



Technical Cooperation between FAO and India

A White Paper to Guide the Writing of the
National Medium Term Priority Framework for
FAO and the Government of India



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March 2009

This white paper has been prepared to support consultations on the content and structure of the FAO National Medium Term Priority Framework for India. It is intended to be an authoritative report on the issues facing food and agriculture in India and on the capacity of FAO to partner with India in addressing priorities identified by India. The first draft of this white paper was prepared by Ramesh Chand (rc@ncap.res.in) under contract to FAO in India. The draft was reviewed by FAO India and subsequently revised. Further revisions were made following consultation within India and FAO.

The material presented in the paper is drawn from official documents of the Government of India, extensive consultation on sector papers prepared by a team of consultants to FAO in India and research and other publications. Input to Chapters 3 and 4 was obtained from the technical divisions of FAO through a request to identify their areas of work in which they had comparative advantage in India; the chapters also benefited from the Debriefing Report of the Evaluation of FAO Cooperation with India in the period 2003-2008 and takes into consideration views of stakeholders consulted in the process. Chapter 1 was contributed by Gavin Wall, FAO Representative in India and Bhutan.

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ABBREVIATIONS AND ACRONYMS

AEZ	Agri Export Zones
APEDA	Agriculture and Processed Food Export Development Authority
APFAMGS	Andhra Pradesh Farmer Managed Groundwater System Project
APMRA	Agricultural Produce Market Regulation Act
APWAM	Andhra Pradesh Water Management Project
CSOs	Civil Society Organizations
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GMOs	Genetically Modified Organisms
Gol	Government of India
HQ	FAO Head Quarter
ICTs	Information and Communication Technologies
ILO	International Labour Organization
IPM	Integrated Pest Management
MASSCOTTE	Mapping System and Services for Canal Operation Techniques
MDG	Millennium Development Goals
MPEDA	Marine Products Export Development Authority
MSP	Minimum Support Prices
NABARD	National Bank for Agriculture and Rural Development
NATP	National Agricultural Technology Project
NDDDB	National Dairy Development Board
NFDB	National Fisheries Development Board
NGO	Non-Government Organization
NMTPF	National Medium Term Priority Framework
NPK	Nitrogen Phosphorus & Potash
NRAA	National Rainfed Area Authority
NSSO	National Sample Survey Organisation
RAP	FAO Regional Office for Asia Pacific
R&D	Research & Development
SAARC	South Asian Association for Regional Cooperation
SAUs	State Agricultural Universities
SDoA	State Department of Agriculture
SPS	Sanitary and Phytosanitary
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
WHO	World Health Organization
WTO	World Trade Organization

1. THE NEED FOR A NEW RELATIONSHIP BETWEEN INDIA AND FAO

FAO and Global Food and Agriculture ^a

1.1 Agriculture is facing profound changes throughout the world. Some of these changes like climate change, rising stress on the natural resource base, outbreaks of new strains of pests are seen as challenges while some changes like new types of technologies, changing demand patterns, upcoming value chains and supermarkets, revolution in communication technology, institutional innovations and globalization are considered as opportunities not witnessed in the past. These changes necessitate that multilateral agencies like FAO reorient their activities in various countries to help domestic institutions and agencies adjust smoothly to upcoming new events and unfolding new reality to improve food and nutrition security and to achieve other related goals.

1.2 Over the past quarter century FAO has been challenged to respond to ever increasing changes in the context in which it works and to an array of new demands. The original purpose of FAO was essentially to raise levels of nutrition and

standards of living principally by working with governments to increase global food production and it was for all practical purposes the only organization of its kind. Now, FAO work extends well beyond food production to include concerns about the quality of that food in terms of access to and consumption of food, international codes and standards, intellectual property, poverty, gender equity, environment sustainability, rural development, agricultural investment, agribusiness, food safety and consumer protection, natural resource management notably water, and climate change. Moreover, FAO now operates in a crowded field. A number of other UN agencies compete to contribute to agricultural development; the number, size and impact of NGOs working in agriculture, food security, rural development, and natural resource management has grown dramatically; and, the private sector has become a major driver of change in the global food and agricultural systems^b. In accordance with the Paris Declaration on Aid Effectiveness (2005) and Accra Agenda for Action (2008), FAO is committed to working together with other UN agencies and development

a The term "agriculture" and its derivatives include fisheries, marine products, forestry and primary forestry products.

b The analysis of FAO has been drawn from the Report of the Independent External Evaluation of FAO. C2007/7A.1 October 2007. Available at <ftp://ftp.fao.org/docrep/fao/meeting/012/k0827e02.pdf>

partners, NGOs and the private sector to increase synergies and build partnerships to accelerate the attainment of the Millennium Development Goals and member countries development goals.

1.3 These changes reflect the complexity of the global food and agricultural system, an improved understanding of the multiple facets of development, and the threats to the natural resource and economic bases on which the system relies. Although much has changed; poverty, hunger and malnutrition remain a daily reality for some one billion people who predominantly live in rural areas and are reliant in some way on agriculture. Even in the case of countries enjoying strong economic growth (such as India), the rural areas continue to be zones of stagnation and deprivation. The compounding effects of the recent food price crisis and the current economic crisis have underscored the fragility of the global food and agricultural system and the danger that this represents for the low income households of the world.

1.4 There is a serious misconception, in some quarters, as to the capacity and resources of FAO; this has created expectations that are sometimes unrealistic and has clouded thinking about the resource needs of FAO. With a core budget of less than US\$ 400 million per annum, the resources of FAO are very modest in relation to the breadth of its mandate and its global responsibility.

1.5 The foregoing analysis points to the critical need for FAO to make strategic choices to prioritize areas of work in which it has comparative advantage in relation to other players. This applies equally to FAO in India as it does to the Organization as a whole.

Food and Agriculture in India

1.6 The food and agriculture system of India is complex, not only because India is more like a continent than a single country (there are 14 distinct agro-climatic zones); but also because food and agriculture are 'state subjects'. Despite the inherent difficulties of the scale of the country and its problems, India has achieved notable successes. Foodgrain production has more than quadrupled since Independence and the green revolution, while the white revolution brought about the supply of good quality milk to cities from thousands of small scale rural milk producers through their own cooperatives. These are celebrated success stories of development.

1.7 In the past two decades India has made impressive progress in a number of economic sectors and has attained a new level of global stature. Although these changes are impressive, there is a contradiction between the benefits of dynamic progress for some and the hardship faced by others. After registering impressive gains in reducing hunger between 1990–92 and the mid-1990s, progress has stalled since about

1995–97. The high proportion of the undernourished in India combined with a high population growth rate means that India has had a challenging task in reducing the number of undernourished. The increase in the number of the undernourished in India can be traced to a slowing in the growth in per capita dietary energy supply for human consumption since 1995–97. On the demand side, life expectancy in India has increased from 59 to 63 years since 1990–92. This has had an important impact on the overall change in the population structure, with the result that in 2003-05 the growth in minimum dietary energy requirements had outpaced that of dietary energy supply⁹.

