

**CAPRI WORKING PAPER NO. 13**

**BETWEEN MARKET FAILURE, POLICY FAILURE AND  
“COMMUNITY FAILURE”: PROPERTY RIGHTS, CROP-  
LIVESTOCK CONFLICTS AND THE  
ADOPTION OF SUSTAINABLE LAND USE PRACTICES IN THE  
DRY ZONE OF SRI LANKA**

**Regina Birner and Hasantha Gunaweera**



**CGIAR Systemwide Program on  
Collective Action and Property Rights**

**Secretariat:  
International Food Policy Research Institute  
2033 K Street, N.W.  
Washington, D.C. 20006 U.S.A.**



**March 2001**

CAPRI Working Papers contain preliminary material and research results, and are circulated prior to a full peer review in order to stimulate discussion and critical comment. It is expected that most Working Papers will eventually be published in some other form, and that their content may also be revised.



## **ABSTRACT**

Using the case of the semi-arid zone of Southern Sri Lanka as an example, the paper shows that crop damages caused by grazing livestock can constitute an important obstacle to the adoption of available technologies for more sustainable land use. The paper considers crop damages as an externality problem and shows that the classical solutions to externalities—the neo-liberal, the interventionist solution and the communitarian solution—cannot be applied in the Sri Lankan case due to market failure, government failure and “community failure.” The paper discusses collective action and bargaining between organized interest groups as an alternative solution and analyses the conditions which make such a solution work. The paper concludes that - in the Sri Lankan case - a decentralized system of government, a preferential voting system creating incentives for politicians, an institutionalized negotiation platform, and the facilitating role of intermediaries favored this solution.



## CONTENTS

<b>ABSTRACT.....</b>	<b>I</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
<b>2. DESCRIPTION OF THE STUDY SITE AND METHODOLOGY .....</b>	<b>3</b>
LAND TENURE AND LAND USE IN THE RESEARCH REGION .....	5
<b>3. CROP DAMAGES BY LIVESTOCK AS AN OBSTACLE TO TECHNOLOGY ADOPTION.....</b>	<b>11</b>
THE LIVESTOCK OWNER’S PERSPECTIVE .....	15
<b>4. POTENTIAL SOLUTIONS FOR CROP-LIVESTOCK CONFLICTS .....</b>	<b>17</b>
THE NEO-LIBERAL SOLUTION .....	17
THE INTERVENTIONIST SOLUTION .....	19
THE COMMUNITARIAN SOLUTION .....	23
<b>5. COLLECTIVE ACTION AND BARGAINING AS A SOLUTION.....</b>	<b>27</b>
THE INTEREST GROUPS INVOLVED AND THEIR ORGANIZATION .....	28
THE POLITICAL-ADMINISTRATIVE SYSTEM .....	31
THE PROCESS OF NEGOTIATING A SOLUTION .....	34
<b>6. CONCLUSIONS .....</b>	<b>41</b>
<b>REFERENCES.....</b>	<b>45</b>



# **BETWEEN MARKET FAILURE, POLICY FAILURE AND “COMMUNITY FAILURE”: PROPERTY RIGHTS, CROP-LIVESTOCK CONFLICTS AND THE ADOPTION OF SUSTAINABLE LAND USE PRACTICES IN THE DRY ZONE OF SRI LANKA**

Regina Birner and Hasantha Gunaweera

## **1. INTRODUCTION**

In the semi-arid zone of Southern Sri Lanka, conflicts over crop damages caused by grazing livestock constitute an important obstacle to the adoption of more sustainable land use practices. They affect the shift from slash-and-burn agriculture to irrigated farming and to agro-forestry. At first sight, crop damages may appear as a technical problem, but they have an institutional dimension as well. They are a manifestation of an underlying conflict between crop farmers and livestock keepers for property rights in land. For three reasons, this problem is an interesting case for studying the relations between property rights, collective action and technology adoption: First, solving the problem involves collective action at different levels: among the crop farmers and the livestock farmers themselves and between these groups. Second, the case illustrates the decisive role of the political and administrative system in which the groups interact. Third, the problem is not unique to Sri Lanka. It is rather universal in certain phases of agricultural development, especially in areas where both crop and livestock farming are ecologically feasible. The problem typically arises when increasing population pressure

induces the expansion of crop farming and, consequently, land resources used for pastoral livestock keeping become scarce (Birner 1999).

The paper is organized as follows: The study methodology is outlined in Section 2. Section 3 discusses the emergence and relevance of crop damages by grazing livestock as an obstacle to the adoption of more sustainable land use practices. Section 4 examines the difficulties of reaching a solution in the presence of market failure, government failure and “community failure.” Analyzing the process currently observed in the research region, Section 5 shows how collective action within a given political and administrative arena may lead to a solution. Conclusions are drawn in Section 6.

## 2. DESCRIPTION OF THE STUDY SITE AND METHODOLOGY

This study is based on empirical data collected in the Hambantota District of Sri Lanka, which is mainly located in the Dry Zone, which receives less than 1270 mm rainfall. Land use in this zone is characterized by the co-existence of two land use systems, which differ considerably in their intensity: (1) irrigated paddy cultivation, mostly in irrigation and settlement projects, which have been established in Hambantota District since the last century, and (2) slash-and-burn agriculture on the non-irrigated land resources, which traditionally includes fallow periods and in Sri Lanka is referred to as *chena* cultivation. Vegetables and fruits are cultivated to a small extent on the plots adjoining the houses, which are referred to as home gardens. Wasteland, fallow land, and the paddy land after harvesting has traditionally been used for keeping of cattle and buffalo in an extensive free-grazing system.

Two empirical data sources are used for this paper: (1) a research project on livestock development conducted from 1994 to 1995 in selected villages of the Hambantota District and (2) a survey carried out from 1995 to 1998 by a committee nominated to develop a proposal for a solution to the problem of crop damages caused by livestock. The 1994/95 research project applied the methodology of a comparative village case study, which included eight villages in the Dry Zone section of Hambantota District. Four villages were selected from areas settled in the last century and four from areas settled in the period between the 1950s and the 1990s. In each group, two villages were situated within major irrigation schemes and the other two in non-irrigated areas.

Research methods included a review of the household statistics available at the village level, a survey of all livestock keeping households in the selected villages (207 households), participant observation over a period of twelve months in one of the selected villages, interviews with crop farmers affected by crop damages caused by livestock, and interviews with representatives of the agencies involved in settling conflicts concerning crop damages. Information on technology development was also provided by major development agencies in the district and by the Department of Agriculture. Information on the political frame conditions was obtained through informal interviews with local politicians and the observation of the election campaigns for the Provincial Council, Parliamentary and Presidential elections in 1994.

The second data source of this paper, the survey carried out from 1995 to 1998 by the committee mentioned above completely covered one selected Agrarian Services Division of the district, which was particularly seriously affected by the problem of crop damages. The committee reviewed the secondary data maintained by different government institutions and by the livestock farmers' organization of the respective Division. Primary information was obtained from 45 key informants involved in the settling of conflicts concerning crop damages. During the process of developing, negotiating and implementing the proposal for a solution to the problem of crop damages, the committee collected information on the discussion process taking place within the organized interest groups and on their interaction with administrative and political decision-makers.

## LAND TENURE AND LAND USE IN THE RESEARCH REGION

In the traditional settlement areas of the research region, paddy lands and home gardens are typically held as formal private property. In the irrigation and settlement projects constructed after the enactment of the Land Development Ordinance of 1935, farmers hold individual use rights in paddy lands and home gardens. The only transfer right is the right to bestow, which is limited to handing down the land intact to a single heir. This regulation led to a clear stratification of the rural households in those holding comparatively large parcels of paddy land and those without paddy land (see Tables 1 and 2).

