

A study on Alternative Public Distribution System

A Novel Initiative of Deccan Development Society



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Study commissioned by
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It is over eight years since the Deccan Development Society began its initiative called *Alternative Public Distribution System through Community Grain Fund* in 32 villages. This was an initiative aimed at Local Production, Local Storage and Local Distribution. In a rainfed semi-arid region like Zaheerabad in Medak District of Andhra Pradesh, the gain this initiative made on food and nutrition security, fodder and fuelwood security, livelihood and ecological security was phenomenal. A study conducted by the National Institute of Rural Development, the apex rural development academia of the Government of India gave ample testimony to these achievements.

But more than any of these already impressive set of indicators, the fact that this was completely controlled and managed by the dalit women in each of the 32 village communities was a powerful political statement that the women of DDS *sanghams* were making. Unfortunately this self-empowerment of the women was by itself a threat to the vested local interests. Alarmed at the possibility of this initiative cutting at their power base, the local politicians carried out a vicious campaign which forced the Rural Development Ministry, the funder of this programme to halt the funding. Undeterred by this set back, the women of DDS *sanghams* carried out this programme successfully and completed the full five year project cycle.

Buoyed by the overall positive direction this initiative had taken in securing community food security, the Deccan Development Society decided to extend this programme to eleven more villages in the year 2001. The Society also decided to have the initiative systematically documented by an independent research organisation and approached *Glocal Research and Consultancy Services*, a Hyderabad based consultancy firm to do a documentation of the initiative. The present study, *Alternative Public Distribution System* is the result of a one year's documentation work by *Glocal* which we are delighted to present before you.

I am extremely thankful to Dr Srinivas and Dr Thaha who painstakingly did this study and have come up with a compelling insight into the issues. My colleagues Mr Sharanappa, Mr Baliah, Mr Giridhar and others who coordinated this study with the Glocal team deserve my grateful thanks. I also thank Dr Raghavendra Manvi for his help in editing this publication. Ms Supriya Bhalerao of *Bookslines* deserves a very special mention for her extremely valuable help which she renders with an amazing patience even while we made her race against time.

I fondly hope that this publication will open a few policy eyes in this country towards the enormous potential of rainfed agriculture in ensuring a community level food security and feeding our millions and saving the blushes of having a national food bank of 60+ million tonnes and still letting people die of starvation in Orissa.

We hope this publication will lead the debate on Food Rights towards Community Food Sovereignty.

Hyderabad
June 20, 2004

P V Sathesh
Director



Introduction ... 1

The Methodology of the study
Objectives of the study

SECTION-I Concept of Food Security ... 3

What is Food Security?
Agricultural Growth and Food Security
Green Revolution and Changes in Area of Production
Changes in Cropping Pattern
Changes in Agricultural Labour Force
Regional Variations
Neglect of Dryland Agriculture
Declining Soil Fertility and Factor Productivity
Agricultural Sector and Economic Reforms
Increasing Casualisation of Rural Employment
Food Security and Trade

SECTION-II Public Distribution System in India ... 13

Scale of Operations
Public Distribution System in Andhra Pradesh
Problems Associated with the PDS

SECTION-III Alternative Public Distribution System of DDS ... 21

DDS Alternative PDS through Community Grain Fund
Approaches to the Implementation of the Programme
Planning Process
Participatory Monitoring and Evaluation
Programme Implementation

SECTION-IV Economics of the Programme ... 32

Economics of Production
Observations from Non-intervention Village

SECTION-V Impact Assessment ... 46

Impact of the Programme on Local Communities
Questions of Sustainability
Lessons Learnt

SECTION-VI Conclusions ... 55

Appendix ...56



- Box 1 - Green Revolution technologies and some negative trends in Indian agriculture
- Box 2 - Economic Reforms, Liberalisation and Indian Agriculture
- Box 3 - Food Surpluses and Hunger
- Box 4 - Factors behind FCI's Poor Performance
- Box 5 - Food Management
- Box 6 - Varieties of Crops Grown under APDS Programme
- Box 7 - The Impact of Poverty on Rural Livelihoods
- Box 8 - Processes Involved in the APDS Programme
- Box 9 - Potential Benefits Provided by Maintenance or Sustainable Use of Biodiversity
- Box 10 - Uncultivated Greens Grown in the Fields
- Box 11 - Nutritional Value of Cereals and Millets
- Box 12 - Livestock- An Integral Part of Dryland Farming



List of tables

Table 1	Changes in cropping patters at All India Level during 1964-65, 1971-72, 1981-82 and 1991-92
Table 2	- Rural Landless Households (Per cent of rural households)
Table 3	- Distribution of Owned Holdings
Table 4	- Composition of workers by sex and mode of employment in rural areas from 1972-73 to 1999-2000
Table 5	- Levels of Support to Agriculture within OECD counties (\$ billions)
Table 6	- Food Subsidy of the Indian Government
Table 7	- Issue Price of Food Grains (Rs.)
Table 8	- Subsidy on Distribution of Rice by AP Government
Table 9	- Targeting and Efficiency
Table 10	- Costs of Targeting
Table 11	- Costs of Transferring Subsidy to the Target Population
Table 12	- Economic Costs of FCI – A Break up (Rupees/Quintal)
Table 13	- DDS approach to the implementation of the programme
Table 14	- Name of the Village, Number of Beneficiary Farmers and the Cultivable Fallow Lands Brought Under Cultivation
Table 15	- Financial Assistance by DDS to the Beneficiary Farmers of APDS Programme Year-wise Cost of Project Operations (Rs./acre)
Table 16	- APDS Expenditure on Farm Activities – I Year (2001-2002)
Table 17	- Number of Farmers in the Sample Households Studied
Table 18	- Average Input Costs per Acre
Table 19	- Average Yields of Grains per Acre
Table 20	- Average Output of By-Products per Acre
Table 21	- Average Input Cost and Output per Acre in Sample Households (in Rs.)
Table 22	- Average Employment Days Generated Per Acre
Table 23	- Gender-wise Labour Days generated through APDS Project
Table 24	- Male-Female Percentage Details to Total Labour Days Generated through APDS Project
Table 25	- Division of Total Labour Days Generated
Table 26	- Source-wise Average Income Distribution and Its Percentage of the Sample Households (in Rs.)
Table 27	- Item-wise Average Consumption Pattern of Sample Households (per annum - in Rs.)
Table 28	- Grain Output in Programme Villages
Table 29	- Total Employment Days Generated
Table 30	- Repayment of Money and Jowar
Table 31	- Jowar Card and Distribution Details - Village Wise
Table 32	- Main Reasons for Fallowisation of Lands in the Sample Households of Badampet Village
Table 33	- Source-wise Average Income Distribution and Its Percentage of the Sample Households in Badampet Village (in Rs.)
Table 34	- Item-wise Average Consumption Pattern of Sample Households in Badampet Village (per annum)
Table 35	- Relative Merits of PDS and APDS
Table 36	- Changes observed between DDS Programme villages and non-intervention village



AP - Andhra Pradesh
APDS - Alternative Public Distribution System
APL - Above Poverty Line
BPL - Below Poverty Line
CGF - Community Grain Fund
DDS - Deccan Development Society
DWCRA - Development of Women and Children in Rural Areas
EU - European Union
FAO - Food and Agricultural Organisation
FCI - Food Corporation of India
FPS - Fair Price Shops
GATT - General Agreement on Trade and Tariffs
MSP - Minimum Support Price
NGO - Non-Governmental Organisation
NIN - National Institution of Nutrition
NPM - Non-Pesticidal Management
NSS - National Sample Survey
OECD - Organisation for Economic Co-operation and Development
PDS - Public Distribution System
PRA - Participatory Rural Appraisal
RBI - Reserve Bank of India
SHG - Self Help Groups
TPDS - Targeted Public Distribution System
WHO - World Health Organisation
WTO - World Trade Organisation



Introduction

Over the decades the functioning of the Public Distribution System (PDS) in India has suffered due to inefficient management and lack of proper targeting to improve the food security of the poor. Although, India has achieved self-sufficiency in food grain production, and surplus food stocks are available in the FCI godowns across the country, the poor have little access to food as they lack purchasing power. This paradox of surplus food availability in the market and chronic hunger of the poor has brought into sharp focus, the lopsided policies of the government, with regard to food distribution in the country. The PDS evolved from a food rationing system introduced by the British in India during World War II. A fixed amount of food rations were distributed to the entitled families in specific towns/cities through The Department of Food created in 1942 under the Government of India. After the end of the war, the government abolished the rationing system only to reintroduce immediately after independence in 1950 due to inflationary pressures of the economy. Ever since, the Indian government has used the public distribution system as a deliberate policy instrument to overcome chronic food shortages, apart from using it for stabilizing food prices and consumption, in view of fluctuating food production in the country.

In the present context of the failure of the PDS system to ensure the food security of the poor, it would be relevant to raise some important questions about the food security policies of the government as well as the need for alternative approaches/paradigms of food security. "The Alternative Public Distribution System (APDS) through the Community Grain Fund" conceived by Deccan Development Society is one such programme that breaks away from narrow framework of government PDS that is solely concerned with procurement and distribution of food grains to the target groups. The Deccan Development Society (DDS) conceived the APDS programme with an idea of local solutions for local problems. The programme integrates the goals of sustainable agricultural strategies such as bio-diversity and natural resource management with community goals of rural livelihoods, food security and socio-economic empowerment of dalits and women, based on plural values, local customs, practices and indigenous knowledge.

The significance of the DDS framework of sustainable agriculture in ensuring food security of local communities can be put in perspective by understanding different perspectives that informs and motivate different actors, both governmental and non-governmental, in designing and implementing policies to address food security needs of the population.

The first perspective is the so-called Productivity perspective that sees Indian agriculture as mostly dominated by small and marginal holdings and as such inherently inefficient. The votaries of this perspective argue that food insecurity is the result of subsistence farming and lack of marketable surplus to provide for the ever-growing population. To raise farm productivity and incomes the farmers are goaded to go in for more inputs such as fertilizers, pesticides, irrigation, credit etc. In other words it's a continuation of the follies of the green revolution on a much wider scale. A variant on this approach is the reliance on new technologies such as biotechnology and genetics for agricultural productivity and efficiency.

The second perspective is a purely market-oriented perspective. It argues that it's economically and environmentally expensive for every country to try to achieve national food security via self-sufficiency in every thing. It further argues that, a large fraction of world agricultural production is likely to move through international markets in the future. This can ensure global food security as long as there is an open international trading system that permits agricultural products to move freely from agricultural surplus to deficit countries. To ensure national food security, the system must permit food-deficit, low-income countries to export goods in which they can be competitive to earn the foreign exchange necessary to pay for their food import needs.

The third perspective is the bio-diversity perspective. In contrast to the assumptions that small holdings are

inherently unproductive and inefficient, this perspective argues that small holdings are bio-diversity based production systems and great conservatories of genetic resources of the world. The food security of the world depends mostly on the conservation and production of a variety of genetic resources and the role of small farms in ensuring this. The forced introduction of high-yielding seed varieties is the cause of the loss of farmer-bred seeds, leading to massive genetic erosion and with it the traditional knowledge base of the farming communities. In essence, the food security of the world rests on diversity-the diversity of cultural values of farming communities as well as genetic diversity. Food security requires diversity of germ plasm, of species, of production and distribution systems. Further, it also requires the protection of the human rights-including the inalienable rights of indigenous peoples and farmers' rights. Food security cannot be isolated from issues of equity in land tenure, pricing policies or trade practices.

The present study tries to address the issue of food security and the need for alternative PDS by first defining what is food security and the linkage between agricultural growth and food security. This forms the first section of the study. It also includes a thorough analysis of the various issues linked with agricultural growth and productivity such as rising subsidy costs, minimum support prices, price fluctuations, agricultural trade, WTO agreements etc and their impact on food security. The second section discusses the evolution of PDS and the issues related to its implementation by the government. The third section highlights the significance of alternative approaches and paradigms in ensuring food security of the poor. This section conceptualizes the alternative public distribution system designed by DDS within the larger framework of food security and livelihoods of rural communities in rain-fed regions of the country. Socio-cultural, economic and ecological aspects of the DDS programme are also discussed in this section. The fourth section deals with the economic viability of the APDS implemented by DDS. The fifth section evaluates the programme for its impact both on the stakeholders and their communities in ensuring food security. The sixth and concluding section gives a summary of the findings of the study.

The Methodology of the Study

The present study is a programme designed and implemented by DDS in 11 villages of Zaheerabad, Jharasangham and Nyalkal mandals of Medak district. The study involves process documentation and evaluation of the programme for its sustainability and replicability in other rain-fed regions of the country.

The study selected 3 villages out of a total of 11 villages in three mandals. A representative sample of 15 households in each village is taken on a random sampling basis to study the impact of the programme using a pre and post-test research design. A control village has been selected (non-DDS intervention village) for the purpose of comparison. Apart from the data on household survey, secondary source material such as articles, NGO reports and government statistics were used in the analysis of the study. Qualitative information was collected through group discussions, interviews with key informants and also the project staff of DDS. The study was conducted for the first year of the programme (2001-2002), covering all the agricultural seasonal activities right from ploughing, manure application, sowing, weeding to harvesting and finally storing and distribution of grain within the community.

Objectives of the Study

To study the whole process of "Alternative Public Distribution System" initiated by DDS in eleven villages, we were guided by the following broad objectives:

1. To document the various processes involved in reclaiming fallows and setting up alternative public distribution system by the local communities.
2. To study the effects of reclamation of current fallow lands and alternative PDS on the livelihoods of the individual households as well as the community at large.
3. To study the economics of alternative PDS Scheme and its sustainability in future.
4. To study lessons from the project implementation for its wider acceptance and applicability across rain fed regions in the country.





Concept of Food Security

The concept of food security has been evolving over the last few decades with academics, policy makers and NGO activists contributing substantially to the debates on what constitutes food security, determinants of food security and how it can be ensured at global, regional, national, state, household and individual levels. The definitions on food security varied depending on the unit of analysis. For instance, the world Food Conference of 1974, which was organised in the wake of the world food crisis of 1972-74 was largely concerned with global food security and it had recognised that world food security was a common responsibility of all nations and that international approaches were needed to achieve improved world food security (Sarris and Taylor, 1976). Fluctuating global production, supply and price volatility are seen as chronic problems that required national and international efforts in terms of maintaining grain reserves at the inter-regional level that could be used in providing physical supply of a minimum level of food grains both during normal times as well as during harvest failures. Similarly, the International Conference on Population and Development (Cairo, 1994) highlighted the linkage between population growth and food production and the need to evolve global measures to satisfy the ever-growing food needs.

Food security has also been a recurring theme raised in specific contexts in various fora convened by the United Nations. The Conference on Environment and Development held in Rio de Janeiro in 1992 emphasized the need to ensure food security at all levels, within the framework of sustainable development as defined in Agenda 21. The joint FAO/WHO conference on nutrition, held in Rome in 1992, declared, "Hunger and malnutrition are unacceptable in a world that has both knowledge and resources to end this human catastrophe" and recognised that, "access to nutritionally adequate and safe food is a right of each individual". The World Conference on Human Rights (Vienna, 1993) emphasized the need to ensure that everyone enjoyed a right to food. The World Summit on Social Development (Copenhagen, 1995) made a strong commitment to the campaign against hunger through its emphasis on poverty eradication. The fourth World Conference on Women (Beijing, 1995) drew the attention of the international community to the key role played by women in food production. The Habitat II Conference (Istanbul, 1996) specified the need to establish healthy linkages between rural and urban areas and emphasised the role of cities in ensuring proper food distribution and drinking water supply.

What is Food Security?

The World Food Summit (Rome, 1996) which took place at a time of growing international concern over slow growth in global food production and expanding population, gave a new impetus to the fight for food security, by focussing attention on the food issues. The Rome Declaration on World Food Security, convened by FAO defines food security as, "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".¹ This definition forms part of a broader food security frame work that includes policy issues relating to poverty, sustainable agriculture and rural development, food production, stabilization mechanisms, improved access and international trade. The definition adopted at the World Food Summit has been referred to in numerous texts and resolutions since and forms the basis of the international consensus on actions required at global,

regional and national levels to achieve world food security.

This definition encompasses many issues. It deals with production in relation to food availability; it addresses distribution in that, the produce should be accessed by all; it covers consumption in the sense that, individual food needs are met in order for that individual to be active and healthy. The availability and accessibility of food to meet individual food needs should also be sustainable. This implies that, early warning systems of food insecurity should monitor indicators related to food production, distribution and consumption. The performance of these indicators, therefore, will detect whether a certain area or population is food secure or insecure in relation to the spirit of the above definition.

Food security is closely related to poverty and chronic food insecurity translates into high degree of vulnerability to famine and hunger. Ensuring food security presupposes elimination of that vulnerability. According to Sen (1981), the poor are vulnerable, because they do not have adequate means or entitlements to secure their access to food, even when food is available in local or regional markets. As Henry (1991) points out, although there is irrefutable evidence that poverty is the most evident common denominator among nations, communities or households afflicted by chronic under-nourishment, it is not the sole determinant. The extent of access to gainful employment, to arable land, to sustainable technologies, and to other productive resources, are important factors influencing under nutrition.



Agricultural Growth and Food Security

Agriculture is central to the issues of poverty and food security. Agriculture is the main source of employment and income in most developing countries and its growth and development is essential for achieving food security both at the national and household levels. In India, agricultural sector accounts for 30% of India's GDP and employs over 60% of the workforce. This implies that any adverse developments within this sector have larger ramifications in terms of its impact on the levels of poverty and employment as well as food security of the country.

In the post-independent era, agricultural growth was stunted by a series of droughts and famines. The advent of Green Revolution in the 1960s raised productivity levels and modernized agriculture with new equipment and farm technology. This ranged from the use of fertilizers, pesticides, high-yielding varieties, to the use of tractors instead of cattle to till the soil. The immediate result was that the production of crops such as wheat and rice increased remarkably.

In fact, if the periodization of agricultural growth, starting from the post-independence period is seen, the period 1949-50 to 1964-65 could be identified as one of agricultural growth through area expansion. The next period 1967-68 to 1980-81, considered as the first round of Green Revolution, is marked by sharp reduction in area expansion and a perceptible shift in yields. The first round of Green Revolution was confined to only a few crops-rice and wheat being major beneficiaries and select areas like Punjab and Haryana. Despite the improvement in the yields, the growth rate of production during this period came down from 3.13% per annum during 1949-50 to 2.38 % during 1964-65, due to reduction in area expansion. However, the second round of the Green Revolution from 1980-81 to 1991-92, performed better by achieving a growth rate of 3.21%, coming from improvement in yields. Thus the Green Revolution phase ushered in an era of self-sufficiency in food grain production for the nation. Another important point to be noted here is that over the post-independence decades, the agricultural growth rate remained ahead of population growth rate.