1.8 Commercial agriculture is growing, albeit from a small base. There are high expectations, in some quarters, for India to significantly increase production and export of high value food and agricultural products. However, progress towards modern food value chains to achieve those expectations is quite slow.

1.9 Long-term investment in education and agricultural research and a growing corporate sector has produced a cadre of individuals having a high degree of technical competence. These individuals are well connected to peers around the world and are by and large fully conversant with the principles of best practices and current global trends. However, progress in the agricultural and related sectors has

been hampered by inadequate delivery of public services and a myriad of restrictions, subsidies, governance issues, and under-investment in infrastructure and post farm value addition. The dynamism of the NGO and the private sectors is in stark contrast to the common perception of public services. Centrally sponsored government schemes seek to address growth and inclusion, but systematic improvements in governance and implementation are needed to obtain the desired results from this spending.

FAO and India

1.10 The past models of technical cooperation between FAO and India in capacity building and multilateral interaction deserve to be revisited in light of the changes in the global food and agriculture system and the changed circumstances of FAO and India. FAO must consider becoming more of a facilitator or knowledge manager to assist informed decision making where the neutrality of FAO gives it an absolute comparative advantage. It is also time to acknowledge that India is no longer an obvious recipient of development assistance and that the limited resources of FAO must be complemented by investments from within India. Such investments must be carefully targeted to ensure that the desired benefits accrue. Neither, India nor FAO can afford a *laissez faire* approach to determining future collaborative effort.

1.11 The NMTPF at the country level will therefore be instrumental to: (a) the formation of partnerships with the development stakeholders to ensure greater effectiveness in pursuing MDG goals; (b) better focus on the development

priorities taking into account FAO strength and comparative advantages and (c) direct resources to those identified priorities of the country that are catalytic and able to attract additional resources from multiple partners or lead to joint collaboration.

2 CURRENT CHALLENGES IN INDIA'S AGRICULTURE

2.1 Agriculture is a source of livelihood for the majority of people of India and it serves food security needs of a vast population. Agriculture has special significance for low income, poor and vulnerable sections of society. These simple facts place agriculture at the core of economic development and social progress of Indian society. During the last one and a half decades several challenges have surfaced in Indian agriculture and these are becoming more and more significant with the passage of time. There is a danger that the Indian economy may not be able to sustain the current high growth rate and meet the aspirations of its large population if performance of agriculture sector does not improve and the challenges confronting this sector are not addressed.

Major Challenges

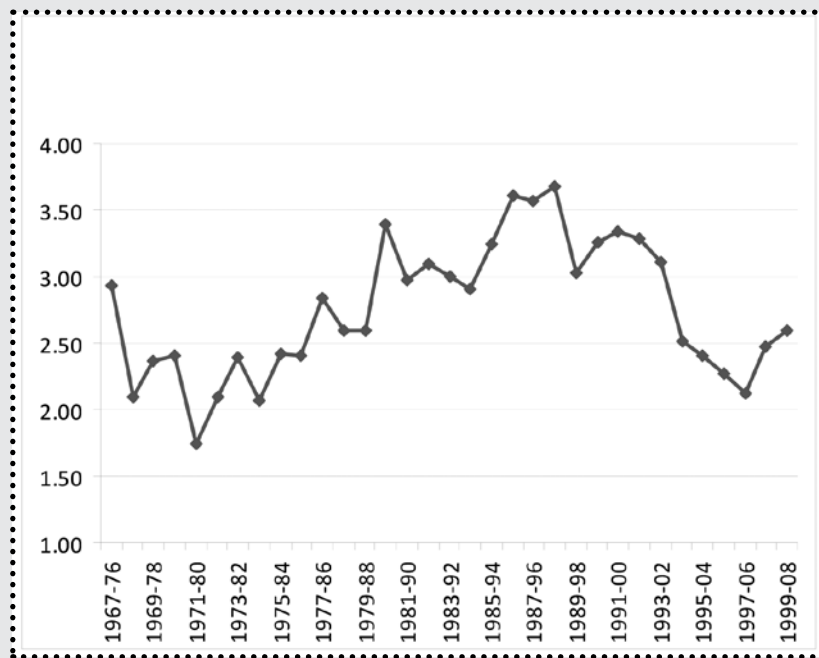
2.2 The major challenges facing Indian agriculture can be grouped in six categories relating to (a) growth (b) sustainability (c) efficiency (d) equity (e) quality, and (f) stability. There are also other important concerns like food and nutrition security, livelihoods, employment, gender issues, improvement in standard of living of rural population and the urban poor but most of these are subsumed in the above six categories. Addressing these challenges

requires efforts on several fronts such as an incentive structure, infrastructure, technology, market development, extension, regulations, input supply, tenancy and an enabling policy environment.

Slowdown in Growth

2.3 Adoption of green revolution technology, which started during late 1960s, led to a significant improvement in the performance of the agriculture sector. The growth rate of GDP increased from around 1 percent during the decade preceding 1967-68 to close to 3 percent during the decade after 1967-68. There was some reduction in growth during late 1970s but India's agriculture quickly recovered after 1980-81. Each year during the 1980s, agriculture moved to a higher growth trajectory. These growth rates based on a semi-log trend fitted to 10 years data are presented in Fig 2.1 and Fig. 2.2. The latter growth rates are based on data series excluding year 1979-80, 1987-88 and 2003-04 which were severe drought years and which could distort estimates of trend growth rates. Agricultural growth, based on the trend between mid 1980s and mid 1990s, peaked at a level of 3.7 percent and started decelerating after that. There was a sharp slowdown between mid 1990s and middle of the first decade of the 21st century.

FIGURE 2.1: Trend growth rate in GDP agriculture based on 10 years period starting from 1967-68 and ending with 2007-08



Source: Computed from GDP data taken from National Accounts Statistics, Central Statistical Organisation, Gol, New Delhi.

2.4 The output of the livestock and fishery sectors grew at a much higher rate compared to the crop sector; however, the slowdown in growth rates is observed across the board.

