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PRODUCTION AND MARKETING PROBLEMS OF VILLAGERS IN VARIOUS ASIAN COUNTRIES

by

B.M. Desai

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B.M. DESAI

Abstract

Farmers and artisans are the two major groups of villagers in Asia who earn their livelihood from self-employed production and marketing activities. Their economic activities centre around agriculture and agriculture-related resources like livestock and forestry. Many of them combine farming, tending animals, and artisan activities. Those who do not combine these three are either absentee landowners and/or are farmers who cultivate their land by hiring labourers. Those who combine the three activities are the medium and small owner-farm-families, tenant-farm-families and landless-artisan-families. It is this category of villagers which makes up the large part of rural Asia.

The basic production problem of Asian villagers is low resource productivity. This is a result of technical, economic and institutional aspects related to their economic activities. Since the introduction of high-yielding seed varieties the high degree of technical complementality[1] so common to the agricultural production process has become sharper. To add to this, because of the institutional factors the access to new inputs and services has become restricted to a small privileged group.[2] Under such environment, the consideration of physiologically and psychologically determined minimum family income that induces self-employed workers like farmers to ensure minimum input uses has not become an engine of growth. Rather, it has reinforced the risk-related behavioural responses, again, so clearly applicable to such workers.

Even their basic marketing problem has remained much the same in the sense that there exists little net marketed surplus and that in whatever temporary surplus that is marketed they do not benefit from the seasonal price appreciation. Most public sponsored marketing programmes for both inputs and commodities are ill-matched with the villagers' needs. And consequently they fail to relax liquidity[3] constraint of villagers who in turn continue to (i) grow early-maturing, although low-yielding, instead of late-maturing and high-yielding varieties, (ii) use of their families' labour instead of market purchased inputs, and (iii) distress sell their produce.[4]

The above described problems of Asian villagers have perpetuated since long. And their resulting incomes are low, static and even highly unstable particularly under such conditions as floods, drought, and high price fluctuations.

These problems are caused by the structural deficiencies associated with the factor and product markets including the technological input market rather than because of the villagers' irrationality. Indeed, given these deficiencies, the villagers are rational decision-makers. They are rational in the sense that their allocation of resources is close to an optimum, given the constraints in which they operate. And the villagers' constraints are the manifestations of the earlier referred structural deficiencies.

Structural deficiencies are those deficiencies which inhibit the access to full information and knowledge about the factor and product

markets and thereby retard the growth of competitive forces in these markets. At a given point in time, such deficiencies arise from a variety of sources. For analytical convenience, these sources may be divided into five categories:

The first source consists of conditions arising from lack of physical infrastructure.

The second relates to the inequality in ownership of resources among the villagers.

The third relates to the poor resource and technological base of the villagers.

The fourth source is with regard to the nature of policy instruments that are used for interventions in the market forces, and

The fifth source relates to the socio-political institutions that are centralized in their character.

Elimination of the deficiencies arising from these sources requires a public policy aiming at developing and perfecting the working of markets. Under such a strategy, the government action extends far beyond its conventional role as tax collector and as provider of social overhead capital: such mundane but difficult tasks as the collection of statistics, dissemination of statistical and technical information, enforcement of engineering standards, weights and measures, besides shouldering the responsibility for research, for such infrastructural items as feeder roads, irrigation systems, and so on are needed.[5]

To perform these tasks, the district officials would continuously require to identify such methods of technical and executive designs for rural development projects which would improve villagers' access to scarce goods and services including production inputs and assets. The principle which we need to appreciate most for identification of the methods is that the villagers' access must be determined by the "social" rather than by the "market" prices.

The paper elucidates the above described theme by organazing its content into five parts. First, the main features of villagers as decision-makers are discussed. This is followed by the discussion on size and nature of the organization of their economic activities. Third section discusses the production and marketing problems of villagers. The structural deficiencies arising from the earlier referred five different sources are discussed in the fourth section. The final section makes concluding observations.

Throughout the paper, wherever possible, an attempt is made to verify the correspondence between assertion and datum. This is done by drawing on micro and macro data and observations from available published literature. Illustrative data are drawn from Asian Countries of India, Bangla Desh, Pakistan, Malaysia, Thailand, Indonesia, Philippines, and so on.

I

Villagers as Decision-Makers

Villagers are confronted by decision making throughout their lives. The process by which they take decisions is intuition. They back up their intuitive decision with some analysis to ensure that the decision is consistent with preferences and available information. Indeed, the reason for the villagers' ability to support the intuitive decision by analysis lies in the fact that they possess experience-based knowledge and education. They possess such knowledge about the technology of production, about the factor and product markets, about the socio-political institutions and also about the climatic and resource-environment conditions in which they carry out their livelihood activities. Their such knowledge is non-formal and hence the analytical method by which they use this knowledge to support their intuitive decision is also non-formal[6]. The non-formal knowledge and also the non-formal analytical method are more difficult to communicate from one person to the other, particularly when language is a barrier between the concerned individuals.

The preceding would suggest that the villagers recognize an element of change in every decision making. Nonetheless, some villagers like us are change-averters and some others like us are change-seekers. Consequently, it is not uncommon to find all people weighing decision-alternatives that consist of inaction or non-action as one of the choices. In the early stages of development such an alternative is often preferred

by villagers[7]. This is largely because of the risks involved in change. The risks perceived by villagers are not necessarily related to technology and weather, but also those related to market and prices and more importantly social and political institutions[8]. It is therefore also common to find villagers perceiving an objective that seeks a balance between returns and risks[9].

Thus, villagers' rationality is interpreted in the broadest sense of such behaviour instead of in the sense of profit-maximization and positive responses to price-mechanisms which are referred to in elementary economics[10]. In other words, it must be interpreted as that rationality which is bounded by the 'budnet' which in turn is constrained not only by their economic conditions but also by the social, ethnic ad political conditions in which they live[11].

II

Villagers' Economic Activities -- Their Organizational Form, Size and Nature of Resource Ownership

Organizational Form: Both the farmers and artisans are self-employed workers. In the labour force engaged in agriculture in early seventies workers constituted 56% in Malaysia, 62% in India, 77% in Indonesia, 85% e each in Philippines and Korea, and 97% in Thailand (Annexure 1).

The organizational form of economic activities of these workers can be described as family-firm or household-firm with functions of ownership, labour and management vested in one individual or family.[12] Family preferences generally exert a more direct influence in such organizational

form. These features are reinforced far more sharply in rural Asia where villagers are marginally oriented to market and where social, ethnic and political institutions tend to inhibit the creation of new relationships through instruments of wider market appeal.

Indeed, in such organizational form the two decision units, namely, a family acting as an entrepreneur and as a consumer, are integrated, into one unit. And the resulting interrelationship between consumption and investment gains added importance. Family firms' consumption, through marketed surplus and cash expenses influences cash flows and determines investment. And their investment, through expected profitability, would determine the size of expected income and influence consumption. Therefore, at a given point of time the production and consumption compete for liquidity and resources in the same manner as do competitive enterprises or products. The question of production versus consumption use of funds and resources is basically a question of determining the allocation of resources between current consumption and savings i.e. future consumption.

Moreover, consumption ("Family") being an integral part in the organization of villagers' economic activities implies that their expenditure is continuous throughout the year. But, the inherent biological characteristics of the production being such that their incomes arise only once or twice in a year. To illustrate, a sample of farms in Punjab of India earned, on an average, 41 percent of their annual income during October to December and another 26 percent during May. Against this, their average monthly expenditure remained around 6 to 8 per cent throughout the year (Annexure 2).[13]

Size and Nature of Resource Ownership: Size of economic activities of farm-families is commonly measured by land area, whereas that of artisans is measured by the value of equipments they own. Most farm-families in rural Asia have only a few acres farm. Thus, the average holding varies from 0.97 hectares in Korea to 5.92 hectares in Malaysia. (Annexure 3). The farms are also highly fragmented into small pieces. This further reduces the effective size of operational units.

The number of tenant farm-families is significant in many of the Asian countries; the percentage of tenant farmers varies from 27% in India to 70% in Vietnam. The land these tenants cultivate range from 16% in Malaysia to 70% in Vietnam (Annexure 3). Moreover, high rates of tenancy are found within specific regions of a country. For example, in Thailand, 11% of households are pure tenants, but in Central Plains in this country tenancy rate is over 40%. It is also very high in Central Luzon in the Philippines, and is growing in Java.

While the farms are small, the labour resource per farm-household tends to be large; it ranges from 1.92 persons per farm in Sri Lanka to 3.86 in Thailand (Annexure 3).[14]

The readily available sample survey data on capital assets per household in India and Korea reveal that such assets are small in value and simple in nature. Land constitutes the largest share in the total assets (Annexure 4). Moreover, many of these capital assets are obsolete and have lower technical efficiency.

III

Villagers' Economic Activities -- Their Production and Marketing Problems

At the outset, the farmers' allocation of resources and the choice of enterprise-mix are optimal in the sense that their incomes can not be increased by reallocating the given resources. This has been empirically shown by a number of studies.[15] Annexures 5 and 6 give results from two of these studies.[16] Annexure 5 based on Hopper's static efficiency study of a sample of Punjabi farmers in India shows that the marginal value product of a given factor in the production of alternative crops is same and is equal to the average price of this factor. This is true of all the four factors of production namely, land, bullock labour, human labour, and irrigation water covered in the study. Moreover, the relative implicit prices of products and factors also closely correspond to their actual market prices. Annexure 6 which reproduces Gotsch's results for Pakistani farmers shows a close correspondence between the crop-pattern followed by these farmers and the optimal crop-pattern derived from the linear programming model. Both these studies have thus revealed that the farmers' incomes cannot be increased by reallocation of their given resources. Some other studies have, however, shown a potential for increasing efficiency of using existing resources of farmers. But such result is largely because these studies have omitted or unsatisfactorily measured some critical variables or constraints like water, subsistence requirements - not to mention problem of risk aversion.[17] A comprehensive examination of these studies is beyond the scope of this paper. Suffice it to say here that the results reported in studies done by Gotsch, Hopper

and others can be interpreted to mean that the optimal use of resources is consistent with the low resource productivity and low incomes. Both Hopper's and Gotsch's study reveal low average productivity of important crops grown in the sample areas (Annexure 7).

Production Problems: The basic production problem of Asian villagers is low resource productivity. In most south and southeast Asian countries per hectare yield of paddy, maize and wheat are only about half of what they are in Taiwan and Japan (Annexure 8). Given low productivity of land and given high labour-land ratio in these countries, the labour productivity is even still lower. So is the case with the productivity of whatever capital employed by the villagers. Further, productivity from these resources is earned only once or twice in a year.

Contemporary production problems of Asian villagers are still very much the same. To some extent, since the introduction of high yielding seed varieties the high degree of technical complementarity[18] so common to the agricultural production process has become much sharper. To add to this, because of the institutional factors the access to the new inputs has become restricted to a small privileged group.[19]

Many studies have documented that water plays a pivotal role not only in stabilizing the yields but also in fully reaping the yield-potential of the new seed varieties and the responsiveness of fertilizers.[20] Yet some other factors that play important role are environmental in nature.

Except in Pakistan and in Malaysia in all the other major Asian countries non-irrigated paddy areas constitute over 40 per cent (Annexure 9). As is shown in this annexure, paddy, the dominant crop in most of Asia, is grown under wide variety of conditions related to water (Also Annexure 10). Most of the new rice varieties released in Asia have been developed under well controlled irrigated conditions. Hence, these varieties do not perform better than the traditional varieties in rainfed low land, upland and deep water (flooded) conditions. Moreover, the recent deceleration in the growth rate of paddy are devoted to modern varieties can be attributed to the fact that most of the irrigated paddy land has already been planted to the available new varieties.

In the case of paddy, the extent of area under new varieties as late as in 1974-75 ranged from only 6.5% in Thailand to 61.5% in Philippines (Annexure 11). In the case of wheat, the corresponding area coverage in 1972-73 varied between 8% in Turkey to 56% in Pakistan (Annexure 12). However, wheat so far does not occupy an important place in the crop pattern of most Asian countries except India, Pakistan, Afghanistan, and Turkey (Annexure 13).

As regards maize, jowar and bajra, the situation is not much different in most of Asia except in Thailand (corn), and in India (Bajra) to a limited extent (Annexure 14). Even in the case of these countries the per hectare yield of the new millet varieties have not achieved their potential yields. This is true of even paddy and wheat

new varieties. For example, in the case of rice in India the National Demonstrations conducted in farmers' fields during kharif 1976 showed an average per hectare yield of 5.42 tonnes. Against this the all-India average is 1.3 tonnes. Even in the states of Punjab, Tamil Nadu, Karnataka and Andhra Pradesh the average yields are about 2.0, 1.85, 1.69 and 1.60 tonnes per hectare, respectively. The picture is not much different for jowar, maize and even wheat (see Annexure 15).

