INTRODUCTION
The previous studies related to a field can be reviewed either in purely chronological order or along with any axis. The former is a highly crude way but the latter requires the identification of the axes along which one proposes to review the literature. These axes may be provided either by major themes embodied in research or by the methodological approaches to the study of problem involved. The main advantage of the review based on the themes helps to trace out those fields which merit attention but have not been adequately dealt with in the past. Hence, in this chapter, the concerned literature on CPRs has been overviewed by categorising it along thematic lines. As mentioned at the very outset, the present study deals only with the common natural resources of land and forest, thus, the studies devoted to these components of CPRs have been reviewed. The following broad themes have been identified:

1) contributions of or dependence on CPRs;
2) availability and decline of CPRs;
3) causes for decline of CPRs;
4) effects of depletion and degradation of CPRs; and
5) management of CPRs.

Some of these themes, for more critical review, have, further, been divided into sub-themes. Moreover, it is well documented that the pattern of endowment, utilisation, vulnerability, depletion and management of CPRs is markedly determined by surrounding ecological and agricultural systems (Agarwal and Narain 1989; Chopra et al. 1990:30-31; Arnold and Stewart 1991). The nature of the present study is also regional. Hence, at second level the studies in each theme (sub-theme) have been treated under the following four macro-agro-ecological regions:

i) wet mountainous and sub-mountainous regions, which include Himalayas and Western Ghats;
i) arid and semi-arid regions;
iii) forested tribal belts of Central and Eastern India; and
iv) wet and irrigated plains.
At this stage, the conventional chronological method of literature review has been adopted.

**CONTRIBUTION OF OR DEPENDENCE ON CPRs**

In the developing countries, the survival of the people, especially poor, substantially and directly depends on the CPRs (Bromley 1989; Bardhan 1993:87). The studies conducted in India mainly investigate the direct economic contributions of CPRs in terms of (a) supply of CPR-products, and (b) employment and income generation. Thus, the literature on the contributions of CPRs has been reviewed along with these two sub-themes.

**Supply of CPR-Products**

The CPRs supply fuel, fodder, fibre and timber etc., and complement the agricultural activities by providing manure, silt, water, fencing material, and space for crop threshing and waste dumping. They also support livestock rearing by catering to the space needs of animal grazing, fodder stalling and animal keeping. These benefits, though, have historically been received by the people, but have rarely been recognized and recorded by the researchers (Jodha 1986). Hence, a very few comprehensive attempts have been made to evaluate them.

_Wet Mountainous and Sub-Mountainous Regions:_ Nadkarni et al. (1989) have presented that the CPRs namely forests and bettas (forests privatized for exclusive exploitation but have common rights) provide substantial amount of fuelwood, grass and straw, mulch and manure, fencing material and timber in the four forest villages on Western Ghats in Karnataka. It has been reported that the dependence on CPRs is so high that 95 percent of the fuelwood consumption during 1985-86 was met from these resources, which was much higher among agricultural labour and poor peasant households (100 and 99 percent, respectively). CPRs also play a major complimentary role in areca nut cultivation as the imputed social cost, which includes the imputed values of leaf manure, fencing material, fuelwood for arecanut processing and farmyard manure, accounted for one-third of the total cost in areca gardens. The dependence on CPRs for
free grazing and fodder is so enormous that: (a) CPRs supply about 75 percent of the total grass and straw consumption; and (b) free grazing on CPRs constitutes about 67 percent of total imputed fodder cost. The livestock economy of poorer sections (agricultural labour and poor peasant) has also been recorded to depend more on free grazing on commons than that of the richer sections.

In another study of 21 sample villages scattered over eight districts of Garhwal and Kumaon divisions of Uttar Pradesh, Partap and Qureshi (1993) have also ascertained the CPRs (forests) as the single source of fuelwood supply to 98 percent of sample households. Above 75 percent of fuelwood requirements of about 89 percent of the sample households have been found to be fulfilled by CPRs. Singh (1993), in his study of 560 sample households in Himachal Pradesh, has also affirmed that the hillmen enormously depend on CPRs for fodder, fuelwood, timber, herbs, etc. An average household has been reported to seek about 86, 90 and 85 percent of fodder, fuelwood and timber requirements respectively from common lands. CPRs have also been recorded to supply about 90 percent of total energy consumption during 1990-91.

In a quite recent survey conducted in eight sample villages of Dasuya-Langerpur watershed in Hoshiarpur district of Punjab (Siwalik Region), Singh et al. (1996) have also established CPRs as the main provider of biomass requirements of a significant proportion of sample households. The study has indicated that about 11 percent of cultivating households use common arable land for crop production; about 62 and 88 percent of landless and cultivating households respectively, obtain fodder grasses from CPRs; about 98 percent of landless and 88 percent of cultivating household get firewood from CPRs; and about 60 percent of the landless as well as cultivating households graze their livestock on CPRs. As far as degree of dependence is concerned, CPRs have been found to cater to the fodder and fuelwood requirements by about 46 and 84 percent, respectively.

Arid and Semi-Arid Regions: In comparison to other three regions, the contributions of CPRs are well studied in arid and semi-arid regions. In a dietary survey conducted by ICRISAT (The International Crops Research Institute for the Semi- Arid Tropics) in six villages of dry regions of south India, it was found that CPRs accounted for 8-9 percent
of food intake in poor and about 4 percent of the better off households (Ryan et al. 1984). Jodha (1985 and 1987), though, has not directly dealt with CPR-contributions, has presented interesting data on proportion of animal grazing days on CPRs in one village each in Nagaur, Jodhpur and Jaisalmer districts of Western Rajasthan. More than 84 percent of the total animal grazing days have been reported to depend on CPRs in all the three villages during 1963-64 and 1977-78. The corresponding proportions are higher among small farmers than large farmers. In another work, which in fact, is the most comprehensive study on CPRs in India and covers 82 villages from 21 districts scattered in seven major states in dry tropical zone of India, Jodha (1986) has revealed that between 84 and 100 percent of the poor households collect fuel, food and fibre items from CPRs. In contrast to poor, lower proportion (10 to 28 percent) of large farmers has been reported to depend on CPRs for these biomass resources. However, the proportions of households who procure more beneficiary items like silt and timber have been documented to be higher (42 to 89 percent) among large than small farmers (19 to 41 percent). The study has also illustrated that the various items (6 to 12 in case of poor and 3 to 5 in case of large farmers) including fuel, fodder, various wild fruits, roots, leaves and bark of plants, gum, honey, fish, small game, silt, clay etc. are collected from CPRs. In regard to the extent of dependence for domestic fuel, the study has revealed that CPRs provide 66-84 percent of household fuel in poor and 8-32 percent in rich (large farmers) households. CPRs have also been found to provide grazing material and space to 69 to 89 percent of the total animal unit grazing days in case of poor households and 11 to 42 percent in case of rich households. Jodha, in another article (1990) has also highlighted the complementary role of CPRs in crop production in five of the 21 districts. CPRs have been recorded to supply 31 to 42, 11 to 16 and 8 to 11 percent of the total own farm inputs of poor farmers in pre-sowing to pre-harvest, harvest and post-harvest stages, respectively. A still greater dependence of small and marginal farmers' crop farming on CPRs has been revealed by the extent of support it receives for sustenance of draft animals. It has been estimated that maintenance of such animals on their own land meant shift of 48 to 55 percent of crop land to fodder crops.
Another study with similar framework conducted in 25 villages located in five different geo-physical regions in Gujarat has revealed only a limited flow of products from CPRs (Iyengar 1989). The cattle grazing and fuelwood collection have been identified as the main contributions of common lands. It has been revealed that 45-76 percent of the sample households utilise CPRs for open grazing, and 35-66 percent for fuelwood collection. A study on Andhra Pradesh (SPWD 1990) has indicated that grazing on commons is a very important source of fodder to all types of livestock. The study has assessed total fodder demand in Andhra Pradesh by converting livestock population into ‘cow units’ and assuming 5 kg dry matter as daily intake of a ‘cow unit’. The total fodder availability from cultivated land has also been estimated by using grain-residue ratios. The study has revealed wide gap between fodder demand and its availability from crop land, and has contended that such gap is filled by grazing on CPRs. But Pasha (1992) has found CPRs contributing about 63 and 72 percent of fuelwood and fodder consumption, respectively, in sample households in three villages of Chitradurga and Tumkur districts of Karnataka. The poor households (landless and marginal farmers) are reported to derive higher proportion of their biomass requirements than rich households.