India's present size of population is estimated at 1.27 billion/1027.0 millions in 2001 while its food production

level is at 209 million tonnes in 1999-2000 and 196 million tonnes during 2000-2001. With an average level of food consumption (NSS 50th Round, 1992-93) at 14-kg /per capita/per month (rural) and 11kg(urban), the current total food requirement is around 200 million metric tonnes, which appears comfortable for the present. However, this may not be the scenario in the years to come. With average population growth rate of 1.9% per annum and food grains productivity slowing down to 1.7%, there can be a serious mismatch between the supply and demand situations; seriously compromising the food security of the country.² In fact, in the last decade i.e.1991-2000, the net per capita availability of food grains (per annum) fluctuated from 186.2 kg in 1991 to 180.8 kg in 1995 to 167.4 kg in year 2000. The aggregate all India production levels given here, however do not explain the changes that Green Revolution technologies have brought about in Indian agriculture, such as changes in area of production, the changes in cropping patterns, changes in agricultural labour force and labour productivity, regional and state level variations in growth and uneven growth between regions.

Green Revolution and Changes in Area of Production

Changes in area of production, is among the several changes that Green Revolution has ushered into the Indian agriculture. Area under crops can grow either through increase in net area sown, or through increase in intensity of cultivation. By the mid 60s, the net area sown had ceased to grow at a significant rate, since most of the cultivable area had already been brought under cultivation. Whatever changes in the cropped area that occurred during this period was notably through increase in intensity of cultivation through irrigation and heavy input use such as chemical fertilizers and pesticides and introduction of short duration crops.

According to G. S Bhalla and Gurmail Singh, "there was a fairly rapid deceleration in the growth of net sown area overtime. For example during 1980-83 to 1990-95, net sown area grew at a rate of 0.07 percent per annum compared with a growth rate of 0.14 percent during 1970-73 to 1980-83 and 0.19 percent during 1962-65 to 1970-73."³

During the same periods, at the all India level, cropping intensity increased from 1.24 percent during 1980-83 to 1.30 percent during 1992-95. Cropping intensity registered in all the regions of the country, but the increase was especially high in irrigated areas of northwestern and the eastern India.⁴

Changes in Cropping Pattern

Prior to the Green Revolution, food grain crops dominated Indian agriculture. Even during the initial phase of Green Revolution, this trend did not change except that the seed-fertilizer technology introduced during the mid-60s was largely confined to wheat and rice. However, by the early 1980s, Indian agriculture began to witness crop diversification away from food grains. According to S. D. Sawant, the crop sector saw two different types of area shifts. The first involved transfer of area to wheat and rice crops; mainly from coarse cereals and pulses during the early Green Revolution and the shift was restricted to the irrigated areas of northwestern region and western parts of the state of Uttar Pradesh. The second type of area shift was in favour of non-food grains, again at the cost of mainly coarse cereals and benefited oilseed crops more than other crops, such as vegetables and fruits.

The shift represented farmer's response to the policy-induced improvement in the technologies and the market environment for the commercial crops, mainly the oil seeds since the 1980s.⁵

The following table gives figures of the changes in cropping patters at All India Level during 1964-65, 1971-72, 1981-82 and 1991-92.



Table I – Changes in cropping patterns at All India Level during 1964-65, 1971-72, 1981-82 and 1991-92

Period/Crop (1)	TE 1964-65 (2)	TE 1971-72 (3)	TE 1981-82 (4)	TE 1991-92 (5)
Rice and Wheat	31.3	33.7	35.9	36.1
Coarse Cereals	28.1	27.5	24.5	19.6
Pulses	15.4	13.8	13.7	12.8
Food grains	74.9	75.1	73.1	68.5
Nine oilseeds	8.9	8.9	9.2	14.1
Cotton	5.1	4.9	4.6	4.1
Sugarcane	1.5	1.6	1.7	2.0
Other crops	9.6	9.5	10.4	11.3
Non-food grains	25.1	24.9	25.9	31.5
All crops (GCA in 000 hectares)	(1,57,651)	(1,64,415)	(1,72,990)	(1,82,700)

Source: S.D.Sawant, "Performance of Indian Agriculture with special reference to regional variations" *Indian Journal of Agricultural Economics*, vol. 52, No.3, July-Sept., 1997, p. 370.

Changes in Agricultural Labour force

Increasing yields and agricultural output across states were not the only changes witnessed during the Green Revolution period. Changes in regional patterns of labour productivity was seen as rapid rise in agricultural output, combined with increasing intensity of cultivation, increased the demand for labour in agriculture in some parts of India.

Initially, this resulted in higher wages and bargaining power of landless labour. However, this trend of rising wages and income was gradually counteracted by increased mechanization on the one hand and large rural to rural migration of landless labour on the other. These two factors have tended to dampen the increase in wage rates in the prime Green Revolution regions. Lacks of diversification in agriculture and low absorptive capacity in the non-agricultural sector have also contributed to the lower productivity of the labour force.

Regional Variations

The inter-regional spread of higher agricultural growth during the Green Revolution period, more specifically during the 1980s, was quite widespread than the preceding sub-periods. Among all the states, growth records of West Bengal, Haryana, Rajasthan, Tamilnadu, Punjab and Kerala have been outstanding. However, this growth has not been uniform, since the well-endowed states with good irrigation facilities and fertile soils benefited more than other dry land regions in the country. In fact, even within the so-called Green Revolution states, one could witness regional disparities due to uneven development of irrigation facilities and other infrastructure creating unevenness in growth and development of people.

Neglect of Dryland Agriculture

One of the worst outcomes of Green Revolution has been the gradual neglect of dryland agriculture. Accounting for nearly a half of the country's gross cropped area, dryland agriculture has been bypassed by the development process since the whole policy environment was geared to address the needs of farmers in fertile and irrigated

regions. Subsidized inputs fertilizers, pesticides, seeds including water and electricity was pumped to these areas while resource poor dryland farmers with little investment capacity appeared unattractive for policy intervention. Dryland agriculture was considered as subsistence agriculture unsuited to the growing food demands of the country's teeming millions. While the government policies favoured regions of Green Revolution growth, the dryland areas languished without R&D, extension, credit and marketing facilities, low capital formation, inadequate rural infrastructure that impacted on overall productivity, yields, procurement price etc., seriously undermining the livelihood of millions of farmers living in these regions.

Green Revolution technology credited for ensuring self-sufficiency in food grain production through high yields per hectare was also responsible for creating certain unexpected negative trends in Indian agriculture. Not only has it changed the cropping patterns and created regional disparities in income and growth, but it has also fundamentally changed the ecological balance in certain regions of the country due to prolonged and indiscriminate use of chemical fertilizers and pesticides to achieve farm yields, undermining sustainability in the long run. In certain Green Revolution belts in the Indo-Gangetic region, the growth rates in rice and wheat yields have stagnated. According to a study, rice yields in Punjab and Haryana reached saturation level in early 1980s and crops also suffered due to the problem of over exploitation of water in some parts and its rising susceptibility to diseases and insects/pests.⁶

Box 1:

Green Revolution technologies and some negative trends in Indian agriculture

- Changes in cropping pattern
- Rice and wheat have become favoured cereals
- Intensive mono-cultural cropping pattern with heavy inputs
- Subsidized inputs-fertilizers, pesticides, seeds including water, electricity
- Regional disparities due to lack of uniform growth, only well endowed states with irrigation and fertile soils such as Punjab, Haryana, A.P benefited from Green Revolution
- Neglect of dryland agriculture
- Policies that favoured big farmers
- Environmental degradation (such as water logging, increased salinity, water and land pollution due to usage of chemical pesticides, etc.)
- Negative impact of subsidies



Declining Soil Fertility and Factor Productivity

One of the serious negative effects of mono-cultural cropping pattern promoted by the Green Revolution technology has been the loss of soil fertility and factor productivity, undermining long-term sustainability of yield growth. Agricultural scientists have realised that continuous rice-wheat rotation coupled with near omission of legumes in cropping pattern and decline in the use of compost and farmyard manure results in serious decline of soil fertility and factor productivity. For example, an analysis of soil test reports from Karnal in Punjab for the past 15 years shows a significant decrease over time in the nutrient status of soils.

Similarly, due to continuous rice-wheat rotation, the intensities of pests, diseases and weeds have been reported to increasingly attack these crops. Other environmental problems related to rice-wheat system include, water logging related salinity, pollution of ground water due to leaching of chemical fertilizers and pesticides and spread of diseases as a consequence, and pollution due to burning of rice straw in many places.⁷

In India, an estimated 1.5 million hectares of land already faces various types of soil degradation. If this trend

continues, average yields per hectare are expected to decrease, while reliance on fertilizers will continue to push up production costs. This situation is a death-knell for small and marginal farmers who constitute a majority in Indian agriculture. Ecological disasters and socio-economic problems go hand in hand. In recent years, many small and marginal farmers across the country, whether in Punjab, Andhra Pradesh, Karnataka or Tamilnadu committed suicides due to indebtedness resulting from short-term loans taken at high interest rates to continue production in an unfriendly market environment that does not cover even the production costs.

Some of the other negative consequences of Green Revolution in the country were, policies and measures that favoured big farmers who were better placed to invest in Green Revolution technologies. Small farmers lacking in adequate capital were marginalized and in some cases displaced from their farms. Most of the subsidized inputs such as fertilizers, pesticides, hybrid seeds including water and electricity were cornered by big farmers in most of the Green Revolution regions of the country. Another negative impact of subsidies was that, fertilizer subsidies caused series nutrient imbalances in fertilizer application. Irrigation and rural power subsidies distorted cropping pattern by promoting crops that need a lot of water in dry regions. Subsidies also bred greater inefficiency. The support leaked to non-agricultural users. In the case of irrigation subsidy, "most of the actual expenses ended up financing the state's irrigation department salary and wages payments to a bureaucracy, with little accountability for operation and maintenance of government schemes".⁸

Agricultural Sector and Economic Reforms

Since July 1991, the Indian economy has witnessed a series of economic reforms encompassing all major sectors of the economy (agriculture, industry, trade, foreign investment and technology, public sector, financial institutions etc). The reforms were intended to change the orientation of development policies of the country by placing greater reliance on markets for allocation of resources, emphasizing private initiative and encouraging domestic and global competition. With regard to agriculture, the main rationale for economic reforms is to remove distortions and create appropriate incentive structure for increasing agricultural production. Subsidies were identified as the main culprit in distorting agricultural growth and productivity, conveniently forgetting other structural and institutional bottlenecks ranging from the pattern of land holdings to poor irrigation, constraining the agricultural sector. The government, in order to reform the agricultural sector first began by cutting down on subsidies. Faced with fierce resistance from farmer lobbies, the government first began phasing out hidden subsidies. For instance, most state governments recently reversed their policies of subsidizing local farmers with free electricity, as it proved too costly.

According to a survey by the World Bank (1997), liberalization of input prices for fertilizers, diesel, high yielding variety seeds and irrigation charges were hiked sharply affecting a majority of small and marginal farmers in the country. During the liberalization period, the agricultural sector also witnessed a steep decline in public sector investment, cut back in R&D and total neglect of dryland crops in R&D.

Box 2:

Economic Reforms, Liberalisation and Indian Agriculture

- Cut-back on subsidies
- Decline in public sector investment in agriculture
- Fall in food consumption levels
- Cut-back in R & D and total neglect of dry land crops in R&D
- Opening up of agricultural trade
- Reforms in the sector failed to reach the small farmers due to structural and institutional bottlenecks ranging from the pattern of landholdings to poor irrigation.

The cumulative impact of all these measures was a steady decline in the agricultural growth rate during the 90s, and a gradual marginalization of small and marginal farmers. According to NSS estimates, the proportion of rural landless and near landless households have steadily increased since the early 1970s from 37.42% to 42.40 % in 1919-92. The significance of this trend would be easy to appreciate when it is considered along with the trend in distribution of ownership given in Table 2.

Table 2 - Rural Landless Households (Per cent of rural households)

Year	Landless (<0.002 ha)	Near Landless (0.200-0.200 ha)	Total
1960-61	11.68	26.22	37.90
1970-71	9.64	27.78	37.42
1981-82	11.33	28.60	39.93
1991-92	11.25	31.15	42.40

Source: VM Rao, HG Hanumappa, *Marginalisation Process in Agriculture Indicators, Outlook and Policy Implications*, EPW, December 25, 1999, P.A-134.

It is worth noting that by the early 1990s over 96 % of owned holdings belonged to the size group marginal, small and semi-medium, i.e., owners ranging between vulnerable to those likely to have only a modest potential for viability. Most important, over two-third of owned land was with the lower three groups, with the medium and large owners accounting for less than a third of total land.⁹

Table 3 - Distribution of Owned Holdings

Year	Marginal (< 1 ha)		Small (1 to 2 ha)		Semi-medium (2 to4 ha)		Medium (4 to 10 ha)		Large (10 ha and above)	
	Holding	Area	Holding	Area	Holding	Area	Holding	Area	Holding	Area
1960-1961	60.06	7.59	15.16	12.4	12.86	20.54	9.07	31.23	2.85	28.24
1970-1971	62.62	9.76	15.49	14.68	11.4	21.92	7.8	30.75	2.12	22.91
1981-1982	66.64	12.22	14.70	16.49	10.78	23.38	6.45	29.83	1.42	18.07
1991-1992	69.38	6.93	21.75	33.97	5.06	17.63	2.84	17.64	0.95	13.83

⁹ V.M.Rao, H.G.Hanumappa, "Marginalisation Process in Agriculture: Outlook and Policy Implications", *EPW*, December 25, 1999, pp. A-134-135.

The changes in the landholding patterns have significance for the production structure in Indian agriculture. The steady marginalization process would mean that, the small and marginal farmers would have to shoulder the responsibility of agricultural growth and development in the future. This is a difficult task in the context of an unfavourable policy environment that neglects the interests of these small and marginal farmers, more so in rainfed regions of the country.

Increasing Casualisation in Rural Employment

The process of marginalization during the 90s is also captured by the changing mode of employment in rural areas. In rural India, the incidence of self-employment has been consistently on a relative decline, both for male and female workers. For rural males, it declined from around 66% in 1972-73 to 55 percent in 1999-2000 and for rural females, it dropped from 65% to 57%. Employment under casual labour basis has fairly steeply increased

in the case of rural male workers, while it has been slightly less for the rural females. This trend is worrisome since the declining incidence of self-employment may be throwing some people out of self-cultivation, only to swell the ranks of the landless agricultural labourers.¹⁰

The following table gives the composition of workers by sex and mode of employment in rural areas from 1972-73 to 1999-2000.

Table 4

Composition of workers by sex and mode of employment in rural areas from 1972-73 to 1999-2000

Worker's Residence	Worker's Sex	Year	Mode of employment			Index of casualisation*
			Self-employed	Regular employee	Casual labour	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rural	Male	1972-73	65.9	12.1	22.0	182
		1977-78	62.8	10.6	26.6	251
		1983	60.5	10.3	29.2	283
		1987-88	58.6	10.0	31.4	314
		1993-94	57.9	8.3	33.8	407
		1999-00	55.0	8.8	36.2	411
Rural	Female	1972-73	64.5	4.1	31.4	766
		1977-78	62.1	2.8	35.1	1254
		1983	61.9	2.8	35.3	1261
		1987-88	60.8	3.7	35.5	959
		1993-94	58.5	2.8	38.7	1382
		1999-00	57.3	3.1	39.6	1277

Note* Index of casualisation shows the number of casual wage earners for every one-hundred of regular salaried jobs

Source: G.K.Chadha, *Impact of Economic Reforms on Rural Employment: No Smooth Sailing Anticipated*, *Indian Journal of Agricultural Economics*, Vol.56, No.3, July-Sept.2001, p. 503

Food Security and Trade

Food security as discussed in the earlier section, related to agricultural growth and production. But some advocates of food security emphasize the importance of trade as a mechanism in addressing food security issues of the developing world. It is argued that countries having comparative advantage in certain commodities can export and earn foreign exchange to buy food in international markets. The import substitution policies pursued by the government since the mid 60s to overcome difficulties in importing food grains from the food surplus countries – mainly the western countries, according to these advocates is no longer necessary, as the country had achieved self-sufficiency in food grain production. The economic liberalization programme launched in India in 1991 and Indian's signing of the Uruguay round Agreement of the GATT in April 1994 are developments

that indicate that sooner or later, Indian agriculture will open up for external trade in agriculture and increasingly face world markets. Opinions differ over whether this will be beneficial or detrimental, for the country as a whole, for the farmers and for the poor.

Economists like Gulati and Kelley (1999) claim that India would be an overall net gainer from trade liberalization, and that rural incomes would rise. Gulati sees evidence that liberalization will in fact strengthen food security by increasing the profitability in growing food grains, compared to a situation of an insulated agriculture, where Indian policy-making encouraged cash crops like oilseeds at the cost of cereals (Gulati 1999). However, he argues that the fruits of liberalization will be unevenly distributed across social groups and regions.

Critiques of liberalization argue that opening up of agriculture will lead to a diversification of cropping patterns away from cereals and that this will be detrimental to the goals of food security. Trade liberalisation would mean responding to international price signals and quickly changing cropping patterns to suit global demand and tastes, for instance switching over from food grains to floriculture, horticulture etc. For small and marginal farmers this is a difficult proposition as they generally lack adequate capital and resources to invest in crops that change with the changes in global demand.

The important question however, is whether international trade is a dependable mechanism for ensuring food security. This question assumes importance in the context of the pressures exerted by the rich countries, through WTO, to remove trade barriers in agricultural commodities. The rich countries, despite their avowed commitment to free trade, accord high priority to protect their agriculture. Subsidies to the farmers in the rich countries vary from one third of the farmer's income in the US to one-half in the EU to two-thirds in Japan.

Subsidies have contributed to the continuing over production of agricultural goods in the developed countries, which itself contributes to the decline in world agricultural prices. Subsidies allow the US and EU to sell crops at artificially low prices, creating unfair competition with the farmers in the developing world, in both domestic market and international market. Artificially cheap products can undermine production in developing countries and force small-scale farmers out of business. Cheaper imports can also contribute to a shift in consumption patterns away from locally produced goods, aggravating the situation for local farmers. In addition, when production levels are high, rich countries have dumped the surplus in developing countries in the form of food aid-this too distorts local markets and can be disincentive to production.

Between 1999 and 2000, developed countries' support to agriculture averaged about \$330 billion per annum, which in nominal terms is some 9% higher than in the period 1886-1988. Table .5 gives a picture of the levels of subsidies given to agriculture within OECD countries in \$billions.

