TARGETING FOOD SECURITY: REDUCING POVERTY THROUGH IRRIGATED AGRICULTURE

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Abstract

Rapidly increasing trends of poverty, particularly in South Asia, have emerged as a major threat to the economic development of this region. Currently, over 500 million South Asians live in absolute poverty, while over 300 million are chronically malnourished. In Pakistan, vulnerable population of 45 million makes 25 percent of those living in poverty due to economic downturn. Although food production in the region has gained momentum during the past decade (per capita dietary energy supply in South Asia has increased), the incidence of poverty and absolute number of under-nourished people in South Asia has gone up. This means that crisis of food insecurity in the region is mostly related to low access rather than low availability. The major reasons for this low access are poor targeting policies of the government and inefficient public distribution system. Therefore, to ensure food security, the government should improve accessibility and distribution of food to poor, particularly those in far-flung areas.

Three quarters of the world's total irrigated area is in developing countries where smallholder agriculture still predominates. No wonder, then, that increased agricultural production is considered a key to poverty reduction in many developing countries. Irrigated agriculture is regarded to be vehicle for the provision of basic needs and reduction in vulnerability to food insecurity. Irrigation development can bring a range of potential benefits at regional and national level. Therefore, by advances in irrigation management, better understanding of the environment in which poor people live, right choices of irrigation technologies, better defining production functions and creating profitable markets can make a significant contribution to crop production and poverty reduction. This paper discusses illusions in different poverty estimates and introduces a framework to increase regional food security. The paper is also aimed at finding the ways to reduce poverty through improving irrigated agriculture.

Introduction

The existence of widespread poverty in the modest of global prosperity is undeniably the most serious challenge confronting the world today. It is an inescapable fact that at the start of the 21st century, almost one fifth of human population or 1.2 billion people subsist on less than $1 a day. Around one third of the populations in the developing countries have a life expectancy of barley 40 years. About 800 million people do not have access to enough food and basic needs, and over 2 billion people cannot enjoy balanced diet. Majority of the world's poor are in Asia and sub-Sahara Africa. Out of 49 least developed nations, 34 are in Africa and nine in Asia. South Asia is one of the worst poverty hit regions with 44 percent people living below poverty line. Highest poverty in South Asia is recorded in Bangladesh where 45 percent people are living below poverty line, and lowest in India with 26 percent poor (Figure 1) (ADB 2002). Pakistan stands

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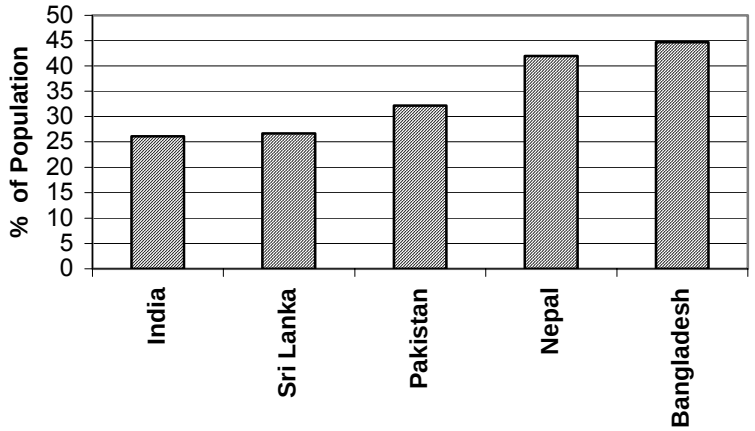
somewhere in the middle with 32 percent people affected by poverty. In Afghanistan, 3-4 million people are affected by poverty and other 8-12 million are under threat of famine and starvation (Qureshi 2002).

Figure 1: Incidence of poverty in South Asia.