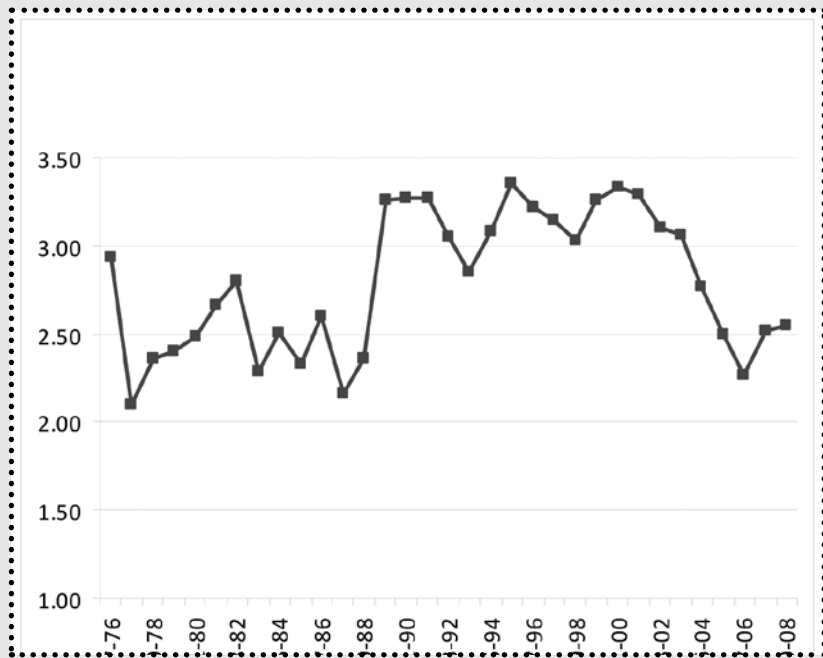
2.5 Pulses, which used to be the principal source of protein for India's vegetarian diet, face the most serious challenge in raising production. Since the onset of the green revolution, per capita availability of pulses in the country has

steadily declined from 60 gram/person/day to around 30 gram/person/day in recent years.

2.6 The main factors responsible for the slowdown in agriculture growth during mid 1990s to 2004-05 were the cumulative effect of declining public investment in agriculture, a decline in power supply to the sector, a slow down in fertilizer use and irrigation, and a deterioration in terms of trade for agriculture^{c 5, 13}.

^c As these factors turned out to be favourable after 2004-05, agriculture has responded in a big way and growth rate in GDP agriculture during 2004-05 to 2007-08 has turned out to be 4.6³.

FIGURE 2.2: Trend growth rate in GDP agriculture based on 10 years period starting from 1967-68 and ending with 2007-08 excluding three drought years



Source: Computed from GDP data taken from National Accounts Statistics, Central Statistical Organisation, GoI, New Delhi.

Natural Resources

2.7 Land resources are degrading and fertile agricultural land is being diverted to meet the growing needs of industrialization, urbanization and infrastructure. Nearly two thirds of India’s agricultural land is reported to be degraded or ‘sick’ to some extent and only about one third is in good health¹³. Most parts of India are overexploiting their water resources and possibilities for further expansion of irrigation are limited. Falling

groundwater levels in several states provides evidence of resource depletion. The water table has fallen more than 4 meters since 1980 in 264 districts including the groundwater rich Indo - Gangetic plains. Similarly, water flow in rivers, canals and water streams is declining year after year. The options being considered in such places are to contain rather than to increase water extraction. However, the overall challenge before the country is to produce more output from less water and less land.

2.8 Like soil and water, biodiversity and forests are under severe anthropogenic pressure. Mono cultures and genetic uniformity of cropping systems make agriculture highly vulnerable to pest, pathogen and weather shocks. Climate change is anticipated to be an additional aggravating stress on natural resources. Moreover, uncertainty about the nature of the impacts of climate change does not lend clarity to the development of a coping strategy.

Efficiency and Competitiveness

2.9 Efficiency was not a serious issue in Indian agriculture until recently. With a scarcity of food in the country, policies emphasized an increase in production, mainly cereals, without an emphasis on increasing dietary diversity or on reducing the average cost of production. Further, the agriculture sector was by and large insulated from competition from abroad through strict import regulations. With economic liberalization, the issue of efficiency has become highly relevant as domestic production now has to compete with products from other countries. Major reasons for this are found to be low productivity, poor marketing, under developed post harvest infrastructure and excessive regulation^{15, 16, 17}. India faces a plethora of interventions in agricultural markets which stifles competition, discourages private investments in marketing, and robs the system of the ability to harness benefits of scale economies. In several cases,

poor competitiveness of farm products is due to inefficiencies in marketing rather than production¹. Thus, there is a major challenge to integrate farm level production with different stages of market and processing.

Equity and Agrarian Distress

2.10 Equity has several dimensions. These could be inter sectoral, inter regional and intra sectoral. Inter sectoral inequity is indicated by disparity between per worker earnings in agriculture and non-agriculture sectors. Since late 1990s, GDP in non-agriculture sectors has experienced a growth rate of more than 8 percent compared with 2.6 percent growth rate in the agriculture sector. Further, while agricultural growth decelerated after the mid 1990s, the non-agriculture economy experienced accelerated growth (Table 2.1). This has resulted in a structural change in the composition of output as the share of agriculture (including allied sectors like forestry and fishery) in total GDP declined from close to one third to one fifth. However, the change in structural composition of output did not result in a commensurate change in the structure of employment. The share of the workforce engaged in agriculture showed much less of a reduction compared to the reduction in the share of agriculture in GDP that accompanied the fast growth of the non-agriculture sector. This has created very serious disparities between per worker income in agriculture and non-agriculture sectors (Fig. 2.3). The combination of these

two factors, i.e. slow growth in per worker income in agriculture and widening gulf between income of those who work in agriculture and those who work in non-agriculture sectors has the potential to be

2.11 The second important dimension of inequity in India is spatial. Crop productivity at the district level for the years 2004-05 and 2005-06, showed a low of Rs 2 908 per hectare to Rs 98

TABLE 2.1: Growth rate of agriculture and non-agriculture GDP and structural changes in Indian economy

Particular	Agriculture and allied sectors	Non- agriculture	Total economy
Growth rate at 1999-00 prices			
1988-89 to 1997-98	3.03	6.58	5.52
1998-99 to 2007-08	2.60	8.31	7.05
Share in GDP (%)			
1987-88	32.81	67.19	100
1999-00	24.90	75.10	100
2004-05	20.43	79.57	100
Share in workforce (%)			
1987-88	60.17	39.83	100
1999-00	56.60	43.40	100
2004-05	52.10	47.90	100
GDP/Worker Rs at 1999-00 prices			
1987-88	16840	52094	30881
1999-00	19897	78276	45233
2004-05	21735	92054	55418