Table 5 - Levels of Support to Agriculture within OECD countries (\$ billions)

	1986-1988	1998	1999	2000	2001	1999-2001 (Annual Averages)
OECD	302	339	357	321	311	330
US	69	91	99	92	95	95
EU	110	125	130	102	106	113

Source: *Farmgate: The developmental impact of agricultural subsidies, Actionaid, August 2002.*

To appreciate the enormity of the problem arising due to subsidies and the way they are used in the west to support farmers, we can take the example of U.S. In the US there are about 2 million farms, based on the government definition of, "farm" as any place with farm sales of more than \$1,000. But there are fewer than 1 million farms with sales of more than \$10,000. When farm programmes began in the 1930s, there were 7 million



farms, and 25% of the population lived on farms. Today, just 2 % of the population live on farms. These figures indicate that the US government channels a huge chunk of taxpayer money, more than \$20 billion per year, to a small segment of population. Indeed, only 42% of farmers receive direct government subsidies, and the producers of just five crops-wheat, corn, soybeans, rice and cotton- somehow secure 90% of government farm subsidies. Federal subsidies are concentrated on just a few hundred thousand large farms that have high incomes. In 1999 the largest 7% of farms received 45% of all government subsidy payments. By contrast, the 76 percent of farms that are classified as small received just 14 percent of subsidies. One study covering the period, 1996 -1998 found that 61% of subsidies went to just 144,000 large farms.¹¹

Statistics reveal that the average net worth of farm households was \$564,000 in 1999, compared to \$283,000 for non-farm households in 1998. Similarly, statistics on household income reveal that average household income was \$64,347 in 1999, about 17% higher than the \$54,842 average for all U.S non-farm households. These statistics indicate that the farming community is in relatively good financial condition and as such requires no financial bailout of \$20 billion per year.¹²

The significance of these statistics is the level of iniquitous distribution of domestic agricultural production subsidies, both at the global and national level. Small-scale farmers in developed countries receive only a fraction of the subsidies available to large landowners who also enjoy massive economies of scale. Yet by comparison, many small-scale farmers in developing countries do not receive any subsidies at all, seriously undermining their viability and livelihoods.

Although lack of a level playing field between developed and developing countries over farm subsidies makes agri-trade uncompetitive for farmers in developing world, there are also other aspects of agricultural trade that make it detrimental to the interests of developing world and its farmers. The OECD countries in order to protect their agricultural sector impose a variety of tariff and non-tariff barriers such as sanitary and phytosanitary measures denying access to third world commodities. Another important factor is the price volatility and risks in international markets, which can hardly insulate small farmers from shocks. Moreover, trade liberalisation in food grain exports generally pushes up food prices in domestic markets causing hardship to the poor. Besides, in a country like India with a huge population, there can be very little surplus to export and given the fact that international market for grains is depressed, the policy to export surplus stocks with FCI would only mean subsidizing food grains for importing countries rather than utilizing those stocks for domestic consumption.

For advocates of trade liberalization who argue on the basis of comparative advantage to export and earn foreign exchange to buy food, the big question is how many countries have food surpluses to export. Can a country like India depend on such imports in the context of price volatilities when a few countries and their multinational corporations control world food supply? Given these realities, agricultural trade as a mechanism for ensuring food security is a difficult proposition for most developing countries and a cautious approach is needed by governments in the developing world to ensure the livelihoods of millions of small and marginal farmers and the agricultural sector as a whole. It is in this context, civil society groups, farmers and policy makers have the responsibility in searching alternative frameworks for agricultural growth and food security.



Public Distribution System in India

Public distribution system (PDS) in India is one of the largest welfare institutions in the world. It represents the direct intervention of the Indian state in the food market to ensure food security. PDS serves a dual purpose of providing subsidized food to the consumers as well as providing price support to the farmers. The objective of PDS and the grain procurement policy of the government is to achieve the twin goals of price stability of food grains, which is expected to contribute to macro-economic stability and to create demand for food grains resulting from food subsidies leading to multiplier effects, raising the overall growth of the economy. Over the decades the functioning of the government PDS has suffered due to inefficient management and lack of proper targeting to improve the food security of the poor. Although, India has achieved self-sufficiency in food grain production and surplus food stocks are available in the FCI godowns across the country, the poor have little access to food as they lack purchasing power. This paradox of surplus food availability in the market and chronic hunger of the poor has brought into sharp focus the lopsided policies of the government with regard to food distribution in the country.

The PDS evolved from a food rationing system introduced by the British in India during World War II. A fixed amount of food rations were distributed to the entitled families in specific towns/cities through The Department of Food, which was created in 1942, under the Government of India. After the end of the war, the government abolished the rationing system only to reintroduce it immediately after independence in 1950; due to the inflationary pressures of the economy. Ever since, the Indian government has used the public distribution system as a deliberate policy instrument, to overcome chronic food shortages apart from using it for stabilizing food prices and consumption in view of fluctuating food production in the country.

Scale of Operations

The all India PDS network has more than 400,000 Fair Price Shops (FPS) and it distributes each year

Table 6 - Food Subsidy of the Indian Government

Year	Amount (Rs.Crore)	% of Total (Govt. Expenditure)
1990-91	2450	2.33
1991-92	2850	2.53
1992-93	2785	2.27
1993-94	5537	3.90
1994-95	4509	2.80
1995-96	4960	2.78
1996-97	5166	2.46
1997-98	7500	3.23
1998-99	8700	3.11
1999-00	9200	3.03
2000-01	8100	2.39

Source: Planning Commission Study Report, GOI; [website: http://PlanningCommission.nic.in/mta-9702/mta-ch8.pdf](http://PlanningCommission.nic.in/mta-9702/mta-ch8.pdf)

commodities worth more than Rs.15, 000 crores to about 16 crore families. The level of food subsidies as a proportion of total government spending, has gone up from 2.3% in 1990-91 to 3.03% in 1999-2000.

Most of the expenses in operating the PDS, consist of two major components: Subsidy costs occur mainly because the cost at which food grains are procured is higher than the price at which they are sold in the PDS. The second component is the administrative costs incurred by the government on storage, transport and distribution with other incidentals in the process of procurement and distribution of food grains.

Box 3:

Food Surpluses and Hunger

“There has not been any breakthrough in the growth of food grains output in the country in the recent period. The present surpluses with the FCI are not a consequence of a big rise in productivity in agriculture achieved through cost-reducing technological change. They are a consequence of a steep rise in the procurement prices in the recent period which, apart from rendering exports uncompetitive and discouraging the holding of stocks by the private sector, reduced the domestic consumption of food grains, particularly by the poor.”

Source : C.H. Hanumantha Rao, "Food Grain Supply Causes and Policy Implications", 5th, Dr. C.D. Deshmukh Memorial Lecture, 2002, Council for Social Development, Southern Regional Office, Hyderabad, Page-1.

Despite massive subsidies given by the central government towards food distribution to the poor, most of these subsidies failed to serve the population below poverty line (BPL). The reason for this is that until recently subsidised food grain provision through the PDS has been universal and not specifically targeted at the poor. Apart from this problem of inclusion of the non-poor and their cornering of major proportion of the subsidies, there are also problems of leakage due to corruption and storage losses straining the exchequer. Some of the other issues related to ineffective management of PDS relate to its perceived urban bias and poor coverage in states with a high density of rural poor and lack of transparent and accountable arrangements for delivery.

Against this backdrop, the government of India acted to streamline PDS during the Ninth Plan period by issuing special cards to BPL families and selling to them food grains through PDS outlets at specially subsidized prices (with effect from June, 1997). Under the new Targeted Public Distribution System (TPDS), each poor family is entitled to 20 kg of food grains per month. This is likely to benefit about 6 crore poor families, to whom a quantity of about 72 lakh tones of food grains per year is earmarked. The identification of the beneficiaries is done by the states, based on state-wise poverty estimates of the Planning Commission. The thrust is to limit the benefit to the truly poor and vulnerable sections: landless agricultural labourers, marginal farmers, rural artisans/craftsmen, potters, tappers, weavers, blacksmiths, and carpenters in the rural areas; similarly those covered by TPDS in urban areas are slum dwellers and people earning livelihood on a daily basis in the informal sector like the porters and rickshaw pullers and hand cart pullers, fruit and flower sellers on the pavements, etc.

The allocation of food grains to states is based on consumption in the past, that is, the average annual off-take during 1986-87 to 1995-96. Food grains out of this average lifting – in excess of the BPL needs at the rate of 10 kg per family per month – are provided to the states as 'transitory allocation' and a quantity of 103 lakh tones is earmarked for this annually. This transitory allocation is intended to continue the benefit of subsidized grains to population Above Poverty Line (APL) to whom an abrupt withdrawal of PDS facility was not considered desirable. The 'transitory' allocation is issued at prices, which are subsidized but higher than prices fixed for the BPL quota.

Following the TPDS introduction, representations were received from several States/Union Territories (UTs) that the new allocation was much lower than the earlier level of allocations particularly during 1996-97. As a

result of this, and keeping in view the guidelines for implementation of TPDS, additional allocations – over and above TPDS quota – were made to States/UTs at economic cost from June, 1997 to November, 1997. At a conference in September 1997, the Chief Ministers reviewed the TPDS implementation and the states demanded that the additional allocations be made at APL rates. Accordingly, the additional quantities are being allocated at APL rates from December 1997, subject to availability of food grains in the Central pool and constraints of food subsidy. The BPL/APL rates (Rs/kg) have been as follows during the Ninth Plan.

Table 7 - Issue Price of Food Grains (Rs.)

Category	Date	Wheat	Rice (common)
BPL	1.6.1997	2.5	3.5
-do-	1.4.2000	4.5	5.9
APL	1.6.1997	4.5	5.5
-do-	1.4.2000	9.0	11.35

Source: Planning Commission Study Report, GOI

Website: <http://PlanningCommission.nic.in/mta-9702/mta-ch8.pdf>

PUBLIC DISTRIBUTION SYSTEM IN AP

The PDS in AP is quite extensive in geographical coverage both in rural and urban areas and about 57 per cent of households in AP are beneficiaries of PDS, the overwhelming majority of them buying rice.¹ The numbers of Fair Price Shops functioning in Andhra Pradesh are around 40,555 out of which, 7,641 are in urban areas and the remaining 32, 914 are in rural areas. The geographical coverage is almost universal and there is one fair price shop for every 1965 persons in the state, as against the India's norm of one fair price shop for every 2000 population.

In Andhra Pradesh, families coming under BPL are 113.60 lakhs; these families are given white cards. But, according to Government of India figures only 37.78 lakh families fall in the category of BPL. The Government of AP is supplying rice to the existing white cardholders numbering 113.60 lakhs up to a maximum of 20 kg per family. While GOI supplies 20 kg of food grains per BPL household per month to 32.65 lakh families only. The state government continues to supply rice to all the BPL families up to 20 kg per month. The government of AP gets 75.560 lakh tonnes of rice per annum at half the Central issue price (Rs.550/- per quintal), whereas the requirement of rice for PDS (BPL families) in AP is 221.95 lakh tonnes, the balance is being drawn from the Central Pool (FCI) at the full Central issue price of Rs.950/- per quintal. The Government of AP incurs a subsidy on distribution of rice at subsidised price of Rs.5.25 per kg. Most of the subsidy goes towards covering overhead charges like transportation from FCI to Civil Supplies Corporation, godowns, unloading, storage loading, transportation to fair price shops, interest on capital borrowed from RBI, fair price shop dealers' margins, etc. The details of expenditure incurred as subsidy since 1992-93 by the Government of AP on rice is as follows.

Table 8 - Subsidy on Distribution of Rice by AP Government

Year	Rs. In Crores
1992-93	245.50
1993-94	408.12
1994-95	751.57
1995-96	1124.77

Source: Govt. of AP, Economic Survey 2000-01, Finance & Planning (PLG.Wing – SMC) Department, AP, Hyderabad

Year	Rs. In Crores
1996-97	899.60
1997-98	712.80
1998-99	781.75
1999-00	1062.80
2000-01	1062.00

Problems associated with the PDS

Despite efforts at reforming the PDS by introducing TPDS since 1997, the programme still suffers from a myriad problems, which also includes improper targeting. Of the two types of targeting errors i.e., error of exclusion and error of inclusion, in AP, which has more or less universal coverage, the error of exclusion is less while the error of inclusion is high.

According to a study² conducted on the relative functioning of PDS in AP and Maharashtra on targeting and efficiency, the figures reveal that the error of inclusion in AP is as high as 22.35% in rural areas while it is 4.29% in urban areas and the error of exclusion for rural and urban areas is 20.42% and 36.40% respectively.

The corresponding figures of error of inclusion for Maharashtra are 11.30% in rural areas and 4.12% in urban areas while the figures for exclusion are 49.90% in rural areas and 51.34% in urban areas. This difference between AP and Maharashtra is due to a combination of factors. First, a higher proportion of the upper deciles in rural AP use the PDS compared to their counterparts in Maharashtra. Second, the average per capita consumption of PDS grain by upper is significantly higher in rural AP than the corresponding figures in rural Maharashtra.

Table 9 – Targeting and Efficiency (In percentages)

	Andhra Pradesh			Maharashtra		
	Rural	Urban	Combined	Rural	Urban	Combined
T1	22.35	4.29	14.35	11.30	4.12	6.92
T2	20.42	36.40	22.29	49.90	51.34	49.61

T1 – Error of Inclusion T2 – Error of Exclusion

The general universal targeting prior to TPDS in 1997 has been a disaster both in terms of fiscal burden on the government as well as the effective reach of the programme to the intended beneficiaries, due to leakage and cornering of benefits disproportionately by the non-poor. After the introduction of TPDS, the programme has not fared any better as identification of the BPL households has become a controversial and costly administrative exercise; with great possibilities of exclusion of the real beneficiaries. This problem is highlighted by the varying BPL figures brought out by the Planning Commission and the estimates of BPL households given by various states in the country. Ideological predilection for reforms and fiscal control has also brought about changes in the implementation of the PDS programme as more and more sections of the population are gradually excluded from the programme.

Related to the errors, inclusion and exclusion, is the problem of efficient targeting of subsidies to the poor. A

comparative analysis of how much expenditure on food subsidies go to the target group in AP and Maharashtra, as revealed in the table given below shows that, after accounting for errors of inclusion, excessive costs and leakage / fraud, the transfer of subsidy to the target population is around 32% of total expenditure incurred on the PDS programme.

Table 10 – Costs of Targeting

	Total expenditure (in millions)	Transfer to non-target groups	Excessive costs	Leakages / frauds	Transfer to target group
AP	7778	2059 (26.5)	2058 (26.5)	1161 (15)	2477 (32)
Maharashtra	1883	568 (31)	295 (16)	529 (28)	468 (25)

Note: Figures in brackets are percentages. (1 crore = 10 millions)

The target group is defined as the bottom 40% of the population ranked by expenditure.

Source: Bharat Ramaswami, EPW, March 23, 2002, p.1131.

These figures imply (dividing the income transfer by the subsidy cost) that it costs Rs.3.14 and Rs.4 to transfer a rupee to the target group (of bottom 40%) in AP and Maharashtra respectively. The table given below presents the cost of providing over a rupee of subsidy to the different deciles of the target group – the entire population, the bottom 40 per cent, the bottom 30 per cent and the bottom 20 per cent.

Table II – Costs of Transferring Subsidy to the Target Population (In rupees)

State / Target Group	Entire population	Bottom 40%	Bottom 30%	Bottom 20%
AP	1.71	3.14	4.05	5.81
Maharashtra	1.82	4.02	5.72	9.05

Source: Bharat Ramaswami, EPW, March 23, 2002, p.1131.

Another angle to the subsidies is that, all of it does not go to either producers or the targeted groups; but a significant percentage goes into subsidising the administrative over head charges like transportation, unloading, storage loading, transportation to fair price shops, interest on capital borrowed from RBI, fair price shop dealers margins, etc. To get an idea of this component of subsidy, a table is presented giving a break-up of various heads constituting the economic costs of running FCI godowns.

Table 12 - Economic Costs of FCI – A Break up (Rupees/Quintal)

Year	Procurement Price	Procurement Incidentals	Distribution Cost	Carrying Cost	Total Cost	Sales Realisation	Net Cost (Subsidy)
			Rice				
1989-90	319	30	73	53	475		
1990-91	338	43	82	48	511		
1991-92	387	46	82	78	593	366	227
1992-93	454	32	99	99	683	442	241
1993-94	519	77	123	105	823	500	323
Growth Rate	12.68	15.89	12.17	20.72	13.89	15.60	17.74
1994-95	565	53	129	95	842	601	241
1995-96	603	76	147	85	911	613	298
1996-97	655	77	138	133	1003	611	392
1997-98	712	50	155	155	1072	584	488
1998-99	776	115	183	157	1231	612	619
Growth Rate	8.02	11.23	7.51	16.06	9.22	-0.12	23.79
			Wheat				
1989-90	215	47	74	54	391		
1990-91	225	27	78	45	375		
1991-92	275	54	88	85	502	252	250
1992-93	330	50	105	105	590	279	311
1993-94	350	107	109	94	660	356	304
Growth Rate	13.58	22.72	10.75	19.28	15.03	17.28	9.83
1994-95	360	99	120	119	699	408	291
1995-96	380	103	121	108	712	412	300
1996-97	475	111	137	166	890	433	457
1997-98	510	107	136	187	940	370	570
1998-99	550	154	167	185	1056	490	566
Growth Rate	11.42	9.19	7.73	14.16	11.02	2.59	19.71

Source: Economic Survey: 1999-2000, Jha and Srinivasan (2001) and World Bank (1999), Annex Table 2.2a.

The levy price is an average for the common variety from eight states, viz., AP, Haryana, MP, Orissa, Punjab, UP and West Bengal. Quoted in EPW, September 29, 2001, p.3782.

Some of the other problems related to the PDS programme are:

- PDS system has encouraged growing of rice and wheat for which MSP is revised upward, year after year leading to little diversification of crop production and growth of surplus stock.
- Rise in Minimum Support Price (MSP) unrelated to actual costs of production leading to surplus production and storage.
- The quantity of food grains distributed under TPDS is way below the average monthly requirements of the households. According to NSS 50th Round 1992-93, the average consumption is fixed at 14-kg/per-capita/per month in rural areas and 11 kg in urban areas.
- The poor do not have cash to buy 20 kg at a time, and often they are not permitted to buy in instalments.
- Exclusion of coarse of grains like jowar, bajra, etc., from the PDS.
- Low quality of food grains – a World Bank report (June 2000) states that half of FCI's grain stocks is at least two years' old, 30% between 2 to 4 years old, and some grain as old as 16 years.
- Imperfect targeting, leading to exclusion of eligible households and inclusion of non-poor in the PDS.
- Weak monitoring, lack of transparency and inadequate accountability of officials implementing the scheme.
- Price charged by the dealers exceeds the official price by 10% to 14%.
- Large differences between open market and TPDS price, provides an incentive for the diversion of grain to the black market.
- According to the Planning Commission, there is 36 percent diversion of wheat, 31 per cent diversion of rice and 23 per cent diversion of sugar, from the system at the national level.
- Low price difference between APL prices and market prices has also resulted in low off-take of cereals by APL group since the quality of PDS grain is inferior to that available in the market.
- Multiplicity of agencies, poor co-ordination and low administrative accountability, have combined to cripple the delivery machinery.
- Under the Essential Commodities Act, restrictions on free movement of goods from surplus states to deficit states, tend to depress prices and are seen as 'anti-farmer', especially when government and agencies like FCI do not have adequate storage capacity available.
- Most storage godowns with FCI are small-scale and have low quality structures; sometimes, grains are also stored in the open leading to heavy storage losses.



Box 4:

Factors behind FCI's Poor Performance

- Diseconomies of scale, despite its large scale operation
- Low capacity utilization of warehouses.
- Storage cost of owned godowns 70% higher than higher godowns.
- Movement of its stocks multiple times between its warehouses.
- Unscientific, inadequate storage – quality determination, ageing of grains, health risk.
- FCI wholesale marketing cost 10-15 percent higher than private marketers.
- Prescribed narrow marketing margin insufficient to cover costs.
- Departmental wages 4-5 times and contract wages 2 times the market wages.