**Table 1—Land tenure in the dry zone of Hambantota District**

Division	Households owning land (number)	Households owning paddy land (percent)	Average size of paddy holdings (acres)	Average size of upland owned <sup>a</sup> (acres)
Hambantota	8,795	39.6	2.36	1.62
Tissamaharama	8,010	34.4	2.94	1.50

Source: DCS (1984: 25)

Note: Data are taken from the 1982 census of agriculture, the last available census data which provide information on tenure of paddy holdings.

<sup>a</sup>Data on chena cultivation on state-owned land were not collected in this census.

**Table 2—Distribution of paddy land**

Division	Percentage of households owning					
	< 1acre	1-2 acres	2-3 acres	3-4 acres	4-5 acres	> 5 acres
Hambantota	12.0	26.1	28.1	23.0	4.8	6.0
Tissamaharama	5.4	16.5	31.5	19.8	9.9	17.0

Source: DCS (1984, 25)

Note: Data are taken from the 1982 census of agriculture, the last available census data which provide information on tenure of paddy holdings.

Paddy land is an important status symbol and access to more than two acres in the research region is commonly considered as sufficient to secure the livelihood of a household throughout the year.

Except for the home gardens, the non-irrigated land resources in the research region are almost exclusively formal state land. These land resources are widely used both for slash-and-burn agriculture (*chena* cultivation) and for livestock rearing. Since the enactment of the Crown Lands Encroachment Ordinance in 1840, *chena* farmers have had to obtain cultivation permits from the local administration. Due to environmental concerns, cultivation permits are nowadays hardly issued at all in the research region. *Chena* farming is nevertheless widely practiced (see Table 3) and tolerated by the authorities, because in non-irrigated areas, the majority of the rural households depend on *chena* cultivation for their livelihood. In the eight villages surveyed in 1994/95, the average cultivated area was 2.1 acres per household.

**Table 3—Area cultivated with other crops than paddy<sup>a</sup>**

Division	All parcels cultivated with other crops than paddy <sup>b</sup>			Home gardens <sup>c</sup>
	(Number)	(Acres)	average size (Acres)	(Number)
Hambantota	5,951	6,093	1,02	4,032
Sooriyawewa	7,415	9,303	1,25	3,617
Tissamaharama	11,639	9,617	0,83	8,913
Lunugamwehera	5,889	5,463	0,93	4,105

Source: DCS (1992/93, 5)

Note: This table includes four divisions, because both the Division of Hambantota and Tissamaharama have been divided since the 1982 census.

<sup>a</sup>The census did not distinguish between state-owned and privately owned land. However, according to information collected from the Divisional Secretariats in Hambantota and Tissamaharama, almost the entire upland cultivation area that is not allocated to home gardens is state-owned.

<sup>b</sup>For this survey, a parcel was defined to be a piece of land cultivated singly or jointly, irrespective of legal ownership (DCS, 1992/93, 2).

<sup>c</sup>The major definition criterion for the home garden was the dwelling house.

Due to low productivity and a considerable risk of crop losses, most of the *chena*-cultivating households have to hire out labor or find other additional income sources in order to secure their livelihood. Notwithstanding, these households are referred to herein as “*chena* farmers.” Most *chena* farmers in the surveyed villages were ranked below the poverty line, which the government defined for the implementation of poverty alleviation programs.

After the harvest, paddy lands and *chena* lands are traditionally used as grazing resources for cattle and buffalo. Fallow *chena* lands and other land resources not used for crop cultivation are used for grazing, as well. The livestock owners claim that they have customary rights to use these lands for grazing. Interviews with key informants and

participant observation revealed that the owners of the larger herds kept outside the village were successful in excluding newcomers and outsiders from using these land resources for rearing cattle and buffalo. However, they have not developed specific regulations to limit the herd sizes and control the stocking rate. The distribution of cattle and buffalo ownership in the research region is highly skewed. In the villages included in the 1994/95 survey, only 5.6 percent of all households kept cattle, 1.2 percent kept buffalo and 0.8 percent kept a combination of both. The average herd size was 33 animals for cattle and 67 for buffalo. Of the cattle (buffalo) keeping households 43 (6) percent kept less than 10 animals and 20 (47) percent kept more than 60 animals. In the Division covered by the 1995-98 surveys, approximately 75 percent of the livestock owners keeping more than ten animals are organized in a cattle farmers' association, which has 150 members. 35 percent of the members keep between 100 and 250 animals and 18 percent keep more than 250. The average herd size is 158 animals per member.

Herds below ten animals are typically kept at the homestead of the owners, while the larger cattle and buffalo herds are kept outside the village in a free-grazing system. During the paddy cultivation seasons, these herds are traditionally shifted to more remote areas. Crop damages are mostly caused by larger herds kept outside the village, which are typically owned by rather affluent families. All cattle and buffalo keeping households included in the 1994/95 survey which owned more than ten animals also cultivated paddy land and, in addition, many engaged in trade, renting out agricultural machinery, money lending, etc. In the research region, the social status of this group is documented by the respectful use of a special Sinhalese term—*Gambaraya*. For convenience, the term “livestock owners“ is used herein to

refer to households that keep herds of cattle and buffalo of more than ten animals outside the villages and are therefore involved in the problem of crop damages.

### 3. CROP DAMAGES BY LIVESTOCK AS AN OBSTACLE TO TECHNOLOGY ADOPTION

The problem of crop damages caused by livestock as an obstacle to technology adoption can be placed into the framework of the theory of induced innovation (Boserup 1981; Hayami and Ruttan 1985). Both the system of slash-and-burn agriculture (*chena* farming) and the system of large-scale cattle and buffalo rearing emerged under the conditions of low population density. Accordingly, these systems are non-labor intensive and employ extensive land use. Both systems have come under pressure due to the rapidly increasing population in the Dry Zone section of Hambantota District. The population density almost doubled from 106 to 204 persons per square km between 1971 and 1994.<sup>1</sup> As land in irrigation and settlement projects must not be divided in the course of inheritance, the members of the second generation of the settlers who do not inherit paddy land are either forced to apply for land in new irrigation and settlement projects or to engage in *chena* cultivation on the non-irrigated land resources. Consequently, reduced fallow periods and increasing soil degradation in the non-irrigated areas are a common phenomenon in the research region, as elsewhere in the Dry Zone of Sri Lanka. In the early 1980s, more than half of the *chena* plots in the research region were already cultivated without fallow period (ILO 1984). The cultivation practices have, however, not been adapted to the reduced fallow periods and the interviewed farmers frequently reported declining yields.

---

<sup>1</sup> Calculated according to information from the Statistical Branch of the District Secretariat, Hambantota, 1994.

Since the 1980s, public research institutions in Sri Lanka have increasingly been engaged in the development of technologies, which allow the shift from *chena* cultivation to more sustainable permanent land use systems. The focus has been placed on the development of alley cropping systems (Keerthisena 1995), on the introduction of drought-resistant fruit and timber trees into the upland farming systems of the Dry Zone (Gunasena 1995), and on moisture conservation techniques such as contour bounds with hillside ditches (Handawela 1995). The interviewed representatives of the agencies promoting alternatives to *chena* cultivation generally reported a low rate of adoption and addressed crop damages caused by the free-grazing cattle and buffalo herds as a major reason. The records from two projects illustrate the problems of adoption.