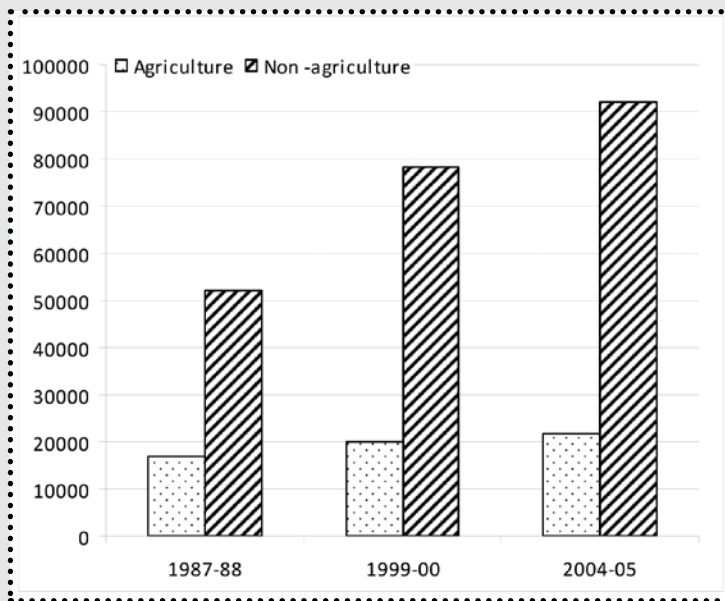
Source and Notes:

1. GDP data from Central Statistical Organisation, GOI, New Delhi
2. Total number of workers for specific years projected by using population census and then divided between agriculture and non - agriculture using sectoral share derived from NSSO data.

a source of social tension. Recognizing this fact, the Approach Paper to the Eleventh Five Year Plan emphasized a shift in focus from growth to inclusive growth¹².

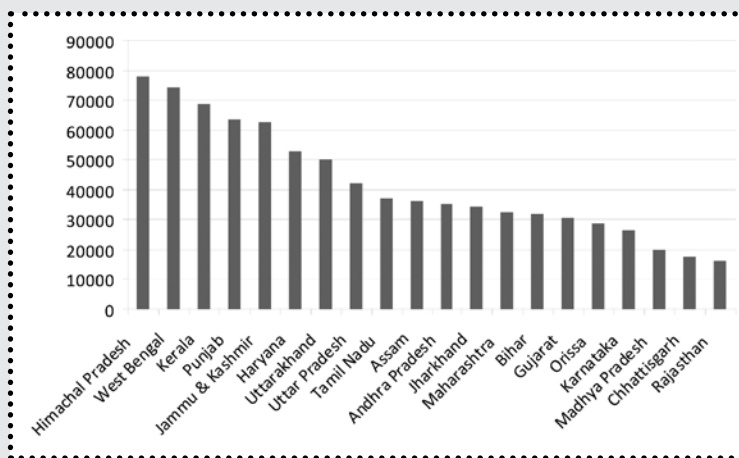
146 per hectare. Estimates at state level show a wide variation in agricultural productivity across states (Fig. 2.4). This variation has shown an increase over

FIGURE 2.3: Per worker GDP in agriculture and non-agriculture sectors, Rupees at 1999-00 prices



Source: Table 2.1.

FIGURE 2.4: Value of crop output Rs / hectare of net sown area during triennium ending 2004-05 in different States of India



Source: Same as in Table 2.1 and 2.2.

TABLE 2.2: Inter State variations in fertilizer use and irrigation, 2004-05

States / India	NPK (Kg/ha)	Area under irrigation (%)
Andhra Pradesh	192	40
Assam	60	5
Bihar	128	59
Gujarat	116	37
Haryana	298	85
Himachal Pradesh	85	19
Jammu & Kashmir	100	41
Karnataka	123	26
Kerala	94	15
Madhya Pradesh	71	31
Maharashtra	99	17
Orissa	62	31
Punjab	368	97
Rajasthan	46	34
Tamil Nadu	187	52
Uttar Pradesh	198	72
West Bengal	235	52
Chattisgarh	76	23
Jharkhand	70	10
Uttarakhand	147	43
Arunachal Pradesh	5	16
Manipur	86	23
Meghalaya	19	28
Mizoram	15	19
Nagaland	2	28
Sikkim	6	12
Tripura	48	16
All India	130	42

Source: *Agricultural Statistics at a Glance 2008*, Ministry of Agriculture, Government of India, New Delhi.

time^d. The main reasons for such large variations in productivity are variations in irrigation, fertilizer use, technology, and diversification towards high value crops. Information on some of the factors is presented in Table 2. 2. Fertilizer use across states varies from as low as 2 kg to as high as 368 kg per hectare of net sown area. Similarly, irrigation availability in various states varies from 5 percent to 97 percent of net cultivated area.

2.12 The agriculture sector in India is also characterized by intra sector disparities related to ownership of land holdings and other productive assets and productivity and income from different types of agriculture. More than 62 percent of farmers in the bottom of farm size categories, officially categorized as marginal, operate on an average land holding of 0.4 hectare and they cultivate only 18.2 percent of net sown area of the country. On the other hand, 6.5 percent farmers in the top farm size categories operate on an average farm size of 7.6 hectare and cultivate 36 percent of net sown area of India. The farmers in low farm size categories face a large number of constraints like low availability of institutional credit and scale disadvantage in input and output marketing. The marketing disadvantage is particularly severe for high value and perishable crops⁶. Another area of concern is that although

^d Coefficient of variation in crop productivity across states increased during triennium ending with 1990-91 to TE 2004-05.

the agricultural labourers make significant contribution in agriculture, 44.1 percent agriculture labour households lived under poverty during 2004-05, accounting for 41 percent of total poor in rural areas (NSSO 2004-05).

2.13 There is wide variation in crops grown in different parts of the country and in some cases by different types of farmers. This results in variation in productivity and income because the value of outputs from various crops differs greatly (Table 2.3). At country level, one hectare area under coarse cereals gave output worth Rs 7 107 while fine cereals yield output of more than Rs 18 000. Fruits and vegetables are at the top with per hectare output of Rs 1 35 000. Thus farmers and regions with a higher share of area under coarse cereals and pulses get very low output and those having higher share of area under horticulture crops get much higher output.

2.14 Another trend is the increased distress due to migration of rural people to urban areas and rising female workers in rural areas (Table 2.4). This has increased the workload of women who are often left behind to take care of family and agricultural operations. Thus increased feminization of agriculture and various other socio-economic reasons pose a growing challenge of addressing gender equity. Women^e constitute 40 percent of

TABLE 2.3: Productivity of different crop groups (Rs / hectare)

Crop group	2005-06
1. Cereals	15 042
a. Rice/ Paddy	18 509
b. Wheat	18 037
c. Coarse cereals	7 107
2. Pulses	9 818
3. Oilseeds	16 891
4. Sugarcane	45 945
5. Cotton	20 438
6. Horticulture	1 14 883
a. Condiments & spices	50 540
b. Fruits & Vegetables	1 35 876
7. All Crops	26 011

Source: 1. *Agricultural Statistics at a Glance 2008*, Ministry of Agriculture, Govt of India, New Delhi.
2. *Various issues of National Accounts Statistics*, Central Statistical Organisation, Govt. of India, New Delhi.

agricultural workforce and this percentage is rising. Also 75 percent of all female workers and 85 percent of all rural female workers are engaged in agriculture⁷. The critical aspect is that most of these female agricultural workers are landless, leading to feminization of poverty as well. The Eleventh Five Year Plan also recognizes some urgent initiative to ensure women's rights to land and infrastructure support, access to credit and markets, inclusivity and participation.

