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WATER DISTRIBUTION, USE AND SOCIAL ORGANISATION: SOME IFS AND BUTS

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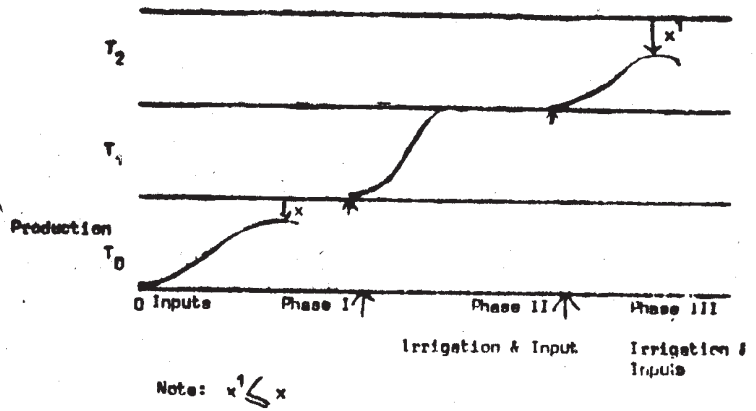
1.00 The purpose of this paper is to list certain possible relationships in water distribution and use at farmers' land vis-a-vis various aspects of social organisation that have remained relatively underresearched In this sense, the paper only lists certain hypotheses that could be tested by those actually engaged in the task. The hope is, admittance of these questions will take us closer to the reality which is portrayed very differently by the 'irrigation specialists.'

1 1 It is worthwhile to note hear that many questions listed have either emanated from my understanding of recent work by Robert Wade[1] and some others or are a sort of response to priliminary exposure I have had with irrigation scenario myself. The absuraities are included to provide definition range of problems.

2.0 Water Use

It is often believed that water intensifies the agricultural activities and so in any type of region (Arid, semiarid etc.) the water use behaviour will be typical of a 'rational farmer'. The rationality being defined in neo-classical terms as an inherent tendency on the part of farmer to improve his production function resonably Let us visualise three stages of an irrigation process at time T_0, T_1, T_2 at time T_0 the farmer has an average production function at time T_1 after introduction of water he improves his P.F. considerably. At time T_2, he extensifies rather than further intensifying i.e. he leases-in the land and operates with the same amount of water at a lower production function. Thus T_2 P.F. could be theoretically lesser than T_0 P.F. The aggregate productivity can go down in the long term or steblise at a level much below the potential.

1 Water Users' Association : Government Mistakes and Sociological Principles-Priliminary draft note by Dr. Robert Wade (1980) susseX.



Implications are that saturating water requirements for some (in the regions where water will always be scarce keeping the total area to be irrigated in view) in arid regions may have an adverse effect on overall productivity in the long term. Keeping water less than total requirement by design by incorporating more people in the command than saturation would permit might trigger conflicts but would also keep the P.F.-improving, hopefully.

2.1 Let us visualise this through another situation where we take three different segments of a canal, part one where water is abundant, Part II where water is scarce Part III where water has

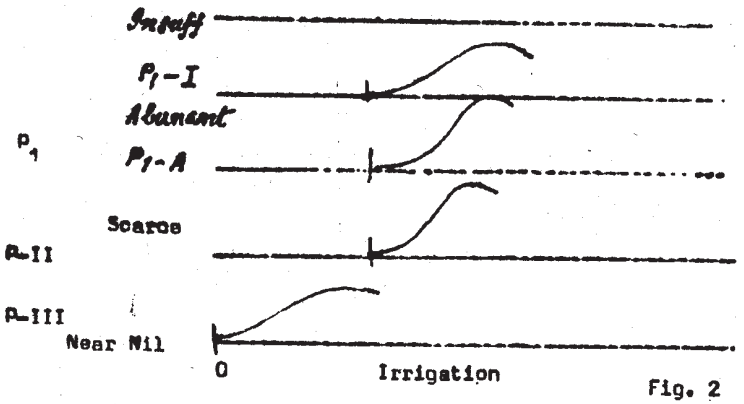


Fig. 2

not reached Within one, there are segment that have started operating at T_1 P.F. i.e. of extensification rather than intensification though changes in cropping pattern leasing etc. Is it possible to bring theory (i) of water distribution out of water-abundant alternatives by emperically establishing the validity of part I-A or in Figure 1, T_1 ?

