

Market Forces and Erosion of Common Property Resources

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Summary

Common property resources constitute a significant component of the agricultural resource base in rural areas of developing countries. Broadly speaking, the common property resources (CPRs) are those that are utilized jointly or individually by the members of the community (with or without usage charges), without any exclusive individual property right on them. In the context of Indian village communities, CPRs include: village forests; community pastures; wasteland; community threshing grounds; river/rivulet banks and beds; watershed drainages, ponds, tanks, and groundwater; etc. The CPRs directly or indirectly play an important role in enhancing and stabilizing the income, employment, and sustenance of village communities. However, under the pressure of circumstances, the CPRs have been declining and deteriorating rapidly during recent decades. Institutional changes, increased pressure on land, and free play of market forces seem to be the primary factors behind the decline of CPRs. This paper, after highlighting the contribution of CPRs to village income, presents evidence on their erosion. Factors contributing to this erosion are discussed with the help of village-level data from selected areas of Rajasthan and Madhya Pradesh in India. The role of market forces in the process is described.

Résumé

Forces du marché et disparition des ressources des propriétés communes : Les ressources des propriétés communes constituent une importante composante de la base des ressources agricoles dans les régions rurales des pays en voie de développement. En gros, les ressources des propriétés communes sont celles qui sont exploitées conjointement ou individuellement par les membres de la communauté (sans ou avec frais d'utilisation), sans aucun droit exclusif de propriété individuelle sur elles. Dans le cadre des communautés villageoises indiennes, les ressources des propriétés communes comprennent : forêts du village, pâturages de la communauté, jachères, terrains de vannage de la communauté, rives et lits des rivières/ruisseaux, bassins-versants, étangs, réservoirs et nappe phréatique, etc. Les ressources des propriétés communes jouent un rôle significatif soit direct soit indirect en augmentant et stabilisant le revenu, l'emploi et les moyens de subsistance des communautés villageoises. Cependant, sous la pression de la conjoncture des circonstances pendant les dernières décennies, les ressources des propriétés communes diminuent en ampleur et se dégradent rapidement. Des changements au niveau d'institut, la pression accrue sur les terres disponibles et le libre jeu des forces du marché semblent être les principaux facteurs de leur diminution. Après avoir souligné la contribution des ressources des propriétés communes au revenu du village, l'auteur met en évidence leur affaiblissement. Les causes contributives de cet affaiblissement sont examinées à l'appui des données à l'échelle villageoise des régions sélectionnées du Rajasthan et du Madhya Pradesh en Inde. Le rôle des forces du marché mises en jeu dans cet affaiblissement est décrit.

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Introduction and Summary

Common property resources (CPRs) constitute a significant component of the agricultural resource base in the rural areas of developing countries. Broadly speaking, common property resources are those that are utilized jointly or individually by the members of the whole village community (with or without usage charges), without any exclusive individual property right on them. In the context of Indian village communities, the CPRs include: village forest; community pasture; wasteland; community threshing grounds; river/rivulet banks and beds, watershed drainages, ponds, tanks, and groundwater; etc. CPRs directly or indirectly play an important role in enhancing and stabilizing income, employment, and sustenance of village communities.

Both the quantity and quality of CPRs has deteriorated rapidly in the recent past. Institutional changes, particularly changes following land reforms in the early 1950s, and the free play of market forces seem to be the primary factors behind the decline of CPRs. This paper describes the contributions of CPRs and highlights the role of different factors responsible for their erosion. The role of market forces and the effects of improved market infrastructure, which increased prices and profitability of CPR-products and helped to accentuate the degradation of CPRs, are discussed. The analysis is based on village-level data from selected districts in Rajasthan and Madhya Pradesh (MP) states of India.

The Approach and Data

Rajasthan and MP, with 75 and 94 persons per square km respectively (compared with 173 for India), are not only among the regions with the lowest population density in India but also have considerable area in CPRs. According to 1979-80 statistics, the CPRs—including grazing lands, wasteland, permanent fallows, and forests—account for 45 and 50% of the total geographical area of Rajasthan and MP, respectively. The corresponding figure for other states, excluding Orissa and the northern and northeastern hill states, hardly exceeds 35%. Because of high rainfall and better soils, CPRs are more productive in the study areas of central MP than in the sandy and arid study areas of western Rajasthan. The relative importance of specific CPRs also changes accordingly. The

change in the status of CPRs and forces underlying their decline are indicated by comparing data for 1953-54 and 1982-83. The cropping year 1953-54 is chosen mainly because it marks a watershed in the agrarian history of the two states. During 1951-54, an ambitious land reform program was conceived and initiated, following the 1949 report of the Rajasthan and Madhya Bharat Jagir Enquiry Committee. The impact of land reform activities started being visible after 1953-54 (Singh 1964). Since the CPRs first suffered from the backlash of progress of the land reforms program, 1953-54 is treated as a starting point for comparative analysis. Initiation of land reforms being a major event in the history of the villages, it offered a useful reference point to elicit information from knowledgeable and elderly villagers through recall. Furthermore, the slow and gradual development of rural areas, particularly in transport and communication, related infrastructure, and links with town-based market structure, started only after 1953-54, when the early land reforms phase was carried out.

