

## Impacts of Irrigation on Land Tenure Conditions

by Walter Huppert

### Introduction

The topic of 'human factors' in irrigation has been drawing increasing attention in recent years (1). One of the various reasons for this interest is the aim of project designers to ensure that potential productivity gains inherent in irrigation can be of profit to small and poor farmers in developing countries as well — and not just to a minority group of larger and politically or socio-economically more influential landowners.

To make it clear from the outset: this paper does not argue that larger farmers should on principle be excluded or neglected in the context of development efforts aimed at the introduction or improvement of irrigation. Instead, reference is made to the present-day reality in countless irrigation schemes all over the world where groups of different socio-economic status co-exist and will have to co-exist in the future. At the same time, however, it is evident that many irrigation schemes in low-income countries are explicitly set up to help the rural poor (2), even if there may be a whole range of multiple goals. It hence appears to be vital to look at potential positive and negative impacts of irrigation on the target group, namely the smallholders, and to adjust project designs accordingly. And amongst the possible negative effects brought about by the introduction of irrigation, unfavourable changes in land tenure relationships will be of prime concern for the smallholders as intended beneficiaries.

### 1. Smallholders and their Goals

The term "smallholder" throughout this paper refers to actual or potential irrigation farmers, whether owner-operators, tenants or owner-tenants, who rely largely on family labour and who occupy a fairly or very disadvantaged socio-economic position in their institutional environment.

It is important to realize that amongst the goal which the smallholder pursues, risk-avoidance considerations rank highly. Hence his decision-making behaviour may be adequately described by "safety-first"-models where profit maximization goals are subject to the prior satisfaction of safety constraints.

In accordance with such lines of thought on a small irrigation farmer's decision-making, *Bromley* specifies the following goals hierarchy for a small irrigation farmer (3):

- "a) assure survival – the *subsistence* goal
- b) cautious optimizing – the *safety* goal
- c) acquire cash for consumption and savings – the *surplus* goal
- d) profit maximization – the *speculative* goal"

A decision-making process according to such a hierarchy of goals follows a so-called 'lexicographic order': "the safety goal is not considered until the subsistence goal has been attained; the surplus goal is not considered until the safety goal is attained; and the speculative goal is not considered until the surplus goal is attained" (4).

The decision-making process of the smallholder in the context of this order of goals will be largely determined by the behaviour and actions of other people around him. The fact that "some people's actions constitute other people's constraints" (5) is particularly relevant in irrigation where the water distribution system creates far-reaching interdependencies.

The "tail-end-problem", where farmers upstream take more than their due share of water and thus deprive downstream users of proper access to water is a well-known phenomenon in that context. However, a question of even more crucial importance – especially to the small farmer – is rarely considered in relation to such 'externalities': the changes in land tenure relationships that irrigation may bring about and hence the potential changes in access to land.

## 2. Land Tenure and Irrigation – Some General Remarks

'Land tenure' in the framework of the following discussion constitutes "the legal and contractual or customary arrangements whereby people in farming gain access to land" (6). With respect to land tenure and irrigation, *Ruthenberg* notes that 'it must... be borne in mind that production techniques and land tenure are interrelated. Whereas in shifting and fallow systems communal land ownership with established rights of usage prevails, we generally find in permanent farming individual land-ownership with owner-farmers or tenants. In irrigation farming, landlord-tenant relationships, provided that they have not yet been abolished by land reforms, are even more typical than in upland farming' (7).

These observations point to an essential area of considerations related to smallholder irrigation. Questions about the possible implications of irrigation on the land tenure situation of the small farmers must clearly be of prime importance, if the above-mentioned goal system of the farmer is to be of any concern in the context of irrigation planning and management. Since 'technologies and social relations are intimately linked' (8), the introduction of irrigation into an area of rainfed agriculture is likely to bring about substantial changes in the tenurial status of the smallholder. Therefore, questions relating to the nature and trends of such changes and to the factors and situation-variables involved appear to be of particular relevance to smallholder irrigation planning.