2.2 Three other implications of questions raised above may be mentioned here :

One : The surplus at T_1 at the farmers' level have not been given much attention. In some pleces they finance mechanization and in other, extensification throughleasing of land, or even money lending, trading stocking etc.

Two : When leased in land happens to be of smaller farms who can't manage similar access to water compared to big farmer, the prospects of their participation in water related other activities can be imagined. The other socio-economic implication can't be avoided.

Three : The land-transfers consequent to activation of land market are found to be significantly higher in irrigated villages than partly irrigated or unirrigated village. Further the irrigated villages have both intra & inter village transfers while dry villages have only inter-village transfers with negligible intra-village transfer. Water thus speeds up the stratification[2] processess having distinct spatial implications. The extensification has to be looked at in above perspective also.

Thus when one is talking of irrigation policy, or water distribution one is simultaneously affecting intentionally (or may be unintentionally) other more basic structures of society than production patterns or canal conditions or conflicts over water distribution

2 The data on land transfers for 20 years has been analysed for 8 villages each in three different blocks of a same-arid district by us which have provided these insights.

etc. which are only the apparent effects of underlying basic contradictions.

2.3 One of the serious most problem faced in regulating water use at farmers' level has been the incapacity of irrigation organization to deal with the problem of cropping pattern at farm level. Several variants of this situation have evolved over the years.

At places, the organizations insist on cultivation of cash crops like sugar acne *atleast* in some areas at other they advise *only* a limited area and no more, in still others they advise that farmers should take only one or two paddy crop and not three and so on.

One common observation is that after allowing, encouraging or sustaining a water intensive cropping pattern in a region, it is not easy to get it changed towards less water intensive one so that water could be taken to longer distances. Two interesting innovative efforts can be mentioned although related to lift irrigation and not directly canal.

One : Salunke's experiment in Nayagaon[3]. Here the farmers were prohibited from growing sugar cane probably anticipating the type of problems that usually follow on uniform acerage under irrigation.

Two : In Ahmednagar, Social centre[4] organised lift irrigation societies around water from tank, well, a river and even *irrigation canals.*

It was insisted that maximum of one acre sugar cane should be grown by the members in some cases in other the hours of water per head were restricted taking into account command and the supply. In both the cases the area under sugar cane could not be

3 My information about this project is restricted to the exposure to a draft note developed by Dr. Chambers recently and some discussions with people in Ahmednagar district.

4 It is a Swiss aided voluntory organization working in Ahmednagar for rural uplift.

checked and controlled. In societies around abundant water supply (from a society's point of view only, the offtake in upstream may reduce total supply in canal and thus affecting other lift irrigation societies towards the tail end) the whole issue of use was left totally to farmer only, charges were regulated but in comparatively scarce water societies, conflicts wereappearing in. Those who could not grow cane because of capital constraints and so had requested for less water originally were finding that even that quantity could not be met with certainty.

In Andhar Pradesh, a few years ago an order restricting three crops of paddy in some parts of canal irrigated regions had to be withdrawn by the government in view of agitation by the affected but privileged farmers.

2.4 One of the most important implications of the foregoing discussion regarding water use policy in arid and semi-arid regions is as follows ;

Whether to ensure sufficient water supply to farmer should be the policy objective or the aim should be to provide say atleast one or two life-saving irrigations to as many farmers as possible though coupling of canal with lift or sprinkler irrigation system[5]. The gains in overall production, effect on social stratification and the impact on general development of the regions which otherwise would never receive water through gravity flow, may be tremendous. The choices are fairly sharp but so far the policy has not been quite un-equivocal.

3.00 *Water Supply & Possibilities of Social Organization for Water Distribution etc.*

Before we go into the specific questions, may be worthwhile to explain, what these terms 'water supply' and 'social organizations' are intended to mean here.

5 Mencher in a discussion on rural class structure in Tamil Nadu (Chingelpet) had raised some doubts about the efficacy of irrigation policy in drought prone regions (EPW-1973) but that was mentioned in only a passing reference.

Water supply relates to the overall availability of water at various points of a canal, say Head, middle or tail. Unless otherwise specified it doesn't mean the water supply at various times or for different crops.

The social organisations imply any formal or informal group where issues of common interest are discussed, resolved or contested. Putting it otherwise, an association of people around one or more functions which may be political, economic or social or all combined becomes a social organization if it is structured in some form of social network or exchange relations.