The data for selected villages from districts of Nagaur, Jodhpur, and Jaisalmer in Rajasthan were collected in several stages from 1963-64 to 1982-83 (Jodha 1985). The data from villages of Raisen and Vidisha districts of MP were collected during 1982-83 under ICRISAT's ongoing village-level studies (Singh et al. 1983) and by ad hoc data-gathering under the research project on "Role of Common Property Resources in Traditional Farming Systems" (Jodha 1982a). The data presented in the paper are from three sources: (i) data relating to whole villages were collected largely from village records and revenue documents with the help of village panchayat (elected village council) and patwari (village-level revenue official); (ii) data relating to village-level marketing and prices were collected from records of traders and through recall from knowledgeable village elders; (iii) data relating to individual families were collected from sample households. Besides these quantified details, qualitative information from the study villages is also presented in the paper.

Contribution of CPRs to Rural Community

Before discussing the decline of CPRs and causes thereof, it will be useful to comment on the direct and indirect contributions CPRs make towards income, employment, and sustenance of rural

communities. In the following discussion we list and describe the possible benefits from CPRs. As far as possible, the benefits have been quantified.

Benefits from CPRs

CPRs generate income directly through the provision of physical products, by supplementing income and employment, and in the form of social gains; CPRs also contribute to the productivity and stability of farming systems. The ways in which these benefits and contributions emanate from different CPRs are described below (see also Table 1).

Fodder supply, grazing space, and land saving for crops. To the extent CPRs (through supply of fodder and grazing space) partly sustain the farmer's draft and milch stock and other animals, they help in retaining land for crops which, in the

absence of CPRs, would have to be used for fodder production. Alternatively, in the absence of CPRs, the farmer would be forced to reduce his livestock to a level permitted by his own feeding resources. In either case, resource availability for private property resource-based (PPR-based) farming would have declined. Such a resource-saving contribution of CPRs is very important, especially for small and medium farmers, who already have too little land to be spared for animals. For instance, in the study areas of Rajasthan mentioned above, the households having land up to 5 ha had 4 to 12 animal units per ha; those with 10 to 15 ha of land had 1 to 3 animal units per ha (Jodha 1985).

Off-season land availability from river/tank beds and availability of irrigation water. The CPRs' resource-augmenting role in PPR-based farming systems is obvious when we look at the beds of dry tanks, or river/rivulet beds, which are used for off-season cropping. Crop irrigation is car-

Table 1. Benefits from common property resources in villages.

Benefits	Contributions to farming systems ¹	CPRs ²						
		A	B	C	D	E	F	G
Physical products								
Food	e,c	+ ³		+				
Fodder	a,c,d,e	+	+			+		
Fuel/timber, etc.	a,e	+	+	+		+	+	
Water	b,c,d				+	+		+
Manure/silt/space	b,c	+	+	+			+	
Supplementary income/employment								
Off-season activities	e,d	+				+	+	
Drought period sustenance	d	+	+				+	
Addl. crop activities	b,d			+	+		+	+
Addl. cattle	b,d	+	+					
Petty trading/handicrafts	d,c	+					+	
Social gains								
Resource conservation	f	+	+					
Drainage/recharge of groundwater	f,d,b			+	+	+		
Sustenance of poor	e							
Stability of farming systems	-	+	+	+				
Renewable resource supply	a,b	+	+	+				+
Better microclimate/environment	d	+	+		+			

1. The benefits can be looked at as contributions to PPR-based farming systems and can be classified under categories: (a) resource saving for CPR-based farming systems; (b) resource augmentation for farming systems; (c) fuller use of environment; (d) seasonal buffer and stability of farming systems; (e) rural equities and nutrition; and (f) importance in resource-centered technology.
2. CPRs: A = Community forest; B = Pasture/wasteland; C = Pond/tank; D = River/rivulet; E = Watershed drainage/riverbank; F = River/tank bed; G = Groundwater.
3. + indicates applicability or incidence.

ried out by lifting water from rivers/ rivulets or ponds and by the use of groundwater (recharged through percolation tanks). This augments both the area under crops and the cropping intensity of the cultivated area.

Support to integrated activities for fuller use of the environment. In dry-farming areas, traditional farming systems partly derive their stability and viability by making fuller use of a highly variable agroclimatic environment. In doing so the farmer uses crops, livestock, and trees/bushes (the latter being less sensitive to temporal variability of rains) as integral components of his production strategy. The CPRs, particularly village forests, grazing lands, rivulets, and watershed drainages play a significant role in this strategy.

Seasonal buffer and stabilization effects during droughts. Due to the seasonality of crop production and periodic droughts, CPRs cushion dryland farmers' welfare during crisis periods. They are sources both of physical supplies (of food, fuel, fodder, etc.) and of income and employment, especially for relatively poorer households (see Table 2).

Contribution to rural equity and nutrition of poor. Rural inequalities generated by PPR-based farming systems are partly reduced by CPRs as the labor-intensive activities to harness most of the CPRs (except irrigation water) are usually performed by the poor. Petty trading and handicrafts based on CPR-products (e.g., basket-making, *beedi*-making) are additional sources of income

Table 2. Dependence on common property resources (CPRs) by indicated categories of rural households in selected villages in Rajasthan and Madhya Pradesh.¹

Indicators	Categories of households			
	Rajasthan villages		Madhya Pradesh villages	
	Labor, small farmer	Large farmer	Labor, small farmer	Large farmer
Households (no.)	58	33	40	20
Households (%)				
— meeting > 70% grazing requirements from CPRs	97	24	82	25
— collecting food material from CPRs	41	3	77	0
— collecting fuel from CPRs	86	0	98	0
— collecting fodder from CPRs	36	3	55	5
— collecting timber, silt, etc., from CPRs	12	36	10	45
— obtaining supplies and wage employment from CPRs during drought	69	0		-
— using CPR water for irrigation (%)	0	9	0	15
— consuming only CPR-food items that were collected and not purchased ²	39	0	50	0
CPR-based income as proportion of gross income per household (%) ³	42	15	-	-

1. Source: See note 1, Table 3. Information for villages of Nagaur, Jodhpur, and Jaisalmer districts of Rajasthan is pooled here.