To a good extent the irrigated paddy cultivation is characterized by inadequate, uncertain and poorly controlled water resource. This is also true of irrigated wheat cultivation in certain selected areas. The management of water particularly from the irrigation projects is often found inappropriate in terms of field channels, scheduling of water, drainage, and making water available to farms located at the head and tail of the canal. To quote from the Asian Agricultural Survey 1976,

> "The major weakness in the irrigation sector is not lack of technology nor lack of resources, but a lack of means by which human talents and skills can be optimally matched with technology and other inputs. The result is that new irrigation system invariably show higher costs and lower benefits than even the pessimistic estimates at the feasibility stage."[21]

The inadequacy of well controlled irrigation resource is largely responsible also for the modest level of multiple cropping index in most of Asia (Annexure 16). Further, barring Malaysia all the other major Asian countries do not have more than 25 per cent of the paddy area as double cropped area. Even the use of fertilizers and other modern inputs have also been limited. Thus, the per hectare use of fertilizers as late

as in 1973 varied from 0.2 kg in Laos to 52.6 kg. in Vietnam (Annexure 17). The simple and less costly mechanical innovations such as power tillers, diesel engines, electric motors, chaff cutters, threshers, and driers are much less used in these countries. Mechanical chaff cutters, threshers, and driers are particularly needed by those who have very short period to complete post harvest operations before the onset of another monsoon. For example, in Indonesia where the peak rainfall period is October to November and again from late December to February the corn farmers face very severe time constraint to dry their corn and then store it. Similar is the case with paddy farmers in Thailand, Philippines, Malaysia, etc. All the major Asian countries have just one or two tractors for every 1000 hectare of land (Annexure 18). However, empirical evidences showing "net" benefits from the investment in tractor are not available. Even the results on validation of the hypothesis that the tractorization would lead to increase in per hectare yield and in the number of crops grown per hectare of land are rather mixed. In these respects whatever differences that are found between tractorized and non-tractorized farms appear to be due to the differences in water input on these two types of farms.[22]

The preceding discussion on irrigation and water resource gains added significance in view of the high degree of complementarity of certain inputs in the agricultural production process. This technical problem extends not only to water, fertilizers and HYV seeds, but also to human labour, particularly in the early and mid-stages of agricultural development.

Thus, the fundamental requirements of the rise in land and labour productivity in most of Asia are, first, basic investments in flood control, irrigation, and drainage, and then, technological innovations entering around the introduction of higher yielding varieties with high fertilizer response. To quote from Ishikawa.[23]

> "These two continue to play the role of leading input alternately. However, the leading input is, as defined earlier, technical in nature. It indicates only the technical possibility of significantly raising per hectare output by use of it in each stage of agricultural development. For clarifying its practicality we have to further consider the economic conditions for applying such leading inputs."

It is widely accepted that the basic investments of the type mentioned above are undertaken by the government. Such investments being lumpy, indivisible, and longer in their gestation period cannot be undertaken by individual villagers. Even the investment in tube well irrigation assets being fairly large often requires lending programmes that would match with the needs of villagers in respect of technical, economic and collateral feasibilities. The technical and engineering services required to ensure a fair chance of striking underground water is also beyond the control of individual villagers.

What is true of ithe irrigation investment is also valid for the investments in evolving and promoting the adoption of biological-chemical technology. Not only the government requires to undertake research investments, but it must also invest in extension, and in developing delivery channels to promote the adoption of new technology. Many of the Asian governments, for example, subsidized on-farm costs

of fertilizers (Annexure 19). The fertilizer to paddy price ratios which developed after 1974 in many Asian countries seem to have dampened fertilizer use (Annexure 18 and also 20). This problem is well highlighted in a recent study of the demand for fertilizers in Asia. It indicates that roughly one-third of the explained variation in fertilizer use is accounted for by price differences, and the remaining two thirds by environmental and varietal factors. The study also shows that half of any change in the sales price of fertilizers ultimately shows up in the retail price of rice.[24]

Thus, the economic problem of exploiting the earlier described technical possibility is ever more accute for the farmers. As will be seen later, this is true of using even the infinitely divisible and technically neutral to scale new technology as embodied in HYV seeds and fertilizers. The economic problem is far more deeply serious because of the complex interactions between technological change, rural institutions, and public policies which affect the distribution of resources and the operation of product and factor markets. This is despite the fact that individual initiative in the case of self-employed decision-makers like the farmers is governed by the physiologically and psychologically determined minimum income for the family. While the consideration of minimum family income would ensure certain minimum supply of labour and other inputs, it does not by itself can become an engine of growth.

Marketing Problems: The basic marketing problem of Asian villagers is the low marketed surplus. Such surplus in the case of tenants and small

farmers is often fictitious and transitory because many of them subsequently in the year buy the grains at higher prices for meeting family requirements.[25] Empirical evidences to examine some change in this phenomenon after the introduction of new seed varieties are not readily available. However, it would be reasonable to hypothesize that these small farmers still continue to benefit relatively less from a given amount of net marketed surplus compared to the large farmers. Their liquidity constraint often forces them to sell their produce soon after harvest (Annexures 21 and 22). Often the public sponsored storage and warehousing facilities do not match in their terms and conditions (related to prices, grading, advance payment against the future sales, etc.) with the farmers' needs arising from this constraint. This is also the case with many new trade outlets organized in recent years by the cooperatives and government marketing boards engaged in agricultural marketing. This is evident from Annexure 20 and also from following quotations from the FAO village level case studies on marketing in Asian countries.[26]

> "An analysis of the sales of produce (in Kepitipola, Sri Lanka) indicated that a greater proportion of the produce had been sold by the farmers in both the villages to the commission agents than to the co-operative in 1975....the tendency for the farmers to sell more of their produce to the commission agent was governed by a variety of factors, not the least important of which was the close ties and relationships that existed between both the parties in regard to the manner in which credit facilities were extended. The following table (i.e. Annexure 20 in this paper) indicates the most important reasons preferred by the producers for preferring the commission agents. The important reasons given by the farmers for selling their produce to the cooperative societies were:
> (a) security of payment for the produce sold; and
> (b) supply of seeds, fertilizers and agro-chemicals at competitive prices".

The Kuala Brang Farmers' Cooperative in Peninsular Malaysia faced problems in marketing the groundnuts produced by its members; these are:

"(i) strong competitions by established buyers at pthe primary level; (ii) lack of working capital to provide cash advances to farmers; (iii) lack of transportation and storage facilities; and (iv) lack of incentives to induce farmers to sell through their farmers' cooperative".

The FAO study also found that the access to government stabilized prices programme is extremely limited for small farmers. Locally based group marketing arrangements tend to be dominated by the larger farmers.

The preceding description of marketing problems imply that the small and tenant farmers continue to sell their produce to existing private marketing agencies. This practice as such need not be considered disadvantageous particularly where there exists fair degree of competition among these agencies. However, in situations where these agencies tend to be monopolistic and oligopolistic the small farmers find their gains from marketing operations rarely advantageous. Such situation is found particularly when the large land owners also control the product market, in addition to controlling credit and land markets.

There is yet another factor due to which farmers are unable to gain a remunerative income from their marketing operations. In most of rural Asia the farms are inaccessible because of inadequate feeder roads and/or roads that are usuable only dry season. In Indonesia, for example, only 2 per cent of the roads network can handle vehicles with loads of 5 metric tons, and about 76 per cent can handle 2 ton and less. In Malaysia, most of the paddy fields are not surrounded with a network of farm roads. In situations like these the transport costs to farmers are high. These costs

increase in rainy days because double handling of produce occurs, farmers bring the produce to pick-up point and from where it is transported to other points. Consequently, first, the price spread between the prices received by farmers and those that exist at, say wholesale point is substantial (Annexure 23). Second, the transportation costs account for a sizable share in the total marketing costs of merchants (Annexure 24). Third, the number of intermediaries between the producers and consumers under this situation also tends to be high. And finally, it is not uncommon to find an apparently irreconcilable character of product market, that, is, some buyers enjoying monopsony power and some others, perhaps, a large majority of them reaping only a reasonable profit margin. Annexure 25 shows illustrative evidence of this latter phenomenon from Indonesia; the unit profit margin of both traders and marketing institutions dealing in corn marketing is about the same.

IV

Villagers' Production and Marketing Problems -- Manifestations of Structural Deficiencies Associated with Factor and Product Markets

From the preceding it is clear that many of the problems which villagers encounter are caused by some factors. It is perhaps also clear from the discussion so far that any attempt to identify these causes is inevitably confronted with the chicken and egg type of circularity of reasoning process so common to such efforts. This difficulty is compounded manifold when such attempt is made with fragmentary data. It is in this context we urge an appreciation of

our indulgence in identifying critical variables in a generalized form.

As mentioned earlier, many of the operational problems of villagers are manifestations of the structural deficiencies associated with the factor and product markets. The structural deficiencies are those which inhibit the access to full information and knowledge about the product and factor including technological input markets.

They in turn then retard the growth of competitive forces and the choices that would have wider market appeal. These deficiencies may arise from a wide variety of sources. For analytical convenience they may be divided into five categories. These are:

(1) Lack of physical infrastructure surrounding villages

(2) Inequality in resource-ownership among villagers

(3) Poor resource and technological base of most villagers

(4) Nature of public policy instruments and interventions in the market forces, and

(5) Social and political institutions that are centralized in character.

Before discussing the sources it may be noted that the basic effect of structural deficiencies as defined earlier is a result of all of these five sources. Nonetheless, we contend that this effect of any one single source is simply compounded and reinforced by the remaining four sources. But for analytical convenience we shall briefly discuss each of them separately.

(1) Lack of Physical Infrastructure:

The first source that contributes to structural deficiencies associated with the factor and product markets is reflected in terms of inadequate roads, railroads, waterways, transport and communication; services reporting crop prospects, prices, current stocks, new technology etc. Besides, it also results from inadequate village markets which are small in number, uncovered and without storage, stallage, drainage, and communication facilities, and which are physically isolated from primary wholesale and terminal markets.

It is common to find this description of the physical infrastructure surrounding most Asian villagers. We hypothesize that such environment restricts farmers', particularly small ones', decision-choices in relation to production, and marketing including storage and input purchases. Indeed, their access to information and knowledge about prices, new technical inputs including extension services is severely retarded under such environment. As a result, as was discussed earlier, (i) transportation and storage costs in marketing tend to be high, and (ii) bulk of commodities change hands three or four times between producers and consumers, and thereby increases the costs of marketing services.[27] More importantly, there also arises monopolistic and oligopolistic practices in both the product and factor markets. This would result from, among other factors, sheer physical isolation caused by inadequate communication and transport infrastructure. To quote from Abbott:

> "Local buyer monopolies are characteristic of agricultural areas in underdeveloped countries with poor transport facilities, narrow markets and meagre supplies of capital."[28]

Monopolistic practices are often exercised through, among other factors, the provision of multiple services in terms of marketing, credit and merchandising.[29] Such multiple functions as performed by the informal agencies including land-owners in the product and factor markets imply that these markets are not independent of each other. Consequently, the choices open to the villagers in various markets are also not independent of each other but very closely interdependent. And, as will be seen later, this interdependence of various markets extend far beyond the product and credit markets to even land, labour and technological input markets.

(2) Inequality of Resource-Ownership Among Villagers:

Land is the key resource for most of the Asian villagers except the landless families who are large in number mainly in India, Pakistan and Indonesia. The ownership of land among these villagers is unevenly distributed. Thus, in Indonesia 70% of holdings own only 29% of land, while 3% of holdings own 24% of land. In Philippines 7% of holdings own 42% of land, whereas 19% own 57% of land. In India 44% of holdings own 2% of land, while 6% own 40% of land. Against this, in Taiwan 66% of holdings own 33% of land, while only 1% own 11% of land. Similarly, in Japan 64% own 31% of land, while only 5% own 16% of land. The Gini ratio for land concentration in Philippines, India, Pakistan, Turkey etc. ranged between 0.58 and 0.61, while that in Taiwan and Japan was around 0.47 each.

We hypothesize that the greater the inequality in resource-ownership the lower is the ability to exercise access to information and knowledge

and hence to inputs and services in the various markets. For the Indian context Raj observes the following:

> ".....ownership of land determines to a very considerable degree -- widening in some cases and restricting in other-) the range of choices effectively open to the different members of agrarian societies--even the quantum of land that could be leased in by rural households in general was apparently governed to a considerable extent by the size-group of ownership holdings to which they belonged. Though households with relatively small operational holdings (less than 2½ acres in size) were more than half the number reporting leased in land they had in all less than 7½ per cent of the total area leased in; on the other hand, households with relatively large operational holdings (more than 10 acres in size) were about one-sixth of the total number of households reporting leased in area, but they accounted for more than 60 per cent of such area."[30]

Inequality in land-ownership facilitates access to not only the leased in land but also to cheaper formal credit, labour and even new technological inputs and services. This is because the larger farmers would have greater ability to take additional risks associated with borrowings and new technology. It is also because the larger farmers have greater literacy, social status, and political influence. For the Asian context Griffin observes:

> "Unequal access to land and capital frequently is accentuated g by unequal access to water and technical knowledge--in an agrarian economy, control of land, credit and water enables landowners to ifnluence the local labour market as well. That is, monopoly of material resources gives the landlords monopsony power over labour."[31]

As will be seen later this process is strengthened by the very nature of policy interventions followed in credit and other markets.

(3) Poor Resource and Technological Base:

We hypothesize that the poorer the quality (and not the quantity) of resources and technology of the villagers, the lowerer is their income,[32] and hence smaller is their ability to exercise whatever choices that may be available in various markets. Thus, paddy farmers in a resource-poor region have very limited access to inputs, credit and other services than those in a resource-rich region. This limited access-ability is compounded manyfold due to the very nature of existing markets and the interventions presently followed in these markets.