The very recent surveys conducted in Aravalli region of Haryana, have also identified CPR-land as the main supplier of fuelwood and fodder needs. The CPRs are indicated to contribute about 67 percent of fuelwood consumption in higher income groups that increases to 100 percent as income of the household decreases (Sharma 1993). The CPRs have also been affirmed to cater to about 45 percent of fodder/forage consumption at aggregate level, but higher among landless than farming households, and in south-east zone than north-west zone of the region (Daulay 1994).

Forest Mixed Belts of Eastern and Central India: In a study of 60 poorest households of three villages located in two different agro-ecological zones (one village in North 24 Parganas and two in Midnapore districts) of West Bengal, Beck (1994) has asserted the gleaning of rice grain by poor from seasonal fallows as major contribution of CPRs. Except one village wherein gleaning is highly restricted, majority of the poorest
households (86 percent) have been found to be engaged in gleaning and the average collected grain is 13 kg per household in one village during one *aman* season, while in the other village, where paddy grain is also collected from rat holes, the poorest households have been reported to collect on an average 29 kg per households gleaned grain and 32 kg grain from rat holes in one season. The study has also listed the gathering of a wide range of minor forest products (MFPs) such as various fish, wild leaves and fruits, mollusc, various tubers and potatoes, hares, tortoises and pigeons, cranes and other birds, monitor lizard and honey by a large number of households. It has been found that almost all selected poorest households met their fuel requirement of whole dry season and some part of monsoon season from CPRs. The animal grazing on CPRs for four to six months has also been indicated in the village located in North 24 Parganas district and all the year over in the villages in Midnapore district.

**Wet and Irrigated Plains:** In their study of three fishermen’s villages located in Gunjam district of coastal Orissa, Sahoo and Misra (1994) have found that a large majority of fishermen’s households (56 to 75 percent) are dependent solely on fishing from CPRs. Except one village, where some degraded grazing land was available and on which large proportion of unproductive animals belonging to the poor households grazed, CPRs have been reported not to provide much grazing benefits. But, the firewood requirements of the large number of landless households (55 to 72 percent) are met from the community forests. The rich households have also been mentioned to get some fuelwood from CPRs. The CPRs are also indicated to provide some minor products like shells of mollusces and flowers of *pandanus*.

**Employment and Income Generation:**
CPRs provide considerable employment and income benefits especially to the poor. One study has estimated that fuelwood collection in India is the largest source of employment in the energy sector, in which at least three to four million people are involved (Agarwal 1987:181). National Wasteland Board has also assessed that around four lakh families are engaged in extraction of firewood from forests in Rajasthan alone.
(quoted in Chambers et al. 1989:146). Kulkarni (1983) has also appraised that about 30 million people in the country, wholly or substantially, depend on minor forest product collection for their livelihood (quoted in Agarwal 1989). But very few empirical studies have been conducted to comprehensively unravel the employment and income generation from CPRs.

Wet Mountainous and Sub-Mountainous Regions: Nadkarni et al. (1989) have reported that the imputed value of forest produce used in surveyed households amounts to 15.5 percent of the total income in the case of all households and 11.9 percent in the case of landless labour in the sample villages of Uttar Kannada district of Karnataka. The employment generation in collection of forest produce is not evaluated. As far as income generation in Himalayas is concerned, Singh (1993) has found that income from CPRs accounted for 37 percent of the total households income in the sample households in Himachal Pradesh. The share of CPRs in total income varies from 32 percent in case of large farmers to 50 percent in case of small farmers. In Dasuya-Langepur watershed of Hoshiarpur district, Singh et al. (1996) have reported that CPRs contribute 27.3 percent of the total gross income of the landless and 22 percent of the cultivating households.

Arid and Semi-arid Regions: In his seminal work on CPRs in dry regions of India, Jodha (1986) has estimated that CPR-product collection provided employment between 128 to 204 days and 34 to 85 days per annum among poor and large farming households, respectively. Jodha has further assessed that CPR-based activities (grazing, off-season cropping, etc.) provided employment for 43-89 days per household or 18-31 days per adult workers, in poor households in selected villages during 1982-83. This employment period is marginally higher to the own farm employment in the poor households and accounted for around 10-20 percent of their daily working time. The study has also pointed out that the greater employment in CPR-activities during the off season, notably after the harvesting, during poor crop years, and during the days of involuntary
unemployment, underlined the CPRs as significant source of employment opportunity for rural poor at a time when no alternative employment was available. In regard to income generation, the study has documented that except in the sample villages of Akola and Aurangabad districts, the income from CPRs accounted for 15 to 23 percent of the gross income of poor households and 1 to 4 percent that of large farmers. More importantly, the study has presented that inclusion of CPR-income in household income substantially reduces the inequality in income distribution.

Iyengar (1989) has found that across five geo-physical regions of Gujarat, the proportion of households reporting dependence on CPRs for income generation varies from 2.5 to 15 percent, and that most of the income generating activities such as collection of fuelwood, MFPs, raw materials, dung, sand and stone, vegetable cultivation on river bed and animal grazing, are undertaken by landless and marginal farming households. The study has not presented any estimates of income derived and employment obtained from the CPR-based activities. In another case study of three villages in Chitradurga and Tumkur districts of Karnataka, Pasha (1992) has brought out that the income from CPRs, which includes values of fodder and fuelwood, and imputed values of fodder grazed by the ruminant livestock, accounts for around 10 and 6.2 percent of the gross income of poor and non-poor households, respectively.

**Forested Tribal Belts of Eastern and Central India:** A survey has revealed that MFPs contribute about 35 and 38 percent of the earnings of tribals in the forest regions of Gujarat and Madhya Pradesh, respectively (GOI 1982 quoted in Chambers et al. 1989:144). Bhaduri and Surin (1981) have found that as many as 48 percent of the households in nine villages of Ranchi district in Bihar are engaged in headloading, i.e. collection from common lands and carrying it on their heads to the nearest market. These households are reported to belong to scheduled tribes and backward communities, and earn their livelihood mainly by this occupation. Beck (1994) has also estimated that CPR product collection (rice gleaning, and fuelwood and wild food gathering) is worth between approximately 19 to 29 percent of the poorest households' income across the three villages located in North 24 Parganas and Midnapore districts of West Bengal.
**Wet and Irrigated Plains:** Sahoo and Misra (1994) have found that in coastal villages of Orissa CPR-based activities accounted for about 10 to 20 percent of total daily time of the poor households during 1989-90. Fishing and collection of minor products and fuelwood are listed as main employment generating CPR-based activities in this area. The income from collection of minor products is estimated to be Rs 1,700 per poor household.

**AVAILABILITY AND DECLINE OF CPRs**
Till the end of last century and in all historical periods before that at least 80 percent of India’s natural resource endowment was common property (Singh 1986:2). But presently CPRs are estimated to comprise only about 22 percent of the total land (Chopra et al. 1990:31), 44 percent of ground water, 80 percent of fresh water ponds and tank fisheries (Singh 1994:10). The availability of CPRs, and the nature and extent of their depletion differ widely from region to region owing mainly to ecological conditions and agricultural systems prevailing there and partly to land settlements and land tenure systems (Agarwal and Narain 1989:41; Arnold and Stewart 1991; Singh 1994:11).