One foreign-funded project was started in 1993 as a participatory technology development program, involving 15 women farmers' groups representing 312 households in all. Fourteen of the 15 groups identified the establishment of fruit trees in their home gardens and on the land they used for *chena* as technology to be developed. The following trees were identified by the groups for on-farm testing: banana, papaya, lime, orange, mango, pomegranate, cashew and wood apple. Two hundred eighty-six households agreed to participate in the on-farm trials. The group discussions held to identify potential constraints led to the conclusion that the trials were only feasible if the plots were fenced with barbed wire. Otherwise, the household members would have to watch the plots day and night to prevent damages by free-grazing cattle and buffalo. In *chena* cultivation, permanent observation during the whole production cycle of approximately four months is the usual practice to protect the crops from damages by

livestock. The participants considered this practice, which draws heavily on the households' labor resources, as not applicable for perennial crops. The traditional fencing material, dry branches of thorny shrubs growing on areas under bush fallow, has increasingly become scarce due to the reduced fallow periods mentioned above.

Calculations by the project showed that the use of barbed wire would increase the costs of establishing 0.5 acres of a typical recommended combination of fruit trees from Rs. 440 to Rs. 2,680. For comparison, the daily labor wage during the peak season was Rs. 135. In view of the high initial capital requirements and the high maintenance costs of barbed wire fences, the program was not considered economically viable for small-scale farmers and was, therefore, not implemented. The year before, the project had for similar difficulties stopped a program to introduce an agro-forestry system based on *Gliricidia* and wood apple trees grafted with oranges. The records of the project show that the problem of crop damages was discussed as the major obstacle to the development of upland cultivation in 111 of 124 village-level meetings held within the period from 1995 to 1998. It became obvious that a practicable solution could not be found at the project level.

The second example refers to the Kirindi Oya Irrigation and Settlement Project (KOISP), the major irrigation project in the region. It illustrates the difficulties to introduce new crop farming practices even without a tree component. As an alternative to *chena* farming, KOISP promoted the planting of other field crops than paddy (chilies, ground nuts, onions, green gram, cowpea) within the irrigation tracts during the minor cultivation season, when the irrigation water was not sufficient to grow paddy. In 1990,

232 ha were cultivated with the above-mentioned crops, corresponding to only 12 percent of the targeted extent of 2,000 ha (HARTI 1995). A situation analysis study by HARTI identified the danger of crop damages as a major obstacle, next to lack of water and insect attacks. As shown in Table 4, for all crops except onions, the farmers reported crop damages by animals as the major constraint to productivity.

**Table 4—Constraints to productivity in crop production**

Type of constraints	Chillie	Ground nut	Onion	Green gram	Cowpea	Total
	(number of farmers)					
Lack of water	14	3	25	-	-	42
Insect attack	37	-	5	5	2	44
Lack of quality seed	5	-	-	-	-	14
Damage by animals	72	23	14	6	11	121
Unsuitability of soil	12	2	10	-	-	52
Total	140	28	53	11	13	246

Source: HARTI (1995: 26)

Almost all farmers reported that they had to take care of the crops throughout the cultivation cycle day and night (HARTI 1995). The study concluded that cultivation of small plots under different areas was not practicable because of the probability of crop damages by animals, especially cattle (HARTI 1995). As a possible solution, the study recommended to cultivate large blocks that are easier to protect. However, the farmers in the KOISP project also have problems to protect paddy from crop damages by livestock, even though paddy is cultivated in large blocks. The project impact evaluation study of KOISP assessed the problem of crop damages in paddy and concluded, “The conflict

between cattle owners and paddy farmers has become one of the major problems of the project, threatening its sustainability“ (IIMI 1995).

#### THE LIVESTOCK OWNER'S PERSPECTIVE

The problem of crop damages by grazing livestock is closely related to increasing population density, which has led to competition between crop and livestock farming for land. Following the argumentation of McIntire et al. (1992), one can assume that crop-livestock competition only occurs after the expansion of crop farming has reached the point at which grazing grounds available during the cropping season become scarce. Until this point is reached, the expansion of crop farming usually increases the potential for livestock farming because crop by-products, especially stubble, improve the fodder availability during the dry season. In the research region, the point at which competition occurs was probably reached during the middle of the 1980s. In the first phase of the above-mentioned KOISP project, which was completed in 1986, an area of 8,800 ha was developed for cultivation. This is more than the total area under all major irrigation schemes that were developed in the area during the entire colonial period (IIMI 1995; Irrigation Department 1975). Moreover, KOISP is situated in an area that traditionally served as a major grazing ground for the cattle and buffalo herds during the cropping season, a fact which contributes to the problem of crop damages. Even though individual cases of crop damages were already recorded during the colonial period (Woolf 1983), the reports by the interviewed persons provide evidence that the incidence of crop damages increased considerably during the last decade. The problem mostly affects the new irrigation scheme, as mentioned above, but also the non-irrigated areas to which the livestock

owners now shift their animals during the cropping season since they had to make way for KOISP. The interviewed administrators of villages in the surroundings of KOISP, which rely mostly on non-irrigated cultivation, reported between 150 and 200 cases of crop damages per season. The damages are usually caused by cattle and buffalo herds owned by persons who reside in the traditional paddy cultivation areas. As the livestock owners protect their own crops (see Section 4), these areas are less affected by livestock. The interviewed village administrators reported less than five cases per season.

The interviews with the livestock keepers showed that they consider the expansion of crop cultivation, especially under KOISP, as a violation of their traditional property rights in these land resources. Therefore, they are reluctant to take measures to prevent crop damages caused by their herds. The livestock owners do not continuously herd their animals throughout the day, and they paddock only the calves during the night. They still practice the traditional system that emerged under low population density when herding was not necessary in order to prevent crop damages. There are obvious economic incentives not to change the prevailing system: continuous herding would decrease the return to labor due to increased labor input and because paddocking the herds during the night time would reduce feed intake, thus affecting milk yields and growth rates.

#### **4. POTENTIAL SOLUTIONS FOR CROP-LIVESTOCK CONFLICTS**

The crop damages caused by livestock can be considered as an external effect of the prevailing livestock farming system. In the theoretical literature, three major approaches to solve the problems caused by externalities can be distinguished: a “neo-liberal solution,” an “interventionist solution“, and a “communitarian solution.“ The following sections examine to which extent each theoretical position can be applied to the problem of crop damages in the research region.

##### **THE NEO-LIBERAL SOLUTION**

The neo-liberal solution to problems caused by externalities can be expressed by the Coase Theorem, which holds that a clear specification of private property rights is a sufficient solution to the problem of externalities. In the absence of transaction costs, voluntary bargaining between individual agents will, according to the theorem, lead to an efficient outcome, regardless of how property rights are initially assigned (Coase 1960). Interestingly, Coase used exactly the problem of crop damages caused by livestock to illustrate his argument. In his example, Coase assumed that a cattle-raiser and a neighboring crop farmer trade for property rights regulating crop damages. Depending on how the liability for crop damages is defined, they trade either for the crop farmer’s right to compensation or for the cattle farmer’s “right to damage the crops.“ Coase showed that, whichever way the liability is defined, the trade will lead to an efficient allocation of the land resources according to the comparative advantage of crop and livestock production. The “Coase Theorem“ requires no state intervention to solve externality

problems because a market in which property rights are traded solves the problem. The idea that even property rights can be allocated efficiently through the market mechanism fits well into neo-liberal economic reasoning and explains to a large extent the popularity of the Coase Theorem in mainstream economics (Medema 1994).

To judge the applicability of the neo-liberal solution in the Sri Lankan case, it is useful to consider two major assumptions on which the Coase Theorem is based:

- the absence of transaction costs, and
- the irrelevance of equity questions.