These farmers have an additional constraint in terms of informational deficiencies regarding the development potential for land improvement measures. Moreover, investment needed to modify their environment through soil conservation, land improvements, and irrigation, drainage and mixed farming development is beyond the control and capacity of individual farmers. Unless such investment is made by public and semi-public agencies, villagers in resource-poor regions cannot utilize the existing new biological and chemical technology even if distribution channels for marketing of modern inputs and institutional reforms are successfully carried out. For the Philippines and Thailand context, Hsieh and Ruttan

observe:

> "Efforts to develop agriculture following World War II have concentrated very heavily on institutional development. In the Philippines this effort is currently being supplemented by substantial efforts to develop and to introduce high-yielding rice varieties responsive to fertilizer similar to the ponlai varieties introduced in Taiwan in the mid-1920s.
>
> Neither Philippines nor Thailand yet place major emphasis on the development of irrigation systems designed to provide dependable water supply in both the wet and dry seasons to a major portion of the area devoted to rice production. It seems apparent that this lag of land and water resource development behind the institutional and technological changes will impose serious limitation on achievement of the output potential associated with the technological advances that are now being realized."[33]

What is observed about Philippines and Thailand is also true of resource poor paddy and millet farmers in India, Bangladesh and other Asian countries. Summarizing the studies on changes in rice farming in selected areas of Pakistan, Indonesia, India, Malaysia, Philippines and Thailand Cassillo observes:

> "Physical environmental factors such as irrigation, flood control, pests and diseases, and soil quality appear to be as important as the institutional factors of farm size, tenure, credit, and price policy, in determining the nature, magnitude, direction and beneficiaries of the new rice technology. Poor environmental and institutional conditions tend to go hand in hand with occasional mitigating circumstances which cushion the extremes of consequences. Therefore, the policies designed to modify, improve, or control the institutional factor will have far-reaching implications as to who benefits. The influence of the second set of factors is very dependent on the nature of the physical environment."[34]

(4) Nature of Policy Interventions in the Market Forces:

We submit that some of the policy instruments and interventions which have been used by the governments in the Asian countries have reinforced the earlier discussed structural deficiencies associated with the factor and product markets. To a good extent this is because these interventions are exercised on a basis which had only partially, if at all, considered prices. For the Asian as well as Latin American context Griffin observes:

> "Land reform and colonization agencies distribute land on a basis other than price, and the same usually is true of public irrigation authorities, state owned rural banks, the extension services, etc. which distribute water, credit and technical knowledge."[35]

Policies for Investment in Technological Research and in Water Resources:

In his survey of Agricultural research and extension in Asia, Evanson observes:

> "The development of institutions capable of generating new technology access has been slow and difficult. Some countries, particularly India, have moved toward a sophisticated system of research institutions, others such as the Philippines and Thailand, have one or two research centres, but do not have strong regional systems. Indonesia is in an even weaker position. But several countries in the region may be said to have made no progress toward developing a research capacity."[36]

The access to new technological knowledge has thus remained inadequate. More importantly the available knowledge has been useful only to restricted areas and groups of people. This is evident from the fact that research expenditure in most Asian countries have been heavily

concentrated on rice, sugarcane, and cotton (Annexures 26 and 27). The "neglected crops" for which research expenditure has been low include pulses, roots and tubers, groundnuts and oilseeds. Indeed, many of these crops are grown in drought prone areas of Asia. For such areas, not only the drought resistent varieties are needed, but also is needed the focus of cropping or farming systems instead of single-crop. Research with this focus is still in the formative stage.

Furthermore, even in rice the bulk of the research expenditure is for the shallow water environment, and that much of the rainfed, upland, and deep water areas have also been neglected. To quote from the Asian Agricultural Survey 1976[37]

> ".....the new rice technology has benefitted only about a quarter of the rice farmers in Asia: those in the shallow water areas where water control is fairly adequate."

> "Countries such as Pakistan, where irrigation facilities were relatively well-developed when the first IRRI varieties were released, benefitted greatly... However, other countries such as Thailand till now have benefitted only a little from varieties developed at the IRRI. This is because the short-stemmed varieties developed at the IRRI were ill-adapted to deep water and rainfed rice areas in Thailand.

Lack of adaptation in research to local conditions is yet another distressing feature of the existing research efforts. To quote from the Asian Agricultural Survey 1976,

> "....the branch stations fail to do an effective job in importing and adapting technology to local environments. Instructions are handed down from the central research stations to branch stations, and there is simply no link between these stations and farmers."[38]

Annexure 28 which is reproduced from this survey, illustrates the above mentioned. Thus,

> "the breeding objectives are not closely aligned with the problems encountered in the area. Breeders are apparently transferring objectives from the other more dominant national and international centres. The result is a substantial gap between the local forms of research and problems encountered in the farmers' fields."[39]

The extension efforts to propagate the new technological knowledge are also rather weak. These are often conducted in such a way that it is difficult to extract meaningful information, particularly in relation to relative profitability and risks of different methods of farming a given crop. Lastly, in most low income countries the proportion of expenditure to the value of agricultural product is higher on extension than on research (Annexure 29).

The import of the proceding discussion for our purposes is that the small and tenant farmers' confidence in the government's ability to deliver what is needed by them is rather limited, weak and insecure. While partially this could be because of non-availability of the trained personnel and the organizational weaknesses, it is also because of the inadequate consideration of social instead of private benefits of investment in research and technology.

This last mentioned point has its relevance also for the policies that have been pushed for the introduction of capital-intensive mechanical technology. The adoption of such mechanical innovations as tractors

has been the result of factor prices; capital being underpriced. Indeed, it would not be unreasonable to argue that the very development of more approrriate laborr-intensive machines may have been retarded by such policies and institutional environment in which there exists conflict between private and social benefits.

What is argued for the introduction of new mechanical technology is also valid for the considerations that have gone into the selection of major versus minor irrigation projects as well as that of various technical designs for the construction of major irrigation projects.

As was mentioned earlier, investment in water resources is required to be undertaken by the government. Practically in all the Asian countries irrigation investment accounts for more than one-third of the governments' investment in agriculture. Indeed, in countries like India, Pakistan, Sri Lanka, Thailand, this share is more than 70 to 80 per cent, while in countries like Bangla Desh, Indonesia, Philippines, Nepal, and Afghanistan, it accounts for nearly 50 per cent (Annexure 30). This single largest component of agricultural investment needs to be carefully assessed because the government funds being usable for any conceivable purpose, implies the highest opportunity cost.[40]

It is doubtful whether this consideration has been adequately viewed in the investment decision making by the government of these countries. This is reflected in a relative neglect of (i) minor

irrigation, (ii) soil and water conservation, and (iii) drainage and flood control components of major irrigation projects. For example, in India, government investment in minor irrigation accounted for only about 29 per cent during the 3rd Five Year Plan period. In the same period the shares of investment in soil conservation, and drainage and flood control were, respectively, 0.5 and 3.2 per cents. While it may be difficult for technical reasons to develop many regions of a country by minor works alone, it is possible to conceive of some choices in this regard. To quote from Ishikawa[41]

> "..... the possibility of decomprising integral major works into a few principal works and many minor works should also be noted... Technological substitutability between major and minor works is likely to exist even in respect of those areas which can be developed only by major works, if one views such areas from the national point of view, and contrasts them with other areas capable of being developed by minor works. In this case, the technological substitution problem transforms itself into a problem of regional substitution; namely the substitution of those regions which can be developed by minor works for those regions which can be developed only by major works, or vice versa."

It is doubtful whether investment decisions have been fully viewed in this manner, despite the fact that cost of irrigation by minor project is lower than that by the major projects (Annexure 31). Whatever benefit-cost analysis that the governments undertake for these investments does not appropriately shadow price the use of government funds over the life period of the projects. For example, in India, the rate of interest used in the benefit-cost calculus is not only the ordinary rate that prevails in the organized capital

market, but is also assumed to remain constant over the whole life span of the project. In judging the relevance of such practice, what Ishikawa has observed may be referred.[42]

> "(i) From the development point of view, the rate of interest to be used in the benefit-cost calculus should be higher for the earlier period after completion of the projects than in the later period, or the rate of return should be calculated in different ways according to the length of time passed after the construction. This is because the need of capital in the economy is more pressing at the earlier period of economic development r than in the later period. The assumption of a constant rate of interest or a constant rate of return pre-supposes a matured economic structure and a relatively stable economic growth, both of which, however, are not relevant in the present context. Once this assumption is removed and, instead, the above assumption of varying rates of interest over time is adopted, it is quite likely that minor projects are more efficient than major ones; a more practical alternative may be to choose minor projects in the earlier period of development and to gradually replace them by major ones in the later period when the need for investible funds in the economy becomes much eased. (ii) For a similar reason, due to the pressing need for investible funds in the early stages of development, the often cited advantages of small-scale projects over large-scale ones due to a shorter construction period emerge. This is explained by the 'compounding effect of having any given increase of surplus at an earlier date,' and this effect also requires an important revision of the above formuli."

What is so far described about major and minor irrigation investments by the government is also applicable to the recent efforts to invest government funds in soil and water conservation and related programmes for drought prone areas. Moreover, in some areas in India, these programmes are meant for implementation only when drought occurs because in such period works on these programmes become a source of employment and livelihood for the local population! Such policy is,

however, self-defeating in the sense that the very purpose for which these programmes have been established does not get achieved. Nor can such programmes induce villagers' access to the opportunities to stabilize and increase agricultural production and incomes. Finally, it is only in recent years in many Asian countries institutional credit for long and medium term purposes such as minor irrigation development have become available (Annexure 32). However, as will be soon seen this credit has been enjoyed by the relatively rich farmers, and hence the water resource base of the non-privileged has still remained weak.

Credit Policies: Imperfections in the rural financial markets are ubiquitous. This market still consists of both formal and informal agencies, despite the legislation prohibiting and regulating money lending activities of the informal agencies. In the Philippines, for example,

> "it appears that farmers supply 20 per cent of their financial requirements from their own savings. Roughly 32 per cent of the finance is supplied by institutional credit, bearing an interest charge of 8 to 15 per cent a year. The remaining 48 per cent comes from the informal credit market, where the rate of interest varies from zero to 200 per cent."[43]

The picture is not much different in other Asian countries (Annexure 33).

Despite the record expansion of institutional credit in most Asian countries, the formal agencies have not succeeded in substituting informal agencies particularly because they have performed an unifunctional role of providing credit alone. Against this, the informal

agencies' operations are characterized by their ingenious functioning in credit, product and factor markets.[44] Such multi-functional role suits most to the small and marginal farmers and artisans. As a result, their access to the cheap credit provided by formal agencies is retarded. In Indonesia, for example, farmers with less than 1 hectare borrowed from money lender and paid interest rate of 10 and 25 per cent a month, while those with one hectare or more were able to obtain credit from a state bank at a monthly rate of interest of one per cent.[45] Secondly, absence of relevant competition from formal agencies perpetuates the hold of land-owners who in some countries have recently emerged as an important agriculturist money lending class. In India, for example, such money lenders in 1961-62, provided as much as 36% of loans to sample farmers covered in the survey against 24% in 1951-52.[46] Thirdly, collateral as a lending criterion is relatively more emphasized by the formal agencies. Such criterion tends to favour larger farmers and neglect small owner-farmers as well as tenants.[47] In Pakistan, for example, the Agricultural Development Bank provides tubewell loans only to those who own a minimum of 12.5 to 25 acres. This lending criterion excludes over 80 per cent of the nation's farmers.[48] Fourthly, ease of access to credit depends not only on the interest rate and lending criterion, but it also depends upon the amount of time required to process a loan. Griffin observes:

> "In general, those farmers who are personal friends of bank officials, who tend naturally to be the larger ones, are able to obtain loans with a minimum delay, while the other farmers are sent to the end of the queue."[49]

Fifth, cheap credit availability together with the above described lending criterion of formal agencies has induced the well-off farmers to use their own savings outside of their farms - in transportation, trading or money lending, for example. Their investment in these activities have further perpetuated their hold. Imperfections arising from such monopolistic control have not been corrected by introducing new financial instruments such as bills of exchange, high-interest-offering-securities, etc. Instead, the policy of low interest rate is pursued in most Asian countries on the assumption that the low private investment in agriculture is because of higher interest rate charged by the informal credit agencies. However, what Ruttan has observed for the Southeast Asian context, can be generalized for the other Asian countries:

> "...the availability of improved technical inputs which generate larger income streams represents the ultimate solution to the credit problem, rather than the credit problem representing a solution to the problem of slow rates of technical change. Much of the effort that has gone into the development of rural credit systems, in advance of the local research effort needed to generate more productive inputs, has, in my opinion, been misplaced."[50]

Finally, policies that restrict interest rates and keep them at lower level force the financial institutions to concentrate concessionally priced loans in the hands of the economically powerful.[51] This is because these agencies cannot, under such policies, afford to lend the risky borrowers most of whom are often the small and tenant farmers. Moreover, the common assumption that when formal credit

supply would be enhanced, the interest rate for informal credit would reduce does not seem to have come true.[52] This is largely because such policy is not accompanied by some of the earlier discussed measures needed to integrate the informal lenders with the formal credit market. The policies of supplying concessional refinances to financial agencies have also induced complacency towards savings mobilization by these agencies. Consequently, their financial structure lacks self-reliance. The mounting overdues (Annexure 34) have further eroded the capital structure of these agencies.[53] Under such conditions, small and tenant farmers would perceive formal credit as transitory.

Land Reforms: Earlier we saw that inequality in land ownership exists in most Asian countries. Land is monopolized by a few families in some Asian countries such as Philippines. This in turn gives landowners monopsony powers in the local labour and credit markets. Landless labourers in such situation hasn no option but to offer their services to landlords. Bonded labour and debt slavery are found in many instances. Given these features and given the earlier discussed nature of formal credit agencies' policies, the greater the inequality in landownership the easier is the access to institutions (e.g. banks and the bureaucracy) and the resources they provide (e.g. credit, irrigation water, and technical assistance) enjoyed by a relatively few.[54] These forces appear to have accentuated despite land reforms. There are many explanations for this. Some of them are: First, land reform measures are attempted without adequate changes in the earlier

described policies for credit, technical inputs, and commodity markets.[55] Second, implementation of these reforms is rather unsatisfactory and ineffective due to lack of political will,[56] administrative resources and also the lack of conviction in the need for such reforms on the grounds of economic efficiency.[57] Third, referring to the implementation issues the recent study done by the World Bank observes:

> "Sustained uncertainty about a government's intensions with regard to the distribution of land adds to the risk of investment and can hamper capital formation and production. In some instances, continued uncertainty has led to disinvestment in agriculture by owner-operators and flight of capital from the country."[58]

Fourth, in some of the countries, the policy of abolition of tenancy altogether has further accentuated the monopoly power of land owners. This has particularly happened in countries like India, Malaysia, Pakistan, Philippines, Sri Lanka where population pressure is high, land redistribution policies are ineffectively executed, and where recent technological breakthrough is relatively better. In such situations it is common to find not only concealed tenancy (in which tenants can not imperil their access to patronage in terms of loans, work or rather jobs, etc.) but also the resumption of personal cultivation in which former tenants are turned into labourers who are usually paid by share of crops.[59] Further in several countries, operational holding structures over the years may become more skewed

rather than less, and the land declared as surplus under land ceiling enactments still remains very small (Annexures 35 and 36).