2. Include a variety of food items indicated by Table 8.

3. The gross CPR-based income includes value of CPR products collected and 50% of the gross income from livestock raising. Comparable details for Raisen district (MP) are yet to be analyzed.

Table 3. Some indicators of extent of benefits derived from selected CPRs by sample households in selected villages of Rajasthan and Madhya Pradesh.¹

	District			
	Nagaur	Jodhpur	Jaisalmer	Raisen
Sample households (no)	56	52	48	80
Animal units grazing days contributed by CPRs (%)	88	97	95	67
Direct employment days per household (no.) ²	71	58	42	60
Direct employment days per active worker (no.) ²	32	21	19	28
Gross value of CPR products collected per household (Rs) ³	285 (10.6)	301 (12.8)	219 (9.9)	426 (10.8)
Free irrigation from CPRs (rivulets) as proportion of gross irrigated area (%)	Nil	2	Nil	92 ⁴

1. Source: For Rajasthan villages (in Nagaur, Jodhpur, Jaisalmer) Jodha 1982b; Madhya Pradesh (Raisen) villages Jodha 1982a (Rajasthan data are for 1963-65; MP data are for 1982-83).

2. Includes only days spent on fodder and fuel collection and animal grazing in the case of Rajasthan villages. In Raisen villages, grazers' employment days are not included. Only days spent collecting a large variety of CPR products are considered. All employment is expressed in man days.

3. In 1982-83 prices. Figures in parentheses indicate CPR income as percentage of gross income per household. The figures for the first three areas would exceed 30, 36, and 48%, if half of the livestock income in these villages is added to CPR income. For Raisen villages the proportion of CPR income to gross household income is tentative, based on preliminary analysis.

4. This information for Raisen relates to 10 villages based on village records. Irrigation is by lifting water from rivulets. Total irrigated area is about 250 ha.

and employment for the poor. The CPRs' contribution to the poor man's nutrition is well-recognized; through their food-gathering activities in forests, ponds, etc., the poor consume a number of items rich in food value (Jodha 1982b) (see Table 2). Data collected through detailed diet surveys in selected villages of semi-arid tropical areas in peninsular India (Ryan et al. 1984), have revealed that CPR-products constitute 8 to 9% of the total diet of labor and small-farmer households. The corresponding extent was around 4% in the case of large farmers.

Importance in resource-based prospective technologies. In the prospective technologies involving soil-moisture conservation, supplemental irrigation through runoff collection, use of seasonal rivulets and integrated use of runoff collection and percolated water in the watershed context, the management of CPRs may prove a crucial factor for PPR-based farming systems. One example is integrated management of watersheds involving social forestry, agroforestry, grassed waterways,

and other provisions for water harvesting and drainage to facilitate optimum use of the environment for crop and livestock production, as revealed by the dry-farming operational research project at Indore (Anon 1980).

Extent of Benefits: Quantified Evidence

Indicators of the actual extent of benefits from selected CPRs derived by sample households in the selected areas are presented in Table 3. Most of the grazing (expressed in terms of animal unit grazing days) in selected villages was done in CPRs. The contribution of CPRs ranged from 67% in the Raisen (MP) villages to 88 to 97% in the arid villages of Rajasthan. CPR product collection (including animal grazing in the Rajasthan villages) generated direct employment of 42 to 71 man days per household in different areas. This excludes the indirect or second-stage employment in terms of processing and/or marketing of the products. Nor does it consider the extent of employment when

CPR-product collection was done incidentally, when the workers' main employment was on other farm activities. CPR-product collection generated direct employment for 19 to 32 man days (of 8 hr or more). Most of the labor engagement in CPR-product collection is during the summer period, when alternative employment opportunities are limited, or when other wage employment is not available, or when the soil is too wet for work in the field. The average per household gross value of CPR products collected was Rs 426 in the Raisen villages. The corresponding figures (after adjustment for price rises between 1963-65 to 1982-83) ranged from Rs 219 to 301 in the Rajasthan villages. The inclusion of more variety and some high-value CPR-products (such as gum, honey, fruits, spices, fish, and game) led to higher gross income from CPR products in the Raisen villages. The only input in collection of CPR products was family labor, but the income from such collection constituted about 10 to 12% of per household gross income from all sources. In the Rajasthan villages, even if 50% of income from livestock is attributed to CPRs (because of excessive dependence on CPR grazing), the share of CPR-based income in gross income per household would become 30 to 48% in the different areas.

Furthermore, as indicated by Table 2, the CPR-based income constituted 42% of per household gross income of labor and small farmers in the villages of the three Rajasthan districts pooled together. The corresponding figure for large farmers was 15%. Table 2 gives further details about relative dependence of poor (labor and small-farmer) and rich (large-farmer) households on CPRs. The low extraction cost, labor-intensive CPR-use activities, such as gathering of food, fuel, and fodder were largely undertaken by the poor. Because of their higher usage cost, some CPR-based activities, such as irrigation from groundwater or surface flows of rivers/rivulets, were confined to large farmers who had higher capital resources. The income from CPR use in such cases was much higher than any other CPR-based activities.