**Wet Mountainous and Sub-Mountainous Regions:** In the villages located in the forest region of Western Ghats in Karnataka, Nadkarni et al. (1989), have found that the forest area to which people use as CPRs accounts for 56 percent of total land excluding bettas and 82 percent including bettas. Similarly Chopra et al. (1990) in their survey of a cluster of five villages, including world famous Sukhomajri village, in Siwalik region in Haryana and Punjab, have also found that the common land varies between 4.7 to 12.2 times to the private cultivated land in all four villages located in Haryana, but curiously enough, the studied village of Punjab has no common land. Singh’s study (1993) has also brought out that CPRs comprise a large size of land in hilly areas of Himachal Pradesh. He has documented per capita availability of common lands and ratio of agricultural and support (common) land which are 0.16 ha and 1:0.47, respectively.
The study of Singh et al. (1996) has also revealed that land-based CPRs account for about one-third of the total area in Dasuya-Langerpur watershed in the Siwalik Region of Punjab. Some arable land (about 12 percent of the total arable land) is also documented to be with common ownership.

Arid and Semi-Arid Regions: In his study based on the primary survey of six villages in three districts in Western Rajasthan, Jodha (1985) has presented that common grazing lands including forests, pastures, uncultivable and cultivable wastelands, and fallow lands other than current fallows, covered a substantial proportion of total area at all selected three periods of time (56-83, 31-61 and 24-26 percent during 1953-54, 1963-64 and 1977-78, respectively). The study has also pointed out that the area under common grazing lands has declined fast and the rate of decrease is dramatic during the period preceding 1963-64 than the succeeding time. Similarly, high rates of decline have been observed in number of watering points (tanks and ponds) and their catchment areas. On the basis of intensive details collected from two villages, Jodha has revealed that number of watering points have declined from 36 to 17, whilst the area of catchments have shrunk from 769 to 456 ha, during 1953-54 to 1972-73. In regard to seasonal conversion of crop land into grazing land, the study has unravelled that though, net sown area has increased over 25 percent during 1956-57 to 1977-78, however as a result of decline in periodic fallowing of crop lands, elimination of bushes, shelter belts and other trees from crop lands, its contributions to grazing have lessened. By comparing the records of the rate of produce of four CPR-plots in a village in Nagaur district during 1945-47 (which were available with an ex-Jagirdar and his accountant) with the same in 1963-65 (obtained from village panchayat) Jodha has also inferred the substantial diminution in the productivity of CPRs. He has recorded the decrease in the number of cartload of, timber from 43 to only 4, top-feed from 85 to 27, fuelwood from 52 to 14, and cut grass from 110 to 45. The sale of dung and gum is reported to be ceased altogether. Furthermore, Jodha elsewhere (1989) by reconstructing the productivity status of CPRs in the past on the basis of nomenclature, village elders' experience and fragmentary
village records and by comparing it with the present productivity status, has established grave degradation in CPRs of the sample villages. He has observed serious diminishments, in the density of trees and other vegetative cover, the ability of CPR-plots to sustain specific category of animals, the water availability in the ponds, and the intensity of actual usage of CPR-units, during four decades preceding to 1982-83. In his most remarkable contribution covering widest area among CPR studies in India, Jodha (1986) has found that extent of CPR-lands ranges from 9-28 percent of total area during 1982-84 in dry regions of India. These proportions are reported to be between 15 and 42 percent in 1950-52. The study has recorded high decrease in the area of CPRs (26 to 63 percent) from 1950-52 to 1982-84. Jodha elsewhere (1987b) has also discerned severe physical degradation in CPRs from 1950s to early 1980s. He has gauged it by: (a) acute decline in the number of CPR-products collected by villagers (from 27-47 in 1950s to 8-22 in 1980s), (b) nearly total extinction of rich vegetation species from a considerable number of CPR-plots, (c) grave depletion in the grazing potentials of some selected CPR-plots, indicated by the fact that these plots, which have been used to graze more productive animals in the past, are only capable for grazing of small ruminants during 1980s, (d) vast diminutions in the number of water points (from 9-48 in 1950s to 3-13 in 1980s), and (e) perceptible variations in the density of trees and shrubs in protected (398-882/ha) and unprotected (83-215/ha) CPR-plots.

Shah (1987) has also described that the common lands (both panchayat and government lands) are grossly encroached upon for farming in the three villages of Gujarat. Severe degradation is perceived on remaining common lands. But Iyengar in a more systematically and on a larger area of Gujarat, has grasped comparatively less shrinkage in the area of CPRs. He has found that in land records the CPRs have decreased from 54 to 41 percent of the total area from 1947-65 to 1974-85. But he has observed more extensive decline in CPR-land due to their huge usurpation which land records could not reflect. In regard to spatial variations in availability of CPRs, Iyengar has contended that the size of common lands is greatly determined by the variations in productivity and potentials of the land. The proportions of CPR-land to total area are recorded to be low (0.4 to 27.9 percent) in the villages with higher productivity and
good potentials, reasonably high (9.6 to 72.9 percent) in the villages having low productivity but good potentials, and very high (30.3 to 96.4 percent) in the villages with low productivity and poor potentials. Identical patterns of CPR-lands are also revealed in whole Gujarat through taluka level data. The study has also presented some evidences of physical deterioration of CPRs which are based on the impressions and opinions collected through informal and in depth interviews of village elders. It is discerned that during last three decades, the tree population on CPRs has substantially declined, many tree species with rich timbers have largely disappeared, and many grass varieties have totally vanished. Another study (SPWD 1990), using land-use statistics, has estimated that CPR-land encompasses around 27.65 per cent of the total geographical area in Andhra Pradesh varying between 14.5 per cent in Srikakulam and 52.8 per cent in Khammam district. The study has also assessed about 9 per cent decline in CPR-land in the state from 1976-77 to 1986-87. Pasha (1992) and Nadkarni and Pasha (1993) have presented that CPR-land constitutes around 23 percent of total geographical area of 14 villages scattered over 10 districts in Karnataka. They have further added that in recent past 35.6 percent of the total area of the sample villages has been used as CPRs. They have also noted wide usurpation of common lands for cultivation (36 percent of such land) by mainly rural elites in developed villages and by relatively poor in backward villages. In a recent examination of land records of 293 villages in Aravalli hills of Haryana, Srivastava and Kaul (1994) have found that the proportions of the common lands to the total area range from a low of 2 percent to a high of 81 percent (the average being 26 percent).

*Forested Tribal Belts of Eastern and Central India:* Beck (1994) has found severe restrictions on the access of the poor on CPRs either by the rich or by the government in the three villages of deltaic region of West Bengal. He has reported the wide curtailments in the access of the poor for gleaning the rice grain and for the collection of MFPs. He has presumed that such restrictions will further increase in the future.
Review of Literature

Wet and Irrigated Plains: Sahoo and Misra (1994) have revealed that CPR-land constitutes around 20 percent of the total geographical area of three coastal villages in Orissa during 1989-90. Without citing any bases and evidences, they have also added that "both the area and productivity of CPRs in terms of quality and quantity of products have declined".

CAUSES OF DECLINE OF CPRs

The government's appropriation, privatisation and encroachment are identified as chief causes for decline in CPRs in India (Arnold and Stewart 1991). The state legislations have been biased in favour of state or individual expropriation of CPRs especially from last half of the 19th century whereby Britishers encouraged privatisation of land to increase land revenue, and nationalised forests to exploit them for colonial interests under several land settlements and forest acts (Guha 1983; Singh 1986; Gadgil and Guha 1992). After independence, Indian government has followed the western model of development and has further strengthened the colonial legislations regarding CPRs (Guha 1983; Singh 1986; Gadgil and Iyer 1989). The curtailment of customary usufructuary rights of local people mainly to safeguard the forests for industrial and urban consumption (so called national interest), allocation of CPRs to other uses like industries, institutions, housing etc., distribution to or in the name of poor and regularisation of encroached upon lands are widely documented contributions of defective public policies and their faulty implementations since independence (Singh 1986; Chambers et al. 1989; Arnold and Stewart 1991). The forests, especially for industrial and urban consumption, have been exploited beyond sustainable rate (Guha 1983; Gadgil and Iyer 1989). The growth of human and livestock population, commercialisation and mechanisation of rural economy, increased concentration of primary activities due to very low diversification in rural economy, demise of craft industry etc. have led to progressive deterioration and further expropriation of CPRs (Singh 1986; Gadgil 1989; Arnold and stewart 1991; Singh 1994). The following detailed review of case studies further affirms these points and adds other location specific reasons for CPR-depletion.
Wet Mountainous and Sub-Mountainous Regions: In Sukhomajri and adjacent villages in Siwalik hills of Haryana, Mishra and Sarin (1987) have ascertained that overgrazing, land clearance and indiscriminate tree cutting are the basic causes for deterioration of common land.