Source: India Development Report, 2002, OUP, p.64.

Efforts at reforming the TPDS, of late, centre on issues of efficient management. They include:

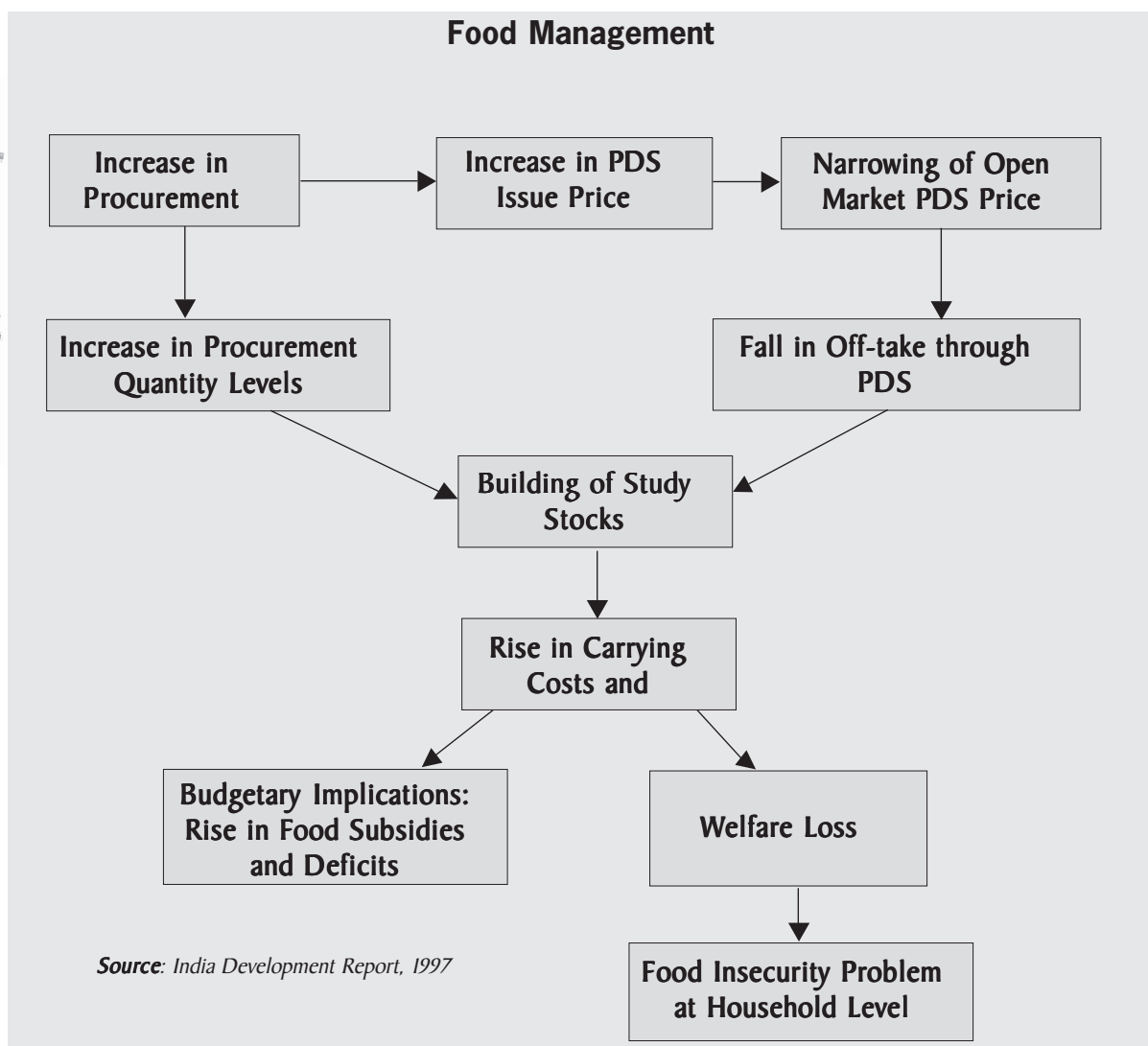
- i) how to reduce subsidy costs
- ii) how to reduce administrative costs

- iii) trying to find out whether the government or the private trader is efficient in marketing and distributing the food in the country
- iv) how to plug leakage, how to overcome the problems of exclusion/inclusion, and whether geographical targeting helps.

But these questions sorely ignore the larger issues such as:

- i) community role in PDS
- ii) local control over production, procurement, storage and distribution
- iii) the choice of cereals available for consumption in the PDS i.e., coarse grains instead of just rice and wheat
- iv) the issue of price distortions by manipulating the minimum support price that encourage production of input intensive and remunerative crops such as rice and wheat and non-food cash crops like cotton and oil-seeds.
- v) the issue of nutrition and dietary diversity
- vi) the issue of ecological sustainability due to intensive and mono-cropping patterns of agriculture

Box 5:



The Alternative Public Distribution System

- A Deccan Development Society initiative

Deccan Development Society (DDS) is an NGO based in Zaheerabad mandal of Medak district of Andhra Pradesh. DDS is a two-decade-old organization working in about 75 villages, spread over 5 mandals in the district. The core activities of the Organisation centre around the issues of sustainable rural livelihoods, food security, community and women empowerment, based on the principles of natural resource management and bio-diversity conservation at the local level. The organisation works with groups of dalit women members called Sanghams in each village. Sanghams form the cornerstone of DDS work and are engaged in a host of interrelated, social and land based activities such as running self-help groups to forming legal committees to address certain social evils like child marriages, atrocities on women, eve-teasing etc., to running a community communication centre, to watershed programmes, managing village medicinal commons, managing community grain fund and community gene fund.

The community food security programme implemented by DDS, also known as Alternative Public Distribution System through community grain fund (APDS) is one of the core programmes around which a range of activities are organized at the community level. This is an innovative programme where food grain production, procurement, storage and distribution are done at the local community (village) level and are entirely managed by the women sangham members. Another innovation of the programme is the identification of poor households within the community through a process of participatory wealth ranking that overcomes problems of exclusion/inclusion so pervasive in government run PDS. The APDS programme is based on addressing three critical questions, which are also its goals:

1. whether the food can be produced and accessed by the communities locally
2. whether the food accessed serves their nutritional security
3. whether local communities can control this food system

To realize these goals of food security at the community level, DDS launched a series of organically integrated community centred programmes that have lead to the APDS programme. These are

1. Eco-employment,
2. Land lease programme,
3. Community Gene Fund Programme.

The Eco-employment programme encourages dalit women farmers to collectively work and upgrade their own marginalized lands, that are often left fallow, into productive lands by engaging in natural resource management works like bunding, trenching, top-soil addition, etc. The land lease programme helps those dalit women, sangham members who are either landless or are marginal farmers, to collectively work on leased lands to grow food for their households.

The Community Gene Fund Programme aims at re-establishing women's control over seeds, the most critical link in the food chain. The dalit women farmers in this programme are seen as the repositories of a wealth of indigenous knowledge relating to bio-diversity conservation and natural resource management practices - key to future food security needs of the country.

CONTEXT

Dryland agriculture constitutes over 60% of Indian agriculture and is a source of livelihood for more than three quarters of the country's rural population. Dry land agriculture in the country is spread over different agro-climatic zones, extending from the deserts of Rajasthan in the north to Central India, Marthwada, North Karnataka and the Deccan plateau in South India. The current DDS project area in Medak district, falls under zone-III and zone-IV of A.P. Agro-ecological classification. Most of these regions are characterized by low-rainfall, sparse vegetation and are prone to soil-erosion. Despite hostile agro-climatic conditions, these regions are a host to a variety of crops that can withstand the vagaries of monsoons and other adverse ecological conditions. Some of the major crops grown in dryland regions of the country are Sorghum (Jowar), Pearl millet (bajra), Finger millet (Ragi), Foxtail millet (Korra) etc that are the mainstay of agricultural, food and cultural systems of people inhabiting these regions. Moreover these crops grow with least external inputs, providing not only food security but also multiple securities that include nutrition, fodder, fibre, livelihood and ecological securities, sustaining livestock and livelihoods for rural communities.

Box 6:

Varieties of Crops Grown under APDS Programme

Jowar (white, yellow and red); Red Gram (red, white, spotted and black); Green gram [three varieties]; Black Gram, Horse Gram, Field Bean, Cow pea, Chickpea, Foxtail millet, Finger millet, Little millet, Pearl millet, Niger, Hibiscus, Sesamum, **Dry sown paddy**, etc.

However, in recent times the traditional crops of dryland regions have come under serious threat as farmers were forced to shift to commercial crops driven by market forces and a slew of governmental incentives. Traditional coarse grain crops have become less remunerative and difficult to grow in the context of a policy environment that neglects dryland agriculture vis-à-vis rice and wheat growing areas. The manifestation of this neglect can be seen in the food grain procurement policies of the government and the exclusion of coarse grain cereals from the public distribution system in the country. This situation has resulted in making dryland agriculture unviable; forcing farmers to either leave their lands fallow or grow commercial crops, with a lot of external inputs; endangering themselves economically and the environment in the process. Since the 1960s, the gross area under coarse cereals, as a percentage share of different crops dropped from 29.20% in 1960 to 19.81% in 1990 in the country, while the corresponding figures for Andhra Pradesh stood at 38.42% in 1960 and 14.90% in 1990. This rapid decline in acreage of coarse grains has serious implications, both for dryland farming as well as food security of the country.

Crops of Security

Most of the traditional crops grown in the DDS programme area provide multiple securities. They:

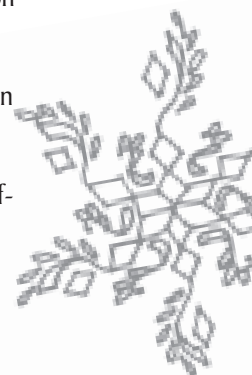
- provide variety and nutritive food security throughout the year.
- provide variety of fodder and feed security for livestock
- enhance soil-fertility
- allow for effective utilization of farmland through mixed cropping, inter-cropping etc.
- provide for economic security in adverse climatic, environmental and market conditions unlike monocultural crops

DDS Alternative Public Distribution System through Community Grain Fund

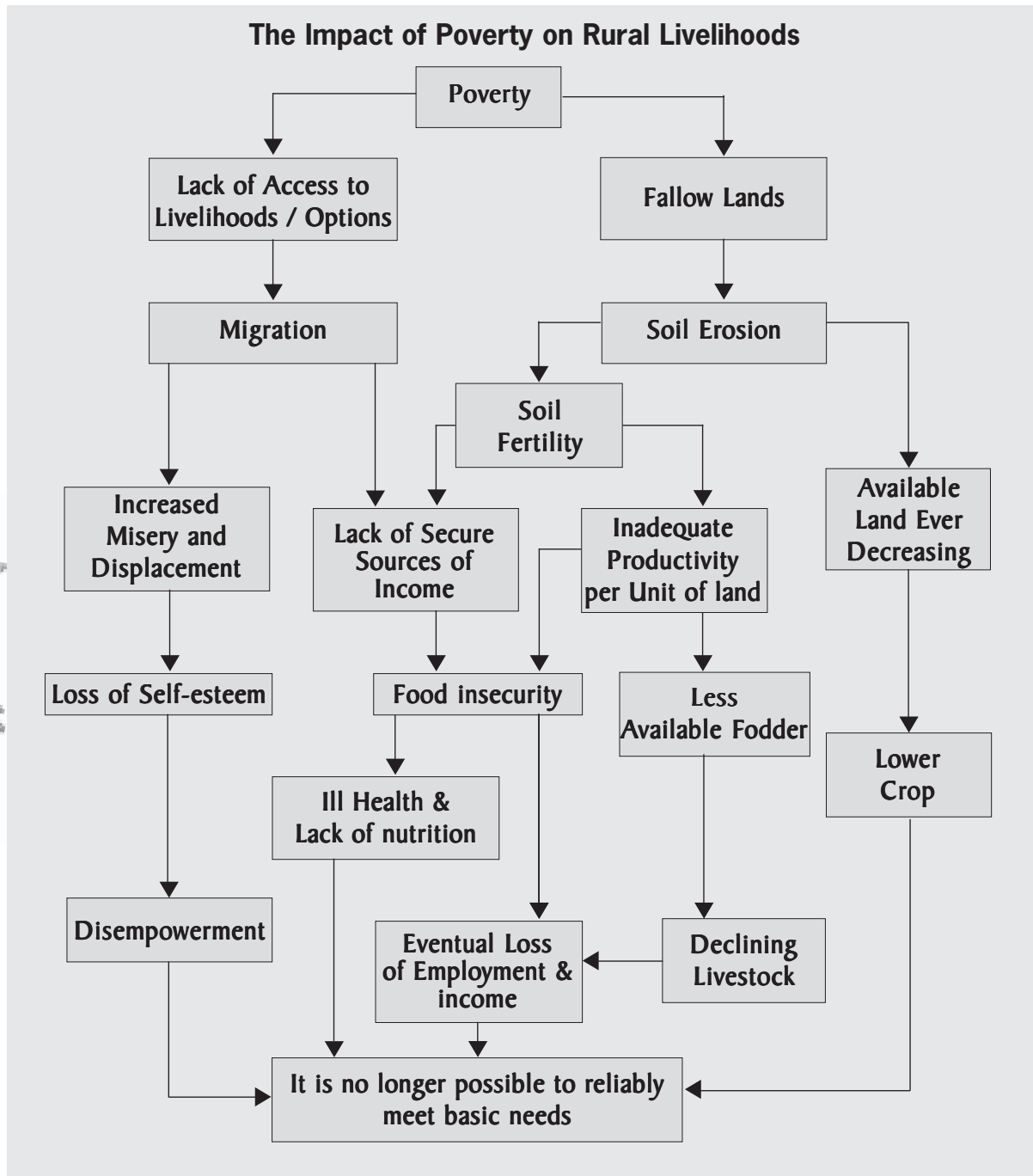
The entire programme of Alternative Public Distribution System has been conceived by Deccan Development Society to evolve local solutions for local problems. The programme integrates sustainable agricultural goals such as bio-diversity and soil fertility with community goals of rural livelihoods, food security and socio-economic empowerment of dalits and women based on plural values, local customs and practices and indigenous knowledge.

The main objectives for initiating this programme are:

1. Bringing cultivable fallows under plough, to enable local production of food grains to meet the local consumption requirements and in the process create community level self sufficiency in food production
2. To generate gainful employment by bringing more fallow land under cultivation of jowar and other coarse cereals in the project area and through this process, generate local agri-based livelihoods
3. Restoration of ecological balance by retrieving local agricultural practices like the use of farmyard manure
4. To reduce overhead costs of PDS incurred in the mainstream PDS that involves long distance transportation of food grains and centralized management
5. To provide nutritionally superior, traditional and staple grains, like jowar instead of rice made available in the mainstream PDS, which is alien to the poorer sections in the villages of rainfed areas.
6. Enable the project partner women to manage the food security system and thereby enhance their self-esteem
7. Getting the women's sanghams to plan and implement the project as a process of empowering them



Box 7:



Approaches to the implementation of the programme

The point of departure in implementing the APDS programme by DDS is the emphasis on diversity, of both people and nature's values, as against viewing natural resources and their use from a purely commercial angle. Democratic participation and decentralised decision-making are the keywords in guiding the programme. The design of the programme integrates issues of rural livelihoods, environmental principles such as bio-diversity,

dalit and gender issues, drawing on people's indigenous knowledge and practices and community spirit. DDS, as an organisation promotes lateral thinking and learning in close interaction with the communities and rejects orders-down, reports-up approach in implementing the programme. Internalisation of the core values by the stakeholders is seen as something natural, since the ideas and actions are rooted in local conditions and local needs.

The entire programme is conceived in building relationships with local communities by empowering them instead of creating a dependency relationship. Lastly, people are seen as actors and not as beneficiaries. The programme approach broadly matches, at various levels, the important participatory approach outlined by David Korten.

Table 13 - DDS approach to the implementation of the programme

	Standard Approach	DDS approach
Point of Departure	Nature's diversity and its potential commercial values	The diversity of both people and nature's values
Key word	Strategic planning	Participation
Locus of Decision-making	Centralised, ideas originate in capital city	Decentralised, ideas originate in village
First steps	Data collection	Awareness and Action
Design	Static, by experts	Evolving, people involved
Main resources	Central Funds and Technicians	Local people and their assets (traditional knowledge, community spirit)
Methods, Rules	Standardised, universal, fixed package consensus-whether its for wealth	Diverse, local, varied basket of (locally decided rules based on ranking or for adopting new methods of agriculture
Analytical assumptions	Reductionist	Systemic, holistic-integrates bio-diversity, natural resource management goals with rural livelihoods and empowerment
Management focus	Spending budgets, completing projects on time	Sustained improvement and performance
Communication	Vertical: orders down, reports up	Lateral: Mutual learning and sharing experience
Evaluation	External, intermittent	Internal, Continuous
Error	Buried	Embraced



Relationship with people	Controlling, policing, inducing, motivating, dependency creating, people seen as beneficiaries	Enabling, supporting, empowering, people seen as actors
Associated with	Normal professionalism	New professionalism
Outputs	<ul style="list-style-type: none"> • Diversity in Conservation, and Uniformity in Production (Agriculture, Forestry) • The empowerment of rural people 	<ul style="list-style-type: none"> • Diversity as a principle of production and conservation • The empowerment of professionals

Source: Adapted from David Korten in Pimbert, M.P and Pretty, J.N. (1995), Parks, People and Professionals: Putting Participation into Protected Area Management, UNRISD-IIED-WWF, Discussion Paper no.57, Geneva.

Planning Processes

Step 1

The planning process first began with the identification of fallow lands in the villages where DDS works as a voluntary agency. Several meetings were held between the DDS programme staff and the Sangham members to collect information about the magnitude of the problem, the total acreage under fallows in each village, the reasons for leaving them fallow, etc. This information allowed DDS staff to work out the modalities of implementing the programme. In all, 11 villages were selected for the implementation of the programme in the first year, covering 574 acres benefiting around 513 farm households. Each of these villages had fallow lands ranging from 50-100 acres and the target groups were drawn from marginal and small farmers, mostly belonging to Scheduled Castes and Backward Castes.

Step 2

The second step in the planning process involved holding PRA meetings in each of the selected villages to get more detailed information about the resource base of the village, the village population, livestock, etc. The farmers/pattedars, willing to join the programme were asked to get certification from village revenue officials to authenticate their claims that their lands were indeed fallow for some years. Later, all their names, survey numbers of their lands were recorded to be included as the programme beneficiaries.

