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II

Night Soil as an Economic Resource

11.1 LABOUR AND ORGANIC RESOURCES IN THE INDIAN SUB-CONTINENT

*John Briscoe*¹

Utilizing human excreta

Human excreta are seldom conserved in the Indian sub-continent, but cow dung (*gobar*), crop residues, vegetable wastes, and water weeds are used for various purposes in the frugal village economies—for cooking food, fertilizing crops, feeding animals, and constructing buildings. Recognizing that traditional practices were often wasteful, scientists long ago devised methods for the efficient production of fertilizer and methane gas from these materials. By contrast, conventional economic planning has considered these issues to be unimportant, though the so-called 'energy crisis' is forcing some revision of this attitude.

Change is also taking place in the health ministries of poor countries. After decades of frustration with the disinterested response of villagers to latrine programmes, health planners are hoping that people who are given the means for producing fuel and fertilizer from their excreta may change their defecation habits.

The use of human excreta cannot be considered in isolation from the use of other organic materials. Human excreta will usually be digested with these materials, first because the quantity of excrement from one person is small and consequently the products are, on a per capita basis, small—and second, because human excreta is rich in nitrogen and can be mixed with carbon-rich matter to obtain carbon-to-nitrogen ratio suitable for efficient digestion.

So we know that resources are being used inefficiently, and that the technologies for improving these efficiencies are available; the problem is one of implementation. Some of the relevant technologies, particularly composting and the production of biogas, have attracted much interest as 'appropriate technologies', and in India, biogas is given official support with soft loans and subsidies for those investing in the equipment. But it is the farmers with most land, not the poor, who are benefiting, and there are many signs that the thrust for appropriate technology is coming from the top, and only helping those near the top. It is an imposed technology² when seen from the villager's viewpoint, and it is not always appropriate to the social and economic arrangements of the rural poor.

When I first went to India, I thought that appropriate technology was something new and very bright. I was brought down to earth in talking to Indians who had been around at the time of Gandhi and who had been thinking about the need for technology to be appropriate in the same terms thirty years ago.³ In speaking with them about why they had failed, I found that there had been nothing wrong with their ideas, which often had high-level support in the government. The problem was that nothing was ever done to change the institutional arrangements that blocked the progress of these technologies. I think that the lesson we can draw from Vietnam and China is that, in these two countries, appropriate technologies are applied in parallel with the institutional changes that could make them work. To ignore these factors is to risk joining the 'stampede to quick solutions', oblivious of the reaction of local people to new, apparently beneficial opportunities.

In fact, what we shall find is that the 'appropriate technology' of biogas production from waste is only appropriate to those farmers who have broken out of the traditional economy into the market economy. When looked at in that context, it emerges that biogas production and other improved waste recycling schemes may even act to impoverish the rural poor—the very people who the advocates of appropriate technology would most like to help.

One reason why these facts are not recognized is that our thinking is often influenced by the neo-classical economists' way of comparing different technologies, for example, in cost-benefit analysis. But the economists' approach is only appropriate to the market economy; it is not very useful for dealing with non-commercial resources⁵ such as wastes, especially within the traditional economy.⁶ Indeed, to understand the traditional economy, we need a different approach—and the key to that is to understand the way labour is organized. In this context, labour organization is 'only another word for the forms of life of the common people'⁷.

This means that we need to understand certain social relationships in the community, and how they have developed historically, if we are to understand how that community uses the available resources.

'Customary' payment and resource use systems

The agricultural system which is referred to as 'customary' or 'traditional' in the Indian sub-continent is of relatively recent origin. Starting with the permanent settlement of Bengal in 1793, the British promulgated a series of radical land tenure ordinances. These succeeded in dissolving the ancient ties and usages of the villages. 'assessing and parceling out the lands which from time immemorial had belonged to the Village Community collectively'⁸.

Under the system that was created by these measures, social equilibrium depended on the surplus produce of peasant farmers being transferred to powerful local 'patrons'⁹ in return for some minimal security.¹⁰ The revolutionary effect of the changes of land tenure was that now, 'patron-client relationships stemmed directly out of the possession of differential rights in land'¹¹. All those working for

a landowner, whether as tenants or servants, or as 'independent' artisans, tended to become his clients.

What are the benefits to patrons and clients of these relationships, which are still the norm in many parts of the sub-continent?