Erosion of CPRs

Three Forms of Erosion

The valuable role played by CPRs in the economy of rural areas, has been seriously threatened in

recent decades, for a variety of reasons. Decline or erosion of CPRs in the study areas has taken three forms: (a) Shrinkage of physical area of CPRs; (b) Legal restriction preventing use of CPRs; and (c) Degradation or deterioration of the production potential of CPRs.

Of the three forms, the first two are easy to illustrate and quantify with the help of land-use statistics in different areas. The decline of CPRs owing to factors (a) and (b) is illustrated using village-level evidence from selected areas of Rajasthan and MP. The extent of degradation can be and has been illustrated with the help of some indirect indicators.

Shrinkage of CPR area. The area of CPRs has declined mainly because more and more land has been given to private ownership. Under land reform programs and other welfare schemes, considerable area of CPRs has been converted into private property and has been distributed to individuals. Besides, the unchecked illegal grabbing of CPR lands for private use has reduced the area of CPRs. Such grabbing of CPR areas is encouraged by the fact that the state does not have firm measures against it. At the tehsil or taluka level (subdivision of district), those illegally possessing CPR areas are punished by an amount of fine which is much smaller than returns from private use of CPRs. After 3 to 5 years of such punishment, the officials take a lenient view of the situation and illegal possession is formally legalized.

Two side issues relating to privatization of CPRs may be mentioned at this stage. The first issue relates to productivity gains through privatization of CPRs. To the extent that better management and higher productivity are achieved after transfer of CPR lands to private individuals, the change may prove beneficial to society. However, such productivity gains are quite doubtful in view of the fact that CPR lands are often submarginal lands and are suited for natural vegetation rather than crop raising. The privatization of CPRs encourages cropping on these lands, which reduces their productivity. At least in the arid zone of western Rajasthan (comprising 11 districts) the increased area under crops, following transfer of CPR lands to individuals, led to corresponding decline in the yield of all major crops during two decades following the land reforms (Jodha 1982c).

The second issue relates to the equity and welfare consequences of privatization of CPRs. This could be a real possibility if CPR lands are distributed to the landless and poor. However, one is not

sure about how much poor people—the major users of CPRs—collectively lose or gain through individual acquisition of low-productivity parcels of land. Furthermore, as Jodha (1985) reported, all those legally or illegally acquiring CPRs as private lands are not the poor. In the study villages of Nagaur and Jodhpur districts in Rajasthan, 59 to 62% of privatized CPR lands went to those who already possessed 10 to 15 ha or more of land. The share of the landless in such land distribution ranged from 11 to 13% only. Furthermore, over 90% of the good quality CPR lands went to this category of large farmers, while the landless did not get any share of these good lands.

However, these and other consequences of privatization of CPRs need further study.

Legal restrictions on use. Under yet another set of arrangements, CPRs are classified as CPRs in land records, but their usage by people is legally prevented. Rather than allowing people to use CPRs, the government or village panchayats have resorted to the system of auctioning the use of CPRs to contractors and thereby generating revenue for the exchequer. The auction is often done for a specific period. Collection of CPR products—fuel, fodder, wood, leaves, fish—usage of dry riverbeds, etc., are restricted by such an arrangement in various villages. The villagers often work as laborers for the contractors in exploiting the CPRs.

Auctioning is often resorted to in the case of CPRs that are still highly productive, and govern-

ment finds them rich sources of additional revenue. Once CPRs are degraded by overuse and fail to attract contractors, they are returned for free public use.

Degradation. The consequence of physical and legal shrinkage of CPRs is the reduced availability of CPRs per user, leading to overcrowding of the remaining CPRs. Overuse of CPRs is also because of complete disappearance of provisions like taxes, penalties, and various regulatory measures against misuse of CPRs following land reforms (Jodha 1985, Singh 1979). Similarly, CPRs auctioned to contractors are also overexploited, since the contracts are for fixed periods and there is no check on overuse.

These institutional factors have accentuated the overexploitation of CPRs, which has resulted from the secular growth of human and livestock population depending on the CPRs in these areas, as elsewhere in the developing world (Pant 1983, Mann and Kalla 1977, Sandford 1976). The third factor, namely market forces, accentuating the degradation of CPRs is discussed later in this paper.

Quantified Evidence on Decline of CPRs

The village-level data indicating shrinkage of physical area of a few CPRs, along with their increased overcrowding by livestock, are summarized in Table 4. Data taken from relevant village records

Table 4. Decline of CPR¹ area in selected areas of Rajasthan and Madhya Pradesh between 1953-54 and 1982-83.²

Area (district, state, and no. of villages)	1953-54		1982-83	
	CPR (%) ³	Animal units/100 ha	CPR (%) ³	Animal units/100 ha
Nagaur (Rajasthan, 2)	43	38	14	68
Jodhpur (Rajasthan, 2)	38	42	16	73
Jaisalmer (Rajasthan, 2)	67	12	48 ⁴	19 ⁴
Raisen (Madhya Pradesh, 10)	27	43	6 ⁵	58
Vidisha (Madhya Pradesh, 8)	32	46	8 ⁵	62

1. Includes village pasture, wasteland (including riverbanks and catchments of tanks), and village forest land. It excludes forest lands under government control, particularly in Madhya Pradesh.

