1. The Notions of Sustainability

The history of mankind is a continuous struggle for food. Globally, the abilities of men to increase agricultural productivity have succeeded in adjusting food production to increasing population. While Malthus’ visions never became reality, for shorter periods and certain regions, many frictions have happened. Famine - caused by different factors - is an experience which mankind has been making until today.

In recent times, the industrial countries have been experiencing a strong desire for a more affluent life. The technological development corresponded to this and led, in some countries, to a degree of wealth which was difficult to imagine in former times.

But in recent years, we have been realizing more and more the “failure of our success.” The high level of production and efficiency have led to cost for the environment: damages to the ecosystem, health problems, abuse of non-renewable resources, etc. This development made a new term popular: sustainability. It is used with different meanings. What do we mean by sustainability?

1) Sustainability primarily means survival. In forestry, the term is used since long and indicates the maximum number of trees which can be cut on condition that the stock be continuously renewed: what is harvested has to be replaced. Thaer and aeroboe, early agricultural scientists, put special emphasis on the nation of sustainability in their discussion of optimal land cultivation. The nation of carrying capacity, the maximum number of people which the ecosystem can support in the long run, also includes the nation of sustainability. Obviously, the level of living has to be included in this calculation.

2) Sustainability has social, economic, and emotional dimensions, social sustainability refers to the survival of cultivating families and rural societies over centuries. The does not exclude social change. Economic sustainability is expressed in the nation of an ‘economic holding,’ which absorbs the labour capacity of a family and supplies this family’s living. The moral dimension becomes obvious in the farm-centered thinking of the peasant family and in its understanding of itself as a trustee who can use the inherited land, but has to hand it over to the heirs in a well-maintained condition.

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3) Sustainability should be understood as being dynamical. There will be a grater demand for food because of population increase on condition that the natural resource base be maintained or improved. Sustainability is not the same as low-input agriculture. Sustainability does not aim at continuation but includes incentives and approaches for further development. It is not using constant or back ward technologies for production, but selecting these technologies which maintains the productivity of the land.

4) Sustainability should be understood comprehensively and is not just 'care of the environment.' Sustainability includes.

**Ecological health**

The system should be self-regulating and replace whatever has been taken out. Exploitations of resources is not tolerable.

**Economic viability**

The system should have the ability to survive and progress as a whole and in its components. Thereby, private interests cannot predominate over public interests.

**Social justice**

Equality in the control of resources (land, labour relations, participation, etc.) is a precondition, while the lack of access to resources leads to environmental damages. The squatter who illegally occupies land and cultivates even steep slopes is an appropriate example illustrating damages done to resources because of poverty.

**Humanity of agricultural production**

A human agriculture values the 'respect of life' as for instance in human relations, in relations to animals as well as in questions of quality of products. Cultural roots are as important as plant roots.

This corresponds to 'world ethics for sustainable living' as formulated by the 'Strategy for Sustainable Living.' Its elements are stipulated as follows:

- every human being is part of the living community consisting of all living creatures;
- all human being have the same rights (life, security, freedom, religion, expression, standard of living);
- every form of life warrants respect;
- everyone should assume responsibility for his/her impact on nature;
- everyone should aim at a fair share of resources, and no generation should limit the opportunities of other societies and generations.

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2) Caring for the Earth, Strategy for Sustainable Living, IUCN/UNEP/WWF, Gland 1991
Sustainability understood in these ways is a continuous process towards a never-ending goal: the management of the natural resource base and its capacity of regenerating in such a way that its productivity is maintained and increased over time.

This requires a new definition of economic and human development. Sustainable development should concentrate on fulfilling the real interests of the current generation without damaging the ability of future generations to satisfy their needs. Socio-economic development is what is the real interest of the total population, not what is technically possible.

I ought to mention that the notion of sustainability is often used with a different meaning in discussions on technical assistance. Here, a project is called sustainable if it continues to have an impact, at least for some time after external support has ceased.

But in the present paper, I concentrate on sustainability as management of the resource base in such a way that productivity is maintained over time.