Defining Poverty

Poverty is a complex and multi-dimensional phenomenon, which goes beyond the notion of income, and encompasses social, economic and political deprivations. Lack of such opportunities limits the abilities of the poor to secure gainful employment and bring about an improvement in their lives (GoP 2002). Poverty has different meanings for different people. Traditionally, poverty has been defined in terms of income and consumptions. The worst kind of poverty is where people do not have access to food and water to fulfill their basic physical needs. Another kind of poverty is where people may have more or less enough food but do not have access to basic needs such as adequate clean water for sanitation, health services, clothes, housing and education.

New approaches recognize complexity and multi-dimensional nature of poverty. Amartya Sen defined poverty as the absence of the capability to lead a full life, which include many things and not merely an adequate consumption. Mother Teresa considered a person poor if he is deprived of love from the community at large (Vaidyanathan 2002).

A person regarded poor according to one measure may not be poor in terms of another. Obviously, there are different dimensions to poverty and their level of importance would vary according to one's inclinations, and also for what purpose the information is used. For the statistician, this presents a dilemma, namely, how to quantify these different dimensions into meaningful categories. The answers to these questions depend upon the concept of well being (Vaidyanathan 2002). Well being is peace of mind, good health, safety, freedom of choice and action, dependable livelihood and a steady source of income, and above all, enough food.

There are essentially four main concepts of well being found in the literature on poverty: (World Bank 1993; Ravaillon 1994; World Bank 2001):

1. Well being is dependent upon the individual having enough resources or capacity to meet the basic needs.
2. Well being of the individual depends on the relative situation of the individual vis-à-vis others in the community. Here, the focus is on the inequality in income, consumption, or other attributes in the population.
3. Well being of an individual is dependent upon the vulnerability of the individual to risk of not meeting his/her basic needs in the present or in future.
4. Well being is subjective, based on the individual's perception whether he is meeting his basic needs or considers himself as poor.

Vaidyanathan (2002) indicated that the underlying notion is that *a person is poor when he/she does not attain the minimum level of well being set by the society.* The minimum level is the poverty line. These concepts of well being can be applied to different dimensions of well being - consumption, income, education, other basic needs, and end up having numerous thresholds of poverty and numerous poverty measures. By determining individual's consumption, income, education, etc., and comparing them with defined threshold values, a person is regarded to be poor if he falls short in these parameters. Depending upon the parameter used and the threshold value adopted, the number of poor will differ. Depending upon the notion of well being adopted we get different poverty lines, for example the following:

Absolute Poverty Line is based on a normative value such as one dollar a day or the cost of the minimum requirements of food items (food poverty line) or the minimum requirements of food and non-food items (general poverty line) (Ravallion 1994; Foster et al. 1984; Moser 1996; Streeten 1994; Grootaert 1983; Grootaert 1988).

Relative Poverty Line is based on the distribution of income or consumption fixing the poverty line as a proportion (usually 40 or 50 percent) of the mean or median income or consumption (Bilsborrow 1994).

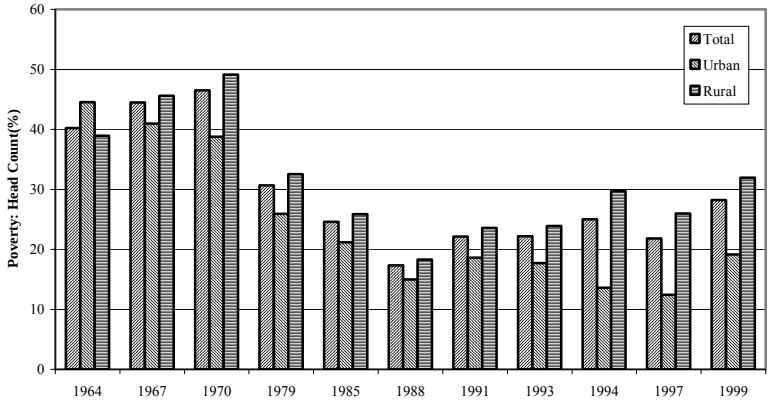
Subjective Poverty Line is based on the respondents' perception of their living standards and what they think as the absolute minimum standard of living, below which they regard themselves poor. This can be done by the construction of a poverty index using a range of qualitative and quantitative indicators (Hatch and Frederick 1998; Chung et al. 1997; Filmer and Pritchett 1998; Filmer and Pritchett 1999). The indicators can easily be adjusted to local conditions. The housing index focuses on a single dimension of poverty. To provide a complete picture, indicators should be drawn from at least four areas: human resource, housing, food security and household assets (UNDP 2000).