Policies for Inputs Supply: The market structure for such modern inputs as fertilizers, insecticides and pesticides is in the developing stage in most Asian countries. For the Southeast Asian context Ruttan observes:

> "The organization of factor markets to supply the inputs in which new technology is typically embodied to subsistence or peasant farmers is relatively new in most areas and is rudimentary or even non-existent in many areas."[60]

This is true in South Asia including and particularly in backward areas in India. Ruttan also observes:

> "In the early stages of development, inputs such as fertilizer, insecticides, and others may be completely imported. Importation is typically subject to tariffs, exchange controls, import licensing, and other formal and informal barriers. Distribution may be under the control of a single firm, a government monopoly, a Central Cooperative organization, or at most a few firms. Even when local production is initiated to take advantage of the forward linkage to the agricultural sector, scale economies frequently dictate that total national or regional production will be organized by a single firm. In the Philippines, for example, the capacity of the new Esso nitrogen facility will exceed the estimated national utilization of nitrogen fertilizer during the initial years of operation. Much of the difficulty involved in the negotiations for the establishment of additional fertilizer capacity in India apparently centres around the issue of the role of the public and private sectors in marketing arrangements."

> "In this situation, the simple problem of logistics of importing or producing and distribution supplies of improved seeds, fertilizers, insecticides and rat poisons, machine parts, and other inputs in such a manner that they are physically available to farmers in the localities in which they are to be used with a reasonable degree of efficiency and timeliness would seem to dominate structural concerns in the markets for technical inputs."[61]

Not only the logistical support but also the allocative or distribution mechanisms used by the organizations in the marketing of these inputs would determine the villagers', particularly small farmers', access to this newly emerging market structure. As was mentioned earlier, under conditions of scarcity and government distribution channels, non-price basis tends to be emphasized in the supply of inputs and services.

The use of subsidies to induce and assure clientele loyalty adversely affects the economic viability of these channels, besides limiting the coverage of the programme to a relatively few farmers, particularly large ones. Similar features are found when the new inputs supply is organized through the cooperatives particularly when price of credit rather than that of inputs supplied by these agencies is subsidized. This is largely because credit policies are biased in favour of large farmers.

In some other cases of cooperatives their policy of distributing credit alone retard the access to new technical inputs supplied by other agencies. This is because, in such situations, it is difficult

to synchronise the timeliness of credit and input supplies. Consequently, the villagers' discount the use of such market structure.

(5) Social and Political Institutions:

The social and political institutions in many Asian countries are hierarchical, narrow-based and centralized in character.[62] The system of kinship, clan, and caste or tribe tend to contribute such character. In the past when technology was poor and large-scale political organization was absent such social structure has successfully met the basic social needs of different members of village community. However, this structure has further perpetuated its character even when new technologies and political organizations have come on the village-scene.[63] Despite the gradual and partial shifting of village elders'f function to lawyers, judges, legislators, technical experts for village production activities and so on, the basic tendencies in terms of centralized decision-making have continued. This is because wealthy members of the village community have been able to undertake and/or influence the new political institutions. In India in 1972, for example, 45 out of 64 members of the Punjab Assembly were bing landowners, in Haryana, 30 out of 52, and in Madhya Pradesh 96 out of 220.[64] The situation is perhaps not much different in the Philippines, Indonesia, Malaysia and so on.

Consequently, the central axis of reciprocity on which traditional social structure survives continues with its wider sphere of influence. This can be found from the fact that the large land owners who are

often local political and social leaders secure control over local planning units and various types of cooperative organizations in rural areas. And thereby they appropriate government and other resources for their private use. To quote from the Asian Agricultural Survey 1976;[65]

> "These problems have been particularly serious wherever quasi-political units are called upon to allocate subsidized inputs. Rural elites have been able to divert production credit and unsecured small investment credit for their own purposes, and to appropriate the services of government owned and/or managed capital goods (such as irrigation pumps, releases from surface gravity systems, and storage and milling facilities)"

V

Concluding Observations

To conclude, the discussion so far suggests that the tasks to solve the villagers problems are formidable. Past experiences have shown that privileged actors of change tend to secure the control over the instruments of change and manipulate them to their own advantage. Such experiences are not necessarily restricted to agricultural development process. Instances of big industrial business houses both in the present developed and in the developing countries attempting something similar are easily found. One cannot and should not therefore expect an idealistic solution to the problems of villagers.

Despite what is presented about the past public policies, the government agencies and policies have still an unquestionable role to

play. If there is any single issue on which consensus has been expressed by the policy makers, bureaucrats, planners and academicians alike, it is the issue of wider participation of people in the development process. It is logical to translate this into the objective of improving and widening the access of villagers to the goods and services including inputs and assets. To realize this objective of the public policy there is a clear need for decentralized decision making in voting for public investments in technological research and water resources fo critical for agricultural development. Additionally, it is also needed for evolving technological as well as executive (or managerial) choices for different projects. Field-level district officials have critical role to contribute in this process. These officials must identify location specific projects of resource development including those assets such as livestock, poultry etc. which can be privately owned and operated. An important principle which we need to appreciate for this task is that the access of villagers to these projects must be determined by the "social" rather than by the "market" prices. This principle is also relevant for identifying and executing those projects having bearing on infrastructure related problems of marketing. So is the case for those projects which will more directly aid the farmers in gaining from seasonal price appreciation for their products. Such projects could include investment in threshing, drying, storage and such other facilities.

Maintenance and dissemination of information about land records, new technical knowledge, weather, prices, crop prospects, marketing practices etc. are yet another valuable set of functions that the district level officials can perform. Again, in performing this, the above described principle is required to meet the basic objective of improving the access of villagers to goods and services.

NOTES

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1. Ishikawa, S., Economic Development in Asian Perspective, Kinokeniya Bookstore Co. Ltd., Tokyo, Japan, 1967, chapter 2 and 3.

2. Asian Development Bank, Asian Agricultural Survey 1976, Rural Asia: Challenge and Opportunity, Manila, Philippines, April 1977, Chapters 1.4, 5, 8, and III.3, 4, 5.

3. Baker C.B., "Role of Credit in Development of Small Farm Agriculture," In A.I.D. Spring Review of Small Farmer Credit, Analytical Papers, Vol. XIX, U.S. Agency for International Development, Washington, U.S.A., 1973, pp. 41-70. Following the literature on Financial Management, the concept of liquidity is defined as the ability to generate cash. Such a definition is emphasised because it helps in identifying appropriate focus and instruments of interventions in rural credit and other markets. Baker C.B., op. cit.

4. See, for example, Narain D., Distribution of the Marketed Surplus of Agricultural Produce by Size-Level of Holding in India, 1950-51, Asia Publishing House, 1951; Dubey A.K. Peasant Marketing in Java, Free Press of Glencoe New York, 1962; Vyas V.S. et. al., Rural Development for Rural Poor, Dharampur Project, Vol. I and II, IIM, Ahmedabad, 1976; Abbott, J.C., et. al. Marketing - Its Role in Increasing Productivity, FAO, Rome 1964;

5. Johnson B.F., et. al., Agriculture and Structural Transformation, Oxford University Press, 1975, pp. 46-47; also see Griffin K., The Political Economy of Agrarian Change, Macmillan, 1974, chapters 2 and 8, Mellor John W., Economics of Agricultural Development, Cornell University Press, Ithaca, U.S.A., 1966, Chapter 21.

6. Coombs Philip H., et. al., Attacking Rural Poverty: How Non-Formal Education Can Help, The Johns Hopkins University Press, 1974.

7. Thorner, David, 'Peasantry', International Encyclopaedia of the Social Sciences, Crowell Collier and Macmillan, 1968, pp.503-511. Also see Johnston B.F., et. al., op. cit., pp. 51-58.

8. On the basis of his experience of action-research in Education for Rural Development in Jawaja block in Rajasthan, India, Matthai *abstracts out social and environmental risks in addition to other* risks, as follows: "Social risks" — the risks inherent in the development of new relationships.

These will exist in relation to the new links which are developed and with which the villager will have to maintain certain forms of relationships. These will exist in relation to intra and inter group working, "intra" in the case, e.g. of weavers or leather workers working together and "inter" in relation to getting the sheep raisers, wool spinners, and wool weavers to work together. Another social risk may lie in the village community's or caste's or other castes' perception of the new activity. There is also the risk inherent in dropping old relationships of economic and social significance, e.g. the merchant-cum-money-lender. "Environmental risks" — risks which result from environmental changes in the villagers' work as an outcome of the new activity. One day of breaking the merchant-cum-money lender's hold over the villager is, amongst other circumstances, to introduce new products requiring new markets with which the merchant is least familiar. The villager then has to deal with markets which he is entirely unfamiliar. The environment within which his total activity takes place change. He is then subject to the risks inherent in dealing with unfamiliar people, culture, rates of change, systems etc." Matthai, Ravi J., "Perceived Risk and Rural Entrepreneurship," Unpublished Paper read at the International Workshop on Rural Entrepreneurship held at Indian Institute of Management, Ahmedabad, India,1976. Risks arising from social and political relationships are difficult to measure and consequently their "net" effect cannot be easily unquantified through "formal" methods.

9. Hazell P.B.R., Rational Decision-Making and Parametric Linear Programming for Combining Farm-Enterprises under Uncertainty, Unpublished Ph.D., thesis, Cornell University, Ithaca, U.S.A., 1970; Schluter, M.G.G. and T.W. Mount "Management Objectives of the Peasant Farmer: An Analysis of Risk Aversion in the Choice of Cropping - Pattern, Surat District, India," Occasional Paper No.70 Cornell USAID Employment and Income Distribution Project, Department of Economics, Cornell University, Ithaca, U.S.A., 1974.

10. Schlutz T.W., Transforming Traditional Agriculture, Yale University Press, New Haven and London, 1964; Mellor John W., op. cit., Falcon, W.P. "Farmer Response to Price in an Underdeveloped Area: A Case Study of West Pakistan". American Economic Review, Vol. 54 May 1964, pp. 580-91; Krishna, R., "Farm Supply Response in India - Pakistan: A Case Study of the Punjab Region, "Economic Journal, Vol. 73, Sept. 1963, p. 477-487; Mohammad G., "Some Physical and Economic Determinants of Cotton Production in West Pakistan," Pakistan Development Review, Vol. 3, Winter 1963, pp. 491-526, and Gotsch C.H., "A Programming Approach to Some Agricultural Policy Problem in West Pakistan" in Studies in Development Planning (ed.), Chenery H.B., et al. Harvard University Press, Cambridge, Masachusetts, 1972, p.223.

11. Firth, R. "Capital, Saving and Credit in Peasant Societies: A Viewpoint from Economic Anthropology," in Capital Saving and Credit in Peasant Societies, Studies from Asia, Oceania, The Caribbean and Middle America, (ed.) Firth R. and B.S. Yamey, George Allen and Unwin Ltd., London, 1964, pp. 15-34.

12. In rural Asia it is common to find production units whose labour requirements are largely met by family members. It is also common to find them supply their seeds and make implements for their own farms. These illustrations clearly reveal the above discussed features of family-farms. Mellor John. W., op. cit., pp. 133-155. Also see Schlutz T.W., op. cit., Fisk E.K., "Planning in a Primitive Society: From Pure Subsistence to the Production of Market Surplus," Economic Record, XL June 1964, pp. 156-175, India, Government of, Ministry of Food and Agriculture, Studies, in the Economics of Farm Management, 1958 and 1966, Studies in the Planning and Implementation of HYV Varieties, 1968, Penny David "Case Studies of Subsistence and Transition: North Sumatra, Indonesia," Paper presented at the A/D/C Seminar on subsistence and Peasant Economics, Honolulu, 1965, and Warriner, Doreen, Economics of Peasant Farming, 2nd ed., New York, Barnes and Noble, 1965.

13. These results are likely to give less representative picture of seasonality of surpluses and deficits for the farmers in other parts of India and also in other Asian countries. This is because farmers in these regions have lower intensity of use of land and other resources.

14. Similar country-level data on artisans' economic activities are not available. Also, the country-level-data on capital assets owned by farm-families are not available. And hence, wherever possible, sample survey data on capital assets of farm-households and artisan are presented.

15. All these studies rely on static efficiency model. These studies can be classified into three different categories. Two of these three categories consist of those studies which implicitly assume absence of risks and uncertainty, while the third one include studies which explicitly incorporate risks and uncertainty. The former set of studies use different methodologies. Some of them rely on cross-sectional production functions, while some others rely on linear programming. Examples of the studies of the former type include Hopper's study of Indian farmers. W. David Hopper, "Allocation Efficiency in Traditional Indian Agriculture", Journal of Farm Economics, Vol. 46, No. 3, 1965, pp. 611-25. Also, Bardhan, P.K. "Size, Productivity and Returns to Scale: An Analysis of Farm Level Data in Indian Agriculture," (unpublished paper), 1972; Saini G.R. "Resource-Use Efficiency in Agriculture," Indian Journal of Agricultural Economics, Vol. 24, no.2, 1969; and B.M. Desai "Economics of Resource Use on Sample Farms in Central Gujarat", Indian Journal

of Agricultural Economics, Vol. 28, No. 1, January - March 1973, pp. 71-85. The studies which rely on linear programming include, among others, Gotsch's study of Pakistani representative farm. Studies that incorporate risks and uncertainty mainly use linear programming with alternative solution procedure or quadratic programming. Hazell's, Schluter and Mount's studies are some of the examples in this category. C. Gotsch, op. cit., Amerasinghe N., "The Determination of Economic Holdings for Settlement: A New Approach", Indian Journal of Agricultural Economics, Vol. 30, No. 1, 1975, p. 57 and Desai B.M. and Desai D.K., Farm Production Credit in Changing Agriculture, Indian Institute of Management, Ahmedabad, 1971, Hazell P.B.R., op. cit., Schluter M.G.G., et. al., op. cit.