^e Women in agriculture refer not only to women agriculture labourers and farmers but also to women working in the various sub sectors of agriculture and allied non-farm work.

TABLE 2.4: Number of workers by usual status and annual growth during 1983 to 2005

Type of workers		Employment (millions)				Annual growth rate (percent)			
		1983	1993-94	1999-2000	2004-05	1983 to 1993-94	1993-94 to 2004-05	1993-94 to 1999-00	1999-00 to 2004-05
Rural	Male	153.9	187.8	196.7	219.0	1.91	1.41	0.78	2.17
	Female	90.6	104.7	104.0	124.0	1.39	1.55	-0.11	3.58
	Total	244.4	292.5	300.7	343.1	1.72	1.46	0.47	2.67
Urban	Male	47.2	64.6	77.0	90.4	3.04	3.10	2.98	3.25
	Female	12.2	17.2	19.0	24.0	3.36	3.08	1.65	4.82
	Total	59.4	81.8	96.0	114.4	3.10	3.10	2.70	3.57
Total	Male	201.1	252.4	273.8	309.4	2.19	1.87	1.37	2.48
	Female	102.7	121.9	123.0	148.0	1.64	1.78	0.15	3.78
	Total	303.8	374.3	396.7	457.5	2.01	1.84	0.98	2.89

Source: *Growth of employment (1993-94 to 2004-05); Illusion or Inclusiveness?* by J Unni and G Raveendran, EPW, Vol. XLII No.3, January 20-26, 2007. Draft National Policy for Women in Agriculture, April 2008; National Commission for Women.

Stability and Vulnerability

2.15 Agricultural production and farm incomes in India are frequently affected by natural disasters such as droughts, floods, cyclones, storms, landslides and earthquakes. The vulnerability of agriculture production to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides and price crashes. All these events severely affect farmers through lost production and farm income, and it is beyond their control. Small resource poor farmers who are food insecure

and nutritionally compromised are particularly vulnerable. With the growing commercialization of agriculture, the magnitude of loss due to unfavourable eventualities is increasing. The risk and threat from trans-boundary plant, animal and fish pests and diseases has increased recently. The country has witnessed outbreaks of avian influenza and there is a looming threat from plant rusts. Global warming and climatic change are also seen to be posing a threat to stability of farm production though the exact nature of climate change and its likely effects are not yet known. Mountain and coastal areas

are considered to be more vulnerable to climatic change.

Rising Pressure on Land

2.16 The lack of a sizable shift of the labour-force from agriculture to non-agriculture activities means that the land to labour ratio in India has been worsening over time. During 1980-81 one worker depended upon 0.94 hectare of land for employment and livelihood, which had shrunk to 0.60 hectare by 2001. As the number of workers in agriculture is growing there is further reduction in the land to labour ratio. Since the beginning of the era of planning, India's policy makers have tried to reduce economic dependence on land based activities; however this has not been successful. It is a big challenge for India to shift cultivators and agricultural labourers to non-farm employment.

Food and Nutrition Security

2.17 Food and nutrition security in India continues to be seen as an issue of an adequate supply of rice and wheat in the country. The country sees itself as food secure as long as these two food staples are available, their prices are stable and there is a sufficient quantity in government buffer stocks. Much less attention is paid to the nutritional aspect of food security. More than 20 percent of the population in the country does not eat enough food to meet their minimum daily energy

requirement. Even though per capita income in India has increased by 225 percent during the last two decades, it has not resulted in an improvement in basic nutrition in terms of energy intake (Table 2.5). On the contrary, there are reports of increase in number and proportion of population that did not consume even minimum required energy⁹. A low intake of energy has long term health implications. India needs to address two serious challenges in food security; firstly, to reduce the proportion of the population below the minimum threshold of calorie intake; and secondly, to increase per capita energy intake.

2.18 The progress in reducing protein-energy malnutrition is also quite slow. In 1998-99, according to National Family Health Survey-2 (NFHS-2), as much as 36 percent of the adult population of India had a body mass index (BMI) below 18.5 (the cut-off for adult malnutrition); eight years later (2005-06) that share had barely fallen to 33 percent of the population, despite a decade of robust economic growth. Similarly, the share of the under-weight children under-three, in the total child population under-three, had not fallen at all (47 percent in 1998-99 and 46 percent in 2004-05/06). There is a need to look at food security issues not in isolation as being confined to cereal production and consumption, but to examine how nutritional outcomes can be improved for the vast majority of the poor through adequate intake of the quality of food

TABLE 2.5: Per capita intake of calorie and protein

Survey Details	Calorie (Kcal/day)		Protein (gram/day)	
	Rural	Urban	Rural	Urban
1983 (NSS 38th Round)	2 221	2 089	62.0	57.0
1993–94 (NSS 50th Round)	2 153	2 071	60.2	57.2
1999–2000 (NSS 55th Round)	2 149	2 156	59.1	58.5
2004–05 (NSS 61st Round)	2 047	2 020	57.0	57.0

Source: NSS Report No. 513, *Nutritional Intake in India, 2004–05* (Quoted in *Sector Paper on Food & Nutrition Security and Food Safety from Consumers Perspective in India* by Vijay Sardana).

in terms of proteins, fats and essential micronutrients – vitamins, minerals and trace elements.

Food Safety

2.19 Food safety and quality have suffered in India due to many reasons. The country did not have a strong food law and there continues to be inadequate regulations and standards, inspection services, laboratory services and education and awareness on various aspects of food safety and quality. Responsibility for food safety is sometimes divided among several agencies with overlapping authority. No comprehensive regular monitoring programme is being conducted in the country. Producers and support services are not sensitive towards food safety and hygiene and food safety issues are ignored because public service departments are not in position to deliver the basic infrastructure like clean water and handling facilities. Food testing facilities are not within the reach of consumer groups and consumers. The credibility

and accountability of the food safety enforcement system is very low and food safety surveillance mechanisms and contaminated food recall systems are also missing.

2.20 The production of safe food requires all those involved along the food chain to recognize that primary responsibility lies with those who produce, process and trade in food. Food safety and quality depends on the way food is grown or raised, to how it is collected, processed, packaged, sold and consumed. One weak link can mean the whole food chain collapses. Stakeholders include farmers, fishermen, slaughterhouse operators, food processors, transport operators, distributors (both retail and wholesale) and consumers, as well as governments obliged to protect public health. This necessitates a food chain approach from farm to fork.