For the landowning patrons as a class this system provides a means for extracting the surplus value of labour while simultaneously ensuring social equilibrium. For individual landowners, too, there are benefits. Bigger landowners lease out land to tenants and sharecroppers in part to reduce their management problems and in part to assure a supply of labour during planting and harvesting when manpower shortages are common¹².

Poor villagers foster ties with powerful patrons as a way of reducing risk and improving stability. An ideal patron not only provides his clients with work and income, which is customarily paid in kind at the time of harvest, but also helps them in every way he can. 'He intercedes on the client's behalf with officials of local self-government bodies or co-operative societies, to secure for him a benefit or contract, introduces him to a lawyer or doctor, advances him a loan to meet an emergency, and tries to influence decisions in his favour in disputes.'¹³ He also looks after 'the welfare of the client's children, particularly in the way of education and employment'¹⁴. A well-off person courts unpopularity if he does not maintain his side in these relationships, or if he neglects to sponsor village events and carry out community work.

Peasants have few options for meeting their needs for fuel, fertilizer, fodder and construction materials and their economies are consequently frugal in their use of organic materials.¹⁵ The per capita availability of many of these resources is declining rapidly over large areas of the Third World.¹⁶ In rural Bangladesh, the scarcity is manifest. Fuel collection has become a major task for women and children¹⁷; the number of *bichas* (village trials) arising from disputes over the ownership of trees, crops residues, and other fuel sources is large and increasing.¹⁸

The distribution of these scarce resources is governed by those mechanisms which control the distribution of food and other valuable commodities. A traditional landowner in Comilla District, for instance, may neither compost all of the available rice straw nor burn the straw on the field, where the ash is valued as fertilizer, but is expected to allow clients to clear a prescribed area of the harvest paddy field. Similar privileges may be extended for the collection of *gobar* from the cows of the rich. So a programme for the utilization of human excreta with the dung from a farmer's cows and the straw from his fields may not be attractive to the farmer, since the benefits may be insufficient to warrant the risk of damaging his customary relationships.

An awareness of these distributive mechanisms allows one to appreciate that when villagers are unenthusiastic about an innovation which urban or foreign 'experts' have thought up, 'it is because the latter are insensitive to the full implications of the innovation at the village level'¹⁹. The villagers live in complex, multistranded relationships with each other and with landowners²⁰. To use straw or dung in a new way may threaten some part of that relationship. To use night

soil, however, would not affect the relationship; the rich might object to it on grounds of ritual purity, but the poor would probably welcome it²¹. Innovation seems to work best when it involves something entirely new, and does not involve any attempt, 'to change the traditional methods and techniques of production'²². Thus there may be fewer barriers to introducing the use of human excreta than to altering the customary uses of rice straw and *gobar*.

Current changes in the resource use system

With the adoption of high-yielding crop varieties and mechanization of agriculture, the 'traditional' system has begun to disintegrate. In Purnea District of Bihar, as land values rose five-fold²³, payments in kind, sharecropping and the employment of permanent labourers gave way to money wages, owner cultivation and the hiring of daily labourers²⁴.

These processes are also under way in areas where there have not been dramatic increases in productivity, which is the situation in Bangladesh²⁵. There, the decline of the traditional system and the rise of the market economy has led to a dramatic polarization in rural society. In the decade since 1966, about 15 per cent of households have increased their incomes, while the percentage of landless to total households has increased from 18 to 38 per cent²⁶. Real agricultural wages have declined by nearly half, and nutritional standards have fallen drastically.

The causes of these changes

The customary system provided a channel through which rich and poor could reach their respective goals of power and security. A change now in the opportunities of patron and client alters the relative bargaining position of the two parties and consequently tilts the balance in the customary relationship: the terms of the relationship may change, or the ties may even be dissolved. In Bangladesh, several factors have contributed to the tilting of this balance against the poor, including:

- (a) the impact of high-yielding crops,
- (b) increased income from non-agricultural sources,
- (c) decline in the availability of slack resources such as unused land, common pasture, and free fuel,
- (d) changes in labour supply and demand.

It is probably the last of these which has had the biggest effect on Bangladesh.