2. Source: Data collected from village records and other revenue papers.

3. Expressed as % of total land area of the selected villages.

4. Relates to 1963-64 and 1964-65.

5. This excludes the areas of CPRs the public use of which is legally restricted by government or panchayats in Madhya Pradesh. Their extent varies from 2 to 5% of total area in different villages.

and revenue records at two points of time are presented. As explained earlier, the first period (1953-54) corresponds to the years before comprehensive land reforms programs were able to make their impact on land usage. Hence this reflects the position of CPRs (i.e. proportion of their area to total geographical area of villages) before large-scale conversion of CPRs into private ownership took place. The second point in time (1982-83) represents present conditions. Though the rate of legal conversion of CPRs into private property resources (PPR) slowed down with the passage of time, the illegal grabbing of CPRs by influential villagers continues (Jodha 1985). Similarly, legal restriction on public use of CPRs through their auction to contractors for revenue became more important over time as public authorities started exploiting every conceivable source of revenue.

According to Table 4 the CPRs—village pasture, wasteland including riverbanks, catchments of tanks, and village forest—constituted 27 to 67% of total geographic area of selected villages during 1953-54. This had declined to 6 to 16% by 1982-83; this excludes the Jaisalmer villages, for which data only for 1963-64 to 1964-65 are reported. As indicated by district-level data, the decline in area of CPRs during the decade following land reforms has been faster than the rate of growth of rural population in these areas. If Jaisalmer villages are again excluded, the pressure of livestock on the above CPRs has increased from 38 to 46 animal units per 100 ha in 1953-54 to 58 to 68 during 1982-83. Not only has pressure on CPRs increased, but the taxes, penalties, and other provisions regulating the use of grazing space during the feudal order prior to land reforms have also disappeared. As reported by Singh (1979) the *jagirdars* (feudal landlords) were legally entitled to 64 *lags* (taxes, levies, etc.) besides the right to impose penalties to be paid by the farmers and grazers. The important ones relating to use of CPRs (Jodha 1985) were: grazing tax (called *ghas mari*), cost of grazing some parts of CPRs on priority basis, livestock-related levies (*laag baag*) payable during ceremonies, compulsory labor for digging/desilting watering ponds, and penalties for unauthorized use of CPRs.

Following the disappearance of these provisions, there is no restriction on overexploitation of CPRs. Village panchayats are authorized to regulate the use of CPRs, but they seldom do it.

In the MP villages, CPRs covered by legal restriction on their use by villagers constituted 2 to 5% of the total geographical area of the villages during

1982-83. Such restriction was negligible in the Rajasthan villages.

Degradation of Physical Production Potential

Recording the extent of degradation of the production potential of CPRs is a difficult task. Benchmark information is not available. Indirect evidence was used, recording the experiences of older people who have witnessed the changes. In some cases a recorded description of an earlier period can be compared to the existing situation. Efforts to assemble evidence and quantify the extent of degradation of CPRs is still in progress under ICRI-SAT's research project on CPRs (Jodha 1982a). The physical degradation of CPRs is suggested by deterioration in the botanical composition of vegetation in village forests and pastures; reduced carrying capacity of grazing lands; accentuated soil erosion in the forest, grazing areas, and river banks; and deterioration in both quantity and quality of groundwater (Jodha 1980). Some of the indicators of physical deterioration of CPRs are presented in Table 5. These indicators are not confined to only the CPRs covered by Table 4, but include several other CPRs as well.

Role of Market Forces

While discussing the role of market forces in the erosion of CPRs, a few points should be noted at the outset.

Some Basic Issues

First, erosion of CPRs through decline in their area and overexploitation is largely because of institutional measures (e.g., land reforms) and secular growth in pressure on CPRs. Market forces have only accentuated the erosion of CPRs that was caused by these factors. Hence, market forces have played mostly a complementary role in the process. However, market forces have also played an independent role, as they are largely responsible for the degradation of CPRs. This is because market forces have tended to be more strongly felt with advances in communication and transport facilities over the period of time, and thereby have become more conducive to exploitation of CPRs.

Table 5. Manifestations of degradation of common property resources in villages.

Manifestation ¹	Village forest	Community		Watershed drainage	Riverbank	Riverbed (dry)	Ground-water
		Pasture	Pond/tank				
Deterioration in botanical composition of vegetation	x ²						
Emerging vegetationless patches	x	x		x	x		
Reduced carrying capacity	x	x			x		
Fall in physical supplies (fuel, timber, food, etc.)	x	x	x		x		
Increased instability of supplies	x	x	x				x
Reduced period of assured supplies	x	x	x				x
Erosion/deep gully formation	x	x		x	x		
Fall in water table						x	x
Low recharge in wells						x	x
Underutilized pumpsets							x
Out-of-use wells						x	x
Extent of wells requiring redigging						x	x
Increased salinity of groundwater							x
Increased silting			x	x		x	
Shrinkage of command/service area			x		x	x	x

1. Work is in progress to quantify the extent of manifestation.

2. X denotes that manifestation is applicable.

Secondly, a highlighting of the negative impact of market forces should not mean their complete negation. The positive role of market forces in promoting growth cannot be denied. The negative impact felt at this stage could be a necessary evil, characterizing a transitional phase before market forces develop mechanisms that induce protection and restoration of CPRs.

Thirdly, because of the very nature of the variables involved, isolation and quantification of the role of market forces in the erosion of CPRs is difficult. It calls for evolving an approach or procedure to meaningfully describe the process through which market forces play their role in the exploitation of CPRs.

Finally, in keeping with the preceding statement, we can discuss the role of market forces vis-a-vis three forms of erosion of CPRs, and provide quantitative evidence wherever it is possible. It is useful to provide a sketch of the market situation as it obtained at two points of time, particularly with reference to infrastructure, marketing, and prices of CPR products.