Step 3

The third step involved meetings with the stakeholders/APDS partner farmers to finalise the details of the programme implementation that included the estimated costs of cultivation per acre of land, the land improvement activities and the likely benefits from the programme etc., This exercise was meant to arrive at a consensus between the two parties i.e., DDS and the partner farmers before entering into a formal agreement with each other over the implementation of the programme. DDS on its part, agreed to advance a sum of Rs.4200/- per acre over a 3 year period as given below:

Year 1	ploughing, manuring, sowing and weeding	Rs.2700/-
Year 2	ploughing, manuring, sowing and weeding	Rs.1000/-
Year 3	ploughing, sowing and weeding	Rs. 500/-
	Investment over three years	Rs.4200/-

Step 4

This investment amount was to be repaid both in the form of cash and grain, over five years in pre-fixed quantities at pre-fixed rates as below:

Years	Jowar (kgs.)	Value (Rs.)	Cash (Rs.)	Total (Rs.)
1	150	675	125	800
2	200	900	125	1025
3	150	675	125	800
4	150	675	125	800
5	150	675	100	775
Total	800	3600	600	4200

In consultation with the partner farmers, the following terms and conditions were evolved:

1. not to use chemical fertilisers and pesticides
2. not to sell the lands
3. not to lease the lands
4. to grow only food crops
5. use farmyard manure produced by the household for their fields and not to sell it to others
6. to preserve seeds from their crops for use in the next season
7. to use only NPM methods for pest control
8. to grow a variety of food crops

The farmers constituted their own monitoring committees at the village level to oversee the timely implementation of various seasonal agricultural activities and regularly report them to the DDS office. It was also agreed by the committee members to collect the grain after harvest and store it in the community grain fund, before it is distributed among various categories of poor and the dispossessed, based on participatory wealth ranking in each village.

Participatory Monitoring & Evaluation (PM&E)

Monitoring and evaluation is a vital management tool. Communities and NGOs need to know how effective their efforts have been. PM & E can reveal valuable lessons and improve accountability for all stakeholders. It also provides an opportunity to build their own capacity to reflect and analyse their programme's progress and the action that might be required to take corrective action. The purpose and focus of a programme's monitoring activities will depend upon the issues it addresses, the goals and priorities it has set to address them and the strategies it employs to achieve them.

DDS APDS programme has been designed in a manner that provides for an inbuilt mechanism for monitoring and evaluation at every stage of the programme. Monitoring is done jointly; by women sangham members and the DDS staff. The organisational structure of the programme's implementation and monitoring agency consists of:

- Women Sangham's Committee Members
- Village Level Supervisors

- Two Team Leaders
- Project Coordinator
- Joint Director
- Project Director

While most of the monitoring at the village level is done by women committee members and village level supervisors, the DDS staff consisting of two team leaders, project coordinators, joint director and director essentially perform the role of facilitation in effective implementation of the programme. They organise periodic capacity-sharing and mutual learning sessions with the sangham members apart from collective supervision of the overall running of the programme. DDS with the objective of strengthening the institutional processes held several workshops for the Sangham members, focussing on areas/themes useful for the long-term sustainability of the programme. Some of the areas/themes in capacity sharing include:

- a. Sangham norms
- b. Book keeping
- c. Women in Agriculture
- d. Reproductive rights
- e. Gender issues
- f. Social analysis of income generation
- g. Literacy
- h. Issues on Panchayati Raj etc.

The institutional capacity building by DDS is done in the larger context of women empowerment for self-reliance and solidarity in all the community initiatives undertaken by them.

Apart from institutional capacity building, regular mutual learning sessions are also conducted in:

- i. Natural resource management practices such as watersheds, bio-diversity conservation
- j. Non-Pesticidal management methods of crop protection, raising of village medicinal commons for regaining control over traditional health care systems for the Sangham members, to make them self reliant in all aspects of natural resource management and protection.

As part of continuous participatory monitoring and evaluation, the women committee members of the APDS programme maintain regular documentation of various activities for accountability and transparency of the programme activities.

Some of the documentation and field level responsibilities entrusted to the women committee members are:

- The passbook for each agricultural activity is maintained either by the committee member or kept in the custody of a data writer, who keeps record of the number of acres on which a particular activity is completed and the amount spent for that activity.
- A register book is also maintained for the entire village and kept in the custody of a committee member or the data writer.

- The responsibility of the committee members is to oversee / supervise the work on farms of 17-20 members on average and come to DDS office for collecting the money for payment. The PDS supervisor has to oversee the functioning of the committee members of the village and see the entries made in the passbook, without whose signature along with the team leader's signature, the payments cannot be made.
- Separate bill books are maintained for different activities
 1. Tractor ploughing.
 2. Organic manuring.
 3. Bullock ploughing and sowing.
 4. Weeding.
- For repayment of loan by the members, entries are made in the member's passbooks and a separate register is maintained for the entire village. All the entries are computerized at the DDS field office at Pastapur.

List of Documents maintained by DDS relating to the PDS Programme:

1. The acreage of fallow lands in the village; how long have they been fallow, livestock details, household details, the reasons for keeping lands fallow.
2. Patwari's certification for fallow lands.
3. Agreement record/stamp papers of individual partner farmers.
4. Input Inventory record
5. Individual and Consolidated receipts of input costs of the farmers.
6. Daily monitoring report on farm activities; how many acres have been tilled, manured, sown, weeded, etc.,
7. Consolidated report on the cost of inputs for each village.
8. Pattedar passbooks with details of money paid for various agricultural activities.
9. List of crops sown.
10. Video and audio documentation.



Programme Implementation

The programme implementation has four stages :

First stage involves seasonal agricultural activities such as ploughing, manuring, sowing, weeding and harvesting.

Second stage involves grain procurement and storage in the Community Grain Fund

Third Stage involves participatory wealth ranking in the village to identify different categories of poor and issuing them jowar ration cards;

Final stage involves distribution of subsidised Sorghum (jowar) among different cardholders in the village.

STAGE ONE

The first stage of the programme starts with advancing loans to the beneficiary farmers over a three year period, for various agricultural operations starting with tractor ploughing, bullock ploughing, application of farm yard manure, sowing and weeding in the first year. The loan amount for the first year is fixed at Rs.2,700/- per acre. Tractor ploughing is done only for the first year, since soils are hard and require deep ploughing. The second and third year loan amounts are fixed at Rs.1000 and Rs.500 per acre. The total investment for bringing fallow

lands under cultivation for all the three years is Rs.4200 per acre. The task of collecting and disbursing loan amounts rests with the women committee members in each village.

STAGE TWO

The committee members are also responsible for timely implementation of all seasonal agricultural activities at the village level, as well as reporting back to DDS. After the crop harvest, the committee members in each village are required to collect the loan repayment in the form of grain from the partner farmers and store it in bins using traditional storage methods.

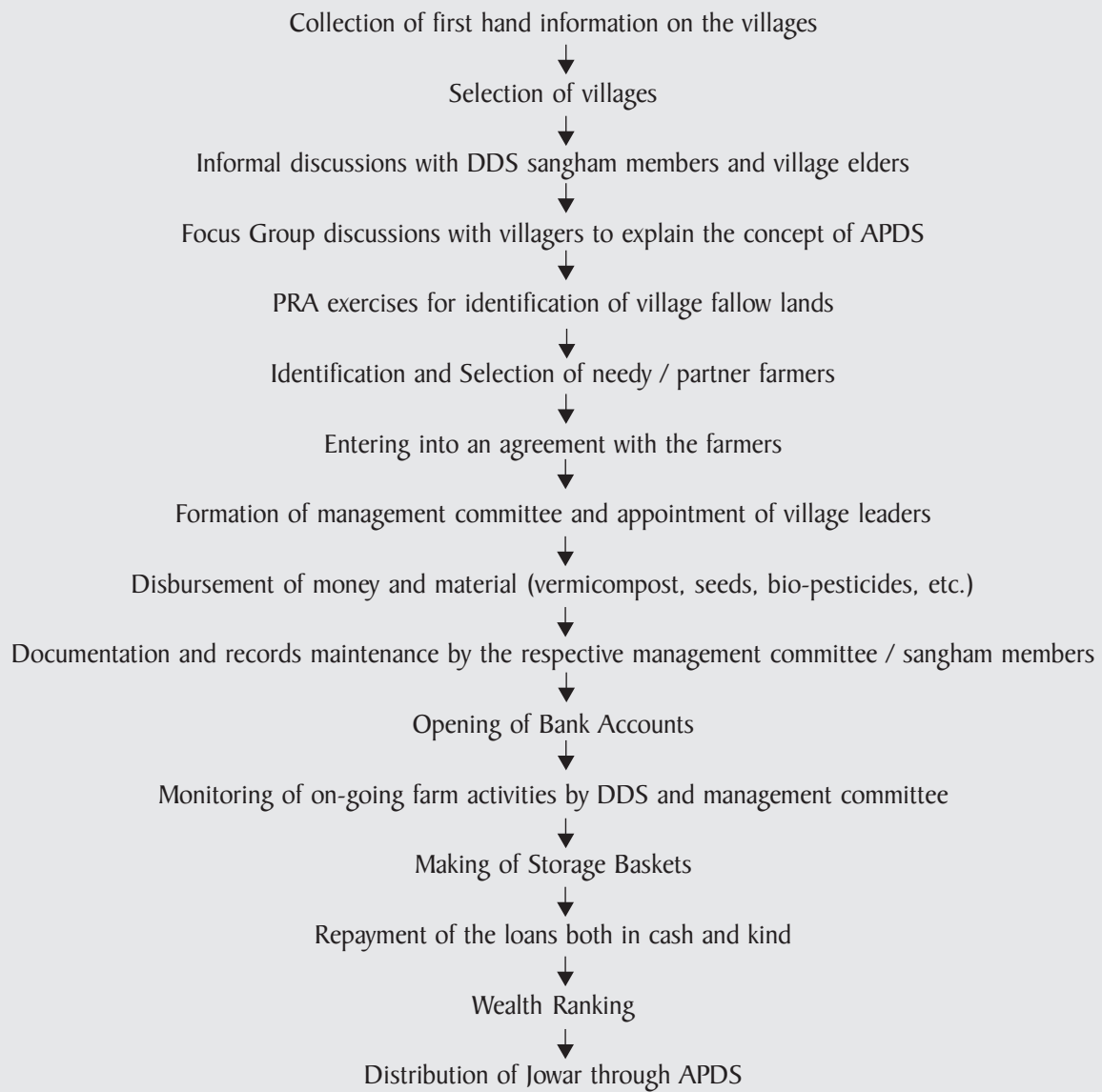
The loan repayments by the partner farmers are spread over a five-year period in the form of grain in prefixed quantities at pre-fixed prices. In case there is a crop failure in any year, the repayment time is extended by one more year. The repayment for the first year is fixed at 150 kg. The second and third year repayments are fixed at 200 and 150 kg respectively. The fourth and fifth year repayments are fixed at 150 kg/year amounting to a total of 850 kg for all the five years @ Rs.4.50 per kg. The total returns calculated in terms of money would be Rs.4,200 per acre.

The grain thus collected is stored in the village for distribution during the scarce months of monsoon season among different categories of poor, based on participatory wealth ranking. The Participatory Wealth Ranking is an innovative process of identifying various categories of poor within the village by the villagers themselves through a PRA method, overcoming the problems of inclusion/exclusion, so pervasive in official calculations. The criteria for rural poverty are developed by the villagers themselves and each household is judged on a five-point scale of poverty. Each poverty level is identified by a different colour card, which entitles beneficiaries under the APDS programme to certain fixed amount of Jowar from the Community Grain Fund. Black cards are given to destitute households, landless poor, women-headed households with children, physically unfit (elderly people). Red cards are given to poor who own an acre or less of land and survive on own labour, households with 4-5 children and households with very few livestock assets-one or two buffaloes and goats. Green cards are given to households with 2-3 acres of land, owning a house with some livestock assets. Yellow cards are given to households owning around 10 acres with livestock assets but are still poor because lands are not very productive. Finally, white cards are given to big farmers employing labourers and possessing livestock assets. White cardholders are not entitled for jowar through community grain fund and all other categories are entitled for fixed amounts of jowar, depending on the colour of the card, decided through wealth ranking process. Households identified thus are issued a sorghum card by the Sangham entitling them to a fixed quantity of jowar at a subsidized price of Rs.3.50 per kg. The proceeds from the sale of jowar are deposited in a bank as the Community Grain fund (CGF). The subsidy of one rupee, between the issue price and procurement price is made up by the interest payments, accruing from CGF Bank deposit in five years. Individual village groups hold the CGF account and the fund is used year after year, for reclaiming more fallow lands.



Box 8:

Processes Involved in the APDS Programme





Economics of Production

The present section deals with the economics of the APDS programme. Under this programme, DDS brought around 574 acres of cultivable fallow lands under cultivation in eleven villages, benefiting 513 small and marginal farmers. Priority was given to the marginalised groups and most of the beneficiary farmers were selected from SC, ST and BC communities. The necessary details of the name of the villages and the number of beneficiary farmers and acres are listed below:

Table 14

Name of the Villages, Number of Partner Farmers and the Cultivable Fallow Lands Brought Under Cultivation

Sl. No.	Name of the Village	No. of partner farmers	Total number of acres brought under cultivation
1	Tekur	31	50.20
2	Malgi	54	69.20
3	Cheekurthi	33	42.20
4	Khanjamalpur	49	49.00
5	Chenigepally	26	37.00
6	Hulgera	56	56.00
7	Narsapur	84	84.00
8	Sangapur	51	51.00
9	Raipally	51	52.00
10	Jharasangam	42	45.20
11	Ippapally	36	37.00
	Total	513	574.00

Financial assistance was given for one acre per family and depending upon the availability of the fallow land, some farmers were provided assistance for two acres. For each acre, a total amount of Rs.4200/- was provided over a span of three years. In the first year (2001-2002), Rs.2700/- was given under different heads. In the second and third years Rs.1000/- and Rs.500 would be given for different agricultural operations. The details of the year-wise financial assistance for different farm operations are given below:

**Table 15- Financial Assistance by DDS to the Partner Farmers of APDS Project
Year-wise Cost of Project Operations (Rs./acre)**

Farm Operations	I year (2001-02)	II year (2002-03)	III year (2003-04)	Total (2001-2004)
Ploughing with tractor	700	—	—	700
Application of farmyard manure (8 carts)	720	—	—	720
Vermicompost (Two quintals)	400	400	—	800
Ploughing with animals	380	300	200	880
Weeding	500	300	300	1100
Total Assistance	2700	1000	500	4200

**Table 16 - APDS EXPENDITURE ON FARM ACTIVITIES – I YEAR (2001-2002)
APDS EXPENDITURE ABSTRACT - I YEAR (2001-2002)**

Sl. No	Village	Tractor Ploughing	Bullock Ploughing	Manure Application	Bunding Work	Weeding	Total
1	Tekur	30300	37875	40400	19260	27775	155610
2	Malgi	41700	52125	55600	18498	38225	206148
3	Cheekurthi	27625	31875	34000	6000	21250	120750
4	Khanjamalpur	29400	36750	46550	17000	19600	149300
5	Chenigepally	25900	20350	35150	19990	18500	119890
6	Hulgera	23700	36400	53200	15100	28000	156400
7	Narsapur	46200	63000	67200	21420	50400	248220
8	Sangapur	28050	30600	53040	25500	26010	163200
9	Raipally	31200	31200	47840	12700	30160	153100
10	Jharasangam	31850	26390	41860	6136	22750	128986
11	Ippapally	21460	22200	37000	12932	19240	112832
	Total	337385	388765	511840	174536	301910	1714436

- On an average Rs.2986/- were given to the partner farmers.
- Actually Rs.2700/- had to be given for an acre; this hike is attributed to the high rental charges for tractor ploughing and other consequential hike in the expenditure. (In some villages Rs.700/- were given towards tractor ploughing for an acre instead of Rs.600/-)

THE STUDY SAMPLE

In the selected sample of three villages, farmers having one to two acres of land were identified for the study. Based on random sampling, 45 partner farmers were selected from these villages. Quantitative data on the economics of production was collected through a structured questionnaire from the sample households. Qualitative information on the impact of the programme was collected through focus group interviews and

individual members of sample households. The data relates to the agricultural year 2001-2002, i.e., first year of the Project.

Table 17 - Number of Farmers in the Sample Households Studied

Name of the Village/ Mandal	Total number of Partner farmers in the village	Total number of households studied (acres)	% of households studied
Malgi / Nyalkal	54	15 (18 acres)	28
Jharasangam /Jharasangam	42	15 (15 acres)	36
Raipalli / Zaheerabad	51	15 (17 acres)	29
Total	147	45 (50 acres)	31

It is seen that all sample households fall in the category of small and marginal farmers. There are no large farmers in the programme, as the programme's main objective is to bring fallow lands of small and marginal farmers under cultivation. All the lands under the programme are rain fed.

Table 18: Average Input Costs per Acre

Item	Malgi	Jharasangam	Raipalli
Tractor Ploughing *	120.00	135.00	125.00
Bullock Ploughing and Bunding	378.33	389.33	408.82
Manure and its application **	316.11	320.66	345.00
Weeding	510.00	400.66	460.82
Seed cost	43.00	42.6	35.00
Harvesting	385.00	314.8	324.00
Total average input cost per acre	1752.44	1603.05	1698.64

* Actual tractor charges were paid between Rs.600 to 700 for ploughing an acre of fallow land. However, the charges are divided into the project duration of 5 years and calculated accordingly.

** Expenditure on farmyard manure (FYM) is divided into 3 years, as single application of FYM is enough for three successive crop years.

- On an average all partner farmers incurred expenditure around Rs.1700/- per acre, after equally dividing the charges of tractor ploughing and manure application over 5 and 3 years respectively.
- Weeding charges occupy the top category in the expenditure list, followed by bullock ploughing and bunding works.
- A tractor can plough an acre of land in two hours; in each village, within a week's time all APDS lands were ploughed with a single tractor. In case where tractors were not available locally, they were brought from other villages.
- Seed cost was estimated on the basis of local tradition of borrowing the seeds from neighbouring households, and to be returned twice the quantity borrowed.
- Seeds were not purchased from the market / outside.