These three approaches for defining poverty are being applied in different countries depending upon their preferences, purpose for which the analysis is made, availability of data, etc. (Vaidyanathan 2002). Poverty lines are generally drawn in absolute and/or in relative terms in Pakistan. Both of these measures are useful in their own right, but for comparison over the time, the absolute measure is more appropriate for the developing countries like Pakistan since it shows the extent to which deprivation of the poor is alleviated. The relative measures, on the other hand, shows position of an individual relative to the other and it is not possible to compare poverty level over time or across regions or counties (Arif 2002).

Current Poverty Status in Pakistan

Poverty in Pakistan, as is the case with most countries, is linked to overall growth performance of the economy. Periods of substantial and sustained poverty reduction – in Pakistan's case, notably, the late 1980s – also happen to be periods of sustained growth. Figure 2 clearly shows the historical trend of increasing in poverty in Pakistan (GoP 2002). On the other hand, uneven growth in the last decade has led to volatility, and on balance, stagnation of poverty measured in consumption terms. Most importantly, even when growth has occurred, resulting in reductions of income or consumption poverty, the gains have not translated into commensurate increases in capability, as measured by indicators of human development. Pakistan has poor health, education and fertility indicators for its level of per capita income. Moreover, comparing Pakistan with countries that grew at about the same rate (regardless of initial income level), it is evident that other moderate growers achieved more social progress than Pakistan for a given amount of growth. The failure to develop human capital, which can be described as a social gap as far as Pakistan is concerned, is one of the likely reasons for the slow-down in growth and poverty reduction in the 1990s. The ability to achieve sustainable growth and poverty reduction in future will, thus, require the addressing of shortcomings in human development, including the institutional factors that contribute to these failings (World Bank 2002).

Figure 2: Historical trend of poverty in Pakistan.



Poverty Estimations in Pakistan: Illusions and Realities

Calorie Based Estimations

The most commonly used measure, the consumption aggregate, is defined as the monetary value of all food and non-food goods and services consumed by the households (Deaton and Zaidi 1998). It includes the value of goods and services received in kind. Non-food goods include clothing, footwear, housing and utilities, education, and imputed use-value of durable goods. The Planning Commission of Pakistan has decided that the official poverty line (National Poverty Line) for Pakistan will be estimated on 2350 calories per adult equivalent per day. This is based on an

adult equivalent intake of 2150 calories in the urban areas and 2450 calories in the rural areas. Based on this, the poverty line for Pakistan for 1999 has been defined at Rs. 670 per capita per month (ADB 2002). This specification appears to be on the low side when compared with the assumptions used in all the earlier poverty measurement studies in Pakistan; or the physical energy requirements of a Pakistani male, particularly of a rural resident; or the assumptions used in the food-based poverty lines of other South Asian or East Asian countries (Nadeem 2002).

No doubt, consistent use of the official poverty line will be an effective tool for monitoring poverty trends in future, and as such, there is an urgent need to examine the methodology and the caloric requirement before making it a benchmark for subsequent surveys. We may note that several recent studies on poverty levels for the 1990s (e.g., Amjad and Kemal 1997; Jafri 1999; Qureshi and Arif 2001; Jamal and Ghaus-Pasha 2000) have used poverty lines based on caloric norms different from the norms adopted in the official poverty line. Differences in results and some controversial remakes in constructing poverty line are given below:

Effect of Caloric Norms on Poverty Estimates

The basic question is how does the caloric norms affect the poverty estimates? The Federal Bureau of Statistics estimated poverty for the year 1998-99 using 2550, 2350 and 2150 caloric intakes criteria. The incidence of poverty based on 2550 caloric intake was 32.2 percent; it declined to 30.6 percent for lower caloric norms of 2350. It declined further to 28.2 percent for 2150 calories. This shows that change in average intake by 100 calories affect the poverty estimates by roughly 1.0 percent (Arif 2002). Table 1 summarizes the criterion used in different studies to estimate poverty in Pakistan based on the various calorie norms used (Arif 2002).