With regard to high-yielding crops, if everyone has equal access to the new technology, modern agriculture offers the possibility of improving the lot of all. Since the demand for labour increases with the adoption of high-yielding crop varieties, even the landless could be better off. The hitch is, of course, that even in the better co-operatives in Bangladesh, the rich have access to new inputs which are denied to most of the small landowners and the landless²⁷. Differential access to resources increases the squeeze on those who do not have access to the new technology—people are forced to sell land, sharecroppers' rents rise, and cultivators are evicted as landowners realize that it has become more profitable to work the

land themselves.²⁸ Market mechanisms are strengthened and traditional relationships decline.

In parts of Bihar, this process is associated with the introduction of new seeds and fertilizers, but in Bangladesh, where these innovations have played a much smaller part²⁹, similar changes are occurring for other reasons. One factor has been a low rate of growth in agricultural production³⁰. At the same time, employment outside agriculture has barely increased, so in fact, the share of agriculture in total employment increased to over 80 per cent³¹ in 1965. The result was that by the late 1960s, many more people in the agricultural sector were producing only slightly more than at the beginning of the decade. Real agricultural wages inevitably fell. And the widening gap between the supply of labour and a decreasing demand is probably the primary factor in changing the system of labour organization in agriculture.

In the 1970s, Bangladesh exhibits characteristics common to all societies which have been subsumed into the cultural system of the market economy—labour is sold, land is rented, and capital is freely invested³². In disposing of a man's labour power, 'the system is disposing of the physical, psychological and moral entity "man" attached to that tag', and it is clear that, 'robbed of the protective covering of cultural institutions, human beings are perishing'³³.

The consequences for the use of organic resources

There is little reliable data on the use of non-commercial resources, so it is difficult to assess how the rise of the market economy has affected this. But there are some indications. Thus some mention was made above of a village in the Comilla District where traditional landowners provided their clients with straw. In the same village, farmers who have acquired land through recent purchases, who farm their own land, and who pay money wages, burn the crop residues which they cannot use themselves. The disintegration of the traditional distribution system is endangering the stable combination of resources which had previously underwritten a minimal livelihood.

In India, 40 000 'gobar gas' plants have been installed under a government programme. The programme has been most successful where new seeds are widely used, particularly in 'progressive' areas of Gujarat and Haryana. Of their own accord, over 30 per cent of the biogas plant owners in Haryana have attached latrines to the digesters³⁴, suggesting that when customary norms have broken down, proscriptions against the use of human excreta may no longer be stringent.

Two surveys of gas-plant owners in Gujarat have been conducted. One showed that the individual families who own gas plants had, on average, 26 acres of land and 10 cattle. According to the other survey, most of the owners had an annual income of more than \$1100 and a large number had an annual income over \$2800 and their primary occupation was agriculture. They were literate and nearly 40 per cent of them had subsidiary occupations such as business, or service.³⁵ *The advantages of using biogas within this rather successful group have been at the expense of the poor, for whom the gobar excreted by the cattle of the rich was previously available as a basic fuel.

* None of the non plant-owners of equivalent social status had any such subsidiary occupation.

The findings of the differential adoption rate among big farmers, depending on whether they had subsidiary occupations, accords with the theory presented in this paper. Those whose traditional ties have been severed are able to mobilize their resources for their own purposes more easily than those whose relationships have a stronger traditional component.

Traditional ties are breaking down rapidly in many areas, with the result that the use of local resources is often 'rationalized' in a limited and capitalistic sense. Adoption of improved technologies for the use of these resources is hastening the deterioration of the resource base of the poor. The use of human excreta might shore up this base, but the Indian experience shows that unless programmes are explicitly tailored for the poor, they are likely to exacerbate an already inequitable distribution of resources.

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THE ORGANISATION OF LABOUR AND THE USE OF HUMAN AND OTHER ORGANIC RESOURCES IN RURAL AREAS OF THE INDIAN SUBCONTINENT

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SECTION I: Introduction

Why are we interested in utilizing human excreta?

Human excreta is seldom conserved in the Indian sub-continent, but cow-dung (gobar), crop residues, vegetable wastes and water weeds are used for various purposes -- for cooking food, fertilizing crops, feeding animals and constructing buildings -- in the frugal village economies. Many years ago scientists, recognizing that traditional practices were often wasteful, devised methods for the efficient production of fertilizer and methane from these materials. Conventional economic planning has considered these issues to be unimportant. With the recent emphasis on small-scale, decentralized production processes; with the search for alternatives to petroleum-based fertilizer and energy sources; with recognition of the self-defeating consequences of programmes which ignore ecological principles, the conventional wisdom on economic development is being re-evaluated and planners have become interested in the efficient and equitable utilization of organic resources.