Sustainability, care of the resource base are topics which are widely discussed nowadays. We can hardly read our daily newspaper without finding at least one article on those subjects.

But how is this notion understood by land-cultivating families? To what extent are they interested in these aspects, and how far are they able to act correspondingly?

2. The Socio-economic Differentiation of Land-cultivating Families

Land cultivators are very inhomogeneous; they have different interests, motives, living conditions, and resource endowments. Before dealing with the attitude towards sustainability, it is necessary to differentiate between the most important socioeconomic categories among land cultivators.

Over the last forty years, the social, economic and political framework conditions have changed agriculture; size of farms decreased because of inheritance, land reforms, and population increased. New technologies have been introduced in agriculture which is now interwoven with other sectors. Non-agricultural development created employment opportunities and caused migration. These and similar factors are more marked in one region than in another. But the general result is an increasing differentiation in agriculture. Forty years ago, apart from a small number of plantations, agriculture consisted of peasant family farms, where the family members applied all their labour to the farm and all family members lived off the produce of the farm. The usually small farm was the centre of common interest of all family members, the basis of their existence, and their security of subsistence. The family's expectations were homogeneous and farm-centered. Differences in farm sizes and ownership were the main reason for difference in the standard of living.

Contrary to former times, it is necessary to differentiate between two types of farm households: 1). Those who have enough land to enable them to earn their living from agriculture.

These households usually concentrate their efforts on farming and take advantage of the possibilities offered by modern technology. They want to increase their income by practising good cultivation. This category consists of
2) Those who do not have enough land to be able to earn their living through agricultural activities. They try to improve their living conditions by taking up non-agricultural activities. Their goal is to achieve a better income, wherever it may come from. Their interest in agriculture is often limited, partly enforced because of the lack of alternatives. Especially the young people in these households look for means of livelihood outside agriculture. This category consists of:
- households with multiple employment
- households with household production
- households of aged people
- marginal existences.

Table 1. Socioeconomic Types of Land-cultivating Households

1. Households with enough land
   - large landowners (landlords, plantations)
   - progressive farmers
   - economic holding.

2. Households without enough land
   - households with multiple employment
   - households with household production
   - households of aged people
   - marginal existences.

In greater detail, the different types can be characterized as follows:

Large Landowners (landlords, plantations)
Their number decreased considerably because of land reforms, measures to limit the impact of future land reforms, and inheritance. As these people usually want to maintain their standard of living after their tended property has been reduced, they make use of the possibilities of modern technologies and intensify land use in self-cultivation. Many 'pettylandlords' become progressive farmers. However, there are exceptions; some still cultivate with sharecroppers is in the old days. Plantations are units producing export crops, mostly perennials, and usually include processing in their activities.

Production is mainly concentrated on one crop and is organized on a semi-industrial basis. Management is of high standard, while the social situation of plantation workers is often miserable.
Progressive Farmers
This group is an offspring of the 'Green Revolution.' Small landlords and active family farmers used the possibilities of achieving a high income in agriculture by applying new technologies. They practise market-oriented modern agriculture that ensures a high income. Eroded political power leads to political power. This group has many representatives in district and provincial assemblies.

Economic Holding
These are economically sound family farms of sufficient size. Often, they have been in the hands of a family over generations. Usually, all family members are interested in farming along modern lines as this yields a good income.
As for the other types without enough land to support the family, the situation is quite different. Since they do not have sufficient land, they have to use all their resources to secure survival. Often, this occurs outside agriculture. Therefore, those are not households which apply all their labour on the farm, live off the proceeds of farm, and whose members focus their interest on the farm.
These groups have increased considerably in number. In detail, they can be characterized as follows:

Households with multiple employment
Difference in family and farm structure, in the region's resource endowment and the level of economic development have resulted in different types of multiple employment:

Individual Income Combination
The cultivator himself takes up non-agricultural work or works as an agricultural labourer. As it is difficult to combine both activities, this is often only a transitory arrangement, except in the case of rural service professions.