Table 1: Methodologies used in recent poverty lines.

Sources	Calorie Norms Used			Type of Data Used	Type of Poverty Line
	National	Rural	Urban		
Amjad & Kemal (1997)	2550	2550	2550	Grouped (secondary)	Basic Needs
Jamal and Ghause-Pasha (2000)	---	2550	2230	Primary	Basic Needs
Jafri (1999)	---	2450	2150	Primary	Basic Needs
Qureshi & Arif (2001)	---	2550	2295	Primary	Basic Needs
FBS (2001)2	2550	2550	2550	Primary	Basic Needs
FBS (2001)	2150	2150	2150	Primary	Basic Needs
Planning Commission (Official Poverty Line)	2350	2450	2150	Primary	Basic Needs

Figure 3 shows a typical example of how poverty estimates for different studies using different criteria could vary for the same year (Amjad and Kemal 1997; Ali and Tahir 1999; Jafri 1999; World Bank 2000 as quote by Arif and Munir (2001); Arif 2002). All

[2] Federal Bureau of Statistics reported the poverty estimates on 2150 & 2550 calories during 1992/93 to 1998/99.

these studies used basic needs approach to determine the trends in poverty. The caloric intake level used by these studies is given in Table 2.

The illusions about poverty estimates continue to persist in other studies. Arif (2002) reported that there was two percent increase in poverty (from 27.4 % to 29.6%) during 1993-94 to 1996-97, whereas Federal Bureau Statistics (2001) noted a three percent decrease in poverty (from 25.0% to 21.8%) for the same period (Figure 4). Interestingly, both studies have used the same criteria of 2550 calories.

Figure 3: Comparisons of various studies for the construction of poverty line in Pakistan.

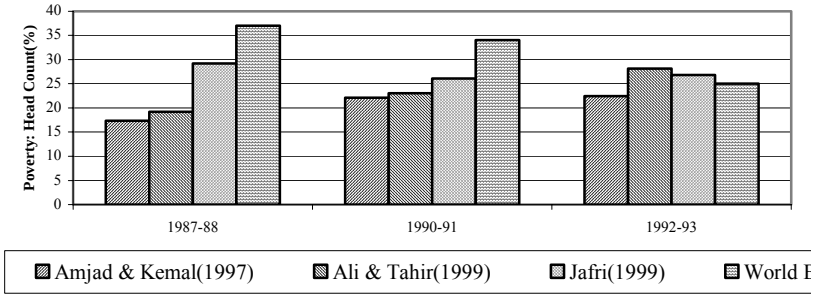
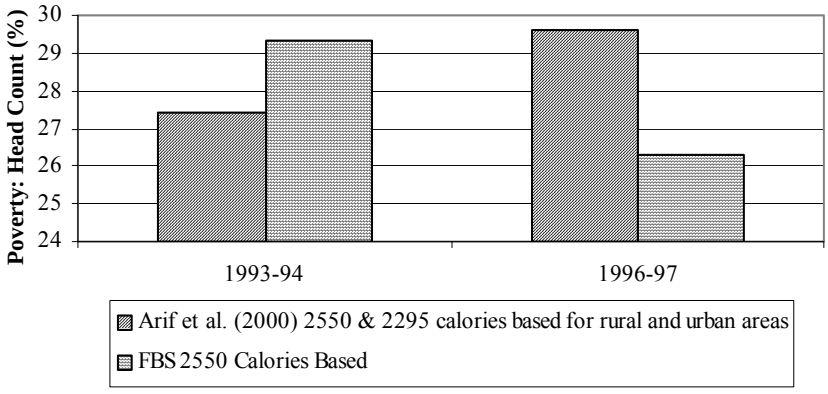


Table 2: Caloric norms used for the poverty lines in Pakistan.