*ad (1):* Coase (1960) pointed out that his argumentation only holds if there are no costs involved in carrying out market transactions (transaction costs are zero). Coase (1960) left no doubt that he considered this assumption an unrealistic one. In the Sri Lankan case considered here, individual bargaining between crop and livestock farmers would certainly involve transaction costs because each crop farmer would have to strike a deal with several livestock farmers in order to protect his crops. Otherwise, the crop farmers would have to organize themselves, which also involves transaction costs.

*ad (2):* Coase (1960) mentions that his argument does not take questions of equity into account. However, it is obvious that the assignment of property rights and the bargaining for them alters the distribution of wealth and income of the parties concerned. In the Sri Lankan case, the current distribution of wealth and income between the livestock keepers and the *chena* farmers is already rather unequal. As indicated above, the livestock owners belong to the upper stratum of the village society, while the *chena* farmers usually live below the poverty line. Even if the right to compensation for crop damages is assigned to the

*chena* farmers, the social barriers created by the difference in status, wealth, caste and education make it unlikely that *chena* farmers and livestock keepers could enter any individual bargaining process as equal partners.

Further implicit assumptions of the Coase Theorem are also unlikely to apply: the assumption of perfect knowledge of one another's production and profit or utility functions, and the assumption that agents strike mutually advantageous bargains in the absence of transaction costs (Hoffman and Spitzer 1982).

As major assumptions of the theorem do not apply, it does matter how the property rights are initially assigned. So long as there are transaction costs and information costs, as well as social and class barriers between the parties concerned, private bargaining for property rights may either not take place at all or it may not lead to an efficient outcome. Therefore, the idea of the Coase Theorem that a market mechanism for the exchange of private property rights can solve externality problems is not applicable in the Sri Lankan case. In this sense, one can speak of a "market failure."

#### THE INTERVENTIONIST SOLUTION

State intervention is the other classical answer to the problem of externalities. In principle, different types of state intervention are conceivable as measures to deal with the problem of crop damages. In the following, four instruments will be discussed which differ in the level of state intervention and in the degree to which they can be enforced at the local level:

- a Pigouvian tax on cattle and buffalo,

- regulations that make the herding of the animals compulsory and prohibit stray animals,
- regulations that forbid livestock keeping in cropping areas, and
- regulations that assign the liability for crop damages to the livestock farmers and include provisions to enforce this liability by state intervention.

*ad (1):* The Pigouvian tax is generally judged to be superior to other instruments of state intervention on efficiency grounds, but this instrument is difficult to implement in the case under consideration. Besides the problem of determining the appropriate tax level, which internalizes the external costs caused by the crop damages, the implementation of such a tax is affected by difficulties to record the exact number of animals kept by the individual livestock owners.

*ad (2):* A legal regulation which requires that livestock farmers herd their animals had already been established in the case under consideration. According to the Cattle Trespass Acts No. 12 of 1941 and No. 24 of 1949, the local administrative authorities such as municipal and town councils have the right to catch all animals in the area under their administration which are not herded and demand a fine from the owner. A similar provision was included into the Agrarian Services Act No. 58 of 1979, which applies to the land resources in irrigation schemes and to other cultivated land held as formal private property. These formal legal regulations have so far hardly been enforced by any municipal or town council or by any village administrator in the research region. The interviewed administrative officers mentioned potential conflicts with livestock owners as a major reason.

As will be discussed in Section 5 in more detail, the attitude of the administration concerning the enforcement of these regulations plays a key role in solving the problem of crop damages.

*ad (3):* A legal regulation which forbids keeping grazing livestock in cropping areas already existed in the case under consideration. According to the Agrarian Services Act, the paddy farmers within one irrigation tract fix at their seasonal meeting a date for the start of the cultivation and the livestock owners are required to move their herds out of the paddy cultivation areas before this date, otherwise they can be fined by the village administrator. In the traditional paddy growing areas, this regulation was fairly well enforced. The livestock owners had a strong incentive to comply with the regulation because they often had their own paddy lands situated in the respective irrigation tracts. Difficulties to enforce this regulation arose, however, in the more recently established irrigated areas, such as KOISP, to which the livestock owners traditionally used to move their animals during the cropping season.

*ad (4):* The assignment of the liability for crop damages to the livestock farmers was also established in the Sri Lankan case. This regulation, too, was affected by enforcement problems. According to the Agrarian Services Act, each crop cultivator with formal property rights in the land he cultivated had the right to seize an animal “trespassing“ on his land and detain it until a compensation for the crop damages was paid. The crop cultivator had to inform the village administrator, who had to assess the crop damages and to inform the livestock owner. In case the livestock owner failed to pay, the Commissioner of Agrarian Services was entitled to sell the seized animals by

public auction and pay the compensation out of the proceeds of the sale. The Agrarian Services Act did not require that crop cultivators fence their land in order to be entitled to claim compensation. In general, the regulations of the Act can be interpreted as an attempt of the state to reduce the transaction costs of the crop farmers involved in enforcing their private property rights in land, because (1) the Act unconditionally passed on the liability for crop damages to the livestock farmers and (2) the Act shifted the efforts involved in claiming compensation to the local administration. According to the Act, all the crop farmer had to do was to seize the animal and inform the village administrator.

However, the crop farmers had considerable problems to enforce this formal right to compensation since: (1) according to the estimation of the interviewed village administrators, the crop farmers were in one third of the cases not able to seize the animals causing the damage; (2) for technical reasons, the appropriate assessment of the damage was difficult and turned out to be a major cause of social conflict in the villages; and (3) the provision of the Act to auction the animals if the livestock owner failed to pay was not practical because the livestock farmers acted in solidarity and did not buy animals at such auctions. Therefore, such auctions were hardly held at all.

The Agrarian Services Act did not apply to *chena* farmers because they did not hold formal property rights to the land on which they grew crops. They could, however, claim compensation for crop damages on the basis of the general legislation which protected their rights to the actual crops. The jurisdiction acknowledged that *chena* farmers were—according to the principle of *fructus industrialis*—the owners of the crops they grew. On this basis, they were granted the right to compensation, but they had to

seek the assistance of the police and, if this was not successful, file a case in court. As several visits to the police were necessary to deal with a single case, this procedure involved considerable transportation costs and resulted in the loss of whole working days, which was difficult to bear during the cultivation season. For the *chena* farmers, there were also social barriers to contacting policemen and advocates. Due to such reasons, none of the three police stations in the research area recorded more than ten reports of crop damages in *chena* fields per year, although the number of such cases in a single *chena*-based village easily exceeded 100 per season. Not a single case for compensation for crop damages by livestock had been filed in court by *chena* farmers during the last years.

In conclusion, as the discussion of this section shows, none of the potential instruments of state intervention which could internalize the external costs caused by the crop damages was effectively enforced at the local level. In this sense, one can speak of a “government failure.”

## THE COMMUNITARIAN SOLUTION

In view of government failures and market failures, a third approach to solve externality problems has received increasing attention in economics: informal institutions such as social norms which are enforced by local communities, herein referred to as a “communitarian solution.” One can distinguish two types of “communitarian solutions” to problems caused by externalities: (1) traditional social norms or other informal institutions which have emerged over time at the local community level for a variety of reasons, and (2) institutional arrangements which have been specifically created by the

members of the respective community to solve the crop damage externality problem.

This section deals only with the first type of solution. The second type is dealt with in Section 5.