16. These two studies demonstrate use of two different methodologies, namely cross-sectional production function (Hopper's) and programming (Gotsch's). Gotsch's study, in contrast to many others which also use programming technique, effectively shows inclusion of a wide variety of constraints, such as water, crop requirement etc. in a formal model and thereby it demonstrates rarely seen "realistic" use of this technique.

17. E.O. Heady, "Techniques of Production, Size of Productive Units, and Factors Supply Conditions", Paper presented at the Social Science Research Council Conference on Relations between Agricultural and Economic Growth, Stanford University, Stanford, California, November 11 - 20, 1960; D.K. Desai, Increasing Income and Production in Indian Farming, Indian Society of Agricultural Economics, Bombay, 1963.

18. S. Ishikawa, Economic Development in Asian Perspective, Kinokuniya Bookstore Co. Ltd., T. Tokyo, Japan, 1967, pp. 90 to 93, 108-109, 122 and 247-249.

19. Asian Development Bank, Asian Agricultural Survey 1976, Rural Asia: Challenge and Opportunity, Manila, Philippines, April, 1977.

20. Ishikawa, op. cit., Chapter 2.

21. Asian Development Bank, Asian Agricultural Survey, 1976, op. cit., p. 247.

22. Desai D.K. and Gopinath C. Farm Mechanization in India, Indian Institute of Management, Ahmedabad, India, 1974.

23. Ishikawa, op. cit., p. 90

24. C. Peter Timmer, "The Political Economy of Rice in Asia: Lessons and Implications," Food Research Institute Studies, Vol. XIV No. f, 1975, pp. 419-431.

25. Narain D., op. cit., p. 10

26. Food and Agricultural Organization of the United Nations, Marketing--An Accelerator for Small Farmer Development - 15 village-level case studies in Asia, Bangkok, 1976, pp. 2-3, 143, 167; 265, 269 and 283.

27. Ruttan V.W., "Agricultural Product and Factor Markets in Southeast Asia", Economic Development and Cultural Change, July 1969, Also see, Behrman, J.R. "Supply Response in Underdeveloped Agriculture: A Case Study of Four Major Agricultural Crops in Thailand, 1937-1963", Ph.D. thesis, Department of Economics, Massachusetts Institute of Technology, 1966; Lele Uma J., Foodgrain Marketing in India, Private Performance and Public Policy, Cornell University Press, Ithaca and London, 1971; King R.A., "Product Markets and Farmers Response to Changees in Prices and Income," in W.W.McPherson, ed., Economic Development of Tropical Agriculture, University of Florida Press, 1967.

28. Abbott, J.C. Marketing Problems and Improvement Programmes, FAO Marketing Guide No. 1, Food and Agriculture Organization, Rome, 1958, p. 84. Also see FAO "Report on the Technical Meeting on Marketing Asia and Far East Region," Food and Agriculture Organization, Rome, 1959.

29. Wharton C.R., "Marketing, Merchandising and Money-lending: A Note on Middleman Monopsony in Malay," Malayan Economic Review, Vol. 7 No. 2, October 1962; Madalgi S.S., Imperfect Competition in Agricultural Markets in India and a Policy for Market Reorganization", Indian Economic Journal, Vol. 5, No. 3, January 1958; Cook H.L., "Observations on Market Structures and National Economic Development in the Philippines," Journal of Farm Economics, Vol. 41, No. 3, August 1959; Long Milland and Chanond Aranjakananda, "Rice Marketing in Thailand", Bangkok Bank Monthly Review, 2962, pp. 19-24; Raj K.N., Agricultural Development and Distribution of Land Holdings", Indian Journal of Agricultural Economics, Vol. 30, No. 1, Jan-Mar 1975, and Desai B.M., "Formal and Informal Credit Sources in Tribal Areas -- A Case of Dharampur Taluka", Artha-Vikas, Vol. 12, No. 2, July-December 1976.

30. Raj K.N., op. cit., p. 7. Also see, Bhalla, Sheila, "Changes in Acerage and Tenure Structure of Land Holdings in Haryana: 1962-1972", Economic and Political Weekly, Vol. XII, No. 13, March 1977.

31. Griffin K., op. cit., Chapters 2 and 3, also see, Chandhari D.P., "New Technologies and Income Distribution in Agriculture". Agrarian Reform and Agrarian Reformism, D. Lehman (ed.) Faber and Faber, 3 Queen Square, London, 1974, pp. 157-189, Breman Jan Patronage and Exploitation, University of California Press, 1974, Falcon W.P., "The Green Revolution: Generations of Problems", American Journal of Agricultural Economics, December 1970, p. 706.

32. In the Philippines 2 hectares of land in Nueva Ecija does not mean the same thing as 2 hectares in Cotabato. Similarly, in India 2 hectares in Rajasthan's semi-arid area are much different from those in soil-rich area in Central Gujarat.

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34. Cassillo Gelia T., "Diversity in Unity: The Social Component of Changes in Rice Farming in Asian Villages", in Changes in Rice Farming in Selected Areas of Asia, International Rice Research Institute, Philippines, 1975, p. 360.

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37. Asian Development Bank, Asian Agricultural Survey 1976, op. cit., p. 246, 86, 88.

38. _____, op. cit., p. 88.

39. _____, op. cit., p. 89-90.

40. Ishikawa, S., op. cit., p. 129-139.

41. _____, op. cit., p. 140.

42. _____, op. cit., p. 141 & 142

43. Griffin K., op. cit., p. 27-28.

44. Wharton C.R., op. cit.; Also see, Desai, B.M. op. cit., and Donald G., Credit for Small Farmers in Developing Countries, Westview Press, Boulder, Colarado, 1976, Chapters 8 and 9.

45. Griffin K., op. cit., p. 29.

46. Reserve Bank of India, Report of the All India Rural Credit Review Committee, 1969, p. 25.

47. Donald G. op. cit., Chapters 8 to 10, Also see Jodha N.S., "Land-Based Credit Policies and Investment Prospects for Small Farmers", Economic and Political Weekly, Vol. VI, No. 39, September 25, 1971, pp. A-143 to A-147; Rao ChH.H. "Farm Size and Credit Policy" Economic and Political Weekly, Vol. V, No. 52, December 26, 1970 pp. A-157 to A-162 and World Bank, The Assault on World Poverty, The Johns Hopkins University Press, Baltimore and London, 1975, pp. 100-163.

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49. Griffin K., op. cit., p. 30. Also see Singh Gurubachan and H.S. Sandhu, "Anatomy of Commercial Banks" Advances to Agriculture" Indian Journal of Agricultural Economics, October-December 1971.

50. Ruttan V.W., op. cit., pp. 513-514, Also see Schlutz, T.W. Transforming Traditional Agriculture, Yale University Press, 1964, 1964, pp. 813-101, 145-61.

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52. Bottomley, Anthony,"A Monetary Strategy for Underdeveloped Rural Areas", Agricultural Economics Bulletin for Africa, No. 12, June 1970, pp. 1-10.

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55. World Bank, op. cit., pp. 187-227, Also see for example, Dantwala, M.L., "Incentives and Disincentives in Indian Agriculture", Indian Journal of Agricultural Economics, April-June 1967, Dandekar, V.M., "From Agrarian Reorganization To Land Reform", Artha Vijnana, March 1964, Thorner Daniel, The Agrarian Prospect in India, Delhi University Press, Delhi, 1956; Ladejinsky W., "New Ceiling Round and Implementation Prospects", Economic and Political Weekly, 30 September 1972; International Rice Research Institute, Changes in Rice Farming in Selected Areas of Asia, Manila, Philippines, 1975.

56. Lack of Political Will arises because wealth, particularly land, is often accompanied as in Philippines and India by Political influence. It also arises because no one single authority is responsible, again as in India, for the policy commitment.

57. It is argued that egalitarian distribution of wealth and income through land reforms would conflict with faster accumulation and agricultural and industrial growth because it inevitably would reduce private savings. However, this assertion would hold only if the aggregate output and aggregate marketed surplus would decline in the post-reform period. Aggregate output may not decline because small farmers who will benefit from reforms produce more output per acre than the large farmers. But it is more uncertain to predict the effect on aggregate marketed surplus in post-reform period, particularly if the technological change and the measures to correct the earlier described features of credit and commodity markets do not accompany, if not precede, the land reforms. Griffin K., op. cit., chapters 2 and 8; Also see for example, Khusro, A.M., Economic and Social Effects of Jagirdari Abolition and Land Reforms in Hyderabad, Osmania University Press, Hyderabad, 1958; Long E.J.; "The Economic Basis of Land Reform in Underdeveloped Economics", Land Economics, May 1961; Krishna Raj, "Some Aspects of Land Reform and Economic Development in India, in Land Tenure Industrialization and Social Stability, ed. Walter Freehlich, Marquette U.P., Milwaukee, 1961; Mellor, John W., op. cit., Chapter 14. Vyas V.S., "Implementation of Tenancy Legislation", Economic and Political Weekly, 19 August 1972.

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60. Ruttan V.W., op. cit., p. 507.

61. Ruttan V.W., op. cit., p. 507-510.

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Glossary of Selected Terms and Concepts

1. Liquidity is defined as the ability to generate cash.

2. Firm may be defined as the unit that uses the services of factors of production to produce goods and services.

3. The term market may be defined as a situation in which buyers and sellers undertake transactions in goods and services. Factor market can be described as that market in which transactions in factors of production namely, land, labour, and capital are carried out. For agricultural context ractors of production would include seeds, fertilizers, water, pesticides, besides the extension services and services from durable capital like machineries etc. Product market can be described as that market in which transactions in commodities produced are carried out.

4. In Production Economics the term optimum is generally referred to a condition in which given resources are so allocated that the maximum net return is attained.

5. 'Socially' determined prices are those prices which reflect the true scarcity of goods and services.

6. Competitive enterprises are those enterprises which compete with each other for use of resources.

7. Monopoly is defined as that situation in which there exists only one seller but innumerable buyers of goods and services. Monopsony, on the other hand, is defined to include only one buyer but innumerable sellers of goods and services.

8. Oligopoly is a situation in which there exists a small number (greater than two) of sellers of goods and services. Oligopsony is a situation in which there exists a small number (greater than two) of buyers of goods and services.

9. Gini ratio shows how close the distribution of a given variable, say land or income, is to absolute equality or inequality. For example, as this ratio for income approaches zero, the distribution of income approaches absolute equality. Conversely, as the ratio approaches 1. the distribution of income approaches inequality.

Annexure 1 Structure of the Employed Labour Force in Agriculture in Selected Developing Asian Countries by Class of Workers

DMC	Year	Self-Employed and Family Workers	Salary/Wage Workers
		(Percent)[a]	
India[b]	1961	75.5	24.5
	1971	61.8	38.2
Indonesia	1964/65	79.3	20.3
	1971	76.8	23.2
Korea	1966	90.3	9.7
	1972	85.5	14.5
Malaysia	1962	54.8	45.2
	1967/68	56.2	43.8
Philippines	1965	84.2	15.8
	1973	84.5	15.5
Thailand	1960	96.9	3.1
	1970	97.0	2.7

a Totals do not add to 100 percent in some cases due to groups with "unknown status".

b Group of "unknown status" for India, which is composed of cultivators and agricultural labourers, distributed between the two categories.

Source: Asian Development Bank, Asian Agricultural Survey 1976 Rural Asia: Chatlenge and Opportunity, Manila, Philippines, April 1977, p. 56.

Annexure 2 Seasonal Pattern of Income and Expenditure on Farms in Punjab, India

Month	Expenditure per holding		Income per holding from crops and Milk		Difference between Income and expenditure	
	Amount (Rs.)	Percent of total exp. during the year	Amount (Rs.)	Percent of total income during the year	Difference	Cumulative Difference
July	200	7	53	1	- 147	- 147
August	194	6	122	3	- 72	- 219
September	217	8	131	4	- 86	- 305
October	360	13	560	14	+ 200	- 105
November	212	8	641	17	+ 429	+ 324
December	102	7	287	10	+ 205	+ 529
January	175	7	144	4	- 31	+ 498
February	208	8	123	3	- 85	+ 413
March	199	8	76	2	- 123	+ 290
April	189	7	281	7	+ 92	+ 382
May	221	8	1021	26	+ 800	+ 1182
June	339	13	367	9	+ 28	+ 1210
Total	2695	100	3906	100	+ 1210	+ 1210

Source: Unpublished data developed by Dr. B.L. Agrawal, Indian Agricultural Research Institute, from the Government of India, Ministry of Agriculture Farm Management Studies, printed in The Economics of Agricultural Development, John W. Mellor, Cornell University Press, Ithaca and London, Cornell Paper backs, 1970, p. 311.