The water users association (WUA) are one such type of formal organization whose irrelevance has been discussed at length by Wade (1980-op cit). However the association may be formed or not, what is indisputable is that some form of community reponse is inevitable under certain condition of a resource distribution, particularly if it concerns communal sharing of scarce resources.

What these conditions are and how could one relate them with various other variables are presented through certain simple bivariate relationship. Obviously the complexity of water distribution cannot be subsetted in so simple terms yet to have clear understanding of the issues involved, these questions might throw some light.

3 1 *Water supply–Extent of Organization*

Whether social organization or say cooperation is highest where the water is abundant or is it otherwise? The possibilities are many such as, (i) lesser the water, greater should be the need to evolve some method or machinery to rationally allocate it, (ii) alternatively, lesser water leading to lesser number of affected people may imply indifference. Thus those who are powerful manage their share and rest take it in a matter-of-fact way.

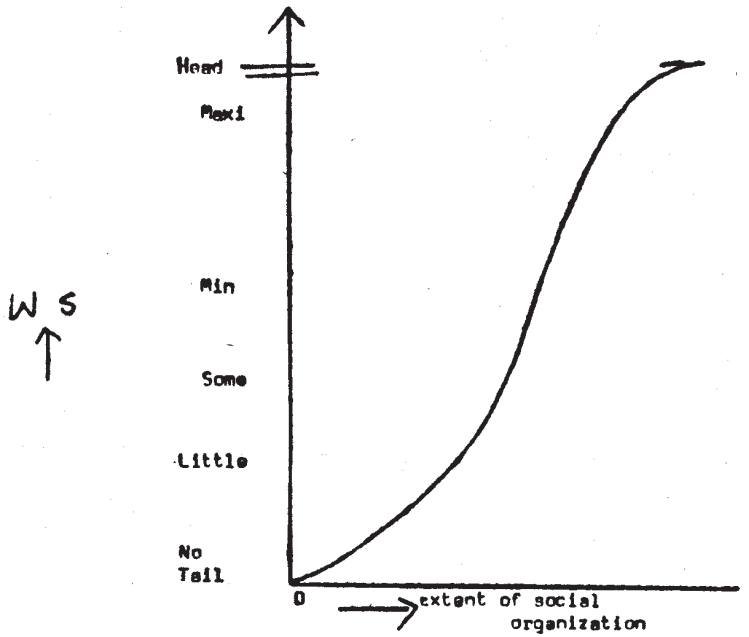


Figure 3

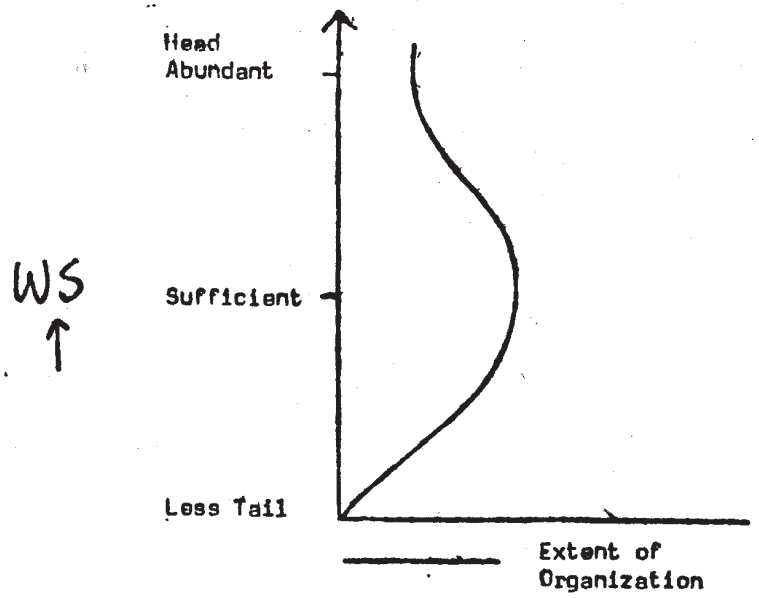


Figure 4

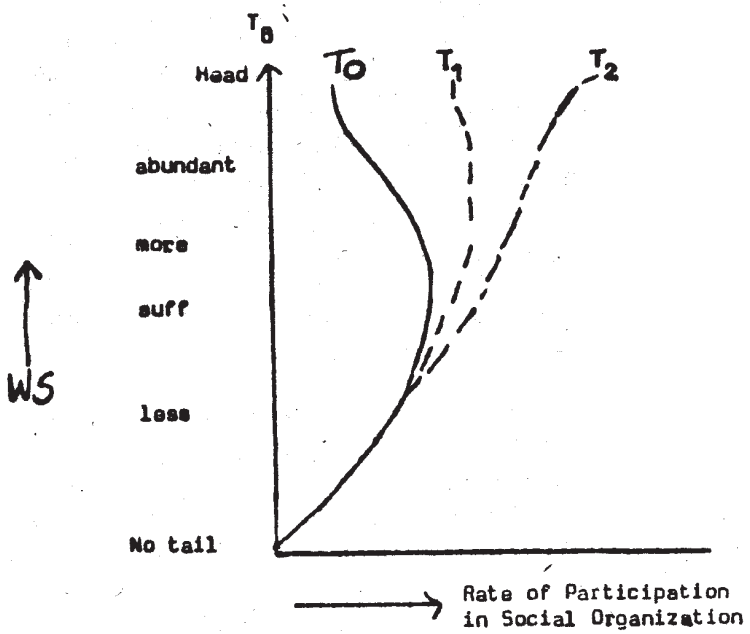


Figure 5