Household Income Combination
One or more sons take up non-agricultural employment or work as agricultural labourers and give part of their salary to the family. They may work locally or in distant places, on a permanent basis or whenever work is offered. Others divide their working life into sections. Up to the age of about 45 years, men work outside the village, while their fathers operate the farm. When the letter becomes too old, the son takes over cultivation, but often his children are of working age at that time.

Extended Family Economy
Nuclear families still maintain close social and economic ties even after some of the branches have migrated. Those living in the cities are given foodstuffs, and pre-school children live on the farm of remittances, not regularly, but whenever needed for investments.
Households with Household Production

Not everybody will find a job outside agriculture, and sometimes there is not suitable person in the family. The strategy left to these households is to produce by using the available resources (weaving mats, gathering firewood, making ropes, producing charcoal, renting animals) or to avoid expenses by assuming maintenance work and repair of buildings, tolls and clothing which, in other households, are assigned to specialists. Often, this is a transitory period until a child is old enough to take up non-agricultural work. Usually, income is low in these households, and, therefore, cultivation is extensive. Many households experience a downward trend.

Households of Aged People

Here, all children have migrated or died. Since other means of social security are lacking, the old couple has to continue cultivation as long as its shrinking working capacity allows. Cultivation is extensive, with much disinvestment, and finally the land has to be rented out.

Marginal Existences

For personal reasons or because of their location, these households have not succeeded in finding means of earning an additional income. They often live in extreme poverty and have to sell their land gradually. Cultivation is done without investment, and yield are low. They desperately fight for survival by whatever means. Some try to migrate to cities in the hope of a better living; most of them cannot even afford it.

This breakdown of land-cultivating households according to socioeconomic categories the wide variety of today's agriculture regarding the degree to which the family employs its labour on the farm and lives off the proceeds, regarding is interest in farming, the functions of land cultivation, and its goals for the future of its cultivation. Some of these households want to make a living from the land, others, only part self-sufficiency or just housing and rural life opportunities, financial means for education and migration cost, insurance in case of unemployment, securing livelihood for old days, etc. Especially the young people on too small farms are often looking for non-agricultural means of living. Not every farm-boy is happy to continue farming, as in the old days. He may do so but often he is forced by the lack of alternatives. In order to give an idea of the number of households belonging to each category and their cultivated area, the author made, in the absence of relevant official statistics, a rough estimate for Pakistan which is presented in Table 2.1. But Pakistan as an example because I am not familiar enough with Indonesia to be able to elaborate such an estimate for that country. However, I invite the socio-economists in Indonesia to work out such an estimates. This would be very helpful in dealing with many questions.

As far as possible, the author used the Official Statistics of Agriculture. In addition, he estimates on the basis of this rather intimate familiarity with Pakistani agriculture as a result of 59 visits between 1961 and 1992, and the information obtained from more than 20 PhD studies he organized in Pakistan. The figures should be taken for what they are estimates. For the argument, it does not really matter whether a category is 5 or even 10 percent larger or smaller.
Table 2. Number and Cultivated Area of Various Socioeconomic Categories of Land Cultivators in Pakistan (in 1000) (Estimate).

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Cultivated Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>abs</td>
<td>%</td>
</tr>
<tr>
<td>With sufficient land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Large farm</td>
<td>13</td>
<td>0.3</td>
</tr>
<tr>
<td>- Progressive farmers</td>
<td>200</td>
<td>5.0</td>
</tr>
<tr>
<td>- Economic holding</td>
<td>750</td>
<td>18.5</td>
</tr>
<tr>
<td>Total</td>
<td>963</td>
<td>24.0</td>
</tr>
<tr>
<td>Without sufficient land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households with multiple</td>
<td>1450</td>
<td>34.4</td>
</tr>
<tr>
<td>employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household with household</td>
<td>350</td>
<td>8.8</td>
</tr>
<tr>
<td>Production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household of aged people</td>
<td>350</td>
<td>8.8</td>
</tr>
<tr>
<td>Marginal existences</td>
<td>1000</td>
<td>25.0</td>
</tr>
</tbody>
</table>

3. Sustainability in the Views of Different Land-Cultivating Categories

This chapter elaborates the role which sustainability, defined as fulfilling the needs of the present generation without limiting the chances of future generations to satisfy their needs, plays for the different socioeconomic categories described above. It comes to the conclusion that there is a great variety caused by different factors.