Transformation of the Market Situation

Change in the market situation in the study areas is a continuous process and hence it is difficult to fix precisely the time when change started. However, absence or presence of some relevant factors on the scene may help in broadly fixing the period from which visible transformation of the market situation started. According to this reasoning, 1953-54 or the period around the early phase of land reforms can be roughly treated as a reference point. Details presented in Table 6 broadly support this.

Market Situation Before 1954

The situation of study villages around 1953-54 or before could be described as follows.

Physical isolation. The villages studied are even today backward, compared with several advanced areas in the two states. However, the situation was worse only three decades ago. Because even min-

num infrastructure was lacking, most of the villages were isolated from trading centers. This restricted the market and marketability of CPR products along with many other products of the villages.

Subsistence orientation. Partly owing to physical isolation and partly for lack of exposure to market and cash nexus, subsistence production dominated economic activities. Production and use of CPRs was largely for self-consumption, notwithstanding very limited need-based exchange or barter trade.

Meek trading. The trading activity in most villages was characterized by the presence of small shopkeepers, who had only loose links with major traders in towns, and by the periodic appearance of itinerant traders, who occasionally bought village products and sold consumables during their visits. They collected supplies of CPR products, but rarely induced sellers to supply more. This was largely owing to high transportation cost, perishability of certain products, lack of processing facilities, and absence of information on outside demand.

Change in Market Infrastructure

During the last three decades or so, this situation has completely changed. The study villages are by no means very well placed in terms of infrastructure even today, but their integration with the rest of the economy—particularly distant marketing centers—has definitely improved, compared with 1953-54. More villages in 1982-83 have all-weather roads, regular bus services, frequent visits of trucks for transport of goods, post offices, and more shopkeepers/traders, including those having links with distant trading centers (Table 7). Improved transport and communication, as witnessed elsewhere (Devres 1980), have helped increase people's exposure to a cash economy and to market forces. Traders (or their agents) having knowledge and links with wider markets have penetrated into the interior areas. Transport and communication facilities have also improved. Collection and marketing of CPR products (and other products) is no longer governed by forces of local supply and demand.

Market forces operating in a much wider context influence the whole pattern of CPR use. High profit-

Table 6. Complementary and independent role of market forces in erosion of CPRs.¹

Details	Changes in the market situation in the selected areas					
	Improved integration/widening of market	Increased frequency of trading	Higher prices/profitability of CPR products	Commercialization of CPR products	Transformation of CPR product collector	Improved economic viability of sub-marginal land's use
A. Factors complemented by market forces						
State policies/measures:						
Privatization of CPRs						A
Indifference to confiscation of CPRs			A			A
Abolition of taxes, regulations on CPR use			CB			
Relief policies	C					
Contractor system of CPR use	CB		ACB			
Secular changes						
Increase in human/animal population			CB			
B. Market forces' independent role		CB		CB	CB	CB

1. Erosion of CPRs in terms of: A = decline in area of CPRs; B = degradation of CPRs (i.e., decline in production potential); and C = intermediate stage (before B) indicating increased pressure on, or overexploitation of, CPRs.

Table 7. Indicators of changes in the market situation in selected villages of Rajasthan and Madhya Pradesh (1953-54 to 1982-83)¹.

Details	Market-related infrastructure ²							
	Rajasthan				Madhya Pradesh			
	Nagaur		Jodhpur		Raisen		Vidisha	
	A	B	A	B	A	B	A	B
Villages studied (no.)	2	2	2	2	10	10	8	8
Villages with all-weather road (no.)	-	1	1	2	1	4	2	5
Villages with regular bus services (no.)	-	1	-	2	-	3	-	5
Villages with bus service in fair weather (no.)	-	-	-	-	-	6	-	3
Villages with post office (no.)	-	2	-	2	-	5	-	6
Villages with shopkeepers/traders (no.)	-	2	1	2	2	9	3	8
Village-level traders/agents dealing in CPR product (no.) ³	-	3	-	4	-	6	1	7
Traders/agents giving advances for CPR-product collection (no.)	-	2	-	1	-	4	-	6
Outside traders visiting villages (no.)	4	6	3	7	6	11	5	12
CPR products covered by village level barter (no.)	5	-	6	-	10	3	12	4
CPR products purchased by traders (no.)	2	8	2	10	4	17	4	20
CPR products covered by contractor system (no.)	-	2	-	1	-	4	-	5
CPR products for which district-level processing facility exists (no.)	-	3	-	4	-	6	-	8

1. Source: See Table 3, footnote 1.

2. A refers to 1953-54, and B to 1982-83.

3. CPR products also include products of CPR-based enterprises, such as livestock raising.

ability of collection and trading (and processing) of CPR products has transformed the behavior of CPR product gatherers as well as that of traders. For instance, the villager who collected CPR products to supplement his own sustenance is now induced to do it for profit. The trader who collected only the offered supplies now induces people by advance payment and by the appointment of village- or cluster-level agents to collect and supply more of the CPR products. In place of occasional visits of traders with bullock carts or caravans of camels to collect supplies, now trucks and tractors frequent villages to collect supplies during all seasons. CPR products, which had very low prices in the past, now fetch much higher prices. This has attracted several external agencies, including speculators and contractors, to the CPR product business. Some of the rich villagers, instead of gathering CPR products, have joined the

traders as their agents. They induce overexploitation of CPRs by obstructing whatever limited regulatory measures villagers attempt to impose on use of CPRs. Indicators of the extent of these changes in the study areas are summarized in Table 7.