This interest is reinforced by changes taking place in the health ministries of poor countries. After decades of frustration with the disinterested response of villagers to latrine programmes, health planners are hoping that people who are given the means for producing fuel and fertilizer from their excreta may change their defecation habits.

The use of human excreta can not be considered in isolation from the use of other organic materials. Human excreta will usually be digested with these materials, first because the quantity of excrement from one person is small and consequently the products are, on a per capita basis, small -- the faecal matter of an Indian villager, for instance, can generate about 15% to 20% of the methane required to cook that person's food -- and second because human excreta is rich in nitrogen and can be mixed with carbon-rich matter to obtain a carbon-to-nitrogen ratio suitable for efficient digestion. On the output side, too, the non-commercial fertilizer and energy systems must be understood since the products of the digestion process are alternative sources for meeting demands presently met by the use of organic materials.

Why is this paper written?

We know that resources are being used inefficiently and that the technologies for improving these efficiencies are available. It is implementation which appears to be the order of the day, not a barrage of words to obfuscate a clear issue. What, then, is the purpose of this paper?

This paper starts with the assumption that a society evolves resource use patterns which meet the particular requirements of that society. By disregarding the social, cultural and economic factors which shape existing practices; by joining "the stampede to quick solutions"¹, we will be incapable of understanding the reaction of the indigenous population to new, apparently-beneficial opportunities. Where the "improved" resource use programmes are not accepted, "the myths of the innate perversity of traditional culture and its consequent impregnability to modernizing stimuli" will be reinforced; where existing practices are changed the programmes are likely to be

like so many efforts at rural development in India -- the cooperatives, agricultural extension, irrigation schemes, the rural health system -- (which have been) designed to help the poor (but have) ended up providing subsidized services to the rich³.

The remainder of this paper is organised as follows: Section II outlines the usual economic approach to the analysis of resource programmes, some limitations of this approach in the present context, and the principal assumptions underlying the method which will be followed in this paper. Section III describes the historical development of "customary" systems of labour organisation in Indian agriculture and the characteristics of social relationships and resource distribution mechanisms in these systems. Some consequences for the design of programme which use organic resources are discussed. Section IV presents evidence on the ways in which these ostensibly stable systems of labour organization have changed and are changing in the Indian sub-continent in general and in Bangladesh in particular. The causes of these changes and the effects on the use of organic materials are examined and the implications for the planning of human excreta and other organic resource use programmes are considered.

SECTION II: Approaches to Planning Programmes for Improving the Utilization of Organic Materials

The neo-classical economist's standard tool for comparing investment alternatives is "cost-benefit analysis". This method proves to be difficult to apply to programmes for the use of these non-commercial resources⁴ since little is known of either the availability and cost of the materials used or the demand for and value of the fuel and fertilizer which are generated. These difficulties signal a serious problem with this method -- the cost-benefit technique was developed for the analysis of problems in economies distinguished by "the specific

separation...of the soil, human effort and the artifacts of production" ⁵ and may not be able to accommodate the complexity of the processes of production and exchange in "customary" societies. A more serious limitation of the neo-classical approach stems from the divorce of social and political factors, on the one hand, from economic factors on the other.

The essential function of society is the organisation of the production and distribution of goods and services. The key to understanding a society is thus a grasp of the existing form of labour organisation -- which is "only another world for the forms of life of the common people" ⁶ -- and the historical processes giving rise to this particular form of organisation. With this grasp we can make sense out of the edifice of social relationships in a community. Since resource use pattern can only be understood with reference to a system of social relationships, we can thus reveal the basic factors which account for the particular ways in which people exchange and use gobar and rice straw, water hyacinth and night soil. This explanation does not draw on abstract categories such as the retention of tradition or the advent of modernity, but is made with reference to the historical experience and mode of production of a community.

SECTION III: "Customary" Payment and Resource Use Systems.