Large Landowners (Landlords, plantations)

Today, most of them cultivate according to modern lines, however, not always with sufficient consideration of the environmental aspects. In other cases, they are traditional landlords operating with share tenants and trying to achieve a high income through strict control and skimming off as much as possible. In this case, the tenants’ interest in maintaining the quality of the land may not exist at all. Chemical may be musused due to insufficient information and carelessness. As far as plantations are concerned, the management usually has all the technical information which is necessary to organize cultivation in line with care for the resource base, i.e., to observe the requirements of sustainability. On the other hand, monoculture and the exploitative character may have detrimental effects as well as the fact that plantations are sometimes operated on concession so that the interest for long-term sustainability may be limited. It is probably justified to assume positive as well as negative cases among the large landowners and plantations as far as sustainability is concerned. We rate them.
Progressive Farmers’
These are mostly young, often well-trained farmers who manage their land according to modern, ‘capitalistic’ criteria and achieve high yields. These “children of the ‘Green Revolution” know about an ecologically sound agriculture. However, in their eagerness to make money from the land, this goal sometimes goes beyond the needs of an ecologically sound cultivation. With the use of modern inputs, especially, they sometimes do more than good. We rate them neutral, i.e., +.

Economic Holding’
These economically sound family farms have often been for generations in the hands of one family. Here, the notion of trusteeship plays a role. Economic limitations and self-interest caused them to be careful with the application of chemicals, etc. In general, here thinking in terms of sustainability is widespread. We rank them +.

Households with Multiple Employment
Often, their main interest, at least their expectations for the young generation is concentrated outside agriculture. Agricultural sustainability plays a limited role in their thinking, especially among younger people. We rank them with.

Households with Household Production
Since they have not been able to find a non-agricultural activity, their living conditions are bad. Their thoughts revolve around survival, and the people lack the means to consider such aspects as sustainability. Therefore, in this case, the lack of interest is combined with the lack of funds. We rank them with.

Households of Aged People
These are residual households in which the children have migrated and the old couple has to manage the small farm since they neve no other means of survival. Disinvestment is frequent. These are neither means, nor interest, nor understanding for the notion of sustainability. The holding will cease to exist when the old couple dies. We rank them with.

Marginal Existances
These houshdds which, for personal of material reasons, have not succeeded in supplementing the income from the small acreage mostly Bve in great poverty. The members have to use every opportunity to ensure survival today without regard to the question as to what tomorrow will be. We rank them with.

If Ms ranking is applied to the figure in Table 2 regarding the number and cultivated area of different socioeconomc catagories, we obtain the picture illustrated in Table 3.
Table 3. Percentage of Cultivating Households and Area and their Ranking Regarding Sustainability

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Percentage of Cultivating Households</th>
<th>Percentage Cultivated Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ f</td>
<td>18.3</td>
<td>41.0</td>
</tr>
<tr>
<td></td>
<td>5.3</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>42.2</td>
<td>23.8</td>
</tr>
<tr>
<td></td>
<td>33.8</td>
<td>16.2</td>
</tr>
</tbody>
</table>

This means that only in the case of about 1/5 the cultivating households and 2/5 of the cultivated area is sustainability satisfactory considered. On the other hand, not less than 76% of the cultivating households holding about 40% of the land are ranked negatively in that regard.

For sure, the ranking can be questioned. But the argument does not change if 5 or 10% more or less belong to one ranking or another. The important statement is that the life situation and interest of many people are such, that considerations of sustainability hardly play a role in their life, often cannot play a role because of their degree of poverty.