In Figure 5 the possibility is raised, whether social organizations are maximum in the regions where water is *just sufficient* and they are less both when water supply is more or less.

In Figure 5, the question is, whether with increase in the water supply, participation rates in less water supply regions approximates that of high water supply regions (Fig. 3). The idea being that initially those who get more water participate less but when distribution approaches the head pattern, participation compulsively follows.

Is it true that those whose majority of lands are in the command area participate more in social organizations than say the rest. 'The issues also need probing because if a household makes a decision rather than an individual the resource allocation on land in command (LC) and the rest (Total Land (TL) would be vitally affected by ratio = LC/TL. From some of the work Dr. Wade did in a semi

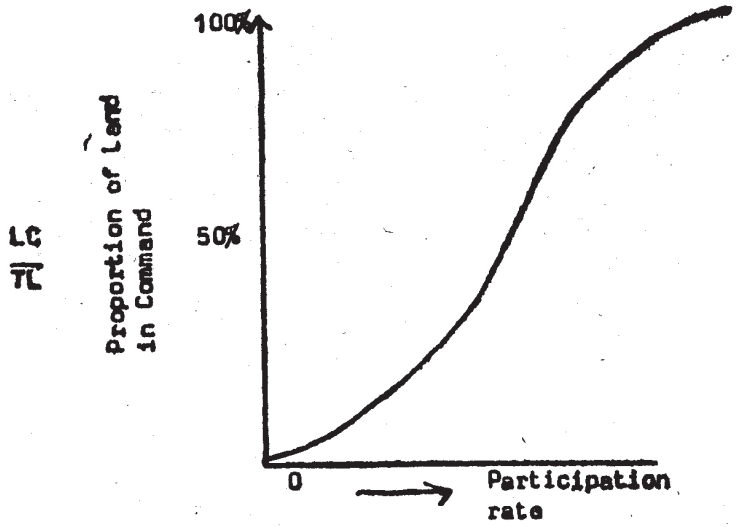


Figure 6

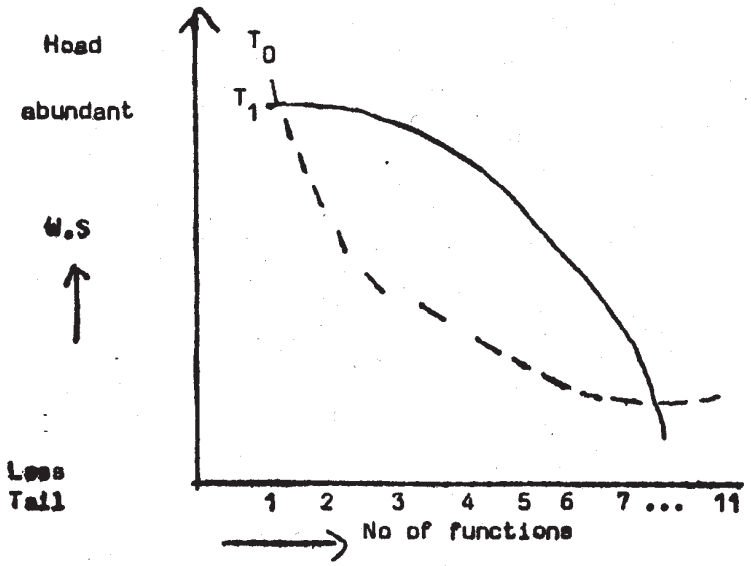


Figure 7: Lesser the Water, more the functions

arid district, I got the imperssion that informal social organizations are multipurpose with lesser supply of water. It was also hinted that social organization were strongest in lesser water region. In abundant water supply region, probably people did not need mutli-functional organizations or could manage each function through separate uni-functional organization. The rate at which functions are deleted or added may change over period of time (Fig. 7).