In the case under consideration, traditional social rules to deal with the problem of crop damages have indeed evolved, but they have been considerably weakened during the last decades. The interviews revealed that the livestock owners traditionally used to pay compensation for crop damages to *chena* farmers, even though they were not formally required to do so. The payment of compensation was embedded in a traditional patron-client relationship between the livestock owners and the *chena* farmers. The livestock farmers usually owned paddy land on which the *chena* farmers worked as hired laborers. The livestock owners also interacted as money lenders and traders with the *chena* farmers. The payment of compensation by the livestock owners was considered as a deed of mercy rather than as the fulfillment of a right held by the *chena* farmers. The village community played a role as well, since there was publicly disapproval if a relatively rich livestock owner refused to pay compensation for the crop damages suffered by a comparatively poor *chena* farmer.

The weakening of the social rule to pay compensation can be related to the dissolution of the traditional patron-client relationship. The mechanization of paddy cultivation since the 1960s reduced the dependence of the livestock owners on the labor resources of the *chena* farmers. The emergence of semi-formal credit organizations in the villages promoted by NGOs, development projects and the government reduced the dependence of the *chena* farmers on the livestock owners as money lenders. In addition,

many *chena* farmers are descendants of settlers who emigrated during the last decades from other regions of the country, because they received paddy land in irrigation projects. These *chena* farmers have never established personal relations to the livestock owners. Moreover, the livestock owners feel that both the settlers in the irrigation projects and their descendants who engage in *chena* cultivation are invading their traditional grazing rights. Therefore, they do not perceive that they have any social obligation to pay compensation for crop damages occurring in these areas.

In conclusion, traditional social norms have become defunct with the dissolution of patron-client relationships and new informal rules, based on voluntary co-operation, are not likely to evolve in a society that is stratified by unequal access to resources, separated by different caste affiliation, and fragmented due to ongoing immigration. To characterize such cases in which informal regulations are not likely to work, Ellickson (1991) has introduced the concept of “social imperfections”—an analogy to the concept of market imperfections. One could also draw a parallel to the concept of market and government failure, and speak of a “community failure” in this case.



## 5. COLLECTIVE ACTION AND BARGAINING AS A SOLUTION

The preceding section has shown that the three classical solutions to problems of externalities did not work in the case under consideration because of market failure, government failure and “community failure.” This section discusses an alternative solution: collective action and bargaining between organized groups with the participation of state authorities. Such a process is currently going on in the research region. The politicians and the local administration act as advocates of the *chena* farmers. Under the mediation of an appointed committee, they bargain with the organized livestock farmers for the following “deal”: The livestock farmers commit themselves to avoid crop damages. In exchange, they receive formal reserved pastureland where they can keep the animals during the cropping season.

This process combines elements of all three classical solutions: the bargaining aspect of the Coase solution; the involvement of the state, which characterizes the interventionist solution; and the engagement of the local communities, which is the essence of the communitarian solution. The following analysis deals with the conditions under which a combination of these elements can possibly overcome the failures of the three classical solutions. For this purpose, the process which is currently going on in the research region is analyzed as a process of institutional change which is driven by the interaction of different interest-groups within a given political and administrative arena. In the first step, the interest groups involved and their organizational capacity are examined. In the second step, the political and administrative institutions and actors involved are analyzed. In a third step,

the bargaining process taking place in the research region is examined and a model solution is discussed, which has been developed for one Agrarian Services Division.

## THE INTEREST GROUPS INVOLVED AND THEIR ORGANIZATION

Three potential interest groups may be distinguished: the paddy farmers, the *chena* farmers and the livestock owners. The organizational capacity of the potential interest groups is characterized by the classical problem of collective action described by Olson (1965). To analyze the organizational capacity of the respective interest groups, one can apply the transaction costs concept of the New Institutional Economics. The transaction costs influence what Davis and North (1971) call the “perception and organization lag”—the time that is required to perceive the potential profits from a new institutional arrangement and organize an interest group. Drawing on the argumentation of Davis and North (1971), one can assume that the lag will be shorter:

- the smaller is the number and the greater is the socio-cultural homogeneity of persons who compose the relevant interest group,
- the larger are the expected net benefits, the closer (in point of time) are these benefits, and the greater is the degree of certainty with which the expected costs and benefits are known,
- the lower is the risk aversion and the time depreciation of the potential members,
- the longer is the menu of known institutional alternatives to the present situation,

- the better is the access of the potential members to the communication and transportation infrastructure, and
- the greater is the possibility to redirect an already existing organization or to pursue the interests within an existing organization.

In the research region, the livestock keepers have organized themselves during the 1980s in three formally registered organizations, which are united in one umbrella organization. According to the factors listed above, the organizational capacity of the livestock farmers can be explained by the fact that they represent a comparatively small and socially homogenous group of comparatively wealthy people with easy access to means of transportation and communication. Moreover, the livestock farmers had an “institutional alternative“ which they pursued: the formal ownership of pastureland where crop farming was not allowed and where they could keep their animals during the cropping season. Another factor which is not included in the above list also played a role: the charismatic leadership provided by one livestock owner who served as the secretary of one of the three livestock farmers’ organizations and as the general secretary of the umbrella organization.

The paddy farmers are formally organized in Farmers’ Associations for the purpose of irrigation management. In contrast to the case of the livestock farmers, the organization of the paddy farmers is strongly supported by state authorities, especially the Agrarian Services Department, which even organized the relevant meetings. In the irrigation projects, membership is compulsory. Therefore, the paddy farmers had in principle the possibility to pursue their interests with regard to the problem of crop damages

within these already existing organizations. However, in the new areas of the KOISP project area, where crop damages in paddy were important, the paddy farmers' organizations were not well functioning, despite state support. As the settlement project was still new, the heterogeneity of the settlers in terms of caste and origin was particularly pronounced. Moreover, widespread disputes among the settlers over the boundaries of the allocated paddy lands, along with some absentee owners, were obstacles to the creation of solidarity.

The *chena* farmers in the research region were hardly organized at all to pursue their common interests with regard to the problem of crop damages. Recalling the factors listed above, this can be attributed to their relatively large number, their socio-cultural heterogeneity (different origin and caste affiliation, etc.) and their comparatively low income, which implies a high time depreciation and risk aversion. The fact that the *chena*-based villages were poorly connected to the communication and transportation infrastructure also reduced the organizational capacity of the *chena* farmers. Moreover, the *chena* farmers were not in a position to pursue their interests in already existing organizations, even though many of them were members of various organizations such as semi-formal credit societies or village groups created in connection with the implementation of poverty alleviation programs. None of these organizations was directly related to *chena* farming and the organizations usually included members such as laborers or craftsmen who were not interested in *chena* farming at all. Moreover, the village groups of these organizations were highly dependent on external "social mobilizers." The experience in the research region has shown that the village groups

usually stopped functioning when the respective program was terminated and the social mobilizers withdrew. Furthermore, unlike the livestock owners, they did not know of an institutional alternative to the present situation. Their experience had only shown that all measures taken so far had not been effective in solving the crop problem.

## THE POLITICAL-ADMINISTRATIVE SYSTEM

To understand the role of "the state" in the bargaining process in the research region, it is useful to conceptualize the state as a system of political and administrative institutions that create an incentive structure for politicians and bureaucrats and influence the bargaining power of the interest groups identified above. Sri Lanka's political and administrative system can be characterized as a comparatively stable democracy which allows changes in the party or coalition in power by democratic elections. Since the introduction of a Provincial Council system in 1987, which was part of a decentralization package designed to solve the ethnic conflict, political representation in Sri Lanka involves three levels: the parliament, the directly elected provincial councils, and—at the local level—the Pradeshia Sabhas, town councils and municipal councils. The members of all these bodies are elected according to a proportional system of representation and a preferential system of voting. This election system creates a particularly strong incentive for the individual candidates to care for the interests of the voters in their district. The system also results in a high politicization even among the rural population and in widespread clientelism, patronage and populist policies (Dunham and Kelegama 1997; Moore 1997). In order to secure votes, politicians have an incentive to induce the local administration to implement development programs and policies beneficial to their

voters. The electoral districts are coterminous with the administrative districts and their administrative resources, which facilitates the co-operation of politicians at all levels with the local administration. In addition, “District Political Authorities“ were created in order to accelerate the process of development at the district level and involve grass-root level organizations in local planning and project implementation (Warnapala 1997). Under the present system, the District Development Committees (DDC), which is chaired by elected politicians, continue to pursue these goals.