Annexure 3 Size of Farm, Labour Resources and Extent of Tenancy in Asian Countries

ountries	Average Farm Size (hect.[1])	% of Farms with less than average farm size[2]	Labour (Indicative) Number of Agriculturally engaged persons		% of Tenant Farmers[4]	% of Farm land under tenancy[4]	Crops of highest current importance[5]
			Per Farm[3]	Per Hectare cultivated Land[4]			
1	2	3	4	5	6	7	8
ghanistan	NA	NA	NA	NA	NA	NA	Wheat, Cotton, Maize, Fruits
ngladesh	1.30	77.9	7.80	5.93	NA	NA	Rice, Jute
dia	2.30	62.3[a]	5.22	2.27	27.3	NA	Major Cereals, Cotton, Oilseeds, Jute, S. Cane, Tea
donesia	1.46	70.1[b]	2.06	1.41	35.9	25.9	Rice, Maize, Rubber, Oil Palm, Coffee, Tobacco
hai	1.22	NA	3.05	2.49	NA	NA	Rice, Maize, Wheat, Jute
kistan	2.36	49.4[a]	2.55	1.09	43.4*	57.0*	Rice, Wheat, Cotton, Jute
ilippines	3.58	62.3[b]	2.76	0.77	54.3	40.4	Rice, Maize, Coconut, S. Cane, Abaca, Tobacco
etnam	1.57	56.0[b]	3.29	2.10	70.3	70.0	Rice, Rubber
ri Lanka	1.60	65.2[c]	1.92	1.20	NA	NA	Rice, Tea, Rubber, Coconut

Annexure 3

1	2	3	4	5	6	7	8
Thailand	3.50	47.9[d]	3.86	1.10	48.8@	54.5@	Rice, Rubber, Maize, Kenaf, Cassava
Turkey	5.03	NA	3.22	0.64	NA	NA	Wheat
West Malaysia	5.92	83.2[e]	3.16	0.53	31.2	15.7	Rice, Rubber, Coconut, Oilpalm, Pineapple
Korea	0.97	67.6[f]	2.18	2.25	NA	NA	Rice, Barley, Soya-been, Sweet Potato
Taiwan	1.05	NA	2.28	1.99	NA	NA	Rice, S. Cane, Banana, Sweet Potato, Ground-nut, Pineapple

1/Total arable land area (including land under permanent crops) divided by total number of agricultural holdings (excluding livestock farms without land) in the year within the 1960-1963 period as listed in FAO Production Year Book, 1966. These results are reproduced from Asian Agricultural Survey, Asian Development Bank, University of Tokyo Press, Tokyo, 1969.

2/The results are approximate and are worked out from the following source: World Rice Statistics, A.C. Pala Capac, The International Rice Research Institute, April 1976. Size categories considered small are:

a/ < 0.40, 0.40-1.00, and 1.01-2.02 hectares

b/ < 0.50, and 0.50 - 1.0 hectares

c/ < 0.40 and 0.40-1.0 hectares

d/ < 0.96, 0.96-2.4, and 2.4-4.8 hectares

e/ < 0.40, 0.40 - 1.20, 1.30-2.00, and 2.10-3.00 hectares

f/ < 1.00 hectares

3/Population economically active in agriculture as estimated for 1965 divided by total number of farm holdings or total arable land area as noted in 1/ above. These results are reproduced from Asian Agricultural Survey, op. cit.

4/The Assault on World Poverty, published by the World Bank, The Johns Hopkins University Press, Baltimore and London, 1975, Annex 1, Table 1: 10, p. 249

*Includes both Pakistan and Bangladesh

@Refers to 16 provinces in the Central Plain in Thailand. Data taken from Ishikawa S. Agricultural Development Strategies in Asia. The Asian Development Bank, 1970, p. 97.

5/These results are reproduced from Asian Agricultural Survey, op. cit.

Annexure 4 The Composition of Assets of Farm-Households in Various States in India, and in Korea

Form of Assets	Korea 1/ (1964)	India (1958) 2/			
		Punjab	Madras	West Bengal	Bombay
Land	82	80	68	85	73
Buildings	12	4	7	8	3
Wells	–	2	17	–	10
Farm Equipment	1	3	2	1	4
Livestock	2	11	6	6	10
Others (Inventory, other durable assets, financial assets)	3	–	–	–	–
Total	100	100	100	100	100

Sources: 1/ Asian Agricultural Survey, op. cit., p. 664.

2/ John W. Mellor, Economics of Agricultural Development, Cornell University Press, Ithaca, U.S.A., 1966, p. 312.

Annexure 5 Results Showing Efficient Allocation of Resources by Sample Farmers in Northern India

	Barley	Wheat	Pea	Gram	Average
Average Price	1.00	1.325	.943	.828	
	Used in Production of:				
Land (Acres)	4.416 (1.056)	4.029 (.355)	4.405 (1.185)	4.845 (.857)	4.424
Bullock Time (Hours)	.0696 (.0116)	.0716 (.0098)	.0820 (.0180)	.0834 (.0156)	.0774
Labour (Hours)	.0086 (.0026)	.0097 (.0037)	.0087 (.0021)	.0076 (.0030)	.0086
Irrigation Water (750 gallons)	.0355 (.0122)	.0326 (.0078)	.0305 (.0111)	.0315 (.0234)	.0325

Product or Factor	Relative Barley Price	Adjusted to the Barley Price (in Rs.)	Actual Market Price (in Rs.)
Barley (md.)	1.000	9.85	9.85
Wheat (md.)	1.325	13.05	14.20
Pea (md.)	.943	9.29	10.40
Gram (md.)	.828	8.16	10.35
Land (acres)	4.424	43.57	8 to 30 (cash rent only)
Bullock time (hours)	.0774	.762	Not available
Labour (hours)	.0086	.085	.068 (cash & kind only)
Irrigation water (750 gals.)	.0325	.321	Not available

Source: W. David Hopper, op. cit., pp. 620-621

Annexure 6 Optimal and Actual Cropping Pattern and Cropping Intensities-Reehna Doat, Perennial Canal Only[a] (based on 10 Cultivated Areas), Pakistan

Crops	Optimal Crop Pattern As Derived from the Model	Actual Crop-Pattern	
		District Data (Central Reehna)	Ghulam Mohammed Study (Upper Reehna)
Winter Crops (Acres)			
Wheat	2.80	3.70	3.23
Barley	-	0.14	-
Oilseeds	0.86	0.10	0.21
Gram	0.82	0.70	0.35
Fodder	1.44	0.91	1.41
Fruits, Vegetables and Miscellaneous	0.16	-	0.35
Total	6.08	5.55	5.44
Summer Crops (Acres)			
Rice	1.78	1.73	3.60
Cotton	-	0.72	0.27
Maize	0.64	0.29	0.25
Fodder	0.64	0.66	1.07
Sugarcane	0.80	0.26	0.58
Fruits, Vegetables and Miscellaneous	0.24	-	0.27
Total	4.10	3.66	6.04
Grand Total	10.10 acres	9.21 acres	11.48 acres
Cropping Intensity[b]	101.00 percent	92.10 percent	114.80 percent

a/ The model approximates most closely data from the central part of the Punjab (Reehna Doab), Column (2) shows the cropping pattern of Sheikhpura district in 1950-51 before implementation of SCRAP I. The lower intensity is due in part to the non-perennial areas located in the northern part of the district.

b/ Cropping intensity is defined as the ratio of cropped to cultivated acreage.

Source: Gotsch, C.H., op. cit., p. 228.

Annexure 7 Average Productivity of Important Crops of Representative Farms in Pakistan and India

Crops	West Pakistan[1]	India[2]
	Yields (maunds*/acre)	Yields (maunds*/acre)
Wheat	1.25	1.81
Fodder (Winter)	45.00	
Rice	1.80	
Fodder (Summer)	25.00	
Maize	1.50	
Sugarcane	50.00	
Barley		5.08
Pea		3.59
Gram		1.93

Sources:
1 C. Gotsch, op. cit.
2 W.D. Happer, op. cit.

* One maund is 82.2 pounds or 41.1 kg.

Annexure 8 Per Hectare Yield of Major Crops
Asian Countries

Year 1965
100 kg/hectare

Country	Paddy	Wheat	Maize	Ground nut (Shell)	Tobacco	Cotton	Irrigated Area as a % Cultivated area
Afghanistan	17.3	9.7	14.4			3.3	NA
Pakistan	16.8	8.6	9.9	12.7	12.1	2.7	65
Bangladesh							8
India	13.1	9.1	9.9	5.6	8.7	1.1	18
Indonesia	18.0		9.0	12.5	9.3	2.0	38
Laos	8.1		5.8		5.4	3.3	NA
Nepal	20.1	12.3	19.5	-	-	-	NA
Philippines	13.1		6.6	5.9	6.0	3.6	10
Vietnam	19.9		12.0	10.3	8.9	3.8	NA
Sri Lanka	17.7		8.4	11.1	5.6	-	52
Thailand	16.1		20.0	13.8	11.2	2.1	28
West Malaysia	27.1		13.9	16.0	10.4	-	40
Korea	38.5	10.7	8.0	6.9	16.3	2.1	33
Taiwan	37.8	21.1	22.0	12.1	20.4	3.7	58
Japan	55.0						48

Sources: (1) Asian Development Bank, Asian Agricu,tural Survey, University of Tokyo Press, Tokyo, 1969, p. 598.

(2) Uphoff N.T. and M.J. Esman, Local Organization for Rural Development - Analysis of Asian Experiences Centre for International Studies, Cornell University, Ithaca, N.Y., 1974, p. 38.

Annexure 9 Estimates of the Proportion of Rice Area in Five Major Environmental Categories

Country	Total Rice area ('000 hec.)	Proportion of Area (Percent)				
		Irrigated	Rainfed	Upland	Deep-water	Secured crop
Bangladesh	9,766	16	39	19	26	10
Burma	4,985	17	81	1	1	1
India	37,755	40	50	5	5	5
Indonesia	8,482	47	31	17	5	19
Malaysia (West)	771	77	20	3	0	50
Nepal	1,200	16	76	9	0	0
Pakistan	1,518	100	0	0	0	0
Philippines	3,488	41	48	11	0	14
Srilanka	604	61	37	2	0	25
Thailand	7,037	11	80	2	7	2
Vietnam	2,713	15	60	5	20	5
TOTAL	78,319	19	47	10	10	14

Source: Asian Development Bank, Asian Agricultural Survey 1976, op. cit., p. 76

Annexure 10 Average Annual Rainfall, Run-Off and Water Requirement for Rice in Some Asian Countries

Classification Annual Rainfall	Country	Average Annual Rainfall (mm)	Average Water Requirement for Rice (mm) (1)
Above 2,000 mm	China	2,430	1,737
	Malaya	2,540	(1st-1,792) (2nd-1,105)
	Philippines	2,360	(1st- 878) (2nd- 934)
	Ceylon	1,960	-
	India	1,137	1,370
1,000 to 2,000 mm	Korea	1,168	1,044
	Pakistan (East)	1,930	1,350
	Thailand	1,450	1,290
	Vietnam	600-3,300	1,500
Below 1,000 mm	Afghanistan	150-500	-
	Pakistan (West)	50-500	(Aman-1,193) (Boro-1,005)

Source: ECAFE, "Review of Water Resources Development in the ECAFE Region, 1953-1963," August 22, 1965, p. 7.

(1) Water Resources Division, "Result of Water Requirement Studies for Rice in Some Asian Countries," ECAFE.

Annexure 11 Proportion of Total Rice Area Planted to Modern Varieties, Asian Countries, 1965-1974

Country	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75
					(Percent)					
South Asia	0.01	1.9	3.8	6.4	9.9	12.9	17.3	20.7	24.5	27.0
India	0.02	2.5	4.9	7.3	11.3	14.5	19.1	22.1	25.6	29.5
Bangladesh	-	0.002	0.7	1.6	2.6	4.6	6.7	11.1	16.1	14.6
Nepal	-	-	-	3.7	3.6	5.7	6.3	16.1	17.1	18.6
Pakistan	-	0.01	0.3	19.8	32.0	36.6	50.0	43.7	43.2	40.3
Sri Lanka	-	-	-	1.2	4.9	5.0	12.0	42.7	64.5	55.2
Southeast Asia	0.2	0.6	3.2	7.2	10.0	12.6	15.7	19.9	25.2	26.9
Burma	-	-	0.1	3.5	3.1	4.0	3.9	4.4	5.1	6.6
Indonesia	-	-	-	2.5	10.4	11.1	16.0	24.2	36.6	40.5
Laos	-	0.04	0.1	0.3	0.3	8.1	7.5	7.5	7.5	7.5
Malaysia (West)	10.3	15.4	23.1	20.9	26.5	31.4	37.1	38.1	37.4	35.6
Philippines	-	2.7	21.2	40.6	43.5	50.3	56.3	54.0	63.3	61.5
Thailand	-	-	-	-	0.04	0.4	1.3	4.6	5.6	6.5
Vietnam (South)	-	-	0.02	1.7	8.4	20.0	25.7	30.9	31.4	31.0
East Asia	-	-	-	-	-	-	0.2	15.7	11.8	25.5
Korea (South)	-	-	-	-	-	-	0.2	15.7	11.0	25.5
Total Asia	0.1	1.4	3.5	6.6	9.8	12.6	16.5	20.4	24.6	26.9

Source: Dana G. Dalymple, Imports and Plantings of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations, Washington, USDA, Foreign Economic Service, 1974.

Annexure 12 Proportion of Total Wheat Area Planted to Modern Varieties, Asian Countries 1965-1972

Countries	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74
Afghanistan	NA	NA	NA	NA	NA	7.0	NA	NA	16.1
Bangladesh	-	-	-	7.2	7.6	11.3	11.8	17.7	23.1
India	Negl.	4.2	19.6	30.0	29.6	35.5	41.1	51.5	57.4
Tunisia	NA	NA	NA	NA	NA	14.0	NA	NA	NA
Pakistan	0.1	1.9	16.0	38.0	43.0	52.3	56.7	55.9	59.0
Turkey	-	Negl.	2.1	7.0	7.6	7.8	8.0	8.0	NA
Nepal	NA	NA	NA	NA	NA	49.1	NA	NA	75.5
Syria	NA	NA	NA	NA	NA	10.1	NA	NA	NA

Sources: (1) Daba G. Dalrymple, Imports and Plantings of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations (Washington, USDA, Foreign Economic Development Service, 1974).