Sources	Caloric Norms used for the study		
	National Level	Rural Level	Urban Level
Amjad & Kemal (1997)	2550	2550	2550
Ali & Tahir (1999)	2550	--	--
Jafri (1999)	2354	2450	2150
World Bank (2000)	2450	--	---

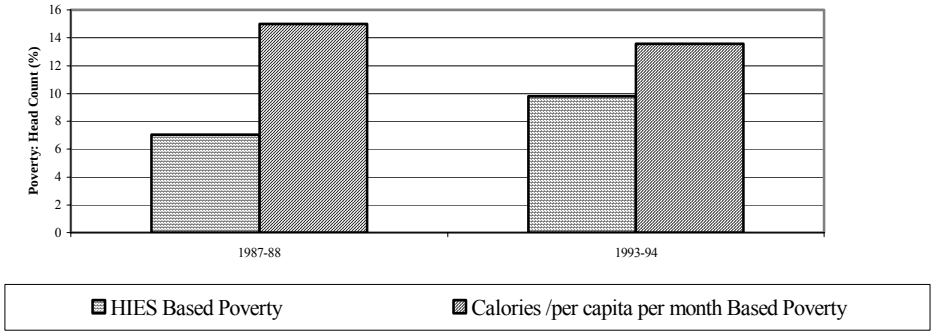
Figure 4: Illusions in poverty trend in Pakistan.



Comparison of Food and Non-food Estimations

Non-food based poverty was first developed by Orshansky (1965) and was discussed by Watts (1968), and Huppi and Ravallion (1991). Pakistan Institute of Development Economics (PIDE) conducted non-food based poverty survey, based on Household Integrated Economic Survey (HIES), to examine the structure of poverty by principal sector of employment and how the profiles changed during 1987-88 to 1993-94 (Haq and Bhatti 2002). A non-food share in total consumption expenditure was taken as a cut-off point. A significant variation was found between the foods and non-food poverty lines. Figure 5 compares the results of food and non-food based poverty estimates in urban area of Pakistan for the year 19987-88 and 1993-94. The results indicate that non-food based poverty estimates are substantially lower than food based poverty estimates. This difference was about seven percent for 19987-88 and three percent for 1993-94. These differences clearly indicate the need to revisit poverty estimation criterion and methodologies in order to get true picture of poverty in Pakistan. This data is absolutely essential to do long term planning and formulation of effective policies for the reduction of poverty in Pakistan.

Figure 5: Differences of poverty estimates based on the food and non-food poverty in urban areas of Pakistan.



How Irrigated Agriculture Can Reduce Poverty

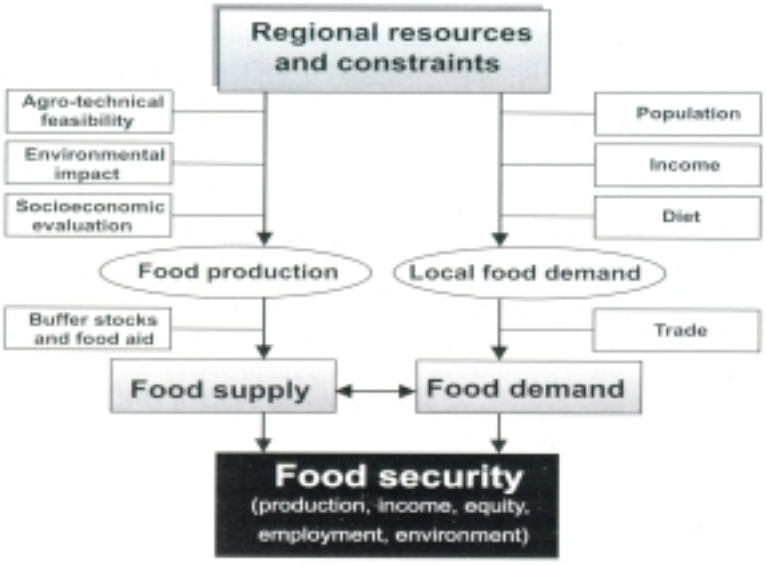
Irrigated agriculture is a vehicle for the provision of basic needs and the reduction of vulnerability to food security. Analysis of information in Asia shows that irrigation has helped in increasing the most crop yields by 100-400 percent (FAO 1996). This has continued to decrease food prices. These reductions have had a positive impact on the real increases of the urban and rural poor, who spend a large proportion of their income on basic food stuff.