The political and administrative system influences the comparative power of the interest groups involved. As the *chena* farmers represent the largest number of voters, their interests have to be addressed by politicians of any party if they want to win elections or stay in power. The fact that the *chena* farmers are not organized certainly limits their ability to articulate their interests. Nevertheless, the political system described above, which implies a close direct relation between the voters and the political candidates, leaves room for the expression of interests even for groups which are not formally organized. This is especially the case during election campaigns. By continuously addressing the crop damages problem in meetings with politicians, the *chena* farmers were obviously able to make the politicians and the local bureaucracy aware of the urgency of the problem. Moreover, the politicians and the local administration have been kept informed about the problems faced by development projects promoting new crop farming technologies, as described in Section 2. Although they tend not to get involved in direct political advocacy, development project and NGO staff can be important in channeling information about issues confronted by *chena*

farmers to local administrations, which serve as project implementing agencies.

Interviews with politicians and local administrators showed that they consider the problem of crop damages as a serious obstacle to the agricultural development in the region.

In contrast to the case of the *chena* farmers, the political power of the livestock farmers rests mainly on their ability to organize themselves effectively and act as a political pressure group. Since their number is comparatively small, their political influence cannot be based on the votes they represent. However, due to their high degree of organization, they are well prepared for lobbying activities and their representatives are able to communicate directly with political and administrative decision-makers. Moreover, due to their comparatively wealthy status, the livestock keepers are able to support the election campaigns of political candidates. Due to these factors, the politicians have an incentive to find solutions that take the interests of the livestock farmers into account.

The paddy farmers represent more votes than the livestock farmers do and, as described above, they are organized, too. However, crop damages are not very prominent in the lobbying activities of the paddy farmers' organizations. Other aspects of paddy cultivation, especially the distribution of irrigation water and the farm gate price of paddy, appear to be of greater relevance for the paddy farmers as an interest group. This can be related to the fact that only the paddy farmers in the new irrigation and settlement projects are severely affected by livestock-related crop damages. As has been outlined above, they are less efficiently organized than the paddy farmers in traditional areas are.

## THE PROCESS OF NEGOTIATING A SOLUTION

Until the early 1990s, the strategy of the administration, especially of the Department of Animal Production and Health, was to convince the livestock farmers to switch to a more intensive system of livestock keeping, involving improved breeds, systematic fodder management, feeding of concentrates, etc. This was seen as an incentive for the livestock owners to reduce their herd sizes voluntarily. It was popular among the administration and the politicians to consider this strategy as an appropriate solution to the problem of crop damages because it would not involve major conflicts with the livestock owners. The interviews showed that a more intensive system of livestock keeping was considered as a necessary “modernization“ of the prevailing system, which was often characterized in a pejorative way as “semi-domesticated.“ However, even though the Department offered extension services as well as subsidies for breeding animals, concentrates, establishment of fodder plots, etc., the livestock farmers did not show any interest in adopting the proposed innovations. Their reluctance to adopt more labor- and capital-intensive technologies can be attributed to economic incentives. As outlined in Table 5, the present extensive system of keeping large herds is competitive in terms of its return to labor and capital. The intensification promoted by the administration aimed at improving the return to land without taking into consideration the—potentially negative—impact of the proposed techniques on the return to capital and labor.

**Table 5—Farm enterprise income from cattle keeping**

Item	Small herds	Medium herds	Large herds
Total herd size (number of animals)	5	30	100
Gross output			
from milk (Rs.)	3,470	16,240	89,390
from cull animals and stock increase (Rs.)	3,760	16,210	67,600
Total (Rs.)	7,230	32,450	156,990
Total costs <sup>a</sup> (Rs.)	2,130	15,010	69,150
(without imputed labour and capital costs)			
Enterprise income I (Rs.)	5,090	17,440	87,830
(without imputed labour and capital costs)			
Fixed capital (Rs.)	9,460	48,630	224,100
Enterprise income II (Rs.) (with imputed capital costs, without imputed labour costs)	4,050	12,090	63,780
Input of labour (man-days)	216	231	552
Enterprise income I per man-day <sup>b</sup> (Rs.)	24	76	159
Enterprise income II per man-day (Rs.)	19	52	114
Enterprise income I in relation to fixed capital <sup>c</sup> (percent)	54	36	39

Source: Birner (1996)

<sup>a</sup>Variable and fixed costs including infrastructure depreciation.

<sup>b</sup>The daily labor wage in paddy cultivation during the peak season was Rs. 135.

<sup>c</sup>The interest rate in the formal bank sector was in the range between 20 and 25 percent.

One can assume that, as long as the livestock farmers bear relatively low opportunity costs of land—which is the case in the present system—their incentive to adopt the proposed technologies and reduce their herd sizes will remain low. In addition, intensive systems of cattle and buffalo farming are generally discouraged in Sri Lanka by an unfavorable relation of the prices for milk and concentrates.

In the 1990s, it became obvious that the strategy of the Department of Animal Production and Health to convince the livestock owners to voluntarily reduce their herd sizes had failed. At the same time, the problem of crop damages gained momentum due

to the increasing population density and the expansion of crop cultivation. The three election campaigns of 1994 with their numerous meetings at the village level provided an excellent forum for the *chena* farmers to launch complaints concerning the crop damage problem. In 1995, the above-mentioned District Development Committee (DDC), which is chaired by a Member of Parliament elected for the district, decided to attend to the problem. The DDC organized a large special meeting to which representatives of the livestock farmers' organizations, the paddy farmers' organizations, NGOs, development projects and the local administration were invited. The *chena* farmers did not participate, because they had no organizations and, therefore, no representatives who could claim to speak for them. However, the interests of the *chena* farmers were expressed by the Member of Parliament who chaired the meeting and by members of the administration. As the number of participants was too large to start a negotiation process immediately, a special committee was nominated which should negotiate a solution. This committee can be considered as an intermediary or facilitator in the bargaining process. It comprised two Sri Lankan counterparts of a foreign-funded agricultural development project and one entrepreneur from the agribusiness sector.

In the past, the livestock owners had already demanded that the government allocate land to them as exclusive pasture. This demand was forwarded to the government during the planning period of the above-mentioned KOISP. As a result, the government identified in 1986 an area of 445 hectares to be declared as exclusive pastureland. However, these land resources were not officially handed over to the livestock farmers' organizations. In the Agrarian Services Division most seriously affected by the

problem of crop damages, about 75 percent of the livestock owners who keep more than ten animals were organized in the cattle owners' association responsible for this area. In essence, the committee negotiated between this association and the DDC as the relevant political and administrative decision-making unit.