Arid and Semi-Arid Regions: Jodha (1985) has enumerated the causes of decline in CPRs in Western Rajasthan into three categories: (i) institutional changes in the form of land reforms, (2) population growth, and (3) commercialisation and mechanisation of CPR-based activities. He has elaborated that land reforms in early 1950s have encouraged the privatisation of CPRs to crop land by drastically reducing the land rent. The transfer of ownership or custodianship of the CPRs to village panchayats is also observed disastrous as the panchayats have dismantled the traditional arrangements of regulated CPR-use without establishing any alternative arrangements. Jodha has contended that population growth in post-independence period has exerted high pressure on CPRs, but before independence, even after substantial increase in population CPR-land remained intact mainly because of, (a) feudal landlords did not allow addition to crop lands from CPRs, and (b) most of the CPR lands were submarginal in ecological terms and high rental charges (from a quarter to half of farm produce) levied by Jagirdars made submarginal in economic terms. The break down of the traditional caste occupations system has also been observed a major cause for expropriation of CPR-land for cultivation. The changes in the village economies from subsistence to market oriented, introduction of irrigation, fertilizers, improved seeds and more especially tractors have also been seen as the factors to encourage privatisation and over-exploitation of CPRs.

In his more famous work on CPRs Jodha (1990a, 1990b and 1992) has affirmed the public policies as the main and demographic, ecological, market and other factors as the supporting causes fostering expropriation of CPR-land in dry regions of India. He has revealed that as a result of populist policies and programmes, lot of CPR-land has been distributed in the name of poor in study villages. The impact of other
factors namely demographic pressure (population size, density of population, growth of population and number of households); ecological conditions (area of the village, extent of submarginal lands and number of livestock); and market forces (distance from a market centre) have been examined by bi-variate tabulation and regression analysis over all 82 sample villages in 1950s and 1980s. It has been revealed that the size of population and number of households negatively influence the initial extent of CPR-land, while the area of the village, distance from the market centre, extent of the submarginal land and livestock density have positively influenced it.

Shah (1987) has also found that the main reason for depletion of CPRs in the three villages of Gujarat is their widespread legal and illegal privatisation. Overgrazing, removal of top soils, extensive cutting of trees on CPRs are seen as the reasons for the degradation of CPRs. Iyengar (1989) on a relatively large area in Gujarat has found the legalised privatisation of CPRs in 9 villages and their illegal encroachment in 12 villages out of 25 sample villages. He has further added that usurpation of the common lands has occurred in all sample villages wherever common land existed and was suitable for cultivation. The population pressure and laxity on the part of revenue administration are listed as the factors for such large scale usurpation. The study has also mentioned that encroachment has been done by all, the rich and the poor, and the dominant and the backward castes people. Through the analysis of direct published statistics and indirect estimation, a study by SPWD (1990) has shown that the reasons for decline in area under commons in Andhra Pradesh are (i) its diversion for other purposes, (ii) its distribution for private use (individuals, industries and institutions), and (iii) its encroachment in the hope of future regularisation.

In dry regions of Karnataka, Pasha (1992) has found the illegal encroachment by rural households and the land distribution under welfare programmes as the main reasons for reduction in CPRs in the 14 sample villages spread over 10 districts. He has emphasized that the encroachment upon CPR-land especially by rich households and its subsequent regularisation has been a more prominent cause. The study has indicated that 52 percent of the total lost CPR-land is usurped by rural rich, but poor households have also encroached upon about 22.4 percent of the total lost land. Rest of the lost CPR-land
(25.6 percent) is reported to be distributed among poor individual households. But, in Marathwada region of Maharashtra, Bokil (1996) has described that the dalits are sole encroachers of common lands. He has elaborated that the dalits are usurping the common grazing land since independence in order to get food security and social status, and that the state government twice (in 1978 and in 1991) has regularised such encroached upon land by weaker sections.

**Forested Tribal Belts of Eastern and Central India:** In three villages in West Bengal, Beck (1994) has found that the increasing agricultural development, commoditization of formerly open access natural resources, and increase in number of dependents on CPRs, are the forces stimulating curtailment in the access of the poor to CPRs.

**Wet and Irrigated Plains:** Singh and Bhattacharjee (1991) have affirmed that the illegal encroachment and forcible occupation of common lands before late 1970s, and their distribution to landless and marginal farming households under ‘Land Patta’ scheme of the state government since 1977, are formidable causes for their decline in West Bengal. They have used secondary information for state as a whole and have supported it with an empirical survey of a village in Midnapore district. Sahoo and Misra (1993) have discerned that the privatisation of CPR-land either through its legal transfer to poor in various social welfare programmes, or through its illegal occupation leading to subsequent legalisation, is the main cause for decline of CPRs in three coastal villages in Orissa.

**EFFECTS OF DEPLETION AND DEGRADATION**

The depletion and degradation of CPRs have threatened the long term sustainability of the natural endowment of the country, and have increased the hardship of poor people whose basic survival invariably depends on CPRs (Arnold and Stewart 1991). Some of the location specific facets of these problems have been noted in the case studies reviewed in the following section, but much still remained unfolded.

**Wet Mountainous and Sub-Mountainous Regions:** In the mountainous and sub-mountainous regions, where the livelihood is traditionally based upon collection of forest
products, the large scale deforestation has made this activity very difficult and has increased the drudgery of women who are generally engaged in it. Satsangi and Gautam (1983) have observed this problem in hilly regions of Uttar Pradesh where people have been found to spend on an average 1.64 hours per household per day in fuelwood collection for domestic consumption. Similarly, Folger and Dewan (1983, quoted in Agarwal 1989) have also ascertained that women has to spend around 3 days per week and to walk 5 - 7 km to get fuelwood. In Nainital district of Uttar Pradesh, Singh et al. (1984) have found that fodder and fuelwood collection take 2-4 mandays per week in each household, while in Chamoli district, Swaminathan (1984) has found that people devote 4-5 hours and cover 3-5 km per day to fetch the fuelwood during 1982. In yet another report, it has been illustrated that as a result of removal of nearby trees in a village in Almora district of Uttar Pradesh time span for fuelwood collection has exceeded from previously 4 hours/day for three months to presently (1979) a whole day for six months a year (Vivekanand laboratory 1984 quoted in Partap and Qureshi 1993). Similarly, Agarwal (1989) has presented that fuelwood collection for domestic use requires 5 hours per day and upto 10 km distance to be covered. Partap and Qureshi (1993) have also brought out that the average time taken and distance covered in a single trip have been 5.5 hours and 5.3 km respectively, and that in a year 100 days has been spent in firewood collection in 21 villages of Kumaon and Garhwal divisions of Uttar Pradesh during 1986-87.