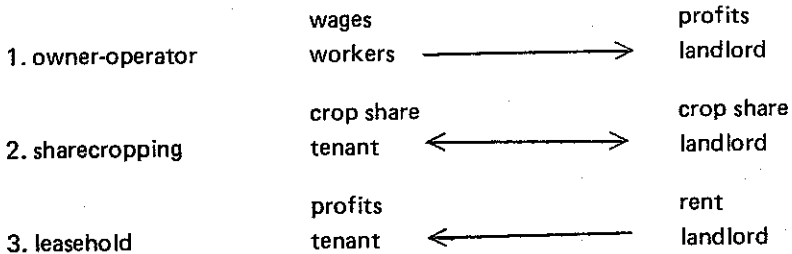
However, empirical evidence related to such questions is rare and has to be seen in the context of differing socio-economic structures and different cultural and historical backgrounds. And with respect to theory relevant to such problems, it is noted that

"while there is an extensive theoretical literature on landlord-tenant relations, we do not have anything comparable in irrigated agriculture" (9). It is therefore not surprising that the impact of irrigation projects and activities on existing land tenure systems — and vice versa — is looked upon as a priority area for further research related to land tenure questions and agricultural development (10).

The following considerations are intended to illustrate the importance of such issues. In order to do so, attention is focussed on landlord-tenant relationships and the interaction of the goals of landlords and tenants under varying production conditions. Moreover, the role and importance of risk-avoidance considerations in the framework of such interrelationships is given particular attention in accordance with the small-holders' premised concerns and preferences.

### 3. The Sharing of Risks

With reference to the role of risk in the context of land tenure arrangements, *Griffin* remarks that "there is no necessary connection between ownership of land, entrepreneurship and risk-taking. He who makes the decisions bears most of the risks, but he who bears the risks need not own the land" (11). *Griffin* illustrates this point by representing the three basic tenure systems in a schematic form where arrows point toward those who bear the risks of production:



This means that the risks of yield reductions or even losses caused by pests and diseases, unforeseen floodings or droughts, by inadequate farming practices etc. have to be borne by the landlord in case (1), will be shared by landlord and tenant in case (2) and have to be taken by the tenant in relationship (3).

However, it is essential to realize that the kind of risk to which *Griffin* refers may be labelled as "technical uncertainty" i.e. uncertainties related mainly to physical and biological factors of production. As far as uncertainty is determined by the socio-economic context, *Griffin's* statement no longer holds: e.g. "institutional uncertainty" may well affect the wage-labourer in a worker-landlord relationship if unemployment is high and if he risks losing his job. And in situations of low legal security, the owner in a worker-landlord relationship may well pass on losses due to technical uncertainties by scaling down the wages he is prepared to pay. Accordingly, in a share cropping arrangement the tenant security may vary widely according to the degree of institutional uncertainty that prevails.

#### 4. Potential Impacts of Irrigation: the Case of Sharecropping

In order to assess potential changes irrigation may bring about in the tenurial status of the smallholder it suffices here to concentrate on sharecropping, which is the most pervasive and persistent of the above-mentioned basic tenure systems. Leaving aside theoretical considerations about resource allocation and productive efficiency that dominate the literature on sharecropping, it may be useful instead to consider the situations in which this tenure system is the preferred arrangement.

With reference to *Pearce* (12) the essential situation parameters that favour the persistence of sharecropping may be defined as follows:

1. where decisions concerning the nature of the contract lie with the dominant landlord, but where the costs of production-supervision in arrangements with wage labour are potentially high
2. where the tenant, due to differing circumstances, has an enhanced bargaining power, but where his resource situation is such that risk-avoidance considerations still largely determine his decisions
3. where differences in resource endowments between tenant and landlord are less pronounced and where both landlords and tenants are existing close to the margin of survival.

If one looks separately at each of these sets of given situational conditions and if one superimposes the introduction of irrigation on each of them, then the following trends may result.