The members of the livestock owners association who together keep approximately 23,800 heads of cattle and buffalo demanded an extension of the land area of 445 hectares which was identified as pastureland in 1986, because this area was obviously not sufficient to maintain the herds of all members during the cropping season. The bargaining problem arose from the fact that the available land resources in the region were not sufficient to maintain the total number of animals kept by the association without reducing the land available for *chena* farming. To reduce this conflict of interests between the livestock owners' association and the *chena* farmers, the committee proposed (1) to declare an area as reserved pastureland where the incidence of *chena* farming was particularly low and (2) to improve the carrying capacity of these land resources by technical measures. The pastureland proposed by the committee covers an area of 2,000 hectares, including the 445 hectares identified in 1986. The suggested improvement measures include the rehabilitation of land resources which had been destroyed by gem mining, the restoration of existing tanks (small earthen reservoirs) and the construction of additional tanks, the introduction of water conservation methods, and the establishment of improved pasture and fodder trees. The committee estimated that even if these measures were taken, only half the number of animals currently kept by the members of the livestock owners' association could be maintained in the proposed pastureland throughout

the cropping season. Therefore, the problem of crop damages could only be solved if members of the association committed themselves to take measures to prevent crop damages outside the proposed pastureland, including a reduction of the herd sizes.

One may ask why the livestock owners' association entered into a bargaining process at all under these rather unfavorable conditions. The major incentive probably came from signals of the politicians that they could induce the local administration to enforce the stray cattle legislation, if no agreement was reached. This threat was credible, because the politicians had a strong incentive to prove that they were able to solve the problem of crop damages after they had publicly given the issue a high priority by involving the DDC. As the local administration participates in the DCC, they also have an incentive not to create the image of being incapable of solving problems of high priority. Moreover, the interviews implied that the attitude of the local administration towards the livestock and the *chena* farmers had gradually changed in favor of the latter group during the last decade. By implementing poverty alleviation programs such as the Janasaviya program or the 15,000 villages project, the local administrators had developed a more direct relationship to this group. Moreover, the local administrators had experienced that many project activities in the crop farming sector in which they were involved were doomed to fail because of the crop damages problem.

The livestock owners knew that, if the administration enforced the stray animals legislation, they would have to reduce their herd sizes and take measures to prevent crop damages without receiving pastureland in return. The committee proposed an additional incentive to convince the association to agree to the proposal: it suggested that the

livestock owners' association itself, and not a state agency, should manage the proposed area of 2,000 hectares of pastureland. The association should receive formal permanent use rights in the proposed pasture area and be in charge of the implementation of the proposed upgrading activities. The Norwegian-funded Hambantota Integrated Rural Development Project and USAID agreed to provide technical and financial support for this purpose.

As an appropriate organizational structure, the committee suggested a company with limited liability formed by the members of the livestock owners' association. The livestock owners' association accepted the proposal in a special meeting after a highly controversial discussion, as did the DDC. The administration promised to enforce the stray cattle legislation in case the livestock farmers failed to fulfill their commitment to prevent crop damages. Obviously, the credibility of this commitment by the administration plays a crucial role for the implementation of the proposal, because it represents the only threat which can prevent the livestock owners from free riding on the proposed solution, that is to receive the pastureland without fulfilling the commitment to prevent crop damages. As mentioned above, the administration has its own incentives to keep its commitment and, in addition, the local politicians have—due to the reputation effect—an incentive to induce the administration to keep its commitment. At the time of terminating the research in 1998, the livestock owners' organization had already registered a private company with limited liability as required by the proposal. The local administration was in the process of surveying the respective land resources in preparation for the official transfer of the property rights in the proposed pastureland.

It remains to be seen whether the proposed solution will eventually solve the problem of crop damages. On the one hand, the proposal involves considerable potential. Unlike earlier approaches, it was negotiated with a view to balancing the various interests, and the parties involved gave their explicit consent. Moreover, the proposal includes an institutional innovation: the arrangements proposed for the management of the pastureland in the form of a private company. On the other hand, the successful implementation depends on a number of critical factors: the possibilities of enforcement crucially depend on the willingness of the local administration to enforce the stray animal legislation if the livestock owners do not comply with the provisions of the proposal. The incentive of the politicians to exercise pressure on the administration mainly depends on the political weight which they attach to the loss of reputation occurring in case they cannot solve the crop damages problem after placing it on the political agenda. It also depends on the extent to which the voting power of *chena* farmers carries weight in comparison to the lobbying efforts and election campaign support provided by the livestock farmers. Moreover, to be sustainable in the long run, the utilization of the proposed pastureland has to be economically viable without subsidies: this remains a major a challenge—both from the organizational and from the technical point of view.

## 6. CONCLUSIONS

The study of *chena* farmers and livestock owners in the Hambantota District of Sri Lanka allows one to draw several conclusions on the relation between property rights, collective action, and technology adoption. The first conclusion concerns the relation between property rights and the adoption of innovations, the development of which has been induced by economic forces such as changing price relations of land and labor. In accordance with the induced innovation hypothesis, the increasing population density in the research region led to the development of innovations, which allowed for use of increasingly scarce land resources in a more efficient way. Due to the goals and interests of the organizations which promoted these innovations, the new technologies were not only designed to use scarce land resource more intensively, but also to enhance environmental sustainability and raise the income of the most disadvantaged land users, the *chena* farmers. The organizations promoting these technologies managed to remove major “traditional constraints“ to technology adoption by providing infrastructure and information and by organizing semi-formal credit societies. However, the concentration of traditional informal rights in grazing resources in the hands of the livestock owners and poor enforcement of formal property rights held by crop farmers under increasing population pressure and competition for land resulted in crop damages by livestock, which prevented the adoption of more sustainable land use practices. It can be concluded that induced technical change may require institutional change such as a redistribution of

property rights and greater incentives to enforce rights as crucial prerequisites. In such situations, institutional change has causal priority over technical change for determining the path of agricultural development.

The case study also supports the conclusion that a redistribution of property rights, which makes more efficient land use possible, is not simply induced by a change of the economic conditions such as increased population density. The case study rather shows that due to market failures, government failures and “community failures,” none of the classical solutions to solve problems of externalities could be applied. Thus, the case considered here contradicts the “efficiency theory“ of institutional change, which is reflected in Demsetz’s (1967) hypothesis that “Property rights develop to internalize externalities when the gains of internalization become larger than the cost of internalization.“ The case study is rather an illustration for North’s (1990) view that “Institutions are not necessarily or even usually created to be socially efficient; rather they, or at least the formal rules, are created to serve the interests of those with the bargaining power to devise new rules.“

One can conclude from the case study that the bargaining power of the potential interest groups involved in institutional change crucially depends on their capacity to organize themselves and act collectively in order to pursue their interests. The comparative bargaining power is also strongly influenced by the political and administrative system in which the different interest groups interact. In the case under consideration, the resource users who were most disadvantaged by the prevailing property regime were also those with the lowest organizational capacity: the *chena* farmers. This

can be considered as a dilemma because exactly these resource users would have had to pursue a change in the prevailing property regime in order to make a more efficient, equitable and sustainable land use possible.

In the Sri Lankan case, the political system of a functioning democracy, a decentralized form of government and a preferential system of voting created an incentive for the politicians and for the local administration to act as advocates of the *chena* farmers. A platform to start a negotiation process was already institutionalized. Members of a donor-funded project and a private sector institution were able to play a facilitating role. Due to this combination of factors, a process of institutional change could be induced in spite of the low organizational capacity of the *chena* farmers. Such favorable conditions are not enjoyed in many developing countries. What has been achieved due to the comparatively favorable conditions was the development of a model solution, which is now in the process of being implemented.