4. Requirement to Reach a General Acceptance of Sustainability

As stated above, sustainability is a continuous process towards a never-ending goal. To come closer to this goal, activities at several levels, which together form an "Environment Management System," are necessary.

1) Environmental Laws

They are the means of setting standards and of providing a frame of reference for the law enforcing institutions. They should be clearly stipulated, including the fixing of tolerance margins and foreseeing punishment for prosecutors. They should also be enforced, since norms vanish if they are not enforced over a long period.

2) Environmental Management Control Force

Law enforcement and continual control in this field is beyond the capacity of the ordinary law enforcement institutions. Especially, for the fact that specific technical knowledge is required makes it necessary to have a cadre of specialists for this task. As long as this does not exist, environmental laws will remain merely on paper.

3) Self-help Organizations

The most important activities - and this is often forgotten - are those of self-help groups. This seems to be the only way to include the poor in the strife for a careful use of resources. Even a well-staffed environmental management control force is not in a position to cheek
thousands of villages and the activities in individual fields. Assessing the varying conditions and situations of different socioeconomic categories of land cultivations is beyond their possibilities. The huge number of cultivating households makes it necessary to group them into village environment associations. Their task is twofold:

They should develop an environmental consciousness among the villagers by means of lectures, discussion circles, field visits, demonstrations, etc. One or two persons from each village association should be trained in all relevant aspects of environmental care - from the proper use of chemicals to useful local measures against erosion. The continuous training of these two specialist would ensure that knowledgeable persons be available within the village. This would free from dependence on government staff and from the government changing policies. The association is so to speak the watchdog of the village community in all environmental aspects. The interest of the community in maintaining the quality of their life base gives them the right to call to order individuals who do not follow the rules. Such a reminder by fellow villagers is much more efficient than punishments stipulated by laws, especially for minor cases. It is always difficult to enforce behaviour against the people's felt interests, whereas the individual is traditionally well integrated in his community and has, there, a feeling of responsibility vis-à-vis the group. It is necessary that especially the younger generation participate actively in these associations because of its better training, greater activity, and its self-interest in maintaining the basis of its future life.

The second task of the village environment associations is to call for activities on the part of the state in cases that are beyond the technical and financial competence of the village people. This includes 'do not' requests, for instance, if the government plans to construct a road which would pass through valuable biotopes, etc. For this task, the village associations should merge into district and provincial NGOs which are in a better position to conduct the policy dialogue than individual village associations.

Sustainability is a goal which can be reached only via a change in human behaviour. This requires a multitude of methods of methods in norm setting, control, and initiative. It can hardly be successful without the people's active contribution towards maintaining the resource base on which their life depends.

5. Summary

The notion of sustainability in its different meanings is discussed. They all see it as a process towards the goal of managing the resource base in a way that does not limit its use by future generations. In order to assess the interest and capability of the very inhomogeneous land-cultivating households, it is suggested that they be classified into socio-economic categories of land cultivators; their characteristics are outlined briefly, and their number and acreage estimated for Pakistan.

The categories are then assessed as to the degree to which they are interested in sustainability and, because of their situation, are able to think in these terms. The socioeconomic categories are rated. The result is that only about 1/5 of all cultivating households with 2/5 of the cultivated area satisfactory takes aspects of sustainability into
account, while the majority has other interests or is too poor to consider aspects beyond its immediate survival.

The large number of cultivating households of a great variety makes it impossible to leave to the government the goal of achieving sustainability. Indeed, governments must set standards and control them. But the most important aspect of an ‘Environmental Management System’ are self-help groups of villagers assuming the double function of developing and controlling environmental consciousness among the villagers and calling for government action in cases that are beyond the villagers’ technical and financial possibilities. It is of great importance to train, per village, two persons as subject matter specialists in environmental care so that technical competence is always available in the Village. This frees from government. These associations are an important task for the village youth.

Socio-Economic Aspects of Sustainable Agricultural Development: The question of Attitudes and Personal Interests of different Population Groups.


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