Arid and Semi-Arid Regions: Nagabrahnam and Sambrani (1983) has reported that in the semi-arid areas of Sabarkantha district of Gujarat, people especially women spend upto 4-5 hours a day and walk around 4-5 km to collect fuelwood. Jodha (1985) has found three main implications of depletion and degradation of CPRs in his survey of six villages in Western Rajasthan. These are: (a) soil erosion and fall in overall crop yields due to putting submarginal CPR-land under plough; (b) distributive implication in which the poor are not merely deprived from collective benefit, but the legal privatisation has also helped more to well endowed land owners who have obtained not only large portion of distributed land but the land with fertile soils; and (c) decline in the average size of animal holdings, change in the composition of livestock in terms of increase in
the proportions of sheep and goats, and change in the method of livestock raising from grazing to stall feeding during 1963-65 to 1977-78. Jodha’s another study (1986 and 1990a) based on extensive survey has also enumerated similar types of impacts of depletion and deterioration of CPRs. He has averred that the CPR-land distribution under various welfare programmes, has benefitted more the large farmers and those who already had more land have received more CPR-land. More astonishingly, the study (1990a:271) has revealed that the poor have disposed off larger proportion (63-91 percent) of CPR-land, and, if Tamilnadu is excluded, 19 to 42 percent of poor land-recipients have disposed off CPR-land. The inability of poor to develop and use the land due to the lack of infrastructure like plough, bullock, etc., inadequacy of land to sustain the family, and needs for cash are the main causes for it. The changes in livestock composition in the form of substantial diminution in number of bullocks and cows (19-42 and 14-35 per cent, respectively) and increase in the number of sheep and goats (19-38 percent except that of Madhya Pradesh) across all seven states during 1950-52 to 1982-85, have also been attributed to depletion of CPRs.

Though not embodied with such details as Jodha’s work, Iyengar’s study (1989) has also mentioned that the allotment of CPR-land for cultivation to the weaker households has not been able to bring out the intended benefits. Most of the allottees have been found unable to convert the CPR-land into agricultural land in lack of other physical inputs and managerial skills. It is further added that some of the allottees, notably Harijans, have even sold their lands. As a result of severe deterioration of remaining CPRs, it has been reported that livestock breeding has suffered greatly. Many poor families, formerly engaged in CPR-based activities, have either out-migrated or shifted to other occupations. Agarwal (1989) has discussed that women and children have to spend around 5 hours/day and travel around 4 km in search of firewood in some villages of Rajasthan. Similarly, in Aravalli hills of Haryana, minimum distance covered for fuelwood collection has been revealed to be 2 km from the village (Sharma 1993).
Forested Tribal Belts of Eastern and Central India: Bhaduri and Surin (1981) have found that the distance covered for fuelwood collection has exceeded from 1-2 km/day in 1972 to 8-10 km/day in 1980 due to receding of forests in fourteen villages in Ranchi district of Bihar.

Wet and Irrigated Plains: Singh *et al.* (1993) have revealed that the allotment of common land (*Gram Sabha* land) has not been able to provide intended benefit to 238 poor households (landless and marginal farmers) in five contiguous villages in upper Ganga plain (Sultanpur district) of Uttar Pradesh. They have asserted that as a result of high cost of reclamation and lack of irrigation facilities, about one-third of the land allottees is lying waste. Similarly in their study on three coastal villages of Orissa, Sahoo and Misra (1994) have presented that as a result of expropriation of CPR-land, the poor households have lost a significant source of their livelihood, and had not got intended benefits. They have exhibited that about 50 percent of the land allottees have leased out the land received by them and 30 percent have left it fallow. The distribution of land without considering its use-capability and the provision of necessary complementary infrastructure to the allottees are identified as the main reasons for non-use of allotted CPR-lands. About 60 percent of land distributed for fishery development has been found to be unproductive.

**MANAGEMENT OF CPRs**
The formal ownership on CPRs in modern legal terms in India had, historically, been with the kings or feudatory chiefs, but the people had unrestricted ‘occupancy rights’ (right to possess, manage and use) on them; and the rulers neither collected any revenue from these CPRs nor intervened in their use and management (Guha 1983; Singh 1986; Gadgil and Guha 1992; Nadkarni 1996). The local communities had developed many indigenous CPR management institutions through a variety of cultural, social and religious mechanisms and presumably used the CPRs in a sustainable fashion (Guha 1983; Singh 1986; Gadgil 1989; Gadgil and Iyer 1989; Gadgil and Guha 1992). This traditional management system collapsed when colonial rulers established strong state control over CPRs through many ‘Land Settlements’ and ‘Forest Acts’ due to their
imperial interests in the exploitation of natural resources of India as much as possible (Guha 1983; Singh 1986; Gadgil and Guha 1992). The Indian government after independence, perhaps due to its several explicit and implicit urban-industrial biasness, strengthened the state's monopoly on CPRs and curtailed people's rights on them with greater zeal (Guha 1983; Singh 1986; Gadgil and Guha 1992). It had led to continuous over exploitation and severe erosion of CPRs, criminalisation of the people by the state, mass out-migration from forest regions, and revolt against the state in the form of 'Chipko' 'Appiko', 'Jharkhand' and so on (Guha 1983; Singh 1986; Bahuguna 1989; Gadgil and Guha 1992). Singh (1986) has argued that just law and legislation is essential for protection of CPRs and suggests ways and means for making forest legislation more people and environment friendly.

The Indian government in late 1970s mainly to 'lighten the burden on production forestry' (Government of India 1976) and save it for industrial and urban consumption, have introduced the social forestry programme to afforest degraded common lands in order to fulfil the biomass requirements of local people through community management and use. Two very recent reviews of the evaluation reports of the programme in different states have underlined that the social forestry programmes have, in general, provided little or no benefit to whom these were intended to benefit, but raised commercial species for urban and industrial consumption (Chambers *et al.* 1989:164-169; Arnold and Stewart 1991:17-20). The Forest department (FD) has treated common woodlots as an extension to forest area and, hence planted the species for market and not to cater to the villagers' needs. The Forest Department has not shared fund and management with village bodies, and has not clarified the rights or procedures for marketing and allocating benefits from plantation to the villagers (Chamber *et al.* 1989; Arnold and Stewart 1991). Thus, the woodlots generally lack all tenets of communal management. Moreover, very few woodlots have been turned over to the panchayats and majority of them continue to be managed by Forest Department (Arnold and Stewart 1991). However, many traditional institutions have survived, and some recent initiatives to resurrect traditional CPR management procedures, or stimulate new ones, have
yielded some good results. Some of such examples have been reported, but much still remained unexplored.

*Wet Mountainous and Sub-Mountainous Regions:* Many studies (Seckler and Joshi 1980; SPWD 1986; Mishra and Sarin 1987; Stewart 1988; Chopra *et al.* 1990) have described the widely hailed successful experiment of community management of CPRs in Siwalik hills of Haryana. The findings of most of the studies are repetitive, and hence only two of them are reviewed here. First is the study of Mishra and Sarin (1987) which provides the most comprehensive and first hand account of evolutionary process of the experiment, and second is the analysis of Chopra *et al.* (1990) which is a recent detailed examination of the management system. Mishra and Sarin (1987) have described that before the evolution of the community management of CPRs, the economic and ecological conditions in the area were terrible: the Sukhna lake of Chandigarh (a popular resort) was continuously losing its storage capacity due to very high soil run-off; and the people were losing their fields due to gully erosion, and the benefit of grazing and fuelwood collection due to depletion of vegetational cover. The authors have further added that as several conventional bureaucratic and technocratic tools for abetting soil erosion, had failed to stop excessive grazing, land clearance and indiscriminate cutting of trees, the officials of forest and other concerned departments realised that people could only be persuaded to stop over-exploitation of hills by changing the management procedure from bureaucratic to community based, and by providing them alternative source of livelihood. In order to stimulate people’s interests in protection of CPRs, small earthen dams have been constructed by government in ‘Sukhomajri’ Village to provide water for irrigation. The study has explained that it had tremendously increased the crop productivity and initiated enthusiasm among the villagers to protect the catchment of dams by restricting grazing. In this way the community management has emerged in Sukhomajri village. But, due to unequal distribution of benefit (water) and lack of strict rules and regulations at initial stage, experiment is reported to face the problem of ‘free riding’ in the form of grazing by some households. It is noted that the problem was resolved by changing the water distribution system from conveyance system to equal distribution to every family of the village, and by forming village society consisting of
the members representing all the families of the village and of the some co-opted members from different government departments. The society charges small amount of money from each member to meet its administrative expenses. The government officials as co-opted members of the village society, perceived to be impartial and neutral, have played very crucial role in resolving many problems. The study has also demonstrated the good results provided by the community management in terms of the increase in the agricultural productivity, prevention in the sedimentation in the lake and expansion in the vegetational cover. The study has further explained the evolutionary process by adding that impressed by the success of the experiment, Haryana government gave the management of grass and bhabar cutting rights also to the village society in 1985-86, which were earlier auctioned to private contractors, which further strengthen the institution of CPR-management in the village.