Price changes. The final impact of these changes on the market situation, particularly with reference to CPRs, is reflected through a very significant increase in the prices of different CPR products over the last three decades. Table 8 presents the prices of selected CPR products at two points of time. Collection of 1953-54 price data during 1982-83 is in itself an incredibly difficult task. Furthermore, their comparability with 1982-83 prices poses other problems because of inflation. In view of this, a small digression on procedure used for collection and comparison of price data presented in Table 8 is useful.

Price data of CPR-products (and a few other items) in MP villages were collected during field work in 1982-83. The author visited the villages with workers of the rural health department of Madhya Pradesh. The health workers were not only frequent visitors to these villages, but had very good and long-standing rapport with the villagers. In fact the villages were purposively selected according to the advice of the health workers and the readiness of villagers to respond in interviews.

Price data were collected partly from records of shopkeepers/traders and partly through interview. The number of respondents for the 1982-83 data was 46 from 14 of the 18 villages studied from Raisen and Vidisha districts. This included shopkeepers/traders, farmers, and a few public func-

tionaries like the *patwari* and the schoolteacher. For 1953-54, the number of respondents was only 18. Despite 1953-54 being an important landmark in the villages (owing to land reforms), not many could clearly recall prices of that period. We had to rely more on nonsystematic records of shopkeepers and others for the 1953-54 data.

The 1953-54 price data were recorded/reported in terms of *annas* (16 annas = 1 rupee). For several items, the unit of measurement was number (e.g. 100 beedi leaves) rather than weight. Even the weights were in terms of *maunds* and *seers*. For purposes of analysis they have been converted into the metric units of measurement now used in India.

To compare 1953-54 prices with 1982-83 prices,

Table 8. Average price of CPR products in selected villages of Raisen and Vidisha districts of Madhya Pradesh during 1953-54 and 1982-83.¹

CPR products	Unit of measurement	Price (Rs) ²				% increase in col. (6) over col.	
		Actual ³	1953-54		1982-83		
			Adjusted to				
			A ⁴	B ⁵		(4)	(5)
Fruits/seeds, etc.							
Achar	Kilogram	3.50	29.75	18.20	47.00	58.0	158.2
Mahua	Kilogram	0.06	0.51	0.31	0.80	56.9	158.1
Tendu	100 pieces	0.13	1.10	0.68	2.00	81.8	194.1
Amla	100 pieces	0.13	1.10	0.68	1.80	63.4	164.7
Gum	Kilogram	2.06	17.51	10.71	33.00	88.5	208.1
Ber	Kilogram	- ⁶	-	-	0.75		
Singada	Kilogram	0.25	2.21	1.3	3.00	35.7	130.8
Leaves/roots, etc.							
Bidi leaves	Kilogram	0.04	0.34	0.21	0.55	61.8	161.9
Pattal leaves	Kilogram	0.04	0.34	0.21	0.45	32.4	114.3
Tesu root	Kilogram	0.13	1.10	0.68	2.20	100.0	223.5
Fodder	100 kg	0.50	4.25	2.60	10.50	147.1	303.9
Fuelwood	100 kg	0.50	4.25	2.60	11.50	170.6	342.3
Fencing material	Cartload	0.50	3.82	2.60	9.0	135.6	246.2
Other							
Honey	Kilogram	1.50	12.75	7.80	28.00	119.6	259.0
Fish	Kilogram	-	-	-	7.00		
Rabbit	1 piece	-	-	-	11.75		
Fox skin	1 piece	-	-	-	4.50		
Deer skin	1 piece	-	-	-	16.50		
Silt/soil	Cartload	0.37	3.25	1.92	6.50	100.0	238.5

1. Price data collected during field work in 1982-83.

2. Per unit of applicable measure.

3. Original price data collected in terms of traditional units of money and measurement. See text for details.

4. 1982-83 price level, using change in gold price as a measure of inflation. See text for explanation.

5. 1982-83 price level, using consumer price index for agricultural labor as a measure of inflation. See text.

6. - indicates products not marketed earlier; thus no basis for comparison exists.

the impact of the inflation rate has to be removed. For this, two indicators were adopted: (i) increase in gold price as a measure of inflation, and (ii) increase in consumer price index for agricultural workers in the concerned districts of MP. The use of the latter is a standard procedure adopted by economists. However, the use of the gold price as a measure of inflation may seem strange, and therefore requires some explanation.

The choice is justified by the fact that, at the village level, a given quantity (a *tola*) of gold is generally equated with a certain amount of food it can buy. In 1953-54 one *tola* (10 g) of gold bought 850 kg of wheat. It bought practically the same quantity of wheat in 1982-83. The price of a *tola* of gold was Rs 200 to 205 in 1953-54, and Rs 1700 in 1983-84. This is an increase of eight and a half times, and thus a measure of inflation as villagers perceive it. On the basis of this simple and crude method, the 1953-54 CPR prices should be inflated by 8.5 times to be comparable to 1982-83 prices. On the other hand, if one uses the consumer price index for agricultural workers in MP, the corresponding figure is 5.2. The adjusted prices on the basis of the two methods are presented in Table 8. If change in gold prices is used as the measure of inflation, the CPR-product prices (net of inflation) have increased by 32 to 170% in the study areas. If the consumer price index-based measure of inflation is used, the increase in real CPR prices is even greater. This increase can be attributed to improvement in the market and the marketability of CPR products.

The increased prices give an accurate picture of the increased profitability of CPR-product collection because family labor (often used when no other jobs are available) is the only cost involved.