2.21 In order to address complexity and to upgrade food safety and quality standards, an integrated food law has

been enacted recently. The Food Safety and Standards Authority of India (FSSAI) has been set up to strengthen the food quality and standards services. It is the mandate of the new Food Safety and Standards Authority to establish and improve regulatory frameworks for food control and quality assurance compatible with international requirements, based on scientific principles, and to supply technical advice and expertise for the development of integrated food control systems. The major challenges in this area are (a) to strengthen and create capacity and infrastructure to develop, monitor and implement norms and standards (c) to create awareness among various actors in food chain and (d) to provide R&D backup.

2.22 Food safety and quality have become increasingly important in international trade over the last few years. The inclusion of international food standards in the WTO's Agreement on Sanitary and Phytosanitary Measures (SPS) and the Agreement on Technical Barriers to Trade (TBT) requires countries to harmonize their food safety and quality standards with the Codex Alimentarius and to participate more effectively in the setting up of international standards. These standards are also to be applied on the food products exported.

2.23 Safe food production agenda is not getting enough attention in the country. As a major agriculture based economy, use of agro-chemicals is common practice

in food production. The use of pesticides in India is one of the lowest in the world. India uses a low amount of 0.5 kg/hectare pesticide compared to 7.0 kg/hectare by USA, 2.5 kg/hectare by Europe, 12 kg/hectare by Japan and 6.6 kg/hectare by Korea⁴. However, despite the low consumption of pesticides, India has more problems of pesticide residues compared to other countries. These residues are found in food products and underground water, in part because of improper use of the pesticides in agriculture, and the inadequate waste disposal by the local chemical industry. There is a need to raise awareness about good agriculture practices, increase R&D on safety aspects of food production and regulate and control the safe disposal of chemical industry waste.

Policies and Perceived Gaps

2.24 Policies for growth and development of agriculture and its subsectors cover a large number of areas like (a) prices (b) marketing (c) trade (d) land tenure (e) farm credit (f) agricultural R&D (g) investments and subsidies (h) technology dissemination (i) legal and regulatory framework and (j) production enhancing programmes, including technology transfer, awareness raising and capacity building.

Price Policy

2.25 The main goals of this intervention have been to provide price assurance

to producers through the system of Minimum Support Prices (MSP) that are implemented through obligatory procurement, maintaining inter and intra year price stability through open market operations, maintaining buffer stocks and distributing foodgrains at reasonable prices through public distribution system. Although MSPs are announced for many commodities, its effective implementation is limited to paddy, wheat and cotton in regions where these are traditionally in surplus and where these crops are procured by official agencies. Sugarcane has also benefited from guaranteed prices through the system of statutory minimum prices and state advised prices. A large number of crops and a large number of states are not covered under implementation of MSP. It is common to find that prices received by the farmers are much lower than the MSP in crops and in markets in various states where MSP is not supported by effective procurement. Only recently, procurement of cereals has been extended to low productivity regions having large potential such as the states of Bihar, Uttar Pradesh, Orissa, Assam and Chattisgarh. Initial indications are that production has started responding to the signal of price assurance in these states.

2.26 Government intervention in foodgrain markets has discouraged private investment and development of value chains in these markets. As a result, the scale of operation remains low and infrastructure in foodgrain

markets remains poor. This has affected competition and the efficiency of marketing.

Marketing and Value Addition

2.27 Agricultural marketing policy primarily includes the framing of rules and regulation for the smooth functioning of markets, the protection of certain interest groups and provisioning of physical and institutional infrastructure. The former includes bringing agricultural markets under public control by establishing regulated markets in the country and the passing of various acts governing movement, storage, processing, sale or purchase of farm produce. All transactions and the conduct of a regulated market are guided by the provisions of the Agricultural Produce Market Regulation Act (APMRA), which is amended from time to time.

2.28 The APMRA mandates that the sale or purchase of notified agricultural commodities is carried out in the market area, yards or sub yards provided for in the Act. The establishment of regulated markets is in general found to improve the functioning of assembly markets for agricultural produce and the integration of production points with markets. The primary criticism of the APMRA is that it granted marketing monopoly to the state and prevented private investments in agricultural market, and that it restricts the farmer from entering into direct contract with any processor / manufacture / bulk

processor as the produce is required to be channelled through regulated markets. In order to overcome these problems, the Ministry of Agriculture prepared a Model Act in 2003 for agricultural produce marketing which can be used by state governments to prepare their individual act. Under the Model APMC Act the private sector can be licensed to set up markets. The model act also allows for contract farming and direct marketing by private trade. Barring a few, states and union territories have adopted either fully or partly the Model APMC Act. Several other initiatives have also been taken to improve the standards and to liberalize agricultural markets.

2.29 As a result of the implementation of the Model APMC Act and other initiatives, the direct purchases by the private sector from farmers and contract farming have seen a large growth in many parts of the country. This has paved the way for private investment in agrifood marketing for establishing supply chain networks with direct links between farmers, processors and other agrifood firms. The resulting vertical coordination in the food and agribusiness sector is expected to change the face of agricultural marketing in India.

2.30 New institutional arrangements, especially farmers' groups, cooperatives and producer companies, and consumer organizations are now emerging in several parts of the country. They are integrating small farmers into the market by removing various bottlenecks.

Similarly, the corporate sector is using the contract farming model for meeting its requirements for retailing, processing or export purposes. The area covered under contract farming is so far mainly confined to the states of Tamil Nadu, Punjab, and Orissa. This institutional arrangement however is picking up across the nation. The main companies involved in contract farming are Hindustan Unilever, WIMCO, Pepsi, Food Pro, NDDDB, Maxworth Orchards, Cadbury India, BILT, ITC, JK Paper, AV Thomas, Reliance, Agrotech, Godrej Agro, United Breweries, DCM Shriram, Markfed, L&T, and Escorts.

2.31 Organized retailing in India has seen steady growth during the last decade; this has been pushed by rapid urbanization, growth in urban population, increased income and consumer spending, changed lifestyle and access to technology. Food World (of the RPG group) has been the leader among the organized food retail chains and there are many more retailing agencies like 'FabMall', 'Monday to Sunday', 'Family art', 'More for you', 'Heritage' etc., operating in the country. Most food chains are regional in nature, having one or two food retail outlets in a particular city without extensive presence outside the region. Despite several factors favouring organized retail trade, it is still in a nascent stage in the country. Factors such as well-established traditional retailers, costly real estate, government policies and consumer perception and purchase behaviour, multiple layers of taxation are found to be limiting the growth of food retail chains.