This experiment has been replicated in about 40 villages of Haryana (Arnold and Stewart 1991). Mishra and Sarin (1987) have also illustrated an attempt of its replication in Nada Village, having similar ecological but different socio-economic conditions. It has been documented that, as Nada is a multi-caste village with vast inter-caste inequalities in land distribution and, with higher caste dominance on village affairs, the Sukhomajri model has been applied here with certain modifications: the formation of separate ‘societies’ of the higher and lower castes and construction of one dam out of the three, exclusive for poverty stricken Harijans. Initially people from the higher castes had resisted, but problem has been resolved and societies are reported to work reasonably well. But, Mishra and Sarin (1987) have shown some unresolved problems of Nada project: the absence of legal rights to the produce of plantation, inter-caste conflict, insufficient opportunities to earn cash income, and absence of outside neutral intervention to resolve conflicts. These may be detrimental to the interests of the project.

Chopra et al. (1990) have examined several vital theoretical and empirical aspects of people’s participation in the management of CPRs using information from a cluster of five villages including ‘Sukhomajri’ in the same region. The authors like these others (Mishra and Sarin 1987; Agarwal and Narain 1989) have concluded that ‘non-governmental, non-market institution’ is the solution of the so called ‘tragedy of
commons' in lower Siwalik hills of Himalayas. The pertinent additions in CPR-management literature, this book has made are: (a) the analysis of linkage between CPRs and PPRs, (b) evaluation of effects of community management system using social-cost-benefit-analysis, and (c) theoretical underpinnings of contractual arrangements between villagers and government. The links between CPRs and PPRs, and benefits derived there from, and its impact on level of people’s participation have been identified by grouping the sample households into homogeneous categories through cluster techniques in which three variables of ‘within village’ income have been used (p.70). The inter-village and inter-cluster differences in the success of community management have been explained in terms of the access to the CPRs and PPRs and inter-linkages among them, in relation to household income. The various direct and indirect tangible costs invested and benefits accrued by the village households, village societies, and government agencies from three ‘within project’ villages are included in SCBA. The information from two ‘without project’ villages have been used as bench mark to assess the increase in production of different factors in ‘within project’ villages as a result of new institutional arrangements. NPSB and CB ratios at a standard (12 per cent) rate of discount have been calculated in all three villages, firstly, by valuating all inputs and outputs at market price, secondly, by valuating the labour and the capital costs at the shadow price, and thirdly, by using distributional weights calculated from income distributional pattern in project region as compared to that generated for government. The study has revealed that the emergence of community management results in fairly high rate of returns. The contractual arrangements between government and societies are found theoretically vital to the success of participatory management. These arrangements provide some welfare improving distributional gains both to the government as well as to the village communities. The evidences of the contributions of contractual arrangements, namely preservation of the forests and land, increase in the productivity of PPRs and impart the gainful employment within village, reinforce these conjectures. The questions of rental arrangement to be contracted, amount of land to be leased-out to the ‘societies’ and the possibilities of employment-type generated through people’s participation are also theoretically examined. On the issue of replicability of ‘Sukhomajri model’ the authors
have argued that the degree of success of the participatory management depends upon
the pattern of private asset distribution, social structure (especially caste composition),
existence of catalysts (committed leadership and support from government and other
agencies) and employment and income situation. The study has strongly recommended
the thorough re-examination of laws and legislations governing the management of
CPRs, and transfer of user's rights to village communities wherever possible.

The 'Van Panchayats' (henceforth as VPs) is one of the largest and most diverse
experiments of CPR management in involvement of local people with the State in
Kumaon and Garhwal divisions of Uttar Pradesh Himalayas. Many scholarly works are
devoted to different aspects of VPs, some of those relevant to CPR-management are of
Ballabh and Singh (1988). Pant (1922), Guha (1983, 1985b, 1989) and Ballabh and
Singh (1988) have traced out the emergence of VPs. They have described that after
many years of intense agitation of people in UP-Himalayas against the settlements and
reservations of forests by colonial rulers, the civil administration as a matter of
compromise introduced VPs during early 1930s to manage only the class I forests under
a set of bureaucratic rules whereby local communities control use of and access to all
forest reserves in class I forest except large pine trees, management of which rests with
forest department. Presently (1985) about 4000 VPs, occupying 13.6 per cent of total
forest area, have been found in this region (Ballabh and Singh 1988). A number of
seasoned observers have pointed out that though the success of VPs in forest protection
and management differs from area to area depending on numerous ecological, socio-
cultural and economic determinants, but upkeep of VP-forests is often much better than
civil or soyam forests and equal to or even better than reserved forests (Gadgil et al.
1983; Guha 1985a; Saxena 1987; Ballabh and Singh 1988). A remarkably rich tree cover
is observed in areas managed under traditional community system, more especially in
'sacred groves' protected by religious associations (Guha 1985a). But, in spite of
comparatively successful performances of VPs, the state has tightened its control on
them over time by amending VP-rules (Niyamawali) and has eroded their power to
manage the forests (Ballabh and Singh 1988; Ballabh 1993; Singh 1994). Hence, Saxena
(1987), Ballabh and Singh (1988), Ballabh (1993) and Singh (1994) have stressed on several changes in VP-rules and regulations to increase their managerial capabilities. Encroachments and illicit felling have been seen as the basic problems of this management system. The inaccurate definition and protection of boundaries between VPs, inability to support a forest guard, lack of equal distribution of forest products and government apathy towards VPs are enumerated as some reasons for their poor performances (Tripathi 1987; Vidyarthi 1987; Ballabh and Singh 1988). The successful VPs have established several use regulations which vary depending on the location-specific factors (Tripathi 1987; Saxena 1987; Ballabh and Singh 1988). But, it is observed that all successful VPs have forest guards or rotate the guarding responsibility among households (Muasawari). The members of a VP (five to nine) are normally elected by the village people every five years. But, where elections have not been held but traditional authority has been eroded, the manipulation by few individuals are described as a problem in a number of villages (Vidyarthi, 1987).

In a remote village of Tehri region of Uttar Pradesh, Moench (1988) has found many informal systems of CPR management. The author has averred that the forests are state property, but are de facto CPRs and are managed by villagers who follow the observable patterns of management regarding inter-village and inter-household distribution of forest resources. Moench has proposed the local land use zoning and management rules for more effective CPR-management.