The agricultural system which is referred to as "customary" or "traditional" in the Indian sub-continent is of relatively recent origin. Even in the late eighteenth century the economy was typically "Asiatic", consisting of the remains of primitive communism in the villages below, and a despotic central government in charge of irrigation and public works above. Starting with the Permanent Settlement of Bengal in 1793, the British promulgated a series of radical land tenure ordinances. These succeeded, in the words of the Madras Board of Revenue of 1818, in

dissolving the ancient ties, the ancient usages which united the republic of each Hindu village, and by a kind of agrarian law newly assessing and parceling out the lands which from time immemorial had belonged to the Village Community collectively ⁸.

Under both the old and new systems social equilibrium depended on a balance of transfers of peasant surpluses to the rulers and the provision of a minimal security for the cultivators ⁹. In South Asia as in other parts of the world this balance had historically been effected through communal organisations and through vertical relationships between powerful patrons and peasants ¹⁰. The revolutionary effect of the changes in land tenure was that, now,

patron client relationships stemmed directly out of the possession of differential rights in land. All those who worked for a landowner, tenants, servants and labourers on the one hand, and members of the artisan and servicing castes on the other, tended to become his clients ¹¹.

What are the benefits to patrons and clients in these relationships which are still the norm in many parts of the sub-continent?

For the landowning patrons as a class this system provides a means for extracting the surplus value of labour while simultaneously ensuring social equilibrium. For individual landowners, too, there are benefits. Bigger landowners lease out land to tenants and sharecroppers in part to reduce their management problems and in part to assure a supply of labour during planting and harvesting when manpower shortages are common ¹². A client is also a loyal follower in village affairs, adding to the patron's power in the "endemic

factionalism" ¹³ of rural India, and is a helper on ritual occasions and times of crisis.

Poor villagers foster ties with powerful patrons as a way of reducing risk and improving stability ¹⁴. An ideal patron not only provides his clients with work and income, which is customarily paid in kind at the time of the harvest, but also helps them in every way he can.

He intercedes on the client's behalf with officials or local self-government bodies or co-operative societies, to secure for him a benefit or contract, introduces him to a lawyer or doctor, advances him a loan to meet an emergency, and tries to influence decisions in his favour in disputes in which he is involved ¹⁵. (He also) looks after the welfare of the client's children, particularly in the way of education and employment ¹⁶.

As a group the poor also benefit from these relationships since a well-off person courts unpopularity and suffers a consequent reduction in influence if he does not sponsor village events and carry out community work ¹⁷. The poor make it difficult for a big landowner to escape his "culturally destined role of patron" ¹⁸.

Peasants have few options for meeting their need for fuel, fertilizer, fodder and construction materials and their economies are consequently frugal in their use of organic materials ¹⁹. The per capita availability of many of these resources is declining rapidly over large areas of the Third World ²⁰. In rural Bangladesh the scarcity is manifest. Fuel collection has become a major task for women and children ²¹; the number of bichas (village trials) arising from disputes over the ownership of trees, crop residues and other fuel sources is large and increasing ²².

The distribution of these scarce resources is governed by those mechanisms which control the distribution of food and other valuable commodities. A traditional landowner in Comilla District, for instance, may neither compost all of the available rice straw nor burn the straw on the field -- the ash is a valued fertilizer -- but may allow clients to clear a prescribed area of the harvested paddy field ²³. Similar privileges may be extended for the collection of gobar from the cows of the rich.

An awareness of these distributive mechanisms is essential for successful planning. When villagers are

unenthusiastic about an innovation which urban and local or foreign experts have thought up, it is because the latter are insensitive to the full implications of the innovation at the village level ²⁴.

A programme for the utilisation of human excreta with the dung from a farmer's cows and the straw from his fields may not be attractive to the farmer since the benefits may be insufficient to warrant the risk of damaging his customary relationships: "In a multi-stranded relationship the snapping of any single strand is prevented by the existence of many other strands" ²⁵.

It is widely believed that the rigidity of social and religious norms is the major factor accounting for the continued squandering of human excreta in the Indian sub-continent. While we can not address this complex subject in this paper, we note that there are aspects to both the norms and the squandering which give hope that programmes for using human excreta may improve the lot of the poor.