2.32 Notwithstanding all recent initiatives to change the face of agricultural marketing, value addition (particularly at farm gate) is very low on account of poor connectivity, non- scientific post harvest handling, unorganized marketing, and a knowledge deficit on grading, packaging, sorting, pre-cooling etc. among stakeholders. The lack of mobile and common infrastructure for post harvest management is another gap. Capacity building of people engaged in agro-processing is needed in terms of market intelligence, processing, marketing, and trade practices. Research and development efforts particularly on quality assurance and packaging are weak. There is also considerable scope for value addition by making economic use of crop wastes and biomass and parts of fallen animals that go to waste in the countryside.

Trade

2.33 Since the removal of restrictions of agriculture trade in the mid 1990s, India's agricultural exports have steadily increased. The ratio of export to GDP has increased from 7 percent during the mid 1990s to more than 10 percent during 2007-08. Export promotion policies like Agri Export Zones and efforts made by institutions like APEDA, MPEDA have also played an important role in this.

2.34 While India suffered setbacks in the export markets of traditional commodities like spices and tea, it has succeeded

in exporting more livestock products, fruits, floriculture products and fish products. However, India's share in global agricultural trade continues to remain low and it has not fully tapped its advantages in the export of commodities like dairy products, meat, fruits, vegetables, and medicinal plants. India has also not taken advantage of new export demand in organic products and attribute based products.

2.35 The major constraints to export are poor infrastructure (transport, cold chain, packaging, port facilities, food processing plants) and lack of good hygienic practices in the entire food chain. Awareness, facilities and regulation for food safety, quality testing and certification, protocols of international standards and conformity with SPS requirements are very weak.

Farm Credit

2.36 Since the nationalization of scheduled commercial banks in 1971, India has taken several steps to enhance the supply of institutional credit to the farm sector. Besides these banks, regional rural banks and different tiers of cooperative credit institutions also serve the credit needs of the agriculture sector. Further, the National Bank for Agriculture and Rural Development was created as an apex institution by an Act of Parliament in 1982 for facilitating credit flow for promotion and development of agriculture. It also has a mandate to support all other allied activities in rural areas, promote integrated

and sustainable rural development and secure prosperity of rural areas.

2.37 Between 1980-81 and 2005-06, the supply of short term credit in nominal terms increased more than fifty times while medium and long term credit increased by more than 55 times. As a result, the credit to output ratio for the agriculture sector increased from 8 percent to 26.5 percent. Even with this progress in the flow of institutional credit to agriculture, its share in total credit for cultivator household was 61.1 percent in 2002 as per the decennial All India Debt and Investment Survey (AIDIS). Further, the findings of the National Sample Survey Organisation (NSSO) 59th Round (2003), revealed that only 27 percent of the total number of cultivator households received credit from formal sources. This calls for initiating measures to check the financial exclusion of a large proportion of small and marginal farmers from the institutional financial system. Another serious problem with institutional finance is that the flow of agriculture credit has not been uniform across states and regions. Even within states, there are sharp differences between the credit flow to developed regions, regions with greater access to physical infrastructure or regions closer to urban centres as compared to underdeveloped districts or regions.

Investments and Infrastructure

2.38 The government has played a leading role in creating core infrastructure

such as major and medium irrigation projects, rural roads, rural electrification, setting up of agricultural markets. However, the beginning of the 1980s witnessed a significant change in policy of resource allocation to agriculture. It marked the beginning of decline in public investment in agriculture and a sharp rise in subsidies to the sector. From 1979-80, public investment in agriculture failed to keep pace with the growth of GDP in the agriculture sector and declined in real terms. In the early 1980s more than 3.5 percent of agricultural GDP was used as public investments. It gradually fell to below 2 percent around year 2000. This caused significant adverse effects on the growth of the agriculture sector^{5, 13}. Recognizing the importance of public investments for the sector, the government has taken steps to reverse the declining trend. Since 2004-05 public investments have increased every year. It is proposed to raise the level of public investments to 4 percent of GDP agriculture by the end of the Eleventh Five Year Plan, i.e. by the year 2011-12.

2.39 Well funded schemes to create or maintain rural infrastructure, including the Rural Infrastructure Development Fund (RIDF) and the Accelerated Irrigation Benefit Programme (AIBP), have either been launched or re-launched. An interesting innovation is the launch of a new scheme to repair, renovate and restore all the water bodies (lakes, tanks etc.) that are critical for irrigation. A very ambitious infrastructure development programme to boost the agriculture

sector in the rural areas has been launched in the form of Bharat Nirman. One serious problem with infrastructure created through public investments is its maintenance. Due to poor maintenance and upkeep, benefits derived from infrastructure have turned out to be much lower than expected. Resource constraint is the main reason for poor maintenance and neglect of rural infrastructure as the ultimate users either do not have to pay or pay much less than the true cost of services. This is best illustrated by the current charging regime for water and power used in agriculture.

Agriculture R&D and Technology Dissemination

2.40 Public sector research and extension agencies continue to dominate knowledge generation and management provision for agriculture in India. The private sector, especially input companies and agro-processors, have become important producers and promoters of new knowledge in the last two decades. NGOs have also expanded their involvement in agriculture, from promoting technical knowledge to generating knowledge of technology, institutions and policies relevant for agriculture.

2.41 Public sector research in agriculture comprises the Indian Council of Agricultural Research (ICAR) and its network of about 100 Institutions and 41 State Agricultural Universities (SAU) and their regional stations. The Central

Government funds ICAR while the State Government supports SAUs in their respective states. Over the years, the share of the Central Government has increased and it now contributes nearly half of the total public funding of agricultural research. The private sector contributes only a small fraction (10 to 15 percent) of the total funding; this is mainly for in-house R&D activities¹⁰. Government budgetary support to agricultural research in real terms has steadily increased, although it is still considered quite low. India currently spends around 0.33 percent of agricultural GDP on agricultural research.

2.42 The main challenge in R&D related to agriculture has been to improve the linkage between research and extension and to reform the system to improve the relevance, accountability and efficiency of public research organizations. These reforms entail decentralization, devolution of power, provision of consultancy and contractual research for better linkage with clients, research planning in an eco-region and production system perspective¹⁰. ICAR has implemented many of these reforms as a follow-up to implement recommendation of various committees that have gone into these aspects. Some of the reforms have also been affected through National Agricultural Technology Project and National Agricultural Innovation Project, both funded by World Bank. However, the SAUs have been slow in implementing these reforms. Another serious challenge faced by SAUs is the

decline in support from respective state governments.