(2) USDA, Imports and Plantings of High Yielding Varieties of Wheat and Rice in the Less Developed Nations, Foreign Economic Development Report No. 14, February 1972. Table D, p. 51. The Wheat figure for Nepal is obtained from FAO and published in Griffin K., The Political Economy of Agrarian Change, Macmillan, 1974, p. 30.

(3) Asian Development Bank, Asian Agricultural Survey 1976, op. cit., p. 66.

Annexure 13 Crop-Pattern, Asian Countries

Country	Arable Land (000 ha.)	Area under various Crops					
		Paddy	Wheat	Maize	Sorghum	Cotton	Tobacco
Afghanistan	3786	222	2345	-	-	150	-
Bangladesh	9097	9012	-	-	-	-	-
Burma	10920						
India	165680	34011	13460	4683	17181	7827	423
Indonesia	18000	7334	-	2537	-	-	148
Laos	950	916	-	-	-	-	5
Nepal	1980	1113	-	-	-	-	-
Pakistan	19235	10333	5371	546	840	1569	91
Philippines	6579	3124	-	2106	-	-	76
Vietnam Republic	2910	2429	-	37	-	-	10
Sri Lanka	1979	505	-	-	11	-	7
Thailand	12900	6187	-	541	-	75	45
West Malaysia	3523	350	-	-	-	-	-
Korea Republic	2291	1212	152	-	127	19	34

Sources: (1) FAO, Monthly Bulletin on Agricultural Economics & Statistics, (April 1967), pp. 18-23; (May 1967), pp. 22-24; (June 1967), pp. 20-21; (July & August 1967), p.27; (September 1967) pp.17-20.

(2) Asian Agricultural Survey, Asian Development Bank, University of Tokyo Press, Tokyo, 1969, pp. 158 and 519.

Annexure 14 Proportion of Area Under Bajra Planted to Modern Varieties in India

Country	Bajra						
	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
India	0.5	3.3	6.2	10.2	15.9	NA	21.4

Source: (1) Bapna S.L., et. al., Studies in Agriculture: 1, Bajra Production: Problems and Prospects, Allied Publishers, 1976, Delhi, p. 23.

Annexure 15 Actual and the Potential per Hectare Yield of Selected Crops in India

(Metric Tonne)

Crops	National Demonstration Yield	Actual Average
Wheat		
1. West Bengal	2.70	1.98
2. Punjab	5.25	2.36
3. Haryana	6.30	1.75
4. Bihar	5.60	1.35
5. Rajasthan	6.75	1.20
6. Maharashtra	5.30	0.84
7. Madhya Pradesh	6.10	0.84
8. Uttar Pradesh	8.50	1.17
Paddy		
1. All-India	5.42	1.30
2. Punjab	NA	2.07
3. Tamil Nadu	NA	1.85
4. Karnataka	NA	1.69
5. Andhra Pradesh	NA	1.60
6. Bihar	NA	0.87
7. West Bengal	NA	1.21
8. Orissa	NA	0.71
Jowar		
1. All-India	3.10	0.61
Maize		
1. All-India	2.75	1.07

Source: M.S. Swaminathan, Convocation Address delivered at the Indian Institute of Management, Ahmedabad, April 19, 1977.

NA = Not Available.

Annexure 16 Cropping Intensities in Various Asian Countries 1960, 1965 and 1966 to 1974

Years	Countries						
	Bangladesh	Burma	India	Korea	Malaysia	Pakistan	Philippines
1960	127	107*	115	147	100	112	136
1965	132	110**	114	150	101	112	139
1966	129	-	114	151	-	115	-
1967	140	-	117	152	-	114	-
1960	139	113	116	152	-	114	-
1969	146	113	110	154	-	115	-
1970	140	114	110	151	105	115	141
1971	130	115	110	145	-	116	-
1972	135	116	-	146	-	-	145
1973	136	117	-	143	107	-	-
1974	134	117	-	147	-	-	-

*1961

**1964

Source: Asian Development Bank, Asian Agricultural Survey 1976, op. cit., p.411

Annexure 17 Use of Fertilizers and Tractor Horsepower Units[a] in Various Asian Countries

Countries	Fertilizers				Tractor Horsepower Units/1000 Hec.[d]	
	Total ('000 m.t. of NPK)		Per Hectare (Kg of NPK)			
	1963[b]	1973[c]	1963[b]	1973[c]	1965[b]	1973
Afghanistan	0.1	30.5	-	-	1.63	5.46
Bangladesh	39.6	193.6	4.7	21.2	3.42	7.53
India	596-6	2753.3	3.7	16.5	7.36	35.03
Nepal	0.8	13.0	0.4	6.8	3.75	5.60
Pakistan	61.5	430.6	3.4	22.2	14.32	64.94
Sri Lanka	21.0	102.1	11.2	51.6	111.30	127.65
Burma	7.5	57.3	1.0	6.7	7.27	32.64
Cambodia	1.3	2.0	0.4	1.1	-	-
Indonesia	121.3	309.3[e]	7.3	21.1	7.43	16.21
Laos	0.1	0.2	0.1	0.2	-	-
Malaysia	49.7	186.5	14.8	-	24.22	62.22
Philippines	90.8	246.1	11.0	22.1	18.38	21.34
Thailand	53.0	173.5	2.5	12.0	7.97	31.26
Vietnam	27.6	166.4	17.6	52.6	-	-
Taiwan	196.9	305.4	225.8	340.8	-	-
Korea	334.8	761.6	157.9	319.1	-	-

a. Power tillers are included in estimating total horsepower. It is assumed that fourwheel tractors have 30 horsepower and power tillers have 5 horsepower.

b. Average of 1961-65.

c. Average of 1972-74.

d. Adapted from Table I-4.9, and Appendices I-3.1, I-8.3 of Asian Agricultural Survey 1976, op. cit.

NPK = Nitrogen, Phosphate and Potash.

Source: Asian Development Bank, Asian Agricultural Survey 1976, op. cit., pp. 77, 79, 342 and 411.

Annexure 10 Fertilizer Subsidies in Selected Asian Countries (Urea only)

Country	Percent of ubsubsi-dized Retail Price	Year
Bangladesh	46	1975
India	25-50	1971-72
Indonesia	63	1974
Korea	44	1974
Malaysia	37	1975
Nepal	32	1973-74
Pakistan	63	1974-75
Philippines	25	1975
Sri Lanka	50	1975-76
Thailand	No subsidy	-

Source: Asian Development Bank, Asian Agricultural Survey, 1976, op. cit., p. 163

Annexure 19 Ratio of Nitrogen to Paddy Price for Selected Asian Countries, 1965-1976[a/]

Country	1965-69	1970	1971	1972	1973	1974	1976
Bangladesh	-	1.36	1.31	1.78	1.52	1.21	1.93
Burma	8.31	5.33	4.61	-	-	-	1.81
India	1.97	1.97	1.93	11.77	1.56	2.23	-
Indonesia	-	-	-	-	-	-	2.40
Korea	1.47	1.07	0.85	0.74	0.92	0.77	1.42
Philippines	3.38	3.81	2.33	2.33	1.63	4.07	3.56
Sri Lanka	1.44	1.33	1.33	1.27	1.20	-	2.04
Republic of China	3.23	2.23	1.97	1.80	1.72	-	0.78
Thailand	-	0.10	10.30	9.44	-	9.16	4.08

a/ Price of kg. N from urea.

Source: Asian Development Bank. Asian Agricultural Survey 1976, op. cit., p. 164

Annexure 20 Marketing Patterns of Paddy by Sample Farmers in Selected Asian Countries

North Arcot, Tamil Nadu, India

Villages	Average holding size (Hect.)	Production (Tons/Hect)	% of Produce Sold			
			Total	Immediately	Within 1 month	After 1 month
Kariyamangalam	4.1	5.3	78	16	27	35
Manmalai	1.8	5.6	74	40	15	19
Palvarthuvehran	2.0	4.1	84	71	11	2

Nainital, Varanasi, Uttar Pradesh, India

Villages	Average holding size (Hect.)	Production(Tons/Hect.)		% of produce sold			
		Rice	Wheat	Total		Within 1 month	
				Rice	Wheat	Rice	Wheat
Dhanpur-Vijaynur	6.0	4.7	3.1	96	85	80	76
Tarna	1.2	3.3	3.2	42	23	91	92
Barain	1.2	3.0	3.2	56	36	95	96

Klaten, Central Jawa, Indonesia

Villages	Average holding Size (Hect.)	Production(Tons/Hec.)		% of produce sold					
		Dry	Wet	Total		Within 1 month		After 1 month	
				Dry	Wet	Dry	Wet	Dry	Wet
Naganjat	0.5	5.9	3.6	60	63	58	62	2	1
Kahuman	0.6	6.5	6.9	64	60	64	60	0	0
Pluneng	0.5	6.1	5.6	69	57	68	54	1	3

Source: International Rice Research Institute, Changes in Rice Farming in Selected Areas of Asia, Manila, 1975, pp. 88, 113, 169.

Annexure 21 Frequency of Sample Farmers' Visit to Market and Sales of Rice, Korea

Farm Size Group (Hectare)	Times visited a market per week	Times sold Rice per year
Less than 0.5	2.2	3.1
0.51 to 1.0	2.4	6.1
1.0 to 1.5	2.9	7.4
1.5 to 2.0	2.7	9.0
2.0 and above	3.1	10.8
All farm	2.6	7.2

Source: Food and Agriculture Organization, Marketing - An Accelerator for small Farmer Development, 15 village-level case studies in Asia, Bangkok, 1976, p.283.

Annexure 22 Sample Farmers' Reasons for Preference for Commission Agents for Marketing Services, Kepitipola, Sri Lanka, 1975

Reasons	Villages			
	Udubadana		Girambe	
	No	%	No	%
1. Pay higher prices	6	27.3	3	23.1
2. Easy to obtain money for crops sold	3	13.6	2	15.4
3. Loans could be obtained at any time	7	31.8	7	55.8
4. Others	6	27.3	1	7.7
Total	22	100.0	13	100.0

Source: FAO, Marketing - An Accelerator, op. cit., p. 143

Annexure 23 Prices Received by Corn Farmers, Wholesale Prices in Bangkok, and Price Spread for Corn in Thailand, 1967-72

(Bahts/Metric Ton)

Year	Price Received by Farmers	Wholesale Prices in Bangkok	Prices Spread
1967	820	1170	350
1960	720	970	250
1969	800	1103	303
1970	810	1224	414
1971	750	1200	450
1972	840	1144	304

Source: Division of Agricultural Economics, Ministry of Agriculture and Cooperative, Thailand.

Annexure 24 Marketing Costs in Four Villages in Lampung with the Terminal Market at Teluk Betung Indonesia, 1972

(Rupiah/Kg.)

Villages	Marketing Costs				Total
	Transportation	Processing	Packaging	Tax	
Bondung Baru	1.35	0.35	0.25	0.15	2.10
Simpong Agung	1.50	0.40	0.25	0.20	2.35
Sri Bhawono	3.00	0.40	0.35	0.30	4.05

Source: Isang Gonarsyah, Institute Pertanian Bogor, 1973.

Annexure 25 Profit Margin in Corn Marketing in Lampung, Indonesia, 1972

Village	Traders				Marketing Institution			
	Terminal Market Price	Producer's Price	Marketing Costs	Profit Margin	Market Price Teluk Betung	Producer Receipt	Marketing Costs	Profit Margin
Bondung Baru	15	10	2.10	2.90	15	10	1.95	3.05
Sirupeng Agung	15	10.50	2.35	2.15	15	10.5	2.20	2.30
Campur Asri	15	8	3.90	3.10	15	8	3.00	3.20
Sri Bhawono	15	9.25	4.05	1.60	15	9.25	3.90	1.85

Source: Isang Gonansyah, Institute Pertanian Bogor, 1973.

Annexure 26 Estimated Agricultural Research Expenditure in Selected Asian Countries

	Rice		Other cereals[a]		All Agriculture		1974 as proportion of 1959 (All-Agriculture)
	1959	1974	1959	1974	1959	1974	
	('000 constant 1971 US $)						
South Asia							
Bangladesh	00	774	0	125	0	1139	-
India	1480	4686	1058	5207	10573	26035	2.5
Pakistan	06	142	96	324	961	2034	2.1
Sri Lanka	0	464	0	0	1322	2441	1.8
Southeast Asia							
Indonesia	74	442	91	0	240	3417	14.2
Malaysia	1124	2245	00	0	1442	4082	3.4
Philippines	667	3020	100	156	1002	5207	2.9
Thailand	661	3173	0	408	661	4082	7.4
Vietnam	48	119	12	0	60	297	5.0
East Asia							
China, Republic of	235	1179	18	203	041	2359	2.0
Japan	21338	93726	10454	46863	57672	260352	4.5
Korea	670	1513	172	390	1081	2441	2.3

a. Wheat, Barley, Maize and Sorghum.

Source: Asian Development Bank, Asian Agricultural Survey 1976, op. cit., p.85.