Since villagers of high social and economic status observe the rituals of pollution and purity most stringently, it has been suggested that programmes for using human excreta may be unacceptable to the rich but welcomed by the poor ²⁶. Observing that in "customary" villages attempts to improve traditional methods of production have failed, while farmers have displayed ingenuity in spheres which are not covered by the hereditary system of rewards, Epstein has concluded that

it may be easier to improve productive efficiency by introducing entirely new crops or products than by attempting to change the traditional methods and techniques of production. ²⁷

Similarly, there may be fewer barriers to accepting the use of human excreta than to altering the customary uses of rice straw and gobar in these societies.

SECTION IV: Changing Labour Organisation and Resource Use Systems.

In "customary" rural societies the avenues available to the rich for seeking power and the refuges open to the poor for gaining protection were limited. These systems persisted because the patron-client relationship was the only vehicle which satisfied the objectives of both rich and poor. The system acquired an apparent stability, with the regulations governing the appropriate behaviour of patron and client embedded in the social norms of the community.

At present these ostensibly stable systems are being swept aside in Bangladesh, India and many other parts of the world.

1. The changes taking place:

The "traditional" system has disintegrated most rapidly and completely in areas where there has been widespread adoption of high-yielding crop varieties and mechanisation of agriculture. In Purnea District of Bihar, as land values rose fivefold ²⁸, payments in kind, sharecropping and the employment of permanent labourers gave way to money wages, owner cultivation and the hiring of daily labourers ²⁹.

These processes are also under way in areas where there have not been dramatic increases in productivity. In Bangladesh the traditional bonds are disintegrating ³⁰, the market orientation of production units appears to be increasing ³¹, and cash contracts and the use of daily wage labourers have become common in some areas ³². Concomitantly there has been a dramatic polarisation in rural society. In the decade since the mid-1960's about 15% of the households have increased their incomes ³³ while the percentage of landless to total households has increased from 18% to 38% ³⁴, real agricultural wages have declined by nearly 50% ³⁵ and the proportion of the population which consumes less than 80% of the required intake of calories has burgeoned from 5% to 41% ³⁹.

2. The causes of these changes:

The ideology surrounding the relationship between patron and client notwithstanding, the strength of the customary system grew out of the suitability of this arrangement as a channel through which rich and poor could reach their respective goals of power and security. A change in the opportunities of patron or client alters the relative bargaining position of the two parties and consequently tilts the balance of reciprocity in the customary relationship: the terms of the relationship may change or the ties may even be dissolved. In Bangladesh several factors have contributed to the tilting of this balance against the poor.

The impact of high-yielding crop varieties:

If everyone has equal access to the new technology, modern agriculture offers the possibility of improving the lot of all. Since the demand for labour increases with the adoption of high-yielding crop varieties, even the landless could be better off. The hitch is, of course, that even in the better co-operatives in Bangladesh it is the rich who have access to the new inputs which are denied to most of the small landowners and the landless³⁷. Differential access to resources increases the squeeze on those who do not have access to the new technology: Land transfers through usufructuary mortgages and outright purchases increase³⁸, sharecropper's rents rise from 50% to 70%³⁹ before they are evicted and the landowners resume self-cultivation which has now become more profitable. The control of the market is strengthened at the expense of traditional relationships.

This process has transformed social relationships in the Punjab and Purnea District of Bihar, but how important has it been in Bangladesh? In Dacca District the adoption of new modes of payment is not associated with farm size, yields or the use of new seeds, fertilizers and pesticides⁴⁰, suggesting that we must look elsewhere for the primary cause of the changes in the organisation of labour in agriculture in Bangladesh.

Increased income from non-agricultural sources:

The formation of external links by either patron or client provides a new avenue for that person to pursue his objectives and inevitably decreases the interdependence between farmers and their agricultural labourers. This has been an important determinant of social change in South India⁴¹. Despite an increase in the percentage of labour force in agriculture in Bangladesh over the 1960's⁴², there appear to have been increased opportunities for middle class Bangladeshis in industry and government service since 1971. Data are not available on these changes or the effects on dependency relationships in agriculture.

Decline in the availability of slack resources:

In Burma the reduced availability of slack resources, such as uncleared land, common pasturage and free fuel led to a decline in the relative bargaining position of the poor and forced peasants into the insecurities of the cash economy.

In the old days of farming for subsistence, the cultivators would get free grass for thatching, free bamboos and free firewood from the public wastelands. They could get their fish in the neighbouring pools or streams, and they could weave their own clothes in their own homes. As the public wastelands became converted into cultivation, as fisheries were declared the property of the Government and as home weaving became unprofitable, the small proprietors, like the tenants, were increasingly obliged to find money for needs which they formerly could supply themselves.⁴³

In Bangladesh the effect of the disappearance of slack resources has not been documented.