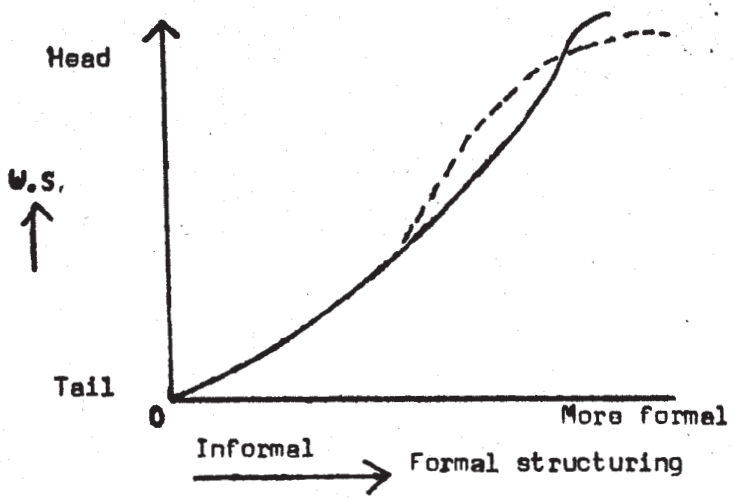


Figure 8

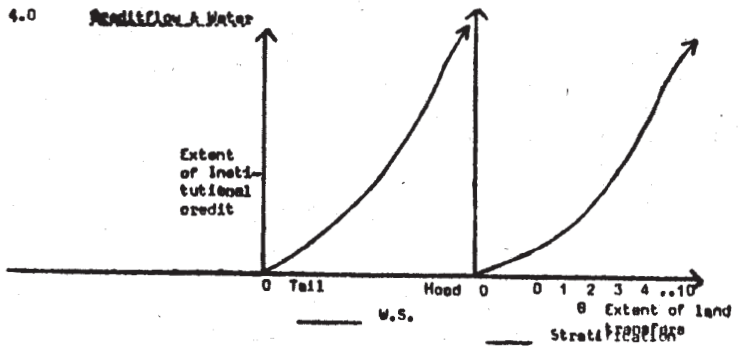


Fig. 9 Credit Flows with Water

Is it true formal elections etc. appear to be more prominent in Head-water organization rather than less water organization. Probably in Head regions, the comparative distribution of power being less skewed than in the tail end regions, the formal structuring is high.

From the emperical analysis of 100% credit accounts for all the villages of a district it appeared that water played a very important role in flow of institutional credit.

The relationship becomes more important when one viewed land-transfer along with credit flow. In Figure 9-A, B the seriousness of the issue can be appreciated. It is quite likely that credit flow might be strengthening the process of land transfer by improving the liquidity of say Rabi growers getting two or three crops at a time when Kharif grower taking only one crop needed capital and were most hard pressed.[6]

4.1 The integrationists should also become conscious of the access differential, the way it would operate if credit and water were linked up. By loosing access to one, the farmers will formally loose access to the others too.

4.2 The flow of various social amenities under food for work etc also seemed to parallel the pattern mentioned above. An emperical investigation brought this correspondence in sharp focus.

The implication is that water-distribution need not be viewed as a problem relating to canals, sluices or distribution only. There are several other resources which get coupled with water flow which make it difficult to accept the view that 'what ever exploitation relation the rich may be involved in (as land owners, moneylender, traders), their power of exploitation is going to be less enhanced by dominance of a WUA, given the common property' nature of water, than in the case of their dominance of organizations dealing in the supply of other inputs (and outputs)" -Wade 1980 op cit.

6 I am grateful to Dr. Chambers for his observation on this point.

This has been noted differently by Harvey et al, "In case of irrigation technological packages are chain like, with access effectively determined by the least accessible link[7].