##### 4.1 Scenario 1: Landlord Dominant – Supervision Costs High

Since the landlord is dominant, conditions will largely be determined by his decision-making and by the adaptation of his goals to situational conditions that change with the introduction of irrigation:

- a) Change from rainfed agriculture to irrigation entails increased labour requirements and the need for timely and skilled execution of predetermined tasks. This means that the landlord's supervision costs, already high, will further increase if he opts for wage labour arrangements. Hence, basically, he may be interested in continuing on a sharecropping basis and security of the tenant may be enhanced.

This hypothesized trend has been observed in India. In surveys of village-based irrigation schemes in Orissa it was found that traditional paddy varieties – in contrast to high yielding varieties (HYV's) – continued to be grown on a crop-sharing basis with "conventional" shares of 40 to 50 % (13).

- b) However, if the advent of irrigation is accompanied by introduction of HYV's, then it is likely that other trends may emerge.

With considerably higher productivity-levels due to irrigation *and* HYV's the potential threat that the landowner may evict the tenant increases.

One possibility is that the landlord may adhere to the above-mentioned "conventional shares" but that he may use this threat of eviction to maintain productive

efficiency at high levels even with low or decreasing inputs of supervision. Indications of such trends have been noticed in the Khanewal subdivision of Pakistan's Punjab (14).

Another possibility may be that share-tenancies continue to prevail but that landowners ask for substantially higher shares. The landowners' argument then is that the tenant still receives a larger absolute portion of the higher output at a low share than from the lower output at a high share. Impacts of this kind have been observed in Ludhiana district of the Indian Punjab and in the rice producing area of Peddalleru, Andhra Pradesh, India (15).

Yet another possibility may be that the profitability in relation to units of output as well as to capital invested may rise such that cultivation becomes attractive to landlords themselves who have previously been uninterested or absent. This may lead to tenant eviction or to changes from sharecropping to wage labour contracts (16).

- c) *Pearce* points to the fact that the same circumstances — introduction of irrigation and HYV's — may result in yet a different outcome if the landowners perceive the reward of the "new" technology to be substantial but if they are aware at the same time that in the short run uncertainty is increased. Uncertainty may be augmented, because new varieties require reliable water supplies and a complete and well dosed "package" of inputs if they are to be cultivated successfully. Neither water reliability nor the necessary managerial skills of the water users can usually be expected in new irrigation schemes.

A "rational" choice for the landlord under such conditions will be to share such risks through cost share leases or 'to off-load them entirely through fixed rent tenancies' (17). Evidence of the latter option is reported by *Bharadway* and *Das* who noticed that in village schemes in Orissa, where irrigation and HYV's were newly introduced at the same time, tenure arrangements 'changed over almost entirely to fixed rent basis' (18).

One might assume in line with *Griffin's* perception of tenure systems (see above) that such leasehold contracts will enhance the tenant's decision-making freedom and hence reduce institutional uncertainties he has to face. However, the above-mentioned surveys of *Bharadway* and *Das* lend little support to such expectations, since they revealed that another feature accompanied the change-over from crop sharing to fixed rent arrangements: the fact that terms of leases were considerably shortened. The researchers interpret this fact as follows:

'... to fix the rent in kind or cash provides an incentive to the tenant to cultivate intensively since what remains after paying rent accrues to him. However, by making the lease contract short enough and/or insecure the landlord can raise fixed rent to capitalise on the productivity gain for each new tenant or for the old tenant under threat of eviction. This quick turnover of tenants, even when actually involving eviction, may not particularly harm productivity, if gains in productivity are mainly being achieved through the tenant's circulating capital rather than through asset formation. If the main asset, irrigation, is provided by public works, as in our present case, this may be an easily workable strategy.' As a result, 'in this region ... insecurity, especially for small tenants, has increased.' (19).

## 4.2 Scenario 2: Enhanced Bargaining Power of Tenants

Situations where tenants have increased influence on tenurial arrangements may arise in various circumstances: First, tenants may be landlords themselves, or may have more favourable resource endowments so that negotiating positions are less unequal. Second, landlords traditionally may not be cultivators or may be engaged in other activities so that supervision costs and/or labour shortages may induce them to seek share cropping arrangements.