For sustainable rural development and to enhance food security, food production should be increased in a sustainable way. This will involve education initiatives, utilization of economic incentives and the development of appropriate and new technologies, thus ensuring stable supplies of nutritionally adequate food, employment and income generation and natural resources management and environmental protection (UNCED 1992).

The development of irrigated agriculture brings a range of potential benefits at regional and national level. It contributes to economic growth by generating export crops, reducing imports and thus saving foreign exchange and increasing home food supplies, which may lead to lower prices. Irrigated agriculture contributes in income increase from production and employment, so that families can have access to schooling, health and welfare services.

Figure 6 describes the key elements for assessing food security. Food security is basically governed by the balance between food demand and supply, both of which are primarily governed by the biophysical and socio-economic resources and constraints of the region. Food demand is a function of population size, its income and the diet used by the average person. On the other hand, regional food production depends on the agro-technical feasibility of various land use types considering the regional resources and constraints. In combination with environmental impact assessment and socio-economic possibilities, gross food production is assessed. Together with food stock and possible food aid, net food supply can be determined (Aggarwal et al. 2001).

Figure 6. Perational steps for sustainable food security in Pakistan.



Ensuring Food Security

An abundance of food at low prices in the world markets does not ensure food security at the country or household level, nor does it help countries to purchase imports to supplement national food supplies (World Bank 1996). The poor tend to spend a high proportion of their income, perhaps 50-80 percent, on food consumption and water (Lipton 1983; World Food Program 1995). Hunger and poverty are, therefore, closely linked. In order to alleviate poverty, poor people need adequate means to obtain food in the quantities and qualities needed for healthy life and generate access to skills, technology, markets and productive resources such as land and capital.

Over the past 25 years, there has been progress in improving the living standards of the people in developing countries. However, even today when the world is producing enough food to provide every person with more than 2700 calories per day, there are still over 800 million people in the developing world who suffer from malnutrition. Severe inequality in land and income distribution prevents the poor from reaping the full benefits of food availability (IPTRID 1999).

Although the overall per capita dietary energy supply in South Asia has increased from 2330 calories to 2400 calories per day, the absolute number of malnourished people has gone up. Currently, over 300 million people are chronically malnourished. The crises of food insecurity in this region are related to low access rather than low availability (HDC 2002).

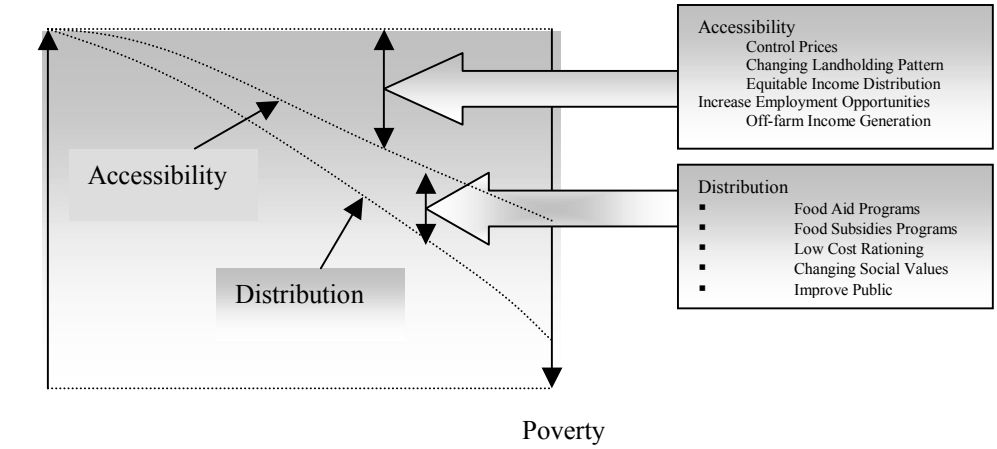
Availability of food for domestic consumption is also affected by food losses that occur during handling and storage processes. For instance, in Nepal, around 10-30 percent cereals, fruits and vegetables are lost during the handling and storage process (HDC 2002). In Pakistan, this percentage falls between 10-20 percent. Controlling these field losses can significantly contribute to the food availability to the rural households.