Changes in labour supply and demand:

During the 1960's agricultural output in East Pakistan increased at a rate lower than that of population⁴⁴. At the same time the demand for labour increased at a rate lower than output, partially as a result of the sharp rise in the price of rice relative to the price of jute and the consequent shift in acreage from a highly labour intensive crop (jute) to one (rice) which is less demanding of labour⁴⁵. On the supply side the sluggish growth of non-agricultural employment meant that the share of agriculture in total employment increased steadily to over 80% in 1968⁴⁶.

Relative to the growth in population, then, the supply of agricultural labour has increased while the demand for labour has fallen substantially. This widening gap appears to be the major cause for the decline in real agricultural wages⁴⁷, and is probably the primary factor responsible for the changes in the systems of labour organisation in agriculture.

3. The pattern of these changes

In the 1970's Bangladesh exhibits characteristics common to all societies which have been subsumed into the cultural system of capitalism in which labour is sold, land is rented and capital is freely invested. Whether this is "the rapid and final stages of the change to capitalist production relationships in Bangladesh agriculture"⁴⁸ is difficult to say, but it is clear that

in disposing of a man's labour power the system is disposing of the physical, psychological and moral entity 'man' attached to that tag, and that robbed of the protective covering of cultural institutions, human beings are perishing from the effects of social exposure⁴⁹.

4. The consequences for the use of organic resources

Because reliable data on the use of non-commercial resources are few, we have to draw heavily on our grasp of the underlying social structure in designing programmes for the use of human excreta and other organic resources. What are these few data and how do they conform to the thesis developed in this paper?

We have described how, in a village in Comilla District, traditional landowners provided their clients with rice straw. In the same village farmers who have acquired land through recent purchases, who farm their own land and who pay money wages, burn the crop residues which they cannot use themselves⁵⁰. The disintegration of the traditional distribution system is endangering the stable combination of resources which had previously underwritten a minimal livelihood.

Fifty thousand "gobar-gas" plants have been installed in India under a government programme. The programme has been most successful where new seeds are widely used, particularly in "progressive" areas of Gujarat and Haryana. Of their own accord, over 30% of the bio-gas plant owners in Haryana have attached latrines to the digesters⁵¹, suggesting that when customary norms have broken down proscriptions against the use of human excreta may no longer be stringent.

Two surveys of gas-plant owners in Gujarat have been conducted.

(The survey of the Indian Institute of Management showed that) the individual gas plant owning families had, on an average, 26 acres of land and 10 cattle heads. As per the findings of another survey carried out in Gujarat by Dena Bank, most of the owners had an annual income of more than \$1100 and a large number had an annual income over \$2800 and their primary occupation was agriculture. They were all literate and nearly 40% of them had subsidiary occupations such as business, or service. It was also noted that none of the non-plant owners of equivalent social status had any such subsidiary occupation⁵².

These gains have been at the expense of the welfare of the poor for whom the gobar excreted by the cattle of the rich has been a basic fuel.

The findings of the differential adoption rate among big farmers, depending on whether they had subsidiary occupations, accords with the theory presented in this paper: Those whose traditional ties have been severed are able to mobilize their resources for their own purposes more easily than those whose relationships have a stronger traditional component.

SECTION V: Summary

We have examined the ways in which the distribution and use of organic resources in Bangladesh and other parts of the Indian sub-continent are affected by the forms of labour organisation. The failure to understand the implications of "customary" multi-stranded relationships for resource use accounts for the "apparent impregnability of traditional culture to modernizing stimuli" A corollary is that resources which are presently under-utilized -- such as human excreta -- may be most easily mobilized since use of these resources is not severely constrained by these relationships.

These "customary" systems are rapidly breaking down in many areas. Since the distribution of organic resources is no longer governed by the requirements of patron-client relationships the use of these resources is often "rationalized", in a limited and capitalistic sense. Adoption of improved technologies for the use of these resources is hastening the deterioration of the resource base of the poor. The use of human excreta might shore up this base, but the Indian experience shows that unless programmes are explicitly tailored for the poor these programmes are likely to exacerbate an already inequitable distribution of resources.

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