If under such conditions irrigation and HYV's are introduced in an area, then the ensuing increase in related labour- and input-costs if borne by the tenant alone, and the fact that the tenant receives only a part of the total product, may decrease the tenant's net revenues below minimum income needs and hence reduce his incentives to cooperate. Given his favourable bargaining position, he may induce the landowner to increase tenant crop shares or to pay part of the input costs, while maintaining the sharecropping contract.

Such trends were confirmed for areas in India where irrigation has been practised for a long time and where "traditional landlords" prevailed, who were partly engaged in occupations other than cultivation. In such circumstances the introduction of HYV's into irrigated agriculture was accompanied by an increase in the tenants' share to 75 % of gross output with costs entirely borne by the tenant (20).

In the above mentioned Khanewal subdivision of the Punjab in Pakistan where tenants have some bargaining power in negotiating contracts due to specialised skills, most costs are shared in a 50:50 ratio which is also the prevalent rental share (21).

In other village schemes in India where irrigation had been newly introduced and a transition from share cropping to fixed rents was the rule — see point c) in scenario 1 — a large number of the tenants were migrants from neighbouring regions. Since these tenants were better off and hence had a more favourable bargaining position, they were able to negotiate longer-term leases: 'while the small tenants were faced with intense insecurity, the large tenants obtained leases (orally) for three to four years' (22).

## 4.3 Scenario 3: Equal Bargaining Position and Low Resource Endowments of Landlord and Tenant

Situations with highly differential bargaining power between landlord and tenant, e.g. when large landowners lease out small parcels of land to numerous tenants, are by no means the rule in share cropping. In Bangladesh e.g. where up to 50 % of all farmers are engaged in crop sharing arrangements most of the tenant farms are cultivated by "mixed tenants", i.e. those who own some land and hire in some more to increase their landholding (23). At the same time total holding sizes remain small (24).

Under such conditions, the introduction of irrigation with demands for more, timely and skilled labour inputs and the continuing risk aversion of both parties may increase needs for share cropping arrangements and hence make tenancy arrangements more secure for small cultivators.

## 5. Conclusions

The above considerations have intended to demonstrate that the introduction or the improvement or irrigation may result in substantial changes in the smallholders' "safety" position with respect to access to land. This may mean that the improvements brought about by decreasing (physical) uncertainties due to irrigation may be upset by increasing (institutional) uncertainties as to land tenure relationships.

If the interests of the small farmer are to be given protection in the context of irrigation schemes, then land tenure issues deserve considerable attention.

However, reality in this respect is hardly encouraging. In most irrigation schemes little is known about the situation and about probable trends in land tenure relationships. And this means that the goals of the smallholder as outlined above may be grossly neglected.

Trying to teach "ignorant" smallholders how to benefit from irrigation while at the same time neglecting their safety goals with respect to access to land may well be the cause of many a project failure in irrigation development in low income countries.

## Summary

The transition from rainfed to irrigated agriculture is often described as a transition from a high risk/low productivity system to a low risk/high productivity system (25).

However, for small and socio-economically weak farmers such a transition may well remain an illusion: a decrease in physical uncertainties due to assured water supplies may be upset by an increase in institutional uncertainties — e.g. in land tenure arrangements.

Since risk avoidance considerations rank highly in the hierarchy of goals of smallholders, such increased uncertainties may cause poor "acceptance" of irrigation schemes by the target group.

If the design of irrigation projects is to be improved in that respect, potential impacts of irrigation on land-tenure arrangements have to be considered.

This paper argues that relatively little is known about such potential impacts of irrigation. To illustrate the serious practical consequences for smallholders that can result from the introduction of irrigation, landlord-tenant relationships are discussed with particular emphasis on sharecropping arrangements. Empirical evidence is given for various changes that can result from the introduction of irrigation, depending on the particular situation.

