable outcomes.

- a) What proportion of value addition is used as dividend, replacement cost, maintenance fund, and most importantly risk fund to ensure the risks of poor poolers in the enterprise.

- b) What share of value addition is used to diversify the resource management strategy in a manner that the skills or resources of the poor members of the cooperative are used in higher proportion.
- c) To what extent the transfer pricing arrangement is used to reduce the income disparities by charging say, higher prices for the same service like veterinary facilities to rich members and lesser price to the poor members. It may be added here that differential pricing of service is easier than of various inputs.
- d) To what extent the pooling is independent of redistribution.
(Gupta 1984)

It has to be appreciated that in any state intervention, the case for such pricing mechanisms that bias the outcomes of the intervention in favour of the poor are justified by the constitutional obligations in most developing countries. These obligations are enshrined in form of socialistic objectives that many of the developing countries have put before themselves. It has also to be noted that market forces will always try to intensify the inequities in a manner in which the resource use options would always turn out to be different for different classes of producers. Finally if development of common lands is an exercise in which the decision making horizon of poor should be extended and of rich should be constricted or made congruent with that of poor, then one can not belittle the role of assurance mechanisms as argued

and Sen.
 by Runge.¹⁶ What we are suggesting is that these assurances would work only if given the class conflict in the rural society, different ration of assurance needed by different sections of the society together with supply of restraint expected from these classes are properly specified.

In the present case it is obvious that the institutional arrangements,, decision making system and the pattern of interaction did not in any way provide disproportionately higher returns to the poor landless shepherds. The reasons for non-cooperation by the poor and rich are different and thus it is important that one takes into account the implication of these differences for any institutional solutions, Further, as mentioned earlier, the commoditisation of a resource in a particular market say product market vis-a-vis private land may lead to break—down of pooling arrangements in say livestock market vis-a-vis the commons. Therefore, using a multimarket socio—ecological framework with proper recognition of historic inequities in resource use might sharpen the Oakerson's model in a way that newer viable options can be discovered.¹⁷

16 Runge CF, 1983 Common Property and Collective Action in Economic Development, Paper prepared for BOSTID, DIA, National Research Councils Washington.

17 The theoretical implications of various aspects of CPR management are briefly discussed in a separate paper, Gupta, Anil K., 1985, Managing Common Properties: Some Issues in institutional design. The concept of scarcity, role of redundancy in role making and the role of state vis—a—vis Assurance Mechanism are discussed in the note.

Socio-Ecological Framework for Analysing Household Economy