Table 19: Average Yields of Grains per Acre

Crops	Malgi		Jharasangam		Raipalli	
	Quantity (Kg)	Value (Rs.)	Quantity (Kg)	Value (Rs.)	Quantity (Kg)	Value (Rs.)
Jowar (sorghum)	220.6	1103.0	297.0	1460.0	242.3	1211.5
Bajra (pearl millet)	3.5	35.0	6.0	54.0	43.5	435.0
Red gram	17.8	356.0	6.5	130.0	53.4	1068.0
Green gram	31.2	624.0	18.7	374.0	8.2	164.0
Anumulu (Field beans)	11.2	168.0	8.3	96.8	14.1	155.1
Ragi (finger millet)	0.7	7.6	2.8	22.4	3.9	30.7
Korra (foxtail millet)	3.3	33.0	2.5	25.0	9.0	65.3
Pundi (hibiscus)	7.4	74.0	13.5	135.0	11.3	71.7
Bebberlu (cowpea)	9.0	108.0	6.0	72.0	6.1	110.1
Nuvvulu (sesamum)	0.3	6.7	6.0	180.0	4.1	61.7
Chana (chickpea)	16.7	263.3	0	0	0	0
Misc. crops and Uncultivated Greens (approx.)	22.4	210.2	27.1	245.1	21.3	154.0
Total	344.1	2988.8	391.4	2794.3	417.2	3527.1

Table 20: Average output of by-products per acre

By-Products	Malgi		Jharasangam		Raipalli	
	Quantity (Kg)	Value (Rs.)	Quantity (Kg)	Value (Rs.)	Quantity (Kg)	Value (Rs.)
Green fodder	19 bundles	380.00	20 bundles	400.00	20 bundles	400.00
Jowar stalk	148 bundles	296.00	152 bundles	304.00	135 bundles	270.00
Lobia creeper	4 bundles	100.00	5 bundles	125.00	5 bundles	125.00
Cow pea creeper	2 bundles	40.00	2 bundles	40.00	2 bundles	40.00
Red gram stalk	1 cartload	310.00	1 cartload	270.00	1 cartload	350.00
Red gram and green gram husk	& 8 bundles 75 kg.	112.5	& 6 bundles 80 kg.	120.00	& 10 bundles 90 kg.	150.00
Hibiscus stalk	2 bundles	30.00	3 bundles	45.00	3 bundles	45.00
Hibiscus fibre	5 kg.	110.00	6 kg.	132.00	6 kg.	130.00
Fallen leaves of red gram and other biomass (worth 3 cartloads of farm yard manure)	3 cartloads	360.00	2.5 cartloads	300.00	3 cartloads	360.00
Total		1738.5		1736.00		1870.00

Table 21: Average Input Cost and Output per Acre in Sample Households (in Rs.)

Village	Input Cost	Output (grains and by-products)	Average Income per Acre
Malgi	1752	4727	2975
Jharasangam	1603	4530	2927
Raipalli	1699	5397	3698

- Jowar, redgram, pulses, millets, etc., are important crops grown by the partner farmers.
- In all sample villages, the yields were normal.
- Average jowar production varied from 220-300 kgs. per acre, depending upon the rainfall of respective regions.
- Average output of grains per acre in sample households is 344 kg in Malgi, 383 kg in Jharasangam and 417 kg. in Raipalli villages.
- All cereals and pulses produced by the partner farmers under the programme are sufficient to provide nutritious food intake of households round the year.
- Uncultivated greens proved to be invaluable in the overall diet of households.
- By-products such as green fodder, jowar stalk, red gram husk, green gram husk, creepers and stalk etc., are valued in monetary terms. However, the values of some by-products have a greater value in terms of the ecological benefits they offer. Some of these by-products are leaf fall and nitrogen fixing leguminous plants that are tilled back into the soil and contribute rich nutrients to the land.
- In all three-sample villages, there is a benefit of around Rs.3000/- per acre. For example, it is Rs.2975/-, 2927/- and 3698/- in the villages of Malgi, Jharasangam and Raipalli respectively.
- As the programme is in its first year, initial expenditure such as tractor ploughing and application of farmyard manure constituted an extra expenditure of Rs.1300/- per acre. Once applied, farmyard manure need not be applied again for the next two agricultural seasons. Taking this calculation into account, the expenditure on farmyard manure is divided over a three-year period. Similarly the lands are ploughed by tractor only once during the five year project cycle. Therefore, the expenditure on tractor charges is divided over five years.
- The agricultural products seen from the table above reveal that the sample households' income from jowar production is more compared to other crops, followed by pulses.



Table 22: Average Employment Days Generated Per Acre

Activity	Malgi Labour days				Jharasangam Labour days				Raipalli Labour days			
	Own		Hired		Own		Hired		Own		Hired	
	M	F	M	F	M	F	M	F	M	F	M	F
Tractor Ploughing	0	0	1	0	0	0	1	0	0	0	1	0
Bullock Ploughing and Bunding	1.7	1.0	3.9	0.9	1.8	0.7	3.5	0.8	2.1	0.9	3.7	0.8
Manure Application and Spreading	1.7	4.7	1.9	3.7	1.4	4.5	1.6	3.5	1.9	4.9	2.1	3.7
Weeding	1.3	14	0	8.0	1.1	11.8	0.7	8.5	1.5	14	0	8.3
Harvesting	1.9	5.4	1.5	3.0	2.7	4.1	1.3	2.7	3.1	4.5	1.6	3.2
Total	6.6	25.1	8.3	15.6	7.0	21.1	8.1	15.5	8.6	24.3	8.4	16
Total Average Employment Days	55.6 Days				51.7 Days				57.3 Days			



Table 23: Gender-wise Labour Days generated through APDS Project

Village	Own		Hired		Total Labour days
	Male	Female	Male	Female	
Malgi	119	452	149	281	1001
Jharasangam	105	317	121	232	775
Raipalli	146	413	143	272	974
Total	370	1182	413	785	2750

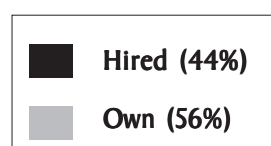
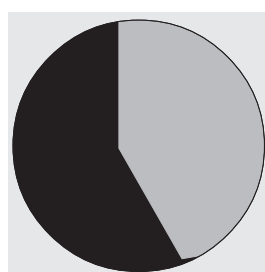
Table 24: Male-Female Percentage Details to Total Labour Days Generated through APDS Project

Gender	Malgi		Jharasangam		Raipalli		Total labour days	%
	Days	%	Days	%	Days	%		
Male	268	27	226	29	289	30	783	28
Female	733	73	549	71	685	70	1967	72
Total	1001	100	775	100	974	100	2750	100

Table 25: Division of Total Labour Days Generated

Total labour days		Percentage to total labour days
Hired	1198	44
Own	1552	56
Total	2750	100

Total Labour Days Generated Through APDS Programme



- The average employment days generated in each sample village varies from 52 to 58 days.
- Total labour days generated in the sample households are 2750 on an average of 55 labour days per acre.
- Weeding and application of manure required more working days.
- Male working days are less compared to female labour days, i.e., 28% and 72% respectively.
- Males are dominant in tractor and bullock ploughing activities.
- Females are dominant in manure spreading and weeding works.
- As many of the beneficiary farmers belonged to small and marginal farmers category, they do most of the agricultural operations themselves. Own labour constituted 56% of the total employment days generated in the sample households.

Table: 26 Source-wise Average Income Distribution and Its Percentage of the Sample Households (in Rs.)

Source	Malgi		Jharasangam		Raipalli	
	Income	%	Income	%	Income	%
New PDS lands	2975.0	20	2927.0	18	3698.0	21
Other Lands	606.7	4	2200.3	14	1371.3	8
Agricultural labour	3100.0	20	4241.3	26	6162.7	34
Non-agricultural labour	5220.0	34	3130.0	19	3466.7	20
Livestock	836.7	5	470.0	3	1404.0	8
Trade	626.7	4	1200.0	7	960.0	5
Service	1600.0	10	1566.7	10	268.8	1
Others	480.0	3	420.0	3	535.0	3
Total	15445.1	100	16155.3	100	17866.5	100

The distribution of income of the sample households by different sources is presented in the above table. The average income of the sample households is Rs.16000/- per annum. It can be seen that the income of the households has increased on an average by Rs.3000 due to the APDS programme. It is seen that income from agricultural labour is the major contributor in total income in all the categories of activities. The share of income from agriculture, agricultural labour and non-agricultural labour sources among the sample households has not shown significant extremes.

- Income from PDS lands constitutes about 20 per cent of the total income of the sample households.
- As seen from the above table, the labour work constitutes the major share of income of the sample population. The main occupation is agricultural labour work, which occupies a major share in the income of the households.
- The non-agricultural labour has a considerable ratio in Malgi village by occupying about 34% of the total income of the sample population. As the villagers find more employment in the non-agricultural work available in the town of Bidar in Karnataka State, the agricultural work remains a secondary income-generating source in this village. Proximity to the towns is also a major contributory factor as a source of non-agricultural income as a major share in the household's income in Malgi village. Lack of irrigational facilities, financial resources, rising input costs, cultivation, less rainfall, etc., are some of the reasons driving small and marginal farmers away from agriculture and search for non-agricultural livelihood options.
- However, agricultural labour work is the major constituent in Raipalli and Jharasangam villages due to more agricultural activities in these two villages.
- Income from sources like livestock forms about five percent. Percentage of income from the service sector (government and private) is about 10 percent.

Item-wise household expenditure of the sample households studied is given below:

Table 27: Item-wise Average Consumption Pattern of Sample Households (per annum - in Rs.)

Item	Malgi		Jharasangam		Raipalli	
	Expenditure	%	Expenditure	%	Expenditure	%
Food	9266.6	61	8566.6	63	8892.0	64
Clothing	2066.6	14	1606.6	12	1813.3	13
Health	480.0	3	570.0	4	430.0	3
Transport	936.6	6	573.3	4	536.6	4
Education	466.6	3	280.0	2	406.6	2
Drinking	600.0	4	613.3	4	633.3	5
Festivals	590.0	4	766.6	7	546.6	4
Others	785.6	5	640.0	4	656.6	5
Total	15192.0	100	13616.4	100	13915.3	100

- Food occupies more than 60% of the total expenditure of the sample households.
- Next to food, the share of clothing has the percentage of 13.
- All other items such as health, transport, education, expenses on festivals, etc., constitute the remaining percentage, i.e., around 25%.

The data presented above shows that expenditure on food is more, constituting more than 60%. Food grains are obtained either through buying from the market, or from wage labour through kind and from the PDS scheme. The dependence either on market or on PDS scheme can be reduced with the production of grains in the newly reclaimed lands through APDS Programme. Food grains grown from own cultivation has considerably reduced their dependency on market, as shown from the table given below.

Table 28: Total Grain Output in APDS Programme lands

Village	Jowar Kgs	Other Crops Kgs	Total Kgs
Raipally	11300	8308	19608
Chenigepally	7375	3550	10925
Malgi	13827	4854	18681
Huligera	10970	3600	14570
Ippapally	10715	6380	17095
Tekur	10765	4402	15167
Cheekurthi	8280	3864	12144
Khanjamalpur	11900	1931	13831
Sangapur	4975	4095	9070
Narsapur	29589	10645	40234
Jharasangam	12207	2359	14566
TOTAL	131903	53988	185891

- In the entire programme, jowar was the main crop grown by partner-farmers and 13,1903 kg of jowar was produced by them.
- Along with jowar, pulses such as red gram, green gram, horse gram, black gram, cow pea, chick pea, etc., and cereals / millets such as foxtail millet, field beans, pearl millet, finger millet, little millet, sesame, niger, etc., were also grown amounting to 53988 kgs.
- A small amount of paddy was also grown as dryland crop. In total 2,215 kg of paddy was grown.

The total production of all kinds of grains from the programme area during the first year was 18,5891 kg. A few important crops are being discussed hereunder.

Jowar: Jowar and millets for all was grown by all farmers in 11 villages. Different varieties of jowar, viz., white, yellow, red, etc., were grown. All farmers grew different varieties of cereals along with jowar, as per the recommendations of DDS. As a result on an average 230 kg of jowar and 250 bundles of fodder were grown per acre during the first year of the programme.

Red Gram: This crop is important due to its economic value. Three varieties of red gram (viz., red, white and black) were grown and on an average 30 kg were produced in an acre. On an average, under normal conditions around 100 kg of red gram is grown in one acre of land in this region. However, due to irregular and scanty rainfall during the year, the yield was very low.

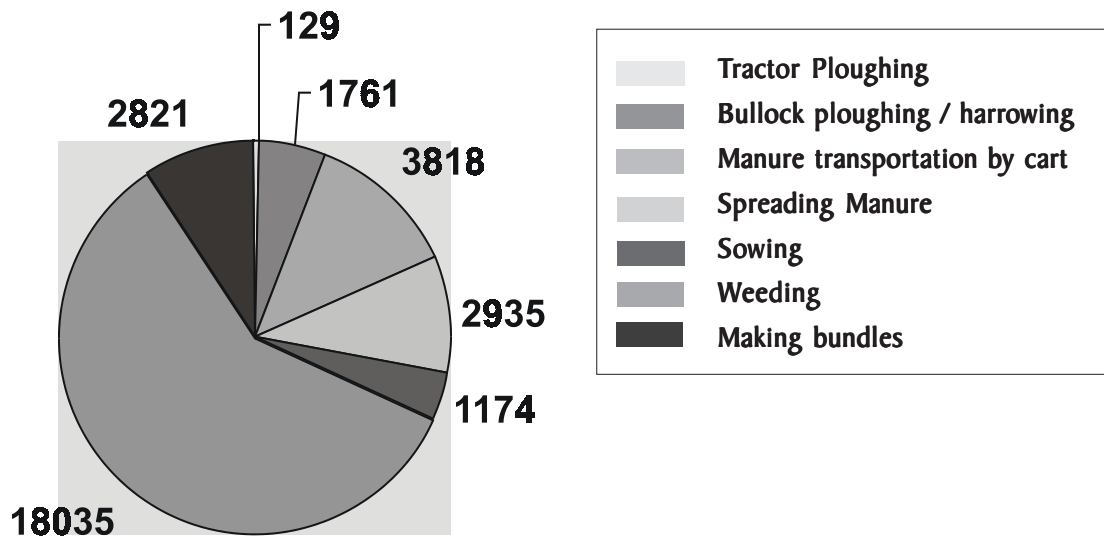
Other Grams and Millets: Farmers under the programme produced a variety of cereals and pulses adopting mixed farming practices. Some of the food grains and pulses grown by farmers are: field bean, cow pea, green

gram, pearl millet, foxtail millet, finger millet, hibiscus, little millet, paddy, niger, horse gram, black gram, sesame, chick pea, etc.

Table 29 - Total Employment Days Generated

No	Village	Tractor Ploughing	Ploughing / harrowing	Manure transportation by cart	Spreading Manure	Sowing	Weed-ing	Making bundles	Total employment days
1	Takur	15	150	320	250	100	1500	250	2585
2	Malgi	14	210	448	350	140	2100	350	3612
3	Cheekurthi	10	126	268	210	84	1260	126	2084
4	Chenigapally	10	120	320	200	80	1200	200	2130
5	Narsapur	17	255	544	425	170	2975	425	4811
6	Jharasangam	10	150	320	250	100	1500	250	2580
7	Sangapur	11	153	326	255	102	1530	225	2602
8	Ippapally	10	123	262	205	82	1230	205	2117
9	Raipally	11	156	332	260	104	1560	260	2683
10	Huligera	11	168	358	280	112	1680	280	2889
11	Khanjamalpur	10	150	320	250	100	1500	250	2580
TOTAL		129	1761	3818	2935	1174	18035	2821	30673

Total Employment Days Generated



- Human labour accounted for more than 90% of the total labour days generated.
- Tractor and animal ploughing had generated only 6% of the total employment days.
- Weeding activity occupied more than 58% of the total employment days generated.
- Next to weeding, manure loading, transportation and spreading activities had more number of days of employment amounting to 6753 days.

Employment Days Generated

One of the main objectives of the DDS Programme is to generate employment in the project villages and it succeeded in its goal. As this programme is aimed at bringing fallow lands under cultivation, it required labour intensive operations such as land development with tractor and bullock ploughing, bunding, weeding, etc. The operations of the whole project had generated a great demand for human labour, tractor power, bullock labour, farm yard manure, vermicompost, manufacturing of storage baskets, etc., because of the additional area brought under cultivation.

The details of estimated person days of employment and wage income accrued to the labour during the first year of operations of the project are given in the above table. On an average, in one acre 55 employment days were generated for various farm operations and created demand for tractor and bullock ploughing. Demand for tractor ploughing (which is required only in the first year of the programme) was created during the first year since the soils are very hard due to growth of scrubs, undulating terrace and required deep ploughing, levelling and development.

In addition to the above-mentioned activities, a large number of storage baskets were required to store jowar in each village for distribution. It required around 15 baskets in each village and gave employment of 5-6 working days to make one storage basket. On the whole, 161 storage baskets were made and in the process generated around 800 labour days from this activity. **Thus, in the first year of the programme, around 31000 employment days generated in all II-programme villages.** On an average, in each village there were around 2800 employment days generated in the first year of the programme. This created an estimated wage income of Rs.6.50 lakhs (excluding tractor and bullock hiring charges) in II villages in the first year i.e., 2001-2002 based on local wage rates between Rs.20-25 per day/person. This wage income accrued not only to the landed beneficiaries but also to other labour households who were not covered by the programme. General practice in these villages is that the farmers hire labour mostly on exchange basis and some times in times of shortage, hire labourers from outside the programme. Either way, the money was circulated within the local village economy benefiting small and marginal farmers and landless labourers.

In addition to this, demand was created for tractors (in the first year of the programme) and for bullock ploughs. Each partner farmer was paid Rs.600/- acre for a one time one acre of tractor ploughing. However, the demand for bullock labour was created on a continuous basis for various agricultural operations such as ploughing, levelling, harrowing, transporting FYM, threshing, etc. The bullock labour is hired at the rate of Rs.150 per day for one pair of bullocks with ploughman. On the whole, tractor and bullock ploughing activities generated 129 and 1761 employment days respectively.

Table 30 - Repayment of Money and Jowar

Sl. No.	Name of the Village	Total Repaid Jowar (kgs.)	Total Repaid Rupees	Bank Deposit Rupees
1	Tekur	7530	6275	6275
2	Malgi	10380	8650	8650
3	Cheekurthi	6330	5275	5275
4	Khanjamalpur	7800	6500	6500
5	Chenigepally	5550	4625	4625
6	Hulgera	8400	7000	7000
7	Narsapur	7350	6125	6125
8	Sangapur	7650	6375	6375
9	Raipally	6780	5650	5650
10	Jharasangam	12600	10500	10500
11	Ippapally	5550	4625	4625
	Total	85920	71600	71600

- Jowar was repaid 100 percent in all villages.
- Money component was also repaid fully.
- Repaid money was immediately deposited in the Banks

Table 31 - Jowar Cards and Monthly Distribution Details – Village-wise

Sl.	Village	Black cards		Red cards		Green cards		Yellow cards		Total Cards in the village	Total jowar Distribn in the village / kg
		No.	Distribn Per card	No.	Distribn Per card	No.	Distribn Per card	No.	Distribn Per card		
1	Malgi	4	25	52	30	8	15	17	20	81	2120
2	Hulgera	5	20	51	25	9	15	1	10	66	1520
3	Khanjamalpur	10	20	50	15	17	5	17	10	94	1205
4	Jharasangam	9	15	73	10	10	6	6	—	98	925
5	Sangapur	10	15	98	10	28	5	14	—	150	1270
6	Narsapur	9	15	49	25	21	15	47	5	126	1910
7	Raipalli	17	10	44	15	74	10	12	—	147	1570
8	Tekur	7	40	39	20	12	15	—	—	58	1240
9	Chenigepalli	3	30	36	25	1	20	7	15	47	1115
10	Ippapalli	9	15	36	20	15	10	11	5	71	1060
11	Cheekurthi	3	40	23	30	6	10	14	20	46	1150
	Total	86		551		201		146		984	15085

Note : In Jharasangam, Sangapur, Raipalli Yellow Card jowar distribution is shown as "NIL", as there was no sufficient jowar in these villages.