Annexure 27 Allocation of Agricultural Research Investment by Commodities in Asian Developing Member Countries

	Approximate Commodity value in '74 (Million US$)	Estimated Annual Research Edpenditure (Thousand US $)		Estimated Scientist Man-Years		Percentage of Commodity Value Invested in Research	
		1959	1970	1959	1974	1959	1974
1. Rice	17,720	5,100	17,700	510	1,600	0.06	0.10
2. Livestock & Livestock products	14,700	3,956	11,900	365	050	0.05	0.00
3. Maize, Millet & Sorghum	4,700	1,700	5,500	90	240	0.04	0.12
4. Pulses	4,300	540	1,920	70	170	0.02	0.05
5. Sugarcane	3,500	4,500	9,400	325	440	0.20	0.27
6. Roots & Tubies	3,400	500	1,288	50	195	0.02	0.03
7. Wheat & Barley	3,050	050	3,960	95	590	0.00	0.13
8. Groundnuts	2,300	300	800	20	45	0.02	0.03
9. Oilseeds	2,100	400	1,000	20	50	0.03	0.05
10. Cotton	2,100	4,200	6,200	350	420	0.25	0.30
11. Tobacco	1,500	1,200	2,300	50	120	0.10	0.15
12. Vegetables	1,400	300	1,000	20	45	0.03	0.07
13. Tea	1,100	1,000	2,000	50	100	0.10	0.10
14. Rubber	1,100	2,000	3,000	80	100	0.20	0.27
15. Coconuts	1,000	300	700	15	40	0.05	0.07
16. Bananas	900	200	500	15	25	0.03	0.05
17. Coffee	000	1,000	2,000	50	100	0.20	0.25
18. Jute	000	500	700	75	40	0.07	0.09
19. Spices	000	500	1,000	25	50	0.00	0.12

Source: Asian Development Bank, Asian Agricultural Survey, 1976, op. cit. p.87

Annexure 20 Perceived Rice Production Constraints and Related Plant Breeding Objectives

Production limiting problem as perceived by sample of 12 plant breeders	Relative frequency	Related breeding objective cited by the sample of 12 plant breeders	Relative frequency
		Yield stability	100
		Lodging resistance	93
		Fertilizer response	90
		Tillering	15
		Yield Potential	8
Excessive monsoon cloudiness	100		
Drought	94	Drought tolerance	10
Diseases	84	Disease resistance	50
Insects	79	Insect resistance	40
Insurions soils	79	Adverse soils	10
Cold temperature	47	Cold temperature	10
Deep water or floods	26	Deep water	3
Others	15	Others[a]	70
		Grain quality	75
		Growth duration	70

a Each of the other objectives cited having a relative frequency of less than 15 include: non-shattering (13), alternate gine source (10) adaptability (8) grain or panicle weight (8), seed dormancy (8), seedling vigor (5), milling recovery (5),.photoperiod sensitivity (3), deep water (3) and threshability (3).

Source: Asian Development Bank, Asian Agricultural Survey, 1976, op. cit. p.89.

Annexure 29 Expenditures on Research and Extension as a Percentage of the value of Agricultural Product (1951-74)

Country Groupings by per capita income (US $)	1951	1959	1965	1971	1974
	A. Percentage spent on Agricultural Research				
> 1750	1.21	1.26	1.80	2.40	2.55
1001-1750	0.83	1.19	1.95	2.34	2.34
401-1000	0.40	0.57	0.85	1.13	1.16
150-400	0.36	0.37	0.62	0.83	1.01
<150	0.22	0.28	0.47	0.70	0.67
	B. Percentage Spent on Agricultural Extension				
> 1750	n.a.	0.45	0.52	0.61	0.60
1001-1750[a]	n.a.	0.17	0.22	0.33	0.31
401-1000[a]	n.a.	0.26	0.40	0.46	0.40
150-400	n.a.	0.07	0.99	1.44	1.59
<150	n.a.	0.57	1.04	1.76	1.82

a. Excluding Eastern Europe and USSR.

n.a. = Not available

Source: Asian Development Bank, Asian Agricultural Survey, 1976, op.cit, p.84.

Annexure 30 Government Investment for Irrigation as a Percentage of Government Investment for Agriculture

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Afghanistan	-	-	-	-	-	-	57.4	56.8	55.4	53.3
Bangladesh	-	-	-	-	-	-	-	-	57.4	54.2
Burma	-	-	-	-	-	-	-	68.8	-	38.2
India	-	-	-	92.7	93.9	94.1	98.6	95.6	98.1	-
Indonesia	-	-	-	81.7	58.6	62.3	62.1	37.6	37.1	29.5
Korea	41.8	30.1	30.5	-	-	-	-	-	-	15.3
Malaysia	43.3	48.9	39.7	-	36.6	-	-	-	-	-
Nepal	-	45.3	51.2	33.7	48.1	52.5	35.7	47.7	43.4	-
Pakistan	100.0	100.0	100.0	100.0	98.8	97.6	98.7	94.2	95.4	-
Philippines	-	-	36.8	38.3	63.3	67.2	24.2	36.7	9.7	24.0
Sri Lanka	55.1	51.1	56.8	61.9	71.9	-	-	-	-	-
Thailand	85.0	78.9	83.1	75,9	82.6	86.0	83.3	81.0	78.5	77.3

Source: Asian Development Bank, Asian Agricultural Survey, 1976, op. cit, p. 150

Annexure 31 Proportions of Major and Minor Projects in Government Development Outlay on Irrigation Mainland China and India

	Increase in Irrigated Land Area in million hec.	Proportion in %	Government development outlay Amount in $ million	Proportion in %	Government investment cost per ha. $
India: 1 FYP period					
Major & Medium Projects	1.174	22.5	630	85.7	537
Minor projects	4.047	77.5	105	14.3	26
Total	5.221	100.0	735	100.0	118
2 FYP Period					
Major & Medium projects	2.469	40.4	782	79.7	317
Minor projects	3.642	59.6	199	20.3	55
Total	6.111	100.0	981	100.0	161
3 FYP Period					
Major & Medium projects	4.654	47.3	1259	70.6	271
Minor projects	5.180	52.7	525	29.4	101
Total	9.834	100.0	1784	100.0	181
Mainland China: 1953-56					
Major projects	0.156	1.4	31.8	18.7	204
Medium projects	0.869	7.8	94.1	55.2	108
Minor projects	10.110	90.8	44.4	26.1	4
Total	11.135	100.0	170.3	100.0	15

Source: Ishikawa, S., op. cit., p. 150-151

Annexure 32 Duration of Agricultural Loans made by Selected Institutions (Percentage of Value)

Country	Institutions	Durations		
		Less than 2 years	2-5 years	Over 5 years
Bangladesh	Agricultural Development Bank	44	40	8
India	Cooperatives Commercial Banks	76	24	0
Iran	Agricultural Coop.Bank of Iran Agricultural Development Fund	30 0	70 10	0 90
Malaysia	Bank Pertanian Malaysia	60	40	0
Pakistan	Cooperatives	88	12	0
Philippines	Rural Banks	93	7	0
South Korea	National Agril Coop.Federation	90	10	10
Sri Lanka	All Institutions	95	5	0
Thailand	All Institutions	71	28	1
Turkey	Supervised Credit Programme	23	53	24
South Vietnam	Rural Banks	100	0	0
Taiwan	All Institutions	50	28	22

Source: G. Donald, op. cit., p.115

Annexure 33 Estimates of the Distribution of Agricultural Loans and Interest Rates Charged by Types of Lender, Asian Countries

Countries	Institutional Loan (IL)					Non Institutional Loans (NL)			
	% of farmers getting IL	IL as a % of Agricul. credit	% of IL		Nominal Interest Rate(% per year) Avg.)	NL as a % of Agric. Credit			Nominal Interest Rate (% per year)(Avg.)
			Public	Private			Commercial	Non-Commercial	
Bangladesh	15	14	100	0	3	86	39	61	
India	20	30	87	13	10	70	71	29	25
Iran		10	----57----		2	90	----43----		
Jordan	8		90	10	5				20
Malaysia	2		54	46	2				60
Pakistan	5	14	100	0	3	86	27	73	30
Philippines	28	42	38	62	6	58	88	12	30
South Korea	40	34	100	0	11	66	30	70	60
South Vietnam	21	23	100	0	28	77	5	95	40
Sri Lanka	14	20	100	0	6	80	56	44	50
Thailand	7	8	87	13	2	92	39	61	30
Turkey	23	40	95	5		60	----60----		
Taiwan	95	65	18	82	7	35			

Source: World Bank, The Assault on World Poverty, The John Hopkins University Press, Baltimore and London, 1975, pp. 170-171, and 179.

Note: This table reflects the division of outstanding credit balances among four types of lenders: Public institutions; private institutions such as Commercial Banks; Commercial lenders such as store-keepers, middlemen, landlords and money lenders; and non-commercial leaders such as friends and relatives. The figures are based on information gathered from a small sample of farmers, except in the case of India where the survey on credit was nationwide.

Annexure 34 — Distribution of Loans by Farm Size and Measures of Delinquency in Selected Asian Countries

Countries	% Distribution of Loans by Farm Size						Ratio of Arrears to Portfolio		
	No. of loans			Value of loans			Institution	Year	Ratio
	Small	Medium	Large	Small	Medium	Large			
Afghanistan	NA	NA	NA	NA	NA	NA	ADBA	1970-72	37
Bangladesh	23	50	27	18	31	51	ADB	1969-73	43
							IRDP		NA
India	16	35	49	16	25	59	PLDB	1974	42
							Conperatives	1974	44
							Coml.Banks	1974	45
Malaysia	36	40	16	18	51	31	BPM	1970-72	6
Philippines	NA	NA	NA	NA	NA	NA	Rural Banks	1969-72	20
South Korea	36	35	29	NA	NA	NA	NACF	1968-72	7
Sri Lanka	NA	NA	NA	NA	NA	NA	New Credit Scheme	1970	50
Thailand	NA	NA	NA	NA	NA	NA	BAAC		35
Turkey	NA	NA	NA	NA	NA	NA	TRAB	1968-70	29
Pakistan	40	45	15	23	46	31	NA		NA
Taiwan	NA	NA	NA	26	47	27	NA		NA

a. Small farmer for Bangladesh means less than 1 acre, for India less than 2 acres, for Malaysia less than 4 acres, for South Korea less than 0.5 hectares, for Pakistan less than 10 acres, and for Taiwan less than 1 hectare.

b. Medium farmer for Bangladesh means 1-3 acres, for India 2-4 acres, for Malaysia 4-8 acres, for South Korea 0.5 to 1 hectares, for Pakistan 10-25 acres and for Taiwan 1-2 hectares

ADBA : Agricultural Development Bank of Afghanistan

ADB : Agricultural Development Bank

IRDP : Integrated Rural Development Program

PLDB : Primary Land Development Bank

BPM : Bank Pertanian Malaysia

NACF : National Agricultural Cooperative Federation

BAAC : Bank for Agriculture and Agricultural Cooperatives

TRAB : Turkish Republican Agricultural Bank

NA : Not Available

Source: Donald G Credit for Small Farmers in Developing Countries, Westview Boulder, Colorado, 1976, pp. 80, 140.

Annexure 35 Pattern of Land Distribution in Selected Asian Countries

Country	Years	Farm Size in Hectares												Gini Coefficien
		0-1		0-2		0-3		0-5		0-10		10		
		Farms	Area	Farms	Area	Farms	Area	Farms	Area	Farms	Area	Farms	Area	
		Percent												
Bangladesh	1960	51.6	15.2	77.9	41.6	89.3	60.9	96.5	80.0	99.6	94.1	0.4	5.9	0.47
	1974	66.0	24.0	88.0	58.0	95.0	77.0	98.0	90.0			2.0	11.0	0.57
India	1961	39.8	6.8	62.2	19.1	74.6	30.4	89.6	53.4	95.5	70.2	4.5	29.8	0.59
	1970-71	50.6	9.0	69.7	20.9	79.2	31.0	88.6	46.7	96.1	69.1	3.9	30.9	0.63
Indonesia	1963	70.1	28.7	88.3	51.5	94.0	64.0	97.5	76.3	99.3	87.5	0.7	12.5	0.54
Korea	1963	73.3	45.0	93.9	81.6	99.7	98.4							0.30
Rep. of	1974	67.0	58.3	93.5	79.5	91.5	92.9							0.32
Malaysia	1960	45.4	15.2	67.4	32.6	83.4	52.5	96.1	79.2	99.0	89.9	1.0	10.1	0.44
(West)	1973	35.3	15.3	72.1	48.0	91.3	76.5	98.8	94.6					
Pakistan	1960	32.9	3.5	49.5	9.4	61.5	16.7	77.1	31.7	92.1	57.3	7.9	42.7	0.60
	1972					43.6	12.2	68.1	30.4	89.2	57.0	10.8	43.0	
Philippines	1960	11.5	1.6	41.1	11.2	62.3	24.7	81.0	43.1	94.4	66.8	5.6	33.2	0.52
	1971	13.6	1.9			61.1	24.1	84.8	47.0	95.1	66.1	4.9	33.9	0.51
Thailand	1963	18.5	2.5	47.9	15.3			75.4	42.1	94.6	77.8	5.4	22.2	0.46
	1971	13.4	2.6	49.5	20.3			80.3	51.8	96.2	83.8	3.8	16.2	0.41

Source: Asian Development Bank, Asian Agricultural Survey, 1976, op. cit., p. 90.

Annexure 36 Land Redistribution Under Land Ceiling Legislation in Selected Asian Countries

	Year	Area (in '000 Hectares)
Bangladesh		
Total Area settled under Raiyat	1957-58 - 1972-73	734
Total Area Acquired	1956-57 - 1966-67	69
Total surplus area	1973	295
Net cropped area	1973	9,098
India		
Total land redistributed	1971	493
Total declared surplus area		988
Net cropped area		139,368
Pakistan		Under 1959 Reform
Total area disposed of	1974	304
Total land acquired by government	1974	770
Total surplus area		unknown
Net cropped area	1965	13,934
		ML order 115 of 1972
Total area disposed of	1974	108
Total land acquired by govt.	1974	385
Total surplus area	(1972 ceilings)	1147
Net cropped area	1971	14,334
Philippines		
Total land redistributed	(3/1976)	121
Total surplus area (rice & Corn)	(the ceiling)	502
Net cropped area	1972	2,625

Source: Asian Agricultural Survey, 1976, op. cit. p.100