Complementary Role of Market Forces

As mentioned earlier, the erosion of CPRs has been accentuated by state policies executed through land reforms and by the secular increase in the pressure on CPRs. The state policies played their role through:

- a. distribution of CPR areas for private use;
- b. implicitly relaxing restrictions on illegal confiscation of CPRs by influential people in villages;

- c. periodical auctioning of CPRs to contractors for public revenue;

- d. abolishing the taxes, penalties, and regulatory measures that prevailed during the feudal days before land reforms to prevent misuse of CPRs.

The first three actions led to reduced physical area of CPRs. This in turn led to increased pressure on CPRs, which, when accompanied by no restriction on use of CPRs, led to their overexploitation and degradation. The role of factors (a) and (b) was further strengthened by demand forces, as the latter increased the profitability or economic viability of using even submarginal lands (i.e., CPRs converted into cropland) (Jodha 1980).

The government's ever-increasing tendency to auction CPRs (factor c) is also encouraged by market forces, because the market price and profitability of CPR products has improved. More and more traders and speculators were thus induced to enter CPR-based business (Tables 7 and 8).

On the other hand, the profitability of CPR use has also been increased through reduction in the private cost of exploiting CPRs due to factor (d). Before the land reforms in Rajasthan villages, one had to pay (at 1976-77 price levels) Rs 1.25 grazing tax per animal, and Rs 23 per household as other costs of using CPRs. With the abolition of the *jagirdari* system in 1952, these private costs of CPR use were also abolished. This has been complemented by increased prices of products from CPRs and CPR-based enterprises like animal husbandry. For instance, at constant price level, the prices of wool and milk products during 1964-65 had increased by 3.5 to 5.5 times over 1950-51 prices (Jodha 1980). The higher profitability of CPR exploitation, resulting from reduction of cost and increase in product prices, has led to increased extraction from CPRs.

There is yet another mechanism through which the combined operation of state policies and market forces has led to overcrowding and overexploitation of CPRs (e.g. grazing lands). This relates to the reduced severity of the impact of droughts and famines in dry areas. Historically, famines played a leveling role as far as the pressure on CPRs is concerned. It was not a welcome phenomenon; yet periodic droughts eliminated a number of animals. As a net result, pressure on CPRs was regulated by nature. In the changed situation, state policies of drought relief and improved integration

of these areas with wider markets have facilitated survival of animals that otherwise would have perished during the droughts. This helped raise pressure on CPRs, without simultaneously upgrading the carrying capacity of CPRs (Jodha 1978).

The secular growth in the pressure on CPRs—resulting from the individual's concern for self and neglect of his collective responsibility to CPRs—is another factor responsible for degradation of CPRs. This has been the basis of the tragedy of commons in various communities (Hardin 1968; Sandford 1976). In the study areas, the factors underlying the tragedy of commons have been further accentuated by state policies and market forces. To the extent that market forces did not initiate but only helped the other factors (state policies and secular growth of pressure on CPRs), their role has been complementary in exploiting CPRs. Table 6 illustrates this role. However, besides this complementary role, the market forces on their own have initiated the process that led to degradation of CPRs.

Independent Role of Market Forces

To the extent that increased marketability and prices of products of CPRs or products of enterprises based on CPRs (e.g., animal husbandry) have induced villagers to overexploit CPRs and disregard traditional regulatory/conservation practices, market forces can be treated as playing an independent role in erosion of CPRs. The system of advance payments to gatherers of CPR products; provision of agents in villages to help collection of CPR products; increased frequency of trading transactions; improved links of local traders with wider markets; transformation of traditional CPR-product gatherers into profit-seeking persons; better transport, marketing, and processing facilities for CPR products are a few concrete factors that have completely transformed the market situation in the villages. All of them in their respective ways contribute to overexploitation and degradation of CPRs.

Protecting CPRs

If the trends shown in this paper are any indication, the CPRs in rural areas have a bleak future. Considering their social, economic, and environmental effects, their loss may imply a national loss,

although to the extent that private property leads to efficient use of land resources, there are also gains involved. Nevertheless, there is need for measures to protect, conserve, and improve productive contribution of CPRs to the rural communities.

At this stage it is not possible to present a concrete scheme to help CPRs. However, learning from the process of erosion of CPRs and the factors underlying it, one can suggest a few broad directions in future steps to protect CPRs.

- Some element of private cost of using CPRs should be introduced. This may be in terms of taxes and penalties on violation of some regulations, to be introduced on use of CPRs.
- The traders, their agents, and contractors should be charged some levy on the basis of their turnover in CPR-product trade, and this should be invested back into the improvement of CPRs.
- Some CPRs could be given to CPR users as a collective body to protect, manage, and use on a long-term basis. Fish ponds given to tribals in parts of MP are a case in point.
- Village institutions (i.e. *panchayats*) already have the responsibility to manage and regulate use of CPRs. However, for various reasons (particularly their dependence on votes), they are unable to adopt strict measures to regulate use of CPRs. One of the ways to activate *panchayats* in this direction could be the provision of grants linked to the productivity and status of CPRs.

To sum up, in a world where free goods are being increasingly used as population increases and as rising incomes accelerate demand, market forces—generally accelerating economic development—will automatically lead to more and more intensive use of CPRs. This calls for better management of CPRs to direct activities away from "mining" of CPRs and toward production-oriented utilization of these resources. Within the framework of appropriate management, rules, and property regulations, market forces can play an equally constructive role for rehabilitation and utilization of CPRs. Formulation and implementation of these rules and regulations is a task facing those concerned about common property resources.

Acknowledgement

The author is thankful to Matthias von Oppen and Thomas Walker for valuable suggestions on an earlier draft of the paper. The views expressed do not necessarily represent ICRISAT's position.

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