Observations from a Non-intervention Village

Bedampet, a small village in the Kohir Mandal of Medak district, is selected as a control for the study to see the impact of the APDS Project in a programme village vis-à-vis the control village. The control village has a population around 1600 with 772 voters. Social composition of this village is that the majority of the village population belongs to the SC, BC and ST communities. There are only 20 families of upper castes in the entire village. There are 8 Self-Help-Groups and 9 DWCRA groups working here. Majority of these groups are from the SC community.

It has a total agricultural land of 1200 acres; main crops grown in this village are sugarcane, jowar, red gram and green gram. Wherever irrigation facility is there, mainly sugarcane is cultivated. This village has only 6 bore wells and 2 open agricultural wells. These irrigation sources show how much land they could irrigate and how meagre compared to the total lands of the village. The village has around 400 acres of lands lying fallow, which is 1/3 of the total cultivable area in the village. These statistics show the magnitude of the problem of fallowization in this village.

The Research Team has studied the problem of fallowization in the village taking a sample of 15 small and marginal farmer households on a random sampling basis.

Table: 32 Main Reasons for Fallowisation of Lands in the Sample Households of Bedampet Village

Sl.No.	Reasons	No.
1	Lack of Capital	7
2	Lack of Awareness / Interest	6
3	Other Reasons (illness etc.)	2
	Total	15

The main reason for keeping lands fallow in **Bedampet** village is lack of money required to bring the lands under cultivation. The undulating terrain in some pockets of village lands is a big problem for these villagers. However, big farmers have managed with their own resources to level it and brought their lands under cultivation. In the case of small and marginal farmers, this is a major hindrance to make these lands viable for cultivation. Uneven lands combined with insufficient rainfall have evaporated the enthusiasm of the farmers and compelled them towards non-agricultural and agricultural labour works. Forestry work in this village (it has 1200 acres of forest area) attracted a large number of farmers and created alternative livelihood source for this village population. Thus, lack of resources and awareness are the main reasons found for keeping the lands fallow in this village. Had any NGO like DDS taken an initiative in this regard, they would have also definitely started cultivating their lands and gained self-confidence as farmers. On being asked, several villagers promptly replied that they were ready to undertake cultivation as the main occupation if new methods of cultivation as well as financial support were provided.

Table 33: Source-wise Average Income Distribution and Its Percentage of the Sample Households

in Bedampet Village (in Rs.)

Source	Income	Percentage
Lands	0	0
Agricultural labour	4600.0	44
Non-agricultural labour	3850.0	37
Livestock	325.0	3
Trade	465.0	5
Service	600.0	6
Others	480.0	5
Total	10320.0	100

Almost all respondents are small and marginal farmers each one having one or two acres of land. Income for them is mainly from labour works. As their lands are lying fallow, no income is gained from agriculture. Except for the labour work, rest of the sources such as livestock, service, and trade constitute 20% of the total average income. Majority of the respondents are dependent on agricultural labour work, which constitutes 44% of the total average income of the respondents. Next to it, non-agricultural labour work occupies with 37%. In this category, forestry work, such as cutting eucalyptus trees, pruning, etc., provides them with employment opportunities. Most of the villagers are dependent on this forestry work for the last 3 years. However, this work may continue for another one or two years and the villagers are apprehensive of losing employment after this work is completed. Some have migrated to nearby urban centres in search of livelihood, while most are left with an uncertain future.

Table 34: Item-wise Average Consumption Pattern of Sample Households in Bedampet Village (per annum)

Item	Expenditure (in Rs.)	Percentage
Food	6893.0	70
Clothing	620.0	6
Health	210.0	2
Transport	330.0	3
Education	200.0	2
Drinking	750.0	8
Festivals	400.0	4
Others	450.0	5
Total	9853.0	100

From the above table it is evident that the most of the expenditure of the respondents is incurred on food constituting nearly 70% of their total expenditure. All other items such as clothing, health, transport, education, etc share the remaining 30%. The striking feature is that they spend meagre amounts on health and education, which are far lower than the requirements of general basic needs. An alarming factor is that they incur more expenditure on consuming liquor than on health or education. Thus, the expenditure pattern of Bedampet village shows the vulnerable condition of rural poor who require a better enabling environment for their well being.





Impact of the Programme

Impact or outcome assessments measure the extent to which a project produces a desired set of changes, usually described in the 'objectives' of the programme. In other words, what are the benefits to participants, to the organization and the community? Are they qualitative and / or quantitative? Short term or long term, etc.

In the case of DDS APDS programme, the impact assessment is done for the first year of implementation and therefore any conclusions drawn from the findings can only be seen as pointers and trends, which can fully be assessed only at the end of the project cycle.

The impact of the APDS programme can be assessed from three different angles. The first one would be to see the impact of the programme on local communities both from quantitative as well as qualitative dimensions. The second method would be to compare the PDS programme with DDS APDS programme and finally, assess the impact of the programme by comparing programme villages with a control village in order to understand the potential for change and betterment of the lives of small and marginal farmers, especially women farmers in ensuring food security to local communities.

Impact of the Programme on Local Communities

Quantitative Outcomes

1. **Increase in Agricultural Productivity:** the lands, which were left fallow and yielded less than 50 kg / acre before the implementation of the programme produced on an average around 250-300 kg of sorghum, 50 kg of red gram, 50 kg of different varieties of grains such as finger millet, foxtail millet, field beans, chick pea, cow pea, sesame, niger, (see table-19) apart from providing 20-25 kg of uncultivated greens, and around **150 bundles** of fodder (mainly sorghum stalk, each bundle weighing around 2 kg). **These yields however, are less than estimated averages due to drought and unseasonal rainfall conditions.**

In aggregate terms, the APDS has brought 574 acres of fallow lands under cultivation which produced 131,903 kgs of sorghum that includes yellow jowar, white jowar and red jowar and an equal quantity of grain from a variety of crops in the eleven APDS programme villages. Apart from food grains, by products such as fodder, provided by these regenerated lands sustained a large number of cattle in these villages. Each acre of land produced fodder that included jowar stalk (around 150 bundles), Green fodder (20 bundles), Lobia/ Cowpea creeper (12 bundles), Red gram and Green gram husk (30 baskets).

2. **Employment Generation:** on an average 55 person days of labour employment was created per acre for various agricultural operations and a demand for 6-8 bullock pair days per acre (3-4 days for tilling/harrowing and 3-4 days for transporting farm yard manure) has been created through this programme. Apart from this, around six-person days of employment was created in making traditional storage baskets, which can hold 5 quintals of grain. In the II villages, the programme generated a total of 30673 person days of employment on 574 acres in the first year itself i.e.2001-2002 and created a wage income of around 13.50 lakhs. (The figure, Rs.13.50 lakhs, is arrived at based on calculation of the total labour charges, inclusive of tractor and bullock hiring charges, for 574 acres in the II villages. For each acre, under each category, the labour charges were calculated on the following basis: for tractor ploughing Rs.600/-, bullock ploughing

Rs.200/-, manure + transportation Rs. 600/- and Rs.20/- per day for women and Rs.25/- for men at 2001 rates for the rest of the agricultural labour activities). This wage income accrued not only to the partner households but also to other labour households who are not covered under the programme. **Thus, the wage income generated in the form of labour charges under this programme circulated within the village economy and created a conducive environment for development of subsidiary economic activities like livestock rearing, savings through self-help groups, etc.**

- 3. Change in Land Prices:** The fallow lands that were left untended and carried no value before the programme, now fetch higher prices and provide insurance against risk. Lands that carried less than Rs.5000/- per acre now carry prices as high as Rs.10000/- to 20000/-.
- 4. Change in Migration Rates and Patterns:** The APDS programme has been able to slow down distress migration of landless poor, small and marginal farmers in the study area. Most of the landless labourers including small and marginal farmers who were forced to migrate due to shrinking employment opportunities in agriculture to nearby towns for temporary casual labour works in building construction, road works, etc., have found new hope and productive employment opportunities in their own villages through this programme. Most of the partners are the households that have joined the programme and regenerated their fallow lands. It was observed that in Malgi village, migration to Bidar (a nearby town in Karnataka) in search of labour works had slowed down due to the availability of agricultural labour works in the village.

Qualitative Outcomes

There are a number of qualitative outcomes derived from the programme, which are long-term in nature and provide sustainability to the overall framework of food security of local communities. Although some of these qualitative benefits are amenable to quantification, for lack of standards they are only treated as qualitative outcomes. The important qualitative outcomes of the programme are:

1. Restoration of environmental and ecological balance, enhancing productivity and value of lands

The APDS Programme was able to arrest degradation of fallow lands that farmers left untended for various reasons, poverty that severely their capacity to invest on upgrading their fallows, being one of the main reasons. Soil conservation measures such as application of organic manure to enhance soil fertility, bunding, watershed works, tree plantations, etc., were undertaken by the partner farmers on a large scale improving ecological balance on lands and making them productive. The farmers in the programme understand the symbiotic relationship between different varieties of crops they now grow in relation to soil management, fertility management, internal cycle of inputs, pest control, labour management, diet management, risk insurance, etc.

2. Conservation of Biodiversity

In the context of a policy environment that neglected dryland agriculture for decades, farmers in these areas continued either subsistence farming practices or went for high input chemical farming that degraded and destroyed ecological balance and biodiversity. Mono cultural cropping systems have begun replacing mixed farming systems, especially with the medium and big farmers in this area. Many farmers, induced by government's attractive procurement prices which are limited to a few crops such as rice and wheat, began cultivating rice as a monoculture, unmindful of their negative consequences on natural resource conservation and biodiversity.



The APDS programme along with other programmes such as Eco-employment, Land lease programme and Community Gene Fund Programme has brought back biodiversity conservation as an important aspect of food security of local communities and has helped them revive over 80 varieties of crops, cereals, legumes, pulses, oilseeds, etc., most of which were on the brink of being lost forever. From a gene pool that had shrunk to less than 20 varieties when DDS launched the programme in Medak district. Women farmers turned the tide and are now cultivating around 80 varieties, ensuring not only food security for themselves but also to future generations and a number of local communities in the district. The high diversity of crops has minimized the risk of crop failure and has enabled farmers to earn more income.

Box 9:

Potential Benefits Provided by Maintenance or Sustainable Use of Biodiversity

A diversity of species provides a range of economic and investment opportunities.

- Food security is improved by a range of varieties which help reduce the risk of loss due to pests, and increase tolerance to climatic stress.
- Land can have greater biomass output over longer periods of time when bio-diverse (non-diverse farming systems succeed by economies of scale, and over shorter periods of time – often requiring high levels of inputs to sustain yields).
- Protection is provided against epidemic pathogens – the more genetically uniform a population is, the more vulnerable it is to epidemic disease.
- Genetic information is available to plant breeding and pharmaceutical industries, the outputs of which contribute to food security and improved human health.
- Exposure to environmental risk reduced through supporting ecosystem processes which protect poor people from variables such as drought and flood.
- Nutrition and health are improved by providing a source of medicines and vitamins for humans and livestock.
- A range of unique social and cultural identities which have developed through the establishment of different people – landscape interactions are maintained.

3. Increase in food intake and improvement in health and nutrition status

The regenerated fallow lands in the II villages have yielded 185891 kgs. of a range of cereals and pulses that included three varieties of jowar, a variety of millets, field beans, cowpea, green gram, etc. These extra cereals available to each household has not only increased their food intake but has also fortified their nutritional requirements, which these varieties of cereals amply provide.

Apart from cultivated grains, the members of the APDS programme, who mostly are dalit women, have a tradition of eating several varieties of uncultivated foods collected from fields. Uncultivated foods are important from the perspective of gender and poverty. Through the APDS programme, the importance of uncultivated foods in the diets of poor households has been brought into focus and the programme has identified over 80 uncultivated foods consisting of vegetables, greens, berries, etc., that freely grow on fields and common lands in the villages.

Box 10 :

Uncultivated Greens Grown in the Fields

Doggali koorā (Amaranthus polygamus), Tagirancha (Cassia tora), Tummi koorā (Leucas aspera), Pundi (Hibiscus cannabinus), Chennangi chettu (Lagerstoemia parviflora), Yelukachevula koorā (Merremia Emarginata), Sannavayeli koorā, Gunugu koorā (Celosia Argentia), Ganga vayeli (Portulaca oleracea), Adivikakarākaya (Memordica charantica), Adivi donda, Adonada kaya (Caparis jelanica), Polapatram (Gymnema sylvestre), Talaili, Tella gurmāsi koorā, Pondaganti koorā (Alternathera sessilis), Gormadi koorā (Enicostema hyssopifolium), Kasha pandlu (Solanum nigrum), Tellarjam, Uttareni (Achyranthes aspera), Mullu thotakoorā (Amaranthus spinosus), Dusari teega (Cocculus hirsutus), etc.

Source: Uncultivated foods and the poor: A study done by DDS at the Zaheerabad region of Medak district in Andhra Pradesh, India

4. Fodder for Livestock

Livestock, especially bullocks and buffaloes, are an integral part of dryland agriculture. They not only provide draught power but also are vital in maintaining soil fertility in these regions. Livestock is also seen as household asset to generate extra income and provide insurance against risk during periods of droughts and stress.

Livestock in the programme area has been dwindling over the years due to lack of fodder as more and more lands are becoming fallow. With the intervention of APDS programme, this trend was arrested as the regenerated lands now provide enough fodder for the cattle in the villages. The APDS programme has brought into focus the integral nature of livestock rearing in dryland agriculture vis-à-vis mechanization and tractorisation that have changed the rural landscape and patterns of crop production.

Box 11:

Nutritional Value of Cereals and Millets

Nutritionally, the intake of a variety of cereals and millets is always desirable as they provide required micronutrients essential for healthy growth and development. This has significance especially, for the poor in dry land areas whose staple diet has changed over the years from consumption of a variety of cereals and millets to one of dependence on PDS rice. This change has resulted in several nutritional deficiencies in the diets of the poor. Malnutrition and deficiency of micronutrients can be corrected by consuming a variety of coarse grain cereals. Compared to standard grain like rice, cereals and millets are richer in calcium, minerals and phosphorous. It is calculated that 460 grams of rice does not meet all the nutritional requirements of adult humans, but 360 grams of cereals like sorghum, pearl millet and foxtail millet can provide most of the nutrients (such as Protein, minerals, fiber, carbohydrates, calcium, phosphorus, iron, thiamin, riboflavin, etc. For details see the table given below). The protein content of millets is more than that of rice and they have a well-balanced amino acid profile. They are a good source of methionine, cystine and lysine and are rich in important vitamins such as thiamine, riboflavine, folin and niacin. Pest attack and diseases are relatively low among millets and they respond well to low levels of inputs and hence are environmentally friendly and sustainable. These crops are well suited to locally prevailing drier weather conditions, grow even in lesser fertile soils, require less water and play a major role not only for regional food security but also the nutritional security of poorer households in the region. The APDS programme has helped revive the cultivation of traditional crops that address not only the food security needs of local communities but also their nutritional requirements but were neglected due to lack of governmental support.

Source: Nutritive value of Indian Foods, National Institute of Nutrition, Hyderabad, 2002.

5. Reduction in Distress Migration:

Migration is generally seen as a livelihood diversification strategy and is not always perceived as bad. But in the programme area, serious loss of seasonal agricultural employment due to fallowisation and lack of other non-farm sector employment opportunities have forced local communities into distress migration mostly to nearby urban centres, the outcomes of which have been invariably negative. The APDS programme has been able to slow down distress migration from the villages to some extent. Another angle to the problem is that in some of the villages, local people do not have the option of migration and are forced to remain poor because either the villages are far away from urban centers or they are too poor to bear the costs of migration. With the introduction of the APDS programme, local people now have more seasonal agricultural employment as more and more fallow lands are brought under cultivation. One of the spin-offs of this programme has been providing employment for certain rural artisanal groups such as basket weavers to make bamboo baskets for storing grain for the community grain fund in each village, vermicompost units that produce organic manure for local requirements, NPM practices that provide employment for women to collect neem seeds and make neem powder and decoction for crop spraying, etc.

6. Social Capital Formation

Social Capital means “features of social organization such as networks, norms and trust that facilitate coordination and cooperation for mutual benefit”(Putnam, 1993). Social Capital fosters reciprocity, facilitates information flows for mutual benefit and creates trust among members of a community. It tends to be self-generating as more and more members are drawn into it through socialization. The trust and cooperation engendered through social capital is important particularly at local level since it can promote development.

Social Capital enhances the benefits of investments in physical and human capital and the APDS programme through its Sangham members was able to generate such social capital by organizing mutual cooperation and help amongst its members in regenerating fallow lands, forming self-help groups for micro-credit needs, forming legal committees to address certain social evils in the community like child marriages, atrocities on women etc to running a Community Grain Fund to address local food security concerns. However all these sets of interventions do not exclusively belong to the APDS Programme. They are also part of the overall DDS activities mainly implemented through its women Sangham members.

Box 12:

Livestock- An Integral Part of Dryland Farming

Livestock is an indispensable and vital asset for farmers in semi-arid areas. Soil erosion, nutrient loss and lack of organic matter that negatively affect agricultural productivity, is a major concern for them. Livestock, especially bullocks and buffaloes provide much needed farmyard manure (FYM) for maintaining soil fertility apart from being useful for other agricultural operations such as ploughing, transportation etc. They are also an important source of nutrition for households through the supply of milk and extra income for small and marginal farmers. Recognising the integral nature of livestock rearing for farmers in the APDS programme, DDS has provided cattle in some villages. Scarcity of fodder for livestock, which was a serious problem earlier to the implementation of the programme was overcome as more and more fallow lands were brought under cultivation and a variety of crops grown having value for farmers, livestock and soil. The APDS programme has made it possible to sustain a large number of cattle in the programme villages. This study has estimated that by-products/fodder from an acre of land under the programme can provide fodder for 170 days per animal.

Amount of fodder grown in one acre of land

Sl. No.	Particulars	Quantity	Days*
1	Red gram husk	30 baskets	30
2	Green grass	20 bundles	40
3	Jowar stalk	150 bundles	75
4	Lobia creeper	10 bundles	20
5	Cowpea creeper	2 bundles	5
		Total Days	170

* Number of days of fodder available for an animal

Empowering Women

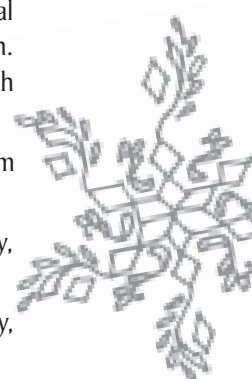
The root cause of poverty for both men and women in most developing societies is the entrenched traditional structures: notably class and caste hierarchies, ethnic or religious discrimination and unequal land distribution. All of these add up to lack of access to economic resources and lack of power on the part of the masses, which limits their ability to take control of their lives and improve their well being.

Women, however, are much more affected in these societies because of gender-specific causes, which stem from patriarchal kinship system. These traditional cultural forces impact women in many ways. For eg :

- Firstly, due to their impact, most women have less direct independent access than men to capital, property, market and extension services,
- Secondly, many women have limited geographical mobility, economic independence, or personal autonomy, and as a result remain economically dependent on male kin.
- Finally, because of their perceived liabilities and their limited bargaining power, women and girls often receive less health care, education, and training than men and boys.