5.0 The question of participation by people in various communal organization around one or more functions has been discussed by me with the help of two matrices in a recent paper.[8]

One : Land Animal Relations

In arid regions, often the discussion is pursued on the traditional lines taking land as the basic determinant of social structure. But the central concern in such region is livestock and not land so much. Even when irrigation projects are designed, the fodder cultivation or cultivation of marginal lands hitherto left as pastures are usually ignored in arid region. Thus the participation of people in social organization could also be studied from following angle.

Figure 10

	More land	*Less land*	*No land*
More animal	MA ML	MA LL	MA NL
Less Animal	LA ML	LA LL	LA NL
No animal	NA ML	NA LL	NA NL

Farmers in different sub-sets will have varying motivations while deciding cropping pattern or other form of investments. Disturbing the economic advantages that farmers may have traditionally enjoyed creates social tensions of various types amongst formers in different sub-sets.

7 Charles Harvey, Jake Jacobs, Geof Flambs & B. Schaffer. Rural Employments and Administration in the Third World. ILO & Saxon House, 1978, 111p.

8 Anil K. Gupta — "Farmers responce to Cooperative Project Impiimentation" paper presented in a recent conference organised by IUAES at Amsterdam on 'Traditional Cooperation & Modern Cooperative Enterprises and Social Organization (1981).

For example I learned through the discussion with Dr. R. Wade recently that along a canal route, the villages in the upstream had either no social arrangements for regulating penning rights for migrating sheep flocks or they were very weak. Where as in tail-end villages such organization were quite strong. Also the social organization in the upstream were unifunctional i.e. only for water while in tail-end villages they performed many other functions. Probably because of intensification of cultivation in upstream villages, there was less land available for grazing or pastures and so lesser interest evinced in the organizing for grazing or penning rights. The excessive use of chemical fertilizers might also have created disincentives for sheep penning.

In latter villages, both the pastures were probably more or atleast current fallows were more and also the farmer's interest in penning was high because of the ecological reasons (the enteprise mix might have had psimacy of livestock over crop because of water shortages.)

Two : Another way in which participation can be canceptualised is using Mean-variance matrix :

	High Mean	*Low Mean Income*
High variance	HM HV	LM HV
Low variance	HM LV	LM LV

Figure 11

The technological option for various ecologies influence considerably the incentives or disincentives for participation of people in various economic projects. HMHV signify the Hybrid Cotton, Hybrid Bajra, cross bred cattle etc. while low mean low variance signify local wheat, local bajra etc. The irrigation distribution influences these choices considerably and in turn the participation of various section of society in various organization for irrigation distribution are influenced.

Alternatively one can use this matrix in terms of water supply also *Those farmers having their own tubewell* (there are many of such type) besides their *entitlement to canal supply* can better deal with uncertainty in water supply than the rest. Thus their capacity to deal with high variance high mean & low mean supply of water is considerable. Their interest in maintaining organization for upkeep of canal may also be there if they lie towards the tail end. Recharging of their well is added interest they have. Somehow this issue has not received due attention so far.

6.00 In last some other issues like tenancy, labour mobility and credit product market interpenetration may be briefly mentioned.

The studies on irrigation & water distribution have assumed some very strange cause-effect relationships between water supply and its use at various lands. Some issues which appear important in this regard are being mentioned briefly here :

6.1 Traditionally the land labour contract were formalized through kind, cash or both types of exchange. Only recently one is witnessing three party contracts—one who gives land, second giving water & third labour.

The relevant point is that access to water influences strategically the contractual involvement of land & labour contributors. This is particularly true when one digs a well in the command of a canal and uses that to augment one's resources. The share of the water giver often is disproportionately higher than that of land & labour giver comparing their costs in the total output. As mentioned earlier the water distribution policies should take such implications also in view.

6.2 Another anamoly observed in this regard is the case of a farmer whose turn comes first in the minor distributory irrigating his lands in command. He also takes water through pipes or field channel to the land which may be far off (probably illegitimately)

The turn of the farmer whose lands lie next comes only later.