However, this solution has been developed without the active participation of the *chena* farmers themselves. While the traditional patron-client relationships between *chena* farmers and livestock owners had been dissolved, the *chena* farmers had become clients of the politicians and the local administration. One could argue that in the case under consideration, active participation of the *chena* farmers in the bargaining process might not have changed the result. However, in cases where the political and administrative frame conditions are less favorable, active participation of the groups which are disadvantaged under the current distribution of property rights may be essential to induce institutional change which leads to more efficient, equitable and

environmentally sustainable resource use. For such cases, the case study supports a further conclusion. The analysis has shown that the New Institutional Economics and the theory of collective action can well explain why the organizational capacity of the *chena* farmers was so low that they could not enter the bargaining process directly. By drawing attention to the relevance of direct communication, reputation, trust and reciprocity, the theory of collective action can also explain how collective action can be achieved and sustained among individuals who have symmetrical interests and access to resources (Ostrom 1998). However, the New Institutional Economics and the theory of collective action are less well equipped to deal with issues of power, and answer the question of how collective action can be induced between groups which have unequal access to resources and which are divided by social barriers of status and wealth. Historical evidence shows that one factor plays a prominent role for turning socially and economically disadvantaged groups into actors of institutional change: the vision that they are—in spite of their disadvantaged position—able to change the present situation, if they act collectively. Creating this vision has much to do with charismatic leadership and ideology. To both factors, the New Institutional Economics and the theory collective action still have remarkably little to say.

## REFERENCES

- Birner, R. 1999. The role of livestock in agricultural development—Theoretical approaches and their empirical application in the case of Sri Lanka. Aldershot: Avebury.
- Boserup, E. 1981. Population and technological change—A study of long-term trends. Chicago: Chicago University Press.
- Coase, R.H. 1960. The problem of social cost. *Journal of Law and Economics* 3 (October): 1-44.
- Davis, L.E., and D.C. North. 1971. Institutional change and American economic growth. London: Cambridge University Press.
- Demsetz, H. 1967. Toward a theory of property rights. *American Economic Review* 57 (2): 347–373.
- DCS (Department of Census and Statistics). 1984. Sri Lanka census of agriculture 1982—Hambantota District report (Smallholding Sector). Colombo.
- \_\_\_\_\_. 1992/93. Agricultural crops and livestock 1992/93—Hambantota District preliminary report. Colombo.
- Dunham, D., and S. Kelegama. 1997. Does leadership matter in the economic reform process? Liberalization and governance in Sri Lanka. *World Development* 25 (2): 179–190.
- Ellickson, R.C. 1991. Order without law—How neighbors settle disputes. Cambridge: Harvard University Press.
- Gunaseena, H.P.M., ed. 1995. Multipurpose tree species in Sri Lanka—Development of agroforestry systems. Proceedings, Sixth regional workshop on multipurpose trees, Kandy, Sri Lanka, 17–19 August, 1995.
- Handawela, J. 1995: Role of agroforestry in stabilisation of upland rainfed farming in the South Eastern Dry Zone of Sri Lanka. In *Multipurpose tree species in Sri Lanka—Development of agroforestry systems*, ed. H.P.M. Gunaseena. Proceedings, Sixth regional workshop on multipurpose trees, Kandy, Sri Lanka, 17–19 August, 1995.
- HARTI (Hector Kobbekaduwa Agrarian Research and Training Institute). 1995. Production and marketing of other field crops in the Kirindi Oya Project area. Research Study No. 91. March 1995. Colombo.

- Hayami, Y., and V.W. Ruttan. 1985. *Agricultural development—An international perspective*. 2nd ed. Baltimore and London: The John Hopkins University Press.
- Hoffman, E., and M.L. Spitzer. 1982. The Coase theorem: Some experimental tests. *Journal of Law and Economics* 25 (April): 73–98.
- IIMI (International Irrigation Management Institute). 1995. *Kirindi Oya irrigation and settlement project—Project impact evaluation study. Volume II (Final Report)*. Colombo.
- ILO (International Labour Organisation). 1984. *Employment and income generation in agriculture in the District of Hambantota, Sri Lanka*. Colombo.
- Irrigation Department. 1975. *Register of irrigation projects in Sri Lanka*. Colombo: Ceylon Printers.
- Keerthisena, R.S.K. 1995. Fifteen years of research on alley cropping at Mahailuppallama—Review. In *Multipurpose tree species in Sri Lanka: Development of agroforestry systems*, ed. H.P.M. Gunasena. Proceedings, Sixth regional workshop on multipurpose trees, Kandy, Sri Lanka, 17-19 August, 1995. Sri Lanka: Peradeniya.
- McIntire, J., D. Bourzat, and P. Pingali. 1992. *Crop-livestock interaction in sub-saharan Africa*. Washington, D.C.: The World Bank.
- Medema, S. 1994. The myth of the two Coases: What Coase is really saying. *Journal of Economic Issues* 27 (March): 208–26.
- Moore, M. 1997. Leading the left to the right: Populist coalitions and economic reform. *World Development* 25 (7): 1009–1028.
- North, D.C. 1990. *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.
- Olson, M., Jr. 1965. *The logic of collective action—Public goods and the theory of groups*. Cambridge, Massachusetts: Harvard University Press.
- Ostrom, E. 1998. A behavioral approach to the rational choice theory of collective action. *American Political Science Review* 92 (1): 1–22.
- Warnapala, W.W.A. 1997. *Provincial politics in Sri Lanka—An analysis of the Southern Provincial Council election 1994*. New Delhi: Navrang.
- Woolf, L. 1983. *Diaries in Ceylon, 1908-1911—Records of a colonial administrator, being the official diaries maintained by Leonhard Woolf while Assistant*

Government Agent of the Hambantota District, Ceylon. 2nd ed. Dehiwala, Sri Lanka: Tisara Prakasakayo.

### List of CAPRI Working Papers

- 01 *Property Rights, Collective Action and Technologies for Natural Resource Management: A Conceptual Framework*, by Anna Knox, Ruth Meinzen-Dick, and Peter Hazell, October 1998.
- 02 *Assessing the Relationships Between Property Rights and Technology Adoption in Smallholder Agriculture: A Review of Issues and Empirical Methods*, by Frank Place and Brent Swallow, April 2000.
- 03 *Impact of Land Tenure and Socioeconomic Factors on Mountain Terrace Maintenance in Yemen*, by A. Aw-Hassan, M. Alsanabani and A. Bamatraf, July 2000.
- 04 *Land Tenurial Systems and the Adoption of a Mucuna Planted Fallow in the Derived Savannas of West Africa*, by Victor M. Manyong and Victorin A. Houndékou, July 2000.
- 05 *Collective Action in Space: Assessing How Collective Action Varies Across an African Landscape*, by Brent M. Swallow, Justine Wangila, Woudyalew Mulatu, Onyango Okello, and Nancy McCarthy, July 2000.
- 06 *Land Tenure and the Adoption of Agricultural Technology in Haiti*, by Glenn R. Smucker, T. Anderson White, and Michael Bannister, October 2000.
- 07 *Collective Action in Ant Control*, by Helle Munk Ravnborg, Ana Milena de la Cruz, María Del Pilar Guerrero, and Olaf Westermann, October 2000.
- 08 CAPRI Technical Workshop on Watershed Management Institutions: A Summary Paper, by Anna Knox and Subodh Gupta, October 2000.
- 09 The Role of Tenure in the Management of Trees at the Community Level: Theoretical and Empirical Analyses from Uganda and Malawi, by Frank Place and Keijiro Otsuka November 2000
- 10 Collective Action and the Intensification of Cattle-Feeding Techniques a Village Case Study in Kenya's Coast Province, by Kimberly Swallow, November 2000.
- 11 Collective Action, Property Rights, and Devolution of Natural Resource Management: Exchange of Knowledge and Implications for Policy, by Anna Knox and Ruth Meinzen-Dick, January 2001.
- 12 Land Dispute Resolution in Mozambique: Evidence and Institutions of Agroforestry Technology Adoption, by John Unruh, January 2001.