Gadgil and Iyer (1989) have demonstrated the wisdom of traditional management system illustrating a case study of a cluster of villages in Uttar Kannada district of Karnataka, where people are largely engaged in traditional occupations. The authors have used the endogamous caste groups as an ecological analogue of ‘species’ specialising in different resources. They have revealed that such diversification of ecological niches of the different co-existing endogamous caste groups ensure monopoly in the use of specific CPR, and is instrumental in the long term sustainability of these resources. The authors have suggested the means and policies by which some of the positive attributes of the traditional resource management system can be preserved and rejuvenated.
Arid and Semi-Arid Regions: Wade (1986 and 1988) has presented the sophisticated rules and norms of collective managements of grazing lands in Kumool district of Andhra Pradesh, and has explained why some villages have an elaborate form of organisation for village based-common-pool-resource management, while others only a few miles away, have none. The author has identified two types of grazing in the ‘cooperative’ villages: (1) year round grazing along the verges of roads and fields as well as on the uncultivated areas, and (2) the post-harvest grazing on the stubble area left after the crop harvest. It has been pointed out that the grazing poses risks to nearby standing crops, and creates the soil degradation in the fields. The study has further added that the privatisation as a means to reduce these ‘externalities’ is made difficult by the nature of the resource and technology, and hence, the villages are following the indigenous collective management system from several decades. In order to reduce the externalities specialized field guards have been suggested to be appointed by the village council to make sure no animal is gazing a standing crop. The study has revealed that the owners of animals caught grazing standing crop pay a fine to village council; either whole or part of it is contained by field guards as a built-in incentive for enforcement of rules. The renting out the surplus grazing land in post-harvest period to the herders of sheep and goats migrating from the other hilly and arid regions is described to provide enough money to the council to pay the field guards. In this well regulated grazing, the farmers get the benefit of stubble cleaning from their fields, manure sold by the herders, and save their soil from the damage of excessive grazing. In order to control externalities and free riding, village councils have to put very tight specification of responsibilities to the herders and farmers. In regard to spatial variations in CPR management, Wade has summarised that the village institutions are only likely to be formed and sustained when the risks of conflict and loss (crop animal and soil) are relatively higher. He has found that "corporate villages" exist in black soils and in the tail-end of irrigation distributaries where ecological conditions create high risks of conflict and crop loss. He has also averred that as an effect of the rules of restrained access on resource use, "both the production and equity are higher with these rules and institutions than they would have been in those same villages in absence of the rules and
institutions". The management of only intensely felt needs that could not be met by individual response, control of 'local elites' on the councils, and simple and transparent technique of calculation and control are features which have been listed by Wade to learn from the "corporate villages" in organisational design. He elsewhere (1987) has logically contradicted all standard theories of collective action (Prisoner's Dilemma, Tragedy of Commons, Logic of Collective Action) on the basis of empirical findings of this management system, and has found it to be as superior alternative to private and state regulation. He has also spelled out the detailed conditions for successful organisation in terms of characteristics of the resource, the technology, user group, as well as the relationships between, resource and the user group, and between users and the state. He has recommended the helps of government and voluntary agencies in certain aspects of organisation. Applying Oakerson's model (1986), Blaikie et al. (1986) have elaborated the CPR management in Tamilnadu, where the state has taken control of virtually all formerly CPR-land. The CPR-land analysed in the study are comprised of the poromboke (the land incapable of cultivation or set apart for public or communal purposes), assessed and unassessed waste and designated forests. The physical and technical attributes of the CPRs have been summarised "as broadly accessible and non-excludable, subject to relatively higher substractibility and divisibility, and with a clear set of boundaries" (p.487). The decision making arrangements have been found mainly to be characterized by minimum collective choice, and extensive bureaucratic control under rules that are partial and often unclear, and that leave a great deal to the discretion of field officers in matter of enforcement, and hence prone to manipulation by those with local power and generally work in their favour. Blaikie et al. have described that in the patterns of interaction, the main actors are users and various functionaries of state backed by rules which in principle clearly demarcate and sanction rights and restrictions, but in real practice lot of illegal uses and encroachments, frequently facilitated by bribery to state officials, take place. The local management and interaction are stated to be drastically limited, and to be characterized by highly individualistic patterns of use and competition among users who have differing qualifications for gaining access. Finally, the authors have discussed the outcomes of the bureaucratic regulations on
CPRs in terms of political economy, environment and livelihood. The outcomes of political economy have been summarised in seven major points: (1) the state seeks to regulate most CPRs, (2) the marginalisation of poor has led to increased use of CPRs and their encroachment, (3) the increases in irrigated area have eased the shortage of pasture, but simultaneously have increased the demand for green manure, (4) there is not a widespread or severe shortage of domestic fuel, (5) there is a severe pressure on grazing land, (6) most MFPs have ceased to be CPRs either because of their exploitation to the extinction or because of their nationalisation, and (7) the shrinkage of CPRs over a long period has left very little common land under the control of the villages. In regard to environmental conditions, the authors have contended that the production of grazing lands is minimal, and many of the forests and their several products are degraded or exploited beyond natural rate of sustainability. The study has averred that CPRs present various livelihood opportunities that are either not pursued or inefficiently pursued from the viewpoint of poor's welfare.

Gupta (1986) has examined mainly the socio-ecological factors of failure of modern CPR-management projects taking a case of World Bank sponsored project in Jodhpur district of Rajasthan. The project was established to provide a demonstration of technological alternative for better rangelands management and possibilities of group action through the organisation of a cooperative of weaker sections of sheep breeders. Applying Oakerson's framework (1986) the author has presented that the pasture plots were established on 100 ha degraded auran (sacred groves) lands having shallow, poorly drained, severely eroded, saline and alkaline soils. The decision-making arrangements are described to be based upon complex processes and requirements, and to be manipulated by wealthy and politically powerful people (the Rajputs) by putting aside the poor shepherds for whom the project was established. The author has argued that since the society of the beneficiaries of the project encompasses only a very few members, majority remainders had not agreed to fence common land through collective decision making, and hence the fence erected by project staff had slowly been broken down from several places. Gupta has found that the plots have not been given to the people within the stipulated time period due to the fear of their total disintegration. The
lack of congruence between the physical and technical resources and the decision making arrangements, and counter production patterns of interaction have been taken as the causes for such undesirable outcomes. Finally, the study has proposed the future options of socially desirable outcomes in co-operative enterprises in terms of some biasness in favour of poor members in institution formation, consideration of the variations in the perception of risks and assurance of cooperative management among different classes in the structure of institutional arrangements, the respect of the principles of traditional resource management, and the positive state action. Jodha in his studies (1985, 1986, 1989) has described that most CPRs have become 'open access' resources following the abolition or disintegration of traditional usages regulations. He has revealed that of the communities that in early 1950s had exercised controls such as rotational grazing, seasonal restrictions and watchmen, only 10 percent have such controls in 1980s, while use of fine, taxes and fees have ceased altogether (Jodha 1989). From the analysis of 176 specific CPRs having at least one instance of local concern of preservation, Jodha has revealed the small size, isolation and maintenance of traditional social sanctions, as village specific determinants for maintenance of CPR management. More specifically, greater distance from market centres, smaller and more visible CPRs, less occupational change, less factionalism, less socio-economic differentiation, and less dependence on state patronage are found to be favourable for preservation of CPR managements. Jodha (1990) from a detailed enquiry of 175 CPR-units has revealed the emerging pattern of CPR management by the local people. The factors inducing this new pattern of people's interventions are: (i) most of the CPR-unit specific management events are a by-product of other developments, such as factional quarrels in the village, or specific conditions of government grants of the village or adherence to attain rituals and religious sanction; (ii) higher productivity and yield of CPRs induce their better management; (iii) the CPR-unit's location, size and proximity to village, as well as rituals and religious sanctions play positive roles in management of CPRs; and (iv) genuine concern against degradation and misuse of CPRs is an important factor inducing people's action for CPRs.
Gupta (1988) has presented the first hand experience of tree plantation on severely eroded CPRs of ‘Jawja’ block in Ajmer district of Rajasthan, under novel experiment of rural development which emphasizes that rural communities should learn to identify and generate their own opportunities and resources, with minimum institutional support from outside. It is noted that the experimenters have involved school system and established non-formal education centres to impart the learning of the value of tree plantation, its growth process and organic relations with it, which yielded good results as villagers accepted the message and two non-formal education centres themselves took initiative to protect tree plantation on CPRs. The author has unravelled that it has produced good results and encouraged others to adopt same practice. The evolution process is reported to cross next stage when some village communities decided to collect seeds and to cultivate nurseries to minimize their dependency on forest department. It is noted that the message also spread in adjoining districts. In 1984, impressed by the success of the experiment, SPWD (Society for Promotion of Wastelands Development) provided financial assistance in nursery raising in some of the villages. On the self sustained nature of the experiment the author has argued that as most species raised are traditionally consumed for subsistence, benefit-sharing would not create problem. But he contends that the movement has not yet attained self-sustaining level. Lastly, the article presents the requirements of such learning process and factors facilitating the learning process.