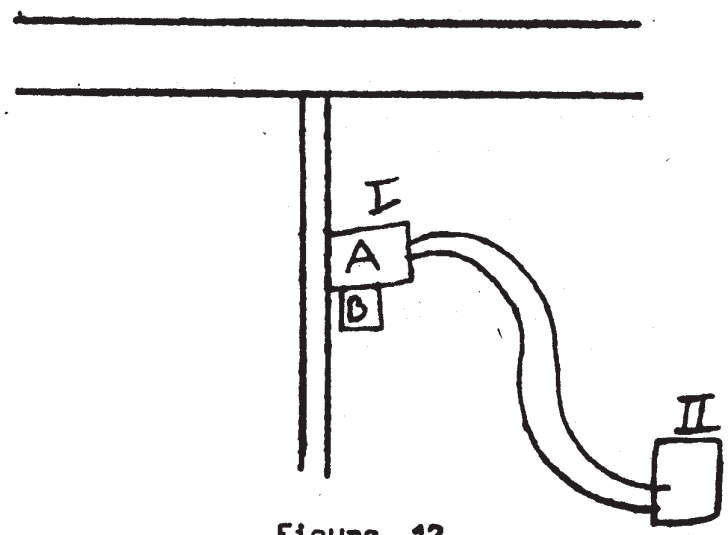


Figure 12

Example in figure farmer A irrigates his lands I and II and then the turn of B comes. Sometimes B gets water only if he agrees to lease out some of his land to A.

Labour Mobility

There have been some studies of irrigation effects in dry villages either as compared to traditionally irrigated villages, or as an impact of irrigation. However there have not been many efforts to look at the continuam of dry-partly fully irrigated village in a region. One such effort was made by me in Kurnool district.[9]

The idea was to relata the labour markets in *neighbourhood-economy* in canal irrigated regions. Irrigation managers often focus

[9] Anil K.Gupta 1980 "Issues in Rural Labour Mobility–or why Poor Can't Organize–the Dependency Web" Paper included in symposium on "Movements of Consciousness" organized by S. F. A. A. at Edinburg, April 16, 1981 & smaller version in I. F. D. A., Doesier, Switzerland.

their attention uptil the last point of the canal and no more, All along the canal one notes there are simultaneously several social changes taking place in partly irrigated or dry *neighbourhood-economies* that can't be ignored any more.

6.4 The question of factor and product market penetration affecting the resource allocative ability and efficiency at farmer household level is linked with access to irrigation directly. The conceptual basis of the credit-product Labour market penetration was discussed by me in another paper where the basic farmework[10] was presented. That can be further developed to relate with irrigation projects in arid region.

The issue becomes all the more important when one notes that irrigation projects without land reforms in arid region increase extraordinarily the productivity levels & income differentiation amongst various size holdings. It has been seen that land holding distribution is much more uneven in arid, semi arid regions compared to traditionally irrigated villages. However when irrigation infrastructure is super-imposed on this structure, the possible implications can be imagined.

A related question in this regard is the migration of people from coastal and prosperous region into the newly opened regions where water is yet to come. These better endowed farmers sometime dispose off an acre or two in their native regions & buy or lease in large stretches of completely dry lands for a paltry sum. Through their links with bureaucracy, these farmers not only gain information in advance but at times are officially encouraged to settle on newly improved & irrigated lands. The developmental strategy through strengthening the existing entrepreneurical skills has vital bearing on the management philosophy of irrigation projects. The not-so enterprising people also disadvantaged in term of access to water credit and other markets may gradually be (like tribals) pushed back into the dry & drier regions.

10 Anil K Gupta "A Note on Internal Resource Management by Small Farmers in Arid Region-Agricultural System (UK) Vol. 6, 1981, pp 154-157.

7.00 Summing up :

Even at the cost of digression I have included some points which may not appear directly relevant to the water distribution at outlet level. One of the point that this paper intends to make is that the micro issues at outlet level are not independent of the macro policy of canal & overall irrigation management. The social organization at outlet level may probably be better understood in the context of certain questions raised here. I may mention here that the discussion presented here may have greater relevance for new irrigation projects in arid and semi arid regions rather than for the older ones.

P. S.

Lastly, just one question. How much do we really know already about these apparently simple relationships from the farmers' point of view ?

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ACKNOWLEDGEMENT

I am grateful to Dr. Robert Wade for sharing with me many of his insights in irrigation system that I find always very stimulating. I have profited from the disussion with Professor V. N. Asopa may colleague at CMA on some of the issues mentioned. The draft note of Dr. Chambers and many other papers (& comments etc) have been used with the stipulation that responsibility of any (mis) interpretation is mine only. I will appreciate ruthless comments from the reader on this very prilimiñary rough first draft.

This institutional support from CMA IIM, Ahmedabad is gratefully acknowledged, however the responsibility of the views is my personal.

July 1981 Anil K. Gupta