The DDS APDS programme, however, has brought significant changes in the lives of women, especially dalit women who constitute the majority of its members. The women members of the APDS programme initially suffered triple handicap of being poor, being women and being dalits. But, these handicaps soon gave way to new forms of social organization, education and awareness, economic freedom and empowerment. The evidence of women empowerment as a part of the overall impact of APDS programme can be seen as:

1. Individual empowerment within the household; a sense of self-worth, and influence in household level decision-making.
2. A sense of respect in the eyes of others in the village community, linked to their improved economic well-being. Women no longer see themselves as mere agricultural labourers but see themselves as proud farmers.
3. Group solidarity and sense of identity amongst sangham members has made them more assertive in claiming their rights.
4. Development of entrepreneurial and organizational skills among sangham women.
5. Breaking stereotypical gender roles in the community especially in relation to division of labour in agriculture.



The impact of the APDS programme can also be compared with the PDS programme and evaluated for their relative merits in terms of its access, targeting, operational efficiency, choice of cereals available, nutritional value and overall framework of implementation. The following table brings out their relative merits in terms of food security requirements of local communities

Table 35 – Relative Merits of PDS and APDS

	PDS	APDS
1. Mode of operation	Centralized PDS Operation	APDS decentralized / community role
2. Location of control	Centralized control	Local control over production, procurement, storage and distribution
3. Framework of implementation as they promote input intensive	The present PDS system and procurement policies linked to PDS are ecologically damaging and mono-cropping patterns of agriculture such as rice and wheat	Ecologically safe, focus on diversity of crops, sustainable practices, resource conservation practices, bio-diversity
4. Targeting	Problems of identification of poor; Problem of inclusion and exclusion	No such problem because community itself identifies its poor. No problem of exclusion or inclusion.
5. Access	Access of PDS and coverage good in some states but not so good in many states	Community access to everyone without administrative hassles
6. Operational costs	Excessive overhead costs	Very low overheads
7. Operational loopholes	PDS system suffers from leakage and corruption	No such danger in APDS
8. Transfer of benefits to the target groups	It takes Rs.5/- on average to transfer Re.1 to the poor	If Re.1 is transferred it reaches the target group with minimal costs incurred for storage and distribution in the villages
9. Choice of grains available to the consumer	Limited choice of grain available to consumers (only rice & wheat)	Different varieties of cereals in line with local tastes and preferences
10. Nutritional value	Less nutritious and little dietary diversity	More nutritious and more dietary diversity
11. Quality of food grains for human consumption	Old and low quality food stock in FCI godowns; sometimes unfit	Farm fresh and good quality food stocks in the APDS Community Grain Fund
12. Attitude	Promotes passive consumers	Promotes active producers and consumers of food

The impact of the APDS programme can also be compared with the control village chosen for the study. The impact of the APDS programme and the changes it has brought about in the lives of local communities is presented in the following table.

Table 36 - Changes observed between DDS Programme villages and non-intervention village

Non-intervention Village	APDS Programme Villages
<p>Fallow lands</p> <p>No value for the land</p> <p>Useless entitlement-can't be used for taking financial loans, credit, mortgage etc.</p> <p>Lack of food security-although government PDS provides rice all round the year</p> <p>Environmental degradation of lands by keeping them fallow</p> <p>_____</p> <p>_____</p>	<p>Productive lands</p> <p>Value of the land goes up</p> <p>Productive entitlement that creates value for the owner of the land</p> <p>Food security ensured in times of need-during lean season when agricultural wage works are not available</p> <p>Environmental and ecological balance maintained</p>
<p>Low-consumption of food</p> <p>Mostly rice as staple diet</p> <p>regular diet</p> <p>Non-availability of fodder for livestock</p> <p>No other spin-off benefits</p>	<p>Practice of organic farming methods</p> <p>Variety of food grains grown</p> <p>Food consumption goes up</p> <p>More variety of cereals, pulses and greens grown organically having good nutritional value becomes</p> <p>Availability of fodder for livestock</p> <p>Spin-off benefits from the programme are the non-agricultural activities like livestock rearing, organic manure making, cottage industry like basket-weaving for grain storage etc.</p>
<p>Availability of employment limited</p> <p>Distress migration from the village</p> <p>No local initiative and community participation</p>	<p>Generates more employment for the community</p> <p>Reduction in distress migration</p> <p>Strong local initiative and community participation/ Social Capital</p>
<p>Low level of confidence among the stakeholders-dalit/women</p> <p>No capacity building skills stakeholders, especially women.</p> <p>_____</p>	<p>High levels of self-confidence and pride in ownership of the land</p> <p>Capacity building and entrepreneurial skills of the</p> <p>Potential of niche market for organic foods</p>



Question of Sustainability

Sustainability of any developmental intervention depends on a number of factors ranging from stakeholders participation, financial viability, capacity building, time scale, scale of operations, to the most important aspect of internalisation of values, principles and philosophy underlying the programme. The question of sustainability of the programme cannot be determined by isolating any single factor. In the case of DDS, the alternative PDS programme has the potential for sustainability since its approach is based on firstly, modifying

conventional agricultural systems in order to reduce consumption of inputs, so that wastes and adverse environmental impacts are substantially reduced. Secondly, introduction of regenerative technologies, making use of both biological and human resources that are available locally. And finally, designing programmes best suited to local conditions. However, in order to have a decisive influence on state policy and to avoid being branded as “*islands of experimentation*”, it is necessary to scale up the programme. But the programme cannot be replicated in a new setting without taking a good look at the various processes and structures that are essential for the viability and sustainability of the programme.

Lessons Learnt

1. A strong people-centred approach in designing, implementing, monitoring & evaluating – a prerequisite for the success of the programme.
2. A strong agency, whether NGOs or any other voluntary agency with well defined goals and objectives is very essential for guiding stakeholders in managing natural, socio-economic and cultural resources finely adapted to local conditions
3. The process of institutional building can be easily done if the conventional notions of education and training are subjected to scrutiny before imparting any useful information, ideas etc to the stakeholders. Appreciating local wisdom and knowledge of the villagers and erasing boundaries of hierarchy during decision-making is a necessary step towards effective implementation of the programme.
4. Core values underlying the programme need to be internalized, since they act as referential guide to the programmes implementation.
5. Monitoring & Evaluation should be seen as an everyday learning process rather than a policing activity. This is possible when the core values of the programme are internalised by all the stakeholders.
6. Replication of the programme in a new setting should be possible if enough care is taken in institutional building adapted to specific local needs and conditions.
7. Poverty reduction is essential to eliminating hunger. However, a focus on food security within poverty reduction initiatives is critical, in order to ensure that such initiatives meet the needs of the hungry and that they address both the chronic and transitory aspects of food security.
8. Revitalised local practices like addition of farmyard manure, cart transportation, increasing draught animal power, all of which have sound implications for sustainable, locally managed, organic agriculture
9. Emphasis on democratic decision-making and control of community, particularly women in primary decision making through collective processes.
10. Bringing marginalised lands, people, culture and grains to the central stage through transparent and equity approaches.



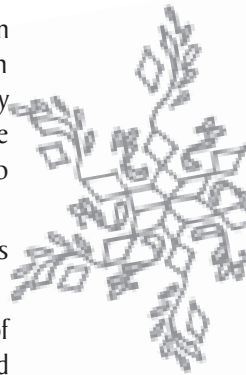


Conclusion

The study of the impact of APDS programme on food security of rural poor allow for three main conclusions.

- The first concerns the way the external organisation, in this case DDS, conceives the situation of farmers. The second, the way the programme is implemented and the third, the question of sustainability. With respect to the first, one can conclude that an approach based on farmers' situation and needs is necessary to design an appropriate programme like the APDS. Differences in agro-climatic zone, resource availability together with the nature of dryland agriculture with their diversity of crops and different types of animal husbandry call for abandoning conventional scientific stereotypes of the way farmers are perceived and their needs understood.
- Secondly, small scale, low resource farming systems are complex environments where agricultural production is risk prone and heavily dependent on climatic factors, particularly availability of water. However, risk can be reduced and production increased by exploiting the diversity of such farming systems, as well as by introducing new elements that can create additional opportunities. Moreover, local knowledge has to be the foundation in understanding these complex systems. Farmers are the most appropriate people to develop new management practices and to experiment with changes in their farming systems.
- Thirdly, the sustainability of the programme largely depends on how the stakeholders perceive their livelihoods in terms of economic well-being and social development.

Thus, the DDS-APDS programme by involving local communities breaks away from mainstream notions of development and envisions an approach that is ecologically, environmentally sound, economically viable and essentially egalitarian and democratic in its content by involving local communities.





Appendix

Table I - Total food grain production in India
Production of main crops (in million tonnes or as specified)

	1980-81	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Total food grain production (in million tonnes)	129.6	140.4	169.9	171.0	176.4	168.4	179.5	184.3	191.5	180.4	199.4	192.4	202.5
Total cereals	119.0	129.4	156.1	158.2	162.1	156.4	166.6	170.9	177.5	168.1	185.2	179.4	186.7
Rice	53.6	56.8	70.5	73.6	74.3	74.7	72.9	80.3	81.8	77.0	81.7	82.3	84.7
Wheat	36.3	46.2	54.1	49.8	55.1	55.7	57.2	59.8	65.8	62.1	69.4	65.9	71.0
Jowar	10.4	12.2	10.2	12.9	11.7	8.1	12.8	11.4	9.0	9.3	10.9	8.0	8.5
Maize	7.0	5.7	8.2	9.7	9.0	8.1	10.0	9.6	8.9	9.5	10.8	10.9	10.8
Bajra	5.3	3.3	7.8	6.6	6.9	4.7	8.9	5.0	7.2	5.4	7.9	7.7	6.9
Total pulses	10.6	11.0	13.8	12.8	14.3	12.0	12.8	13.3	14.1	12.3	14.2	13.1	15.9
Grams	4.3	3.6	5.1	4.2	5.4	4.1	4.4	5.0	6.4	5.0	5.6	6.1	6.6
Tur	2.0	2.3	2.7	2.7	2.4	2.1	2.3	2.7	2.1	2.3	2.7	1.9	2.7
Total oil seeds *	9.4	12.6	18.0	16.9	18.6	18.6	20.1	21.5	21.3	22.1	24.4	22.0	25.7
Groundnut	5.0	5.9	9.7	8.1	7.5	7.1	8.6	7.8	8.1	7.6	8.6	7.8	9.0
Rapeseed and mustard	2.3	3.4	4.4	4.1	5.2	5.9	4.8	5.3	5.8	6.0	6.7	4.7	6.1
Sugarcane	154.2	196.7	203.0	225.6	241.0	254.0	228.0	229.7	275.5	281.1	277.6	276.3	290.7
Cotton (million bales)	7.0	6.4	8.7	11.4	9.8	9.7	11.4	10.7	11.9	12.9	14.2	11.1	12.8
Jute and Mesta	8.2	6.8	7.9	8.3	9.2	10.3	8.6	8.4	9.1	8.8	11.2	11.1	9.8
Potato	9.7	14.1	14.9	14.8	152.2	16.4	15.2	17.4	17.4	18.8	24.2	17.6	22.2

* include groundnuts, rapeseeds and mustard, sesame, linseed, castor seeds, niger seeds, safflower, sunflower and soybean

Notes: unit of measurement for production of all commodities is in million tonnes, except in the case of cotton, jute and mesta where production is in terms of millions of bales. Figures for 1997-98 are provisional.

Source: Ministry of Finance, Economic Survey, various issues in EPW, May 27, 2000, p.1782.

Table 2 - Yield Per Hectare of Major Crops (kg per hectare) in India

	1980-81	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Total food grain production	1023	1173	1331	1349	1380	1382	1457	1501	1548	1491	1614	1551	1611
Total cereals	1142	1315	1493	1530	1571	1574	1654	1701	1763	1703	1831	1772	1836
Rice	1336	1465	1689	1745	1740	1751	1744	1888	1911	1797	1882	1895	1905
Wheat	1630	2002	2244	2121	2281	2394	2327	2380	2559	2483	2679	2470	2596
Jowar	660	762	697	869	814	655	982	898	779	823	956	727	833
Maize	1159	1029	1395	1632	1518	1376	1676	1602	1448	1595	1720	1721	1785
Bajra	458	378	646	610	658	465	836	521	700	577	788	792	732
Total pulses	473	515	598	549	578	533	573	598	610	552	635	572	661
Grams	657	629	753	652	712	739	684	783	853	700	813	812	790
Tur	689	685	779	763	673	588	652	762	644	670	756	563	750
Total oil seeds *	532	629	824	742	771	719	797	799	843	851	926	840	948
Ground nut	736	855	1132	930	904	818	1049	941	1027	1007	1138	1078	1176
Rape seed and mustard	560	748	906	831	904	895	776	847	950	916	1017	667	894
Sugar cane	57844	60000	61000	65000	65000	66000	64000	67000	71000	68000	66000	70000	69288
Cotton (million bales)	152	168	202	252	225	216	257	249	257	242	265	213	240
Jute and Mesta	1130	1274	1540	1646	1634	1662	1658	1713	1760	1712	1818	1795	1730
Potato	13256	16000	16000	16000	16000	16000	15000	17000	16000	17000	19000	14600	17800
* include groundnuts, rapeseeds and mustard, sesamum, linseed, castor seeds, niger seeds, safflower, sunflower and soybean													

Notes: unit of measurement for production of all commodities is in million tonnes, except in the case of cotton, jute and mesta where production is in terms of millions of bales. Figures for 1997-98 are provisional.

Source: Ministry of Finance, Economic Survey, various issues in EPW, May 27, 2000, p.1782.

Table 3 - Population Growth vs. Agricultural Growth (per cent) in India

Year	Population growth		Period	Agricultural growth, all crops (Annual Compound Growth Rate)		
	Total population	Annual compound growth rate		Area	Yield	Production
1951	361.1	1.25	1949-50 to 1964-65	1.61	1.50	3.31
1961	439.2	1.96	1967-68- to 1980-81	0.54	1.83	2.38
1971	548.2	2.20	1980-81 to 1991-92	0.05	3.16	3.21
1981	685.2	2.22				
1991	844.3	2.11				
2000*	987.3	1.09	1949-50 to 1991-92	0.64	2.05	2.70

Notes: Estimated population as on March 1, 2000.

While calculating agricultural growth, years 1965-66 and 1966-67 have been excluded as they were years of serious scarcity.

Source: Agricultural Statistics at a Glance, Government of India, New Delhi, 1993.

Table 4 - Per Cent Share of Different Crops, Grossed Area in Andhra Pradesh and India during Trienniums Ending 1962-65, 1970-73, 1980-83 and 1992-95

State/Period	Rice	Wheat	Coarse cereals	Pulses	Food grains	Non-food grains
Andhra Pradesh						
1960	27.96	0.15	38.42	11.48	78.01	21.99
1970	25.69	0.16	36.00	11.20	73.05	26.95
1980	30.22	0.14	30.89	11.84	73.09	26.91
1990	30.62	0.08	14.90	13.24	58.85	41.15
India						
1960	23.78	8.92	29.20	15.93	77.85	22.15
1970	23.84	12.10	28.04	13.96	77.94	22.06
1980	23.96	13.68	25.04	13.91	76.63	23.37
1990	24.91	14.32	19.81	13.17	72.21	27.79

Source: Government of India, Area and Production of Principal Crops in India (various issues), Ministry of Agriculture, New Delhi.

**Table 5 - Net Availability of Foodgrains (per annum) in India from 1951 to 2000
(Kgs. Per capita per annum)**

Year	Rice	Wheat	Other Cereals	Cereal	Gram	Pulses	Food grains
1951	58.0	24.0	40.0	122.0	8.2	22.1	144.1
1961	73.4	28.9	43.6	145.9	11.0	25.2	171.1
1971	70.3	37.8	44.3	152.4	7.3	18.7	171.1
1981	72.2	47.3	32.8	152.3	4.9	13.7	166.0
1991	80.9	60.0	29.2	171.0	4.9	15.2	186.2
2000 *	75.3	58.4	21.9	155.7	4.0	11.7	167.4

* Provisional

Source: <http://agricoop.nic.in/statistics/capita2.htm>

**Table 6 - Net Availability of Food grains (per day) in India from 1951 to 2000
(grams per capita per day)**

Year	Rice	Wheat	Other Cereals	Cereal	Gram	Pulses	Food grains
1951	158.9	65.7	109.6	334.2	22.5	60.7	394.9
1961	201.1	79.1	119.5	399.7	30.2	69.0	468.7
1971	192.6	103.6	121.4	417.6	20.0	51.2	468.8
1981	197.8	129.6	89.9	417.3	13.4	37.5	454.8
1991	221.7	166.8	80.0	468.5	13.4	41.6	510.1
2000 *	206.4	160.1	60.1	426.8	10.8	31.9	458.6

* Provisional

Source: <http://agricoop.nic.in/statistics/capital.htm>

Table 7 - Share of the different sectors in Gross Capital Formation in India

Sector	Gross capital formation by sector (Rs. crore)						
	1999-00	1998-99	1997-98	1996-97	1995-96	1994-95	1993-94
Gross capital formation	268527	240672	261541	252555	284557	229879	181133
Agriculture, forestry and fishing	21388	18964	18305	18326	17689	16785	15249
Agriculture	18656	16384	15953	16176	15690	14969	13523
Industry	144476	139050	152099	148511	172568	117734	90735
Service	102663	82658	91137	85718	94300	95360	75149

Source: Economic Times, 26th December, 2001

Table 8 - Share of the different sectors in Gross Capital Formation (%)in India

Sector	Gross capital formation by sector (%)						
	1999-00	1998-99	1997-98	1996-97	1995-96	1994-95	1993-94
Gross capital formation	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Agriculture, forestry and fishing	7.96	7.88	7.00	7.26	6.22	7.30	8.42
Agriculture	6.95	6.81	6.10	6.40	5.51	6.51	7.47
Industry	53.80	57.78	58.15	58.80	60.64	51.22	50.09
Service	38.23	34.34	34.85	33.94	33.14	41.48	41.49

Source: Economic Times, 26th December, 2001

Table 9: Nutritive values of rice, sorghum, pearl millet and foxtail millet

Food	Quantity	Protein g	Fat g	Minerals G	Fiber g	Carbohydrate G	Energy Kcal	Calcium Mg	Phosphorus Mg	Iron mg	Thiamin mg	Riboflavin
Requirement	50	20	NA	20	NA	2925	400	NA	30	1.1	1.3	
Rice	460g	31.3	2.3	2.76	0.9	359.7	1587	46	736	3.22	0.27	0.27
Sorghum	460g	47.8	8.7	7.3	7.3	331	1605	115	1021	18.8	1.70	0.60
Foxtail millet	460g	56.6	17.45	15.1	36.8	280	1553	143	1334	12.8	2.74	0.5
Pearl millet	460g	53.36	23	10.6	5.5	311	1660	193	1362	36.8	1.5	1.15

Source: Nutritive value of Indian Foods, National Institute of Nutrition, Hyderabad, 2002.