Singh and Ballabh (1989) have evaluated the village woodlot scheme in Aslali village near Ahmedabad (Gujarat) in which 65 ha of common gauchar land has been devoted to the village woodlot scheme. Most of the features of this case-study are identical with forest department’s afforestation schemes under ‘social forestry’ in the country at large. The authors have worked out the economics of the woodlot by applying cost-benefit analysis and have found it financially viable with 1:73 benefit-cost ratio (BCR) and 28.71 percent internal rate of return (IRR) at 15 percent discount rate. But, they have not found it socially desirable because of the fact that the forest officials consider it the extension of forest area and managed it in similar bureaucratic and techno-economic fashion. From the survey of 70 villagers and some panchayat
officials, the study has found almost no involvement of villagers as well as panchayat in the establishment and management of woodlot. Most of the people, especially poor cattle raisers, who have lost their grazing benefits without gaining anything from woodlot have been to be its staunch critics. The authors therefore, have recommended that the state should only provide technical and financial support to motivate the people for afforestation rather than taking all jobs itself. It is widely documented that the elected village panchayats owing to their various economic and social constraints are not appropriate organisation for development and afforestation of common land. This study has also brought out that the panchayat is not willing to take over woodlot after stipulated time of three years. Hence the need of searching some other alternative forms of organization for this purpose has been emphasized. Singh (1994) has analysed the management procedures of widely known Gambhira co-operative farming society in Kheda district of Gujarat. He applies the Oakerson’s model (1986) in it. On the very outset, he has described the genesis of society as a brainchild of an enlightened and dedicated social worker, Chhaganbhai Patel on whose request the state government agreed to grant flood prone 246 acres bhatha land (riverine/riverbed land) to the society of distressed cultivators. Presently, the society is described to operate on 526 acres of land and to have 291 members from landless labourers and marginal and small farmers mainly belonging to backward castes. The functioning of society is regulated by the management committee with the help of employees, while policy matters are decided in the general body. Many innovative methods of collective farming, work allocation and supervision, distribution of farm produce and profits between the society and groups, and among the members of each groups are documented to have been developed by the co-operative society. The author has not observed any sign of conflict in the interactions among members and with non-members. The work system, the method of distribution of produce and profit of society, high stakes of all members in the organisation of society, and socio-economic homogeneity have facilitated frequent and usual beneficial interaction between members of the society, and inculcated a sense of cooperative work ethics and reciprocity among them. The study has evaluated the
outcomes of the society in terms of four criteria, namely, efficiency, equity, sustainability and members' satisfactions. On the basis of consistent increase in crop yields, total farm production, net farm income per member and net profit over time, the author has affirmed the co-operative management as efficient and sustainable. The criteria of equity has also been reported to be met as firstly, the society provides benefits to destitute and poor and hence reduces inter-household disparity in the constituent villages, and secondly, among members the benefit are distributed in proportion to their labour contribution. The members of the society have also been found, by and large, satisfied with the performance of society.

Srivastava and Kaul (1994a and 1994b) have reported an effort of Haryana government with financial support from Commission of European Community (CEC) for changing the open access system into community regulated access system in order to rehabilitate 33,000 ha highly degraded common lands of 293 villages in Aravalli hills. The ongoing project has been described to aim at restoring the green cover of village commons and improving the income and living conditions of the people by meeting their biomass requirements in an ecologically sustainable manner. It has been brought out that from the very beginning of the project, the participation of local communities is considered vital for achieving the target, and hence to control and manage the CPRs, the project has constituted village Forest committees (VFCs) as Executive committees of village panchayat with 9-13 members including forest ranger, forest protection guard, at least three women and representatives from scheduled castes. The micro-plans for afforestation, grass land development and soil conservation have also been reported to be prepared with active participation of the community. The authors have further added that in order to provide employment and cash incentives especially to women, mahila (women) nurseries have been set up, local women have been appointed as extension workers and women have been encouraged to collect the seeds of grass and legumes being purchased by project. To encourage the local committees, cash incentives have also been described to be given to VFCs with higher degree of success in plantation and with complete protection of vegetative rehabilitation. Although, the reports have claimed some positive trends in the restoration process of common lands, but it is too early to
assess its longer term sustainability or replicability. Qureshi et al. (1995) and Qureshi and Kumar (in press) have found relatively higher tree cover in the Bishnoi villages of western Haryana and Rajasthan, where the Bishnio community is protecting trees and wildlife from centuries, out of their religious faith. In the household surveys in one village in western Haryana and one in western Rajasthan, the authors have found the community quite particular and enthusiastic to preserve their environment. The studies have recommended the use of such traditional community ethos in protecting tree and other natural resources.

_Forested Tribal Belts of Central and East India:_ The famous experiment of 'joint forest management' (JFM) in Arabari range in Midnapore district of West Bengal, just on the edge of the forest belt across central India, is one of the recent examples of diversion of FD’s policy of CPR-management, from highly bureaucratic to people’s involvement and cooperation. Many studies like Malhotra and Poffenberger (1989) Chandra and Poffenberger (1989) Arnold and Stewart (1991), Singh (1994) have described it. Malhotra and Poffenberger (1989) and Singh (1994) have traced out the history of its evolution. They have illustrated that during early 1970s in his effort to regenerate the severely degraded forests, then division forest officer (Dr. A.K. Benerjee) realised that the rejuvenation and protection of forests could not be possible without co-operation of local people as they very intimately depended on them for their biomass needs and cash income; and hence he paid repeated visits to the local people and held informal discussion with them in order to establish his credibility among them, and to develop a close rapport and working relationship with them. The studies have further added that the DFO through his close interaction with the local people found that poverty compelled the people to overexploit the forests and hence their co-operation for the forest protection could not be taken without providing them some alternative source of employment and income. It is described that for getting people's participation in regeneration of forest, the DFO assured the local people to provide employment opportunities in forest regeneration, exclusive rights to all non-wood forest products free of cost, some degraded forest land for crop farming, fuelwood for household consumption and 25 per cent of the net sale at final harvesting of forests. The studies have reported that the people agreed and formed the 'forest protection committee' (FPC)
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Consisting of a president and 11 members one each 11 participatory villages. Some forests guards, van mazadoors and 22 persons selected on rotation from 11 participatory villages are mentioned to guard the 1272 ha planted area. The joint management of planted area has been found to yield good results as the forests have regenerated and average income flow from forest-based activities to local people has been about Rs 722 per annum per participatory family (Chandhra and Poffenberger, 1989:39). Malhotra and Poffenberger (1989:1) have brought out that the average cost of regeneration has been a modest Rs 250 per ha which is only 5 per cent of the cost of establishing a plantation crop. Impressed by the success of Arabari experiment, it has been replicated on a larger area in West Bengal and in some other states (Singh 1994: 280-281). The proper selection of beneficiaries, adequate empowerment of FPCs, micro-planning for the overall development of the area, suitable amount and timing of benefit flows, processing and marketing of non-wood products, training and motivation of FD staff and FPC members, women’s participation and political neutrality in FPCs, are certain issues which have been identified as crucial for Arabari type joint management of commons (Malhotra and Poffenberger 1989).

CONCLUSION

The preceding review reveals that the problem of CPRs is a relatively nascent area of investigation. A few works have been done on CPRs in comparison to the gravity and nature of their problem. The studies have mainly been concentrated on the arid and semi-arid regions and to some extent on sub-mountainous Himalayan and Western Ghat regions. In Himalayas also only the successful experiments of joint forest managements have been examined, while other themes remained untouched. Similarly, a very few studies have been conducted in tribal areas in a CPR framework. The irrigated and wet plains, where both CPRs and poor are facing a severe set back remained largely untouched. In fact, CPRs have not acquire the status of a general research problem in India. The studies devoted to CPRs are mainly conducted as ‘projects’ sponsored by the funding agencies. In brief, this review further emphasized the urgent need to investigate the CPRs especially on the unattended regions and themes.