## Zusammenfassung

Oberflächlich gesehen, läßt sich der Schritt vom Regenfeldbau zur Bewässerungslandwirtschaft wie folgt charakterisieren: er stellt eine Änderung des landwirtschaftlichen Betriebssystems dar, bei der eine mit hohen Risiken und niedriger Produktivität ver-

bundene Ausgangssituation in einen durch niedrige Risiken und hohe Produktivität gekennzeichneten Neuzustand überführt wird (25).

Für kleinbäuerliche Landbewirtschafter in Entwicklungsländern mag sich dieser Übergang allerdings gänzlich anders darstellen. Eine Abnahme „physischer“ Unsicherheiten in der Folge einer gesicherten Wasserversorgung ist für sie häufig mit einer Zunahme „institutioneller“ Unsicherheiten verbunden, z.B. im Hinblick auf die Verfügungs- oder Nutzungsrechte in bezug auf das zu bewässernde Land.

Dem steht gegenüber, daß Kleinbauern der Risikominimierung in der Regel hohe Priorität einräumen. Erhöhte Unsicherheiten in dem zuletzt genannten sensitiven Bereich sind deshalb nicht selten die Ursache für mangelnde Akzeptanz der Bewässerung durch kleinbäuerliche Zielgruppen.

Solche Betrachtungen unterstreichen die Bedeutung, die Überlegungen zu den potentiellen Auswirkungen der Bewässerung auf die Grundbesitzsicherheit bzw. die Sicherheit des Nutzungsrechts zukommt.

Demgegenüber muß davon ausgegangen werden, daß in der Praxis der Bewässerung relativ wenig Klarheit über derartige Auswirkungen besteht.

Der Artikel versucht an Beispielen aufzuzeigen, welche schwerwiegenden Folgen für den Kleinbauern mit der Einführung der Bewässerung verbunden sein können. Stellvertretend für die Vielzahl möglicher Konstellationen der Grundbesitzverfassung wird hierbei die landwirtschaftliche Pacht und die Beziehung zwischen Eigentümer und Pächter einer genauen Betrachtung unterzogen. In diesem Zusammenhang wird insbesondere auf die Bedingungen der Teilpacht eingegangen. Es wird ein Spektrum möglicher Auswirkungen der Bewässerung unter verschiedenartigen Situationsgegebenheiten aufgezeigt und mit Hinweisen auf empirische Untersuchungen belegt.

## Notes

- (1) In the Federal Republic of Germany, evidence of this trend was given by the 1982 Irrigation Symposium on "Men and Technology in Irrigated Agriculture", organised by the 'German Association for Water Resources and Improvement' (DVWK)
- (2) Officially stated in most irrigation appraisal reports; assumed by *Bottrall* (1981) with reference to World Bank irrigation policies
- (3) *Bromley* (1982), p. 37
- (4) *Ibid*, p. 37
- (5) *Berry* (1980), p. 331
- (6) Definition of *Dorner* (1971) cited in *v. Blanckenburg* (1979), p. 118
- (7) *Ruthenberg* (1980), p. 187
- (8) *Pearse* (1980), p. 6
- (9) *Bromley* (1982), p. 3
- (10) *Noronha and Lethem* (1983), p. 42
- (11) *Griffin* (1979), pp. 23/24
- (12) *Pearce* (1983), p. 65



- (13) *Bharadwaj and Das* (1975), p. 233
- (14) *Nabi* (1986), S. 435
- (15) *Pearse* (1980), S. 125
- (16) For empirical evidence see e.g. *Berry and Cline* (1979) and *Pearse* (1980)
- (17) *Pearce* (1983), p. 64
- (18) *Bharadwaj and Das* (1975), p. 235
- (19) *Ibid*, pp. 236, 237
- (20) *Ibid*, p. 235
- (21) *Nabi* (1986), p. 434
- (22) *Bharadwaj and Das* (1975), p. 237
- (23) *Hossain* (1977), p. 300; *Pearce* (1983), p. 45
- (24) In the rural household surveys in Bangladesh referred to by *Hossain* (1977) 60 % of the households owned areas smaller than 3.5 acres
- (25) see e.g. *Carruthers* (1983), S. 39

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