Abundant food does not automatically mean people have access to it as well. Access to adequate food depends upon household income and food prices. For instance, in India and Pakistan, despite an increase in the total food availability from 1980 to 1999, the incidence of poverty has gone up, and in recent years, it has reached the alarming level. At present, about one third of the households in Pakistan are living below the income poverty line and are thus unable to meet their minimal nutritional requirements (HDC 2002). The access to adequate food for all segments of the population also depends upon the pattern of landholdings, income distribution and employment opportunities (Figure 7).

An efficient distribution of food is as important as its production. At the national level, distribution system must be efficient in delivering food items to poor in far-flung areas. Even in the presence of excess supply, inefficient distribution among different segments of the society may lead to inadequate consumption and undernourishment. The basic food distribution system in South Asia is considered highly inefficient (HDC 2002).

In order to secure adequate food for the low-income groups, the governments in South Asia should encourage food aid, food subsidies and low cost ration programs. These programs have not been very successful in the past due to their cost and wrong targeting. The price supports and regulations mostly favored consumers and harmed producers, which depressed the production of domestic food.

Figure 7: Poverty reduction trend with food accessibility and distribution.



The intra-household food security in South Asia is usually dictated by traditions, with women eating last and the least amount of food that is available to a household. The gender disparity in access to good food is evident from the fact that about 550 million women live below the poverty line (60 % of the world's rural population). This represents a 50 percent increase for women over the past 20 years, as compared with a 30 percent increase for men (IFPRI 1995). The gender bias in access to food is mostly due to perceived differences in social and economic benefits that families desired from boys and girls.

In the end, some interventions are reminded here, which can help the smallest producers to improve their livelihoods and contribute towards future food production. Continued investments and extending participatory approach in irrigation will be central to future food production. India, for example, has not faced a serious famine since the early 1960s (IPTRID 1999). Strategy to investment in irrigation was key element to increase food production and maintain stable food prices. Furthermore, the involvement of small-scale farmer's support is needed to improve management and institutional structures so that poor smallholders benefit from reliable water supplies. Moreover, the initiatives that involve the landless gaining access to the benefits of irrigation require greater exposure. New concentrations of the poor in peri-urban areas and regions where water resources are scarce and risk-prone need to be targeted. The challenge will be to make the technology affordable and easy to maintain and operate through which equitable water distribution system especially in difficult and marginal areas, where the poorest live need much more attention in order to alleviate poverty.

Conclusion

Consistent use of the official poverty line (National Poverty Line in terms of food i.e. 2350 calorie intake) will be an effective tool for monitoring poverty trends in future, and thus, there is an urgent need to examine the methodology (agreed criterion) and the caloric requirement before making it a benchmark for subsequent surveys in order to avoid further illusions.

Irrigated agriculture is a vehicle for the reduction of vulnerability to food security. For sustainable food security, food production should be increased in a sustainable way. This can be achieved through the involvement of small-scale farmers and by the promotion and adoption of affordable agricultural technologies in the crop production function and also by creating profitable agricultural markets.

In order to alleviate poverty, we have to gain self-sufficiency in food. Abundant food does not automatically mean people have access as well. Access to adequate food depends upon household income and food prices (assured price stability), and equity in food distribution could be achieved through food supplies in far-flung areas, food deficit districts, and through food distribution schemes.

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