2.43 In the public sector, the extension machinery of the State Department of Agriculture (SDoA) reaches down to block and village levels. The village extension workers of the SDoA continue to be an important source of information for farmers in India, even though the visits are irregular, and the service is pre-occupied with the implementation of government schemes, often linked to distribution of subsidies and inputs. Compared with the SDoA, the animal husbandry and the fisheries departments do not have adequate field level presence. Advisory services in the area of animal husbandry and fisheries therefore do not reach many farmers. About 22 percent of the posts across agriculture and allied departments remained vacant in 2005-06. Since 2004, a call centre based extension service has been set up wherein farmers can call on a toll free number for farm advice.

2.44 In the case of extension, the major reform in recent years has been the establishment of a district level coordinating agency, the ATMA (Agricultural Technology Management Agency), initially in 28 pilot districts in seven states with support from the World Bank. The ATMA model was subsequently upscaled (since May 2005) across the country as a centrally sponsored scheme.

2.45 Though there is an increasingly diverse mix of actors currently engaged in

knowledge generation and management, this has not resulted in better knowledge use or application at the ground level.

It is widely accepted that linkages between the laboratory and the field have weakened and public extension by itself can no longer respond to the multifarious demands of the farming community. Therefore, public-private partnerships need to be promoted for disseminating technologies developed by research institutes at the field level. Alternative institutional models like the Farmer Clubs promoted by NABARD and alternative approaches based on ICTs such as the 'e-chaupal' system, are illustrative in this regard.

2.46 Sustained long run growth depends critically on technological progress and steps are therefore needed to strengthen research and extension support in agriculture. Although the potential of already available technologies is higher than actual farm productivity, this can only help in raising production for the immediate future. Technology frontiers have to be moved further to sustain future growth. This would need increasing application of biotechnology, bio-informatics, ICTs, renewable energy technologies and nanotechnology. The need for strengthening public sector research capacity in employing such new generation science and technologies is more relevant than ever before due to changing ownership rules on new technologies. If the public sector in India does not generate new technologies and

claim intellectual property rights on such technologies, the country risks becoming dependent on developed countries and the private sector as sources of new technologies.

2.47 While the need for integrating different kinds of knowledge in the process of technology generation and promotion are clearly evident, there is an overall reluctance among the public research and extension organizations to work with CSOs and the private sector. Many of the successful experiences emerging from informal R&D facilitated or conducted by civil society organizations remain unnoticed for want of support systems and incentives required for its upscaling. A key lesson from the implementation of the NATP is that deliberate investments in partnership building and shared governance are required to speed up technology adaptation and dissemination.

Policies toward Agricultural Diversification

2.48 As the green revolution technology improved self sufficiency in foodgrains, the policy focus turned towards diversification and broad based growth which is sometimes also termed as the “rainbow revolution”. It includes emphasis on raising production of fruits and vegetables, livestock, and fishery. This shift in policy focus was necessitated by trends in demand which were showing much higher growth rate in livestock

and horticulture products as compared to cereals. The livestock sector started growing at a much higher rate than the crop sector from the early 1980s while fruits and vegetables started showing the highest growth among all segments of agriculture in early 1990s. To support this diversification the Government of India has already declared the horticulture industry as a priority area and is providing a number of fiscal incentives. Financial incentives for promoting horticulture were started in the Eighth Plan which was followed by launching of the Horticulture Technology Mission (HTM) for the Northeast (subsequently covering all hill states in the Western regions also) and the National Horticulture Mission (NHM). These programmes supported setting up of plant nurseries, new plantations of various horticultural crops, rejuvenation of old orchards, and creation of infrastructure like pack houses, cold storages, and markets.

2.49 For improving marketing efficiency and augmenting modern storage, handling and transportation infrastructures, special schemes have been formulated by National Horticulture Board, APEDA and others. Overall policy regime for horticulture has been liberalized and specific incentives have been provided for high priority food processing sector. Major policy initiatives taken in the recent past are:

- a. Industrial licensing requirement for most of the food processing sector has been removed.

- b. Automatic approvals for foreign investments up to 100 percent permitted in food and beverage, except alcohol.
- c. Import of capital goods and raw material for 100 percent export-oriented units allowed at zero duty.
- d. All profit from export sales of processed food exempted from corporate tax.
- e. Many processed food items are totally exempt from excise duty.

2.50 Agri-Export Zones (AEZ) are being developed at 60 places for identified commodities, out of which 45 AEZs in 19 states focus on horticultural crops. Horticulture remains a flagship sector in agriculture in the post liberalization period. The major constraints in further progress of this sector are low processing capacity, poor post harvest infrastructure, absence of organized value chains and weak linkage between market and small holders¹⁷.

Area Specific Programmes

2.51 Even after massive investments in irrigation more than 60 percent of the arable area in the country remains rainfed. These areas have suffered more from the post mid 1990s slowdown than irrigated areas. Achieving improvements in agricultural productivity and livelihoods are also more challenging in these areas. These areas require a holistic approach for land and water management that harness synergies in

natural resource use, crop and livestock production, and various government, non-government and community based institutions. The central government constituted a National Rainfed Area Authority (NRAA) in 2006 for holistic development of rainfed areas. The NRAA has a very wide mandate to work and coordinate with the key ministries to promote development of rainfed areas by raising productivity.

2.52 Some of the rainfed regions in India are chronically drought prone and some regions get relatively high and assured rainfall. This would require NRAA to develop totally different strategies for different regions. NRAA could also introduce changes in law to restrict the individual's right to extract unlimited amounts of water from under one's plot, and vesting the right to regulate access to and use of groundwater and its pricing with village communities. A farming system approach that integrates crop, livestock, agro-forestry, and horticulture and watershed development approach is considered vital for holistic and sustainable development of rainfed areas. Different Ministries are involved in various programmes in rainfed areas. Convergence of these programmes at the watershed level would help in raising agricultural productivity.

Livestock Development

2.53 The livestock sector has shown better performance than crop sector

in both production and trade. The sector holds vast potential for increase in productivity and production and importantly providing livelihood opportunities to the poor. The challenges in this sector are improvement in herd quality such as selective breeding utilizing better quality indigenous stocks, harnessing quality traits of indigenous breeds, elimination of unproductive animals, improvement in feed and nutrition, and health and disease management. A major step-up in infrastructure and policy support, a comprehensive disease control programme including for small ruminants, poultry and pigs, are required. The needs of this sector also link to those of food safety and value addition.

National Forest Policy and Resources

2.54 India's National Forest Policy 1988 deals with almost all aspects of forests. The policy assigns highest importance to environmental functions of forests including conservation of biological diversity, soil and water. This great heritage is, however, under threat not only from unplanned collection, but also from rampant grazing, fire and trampling by animals. According to a recent estimate of Forest Survey of India, forest regeneration, in general, is lacking in more than 50 percent of forests of the country. Nearly 1 73 000 villages (about 28 percent of the

total) are located along the forest fringe. Forests support grazing of nearly 60 percent of the livestock (270 million out of about 450 million) and provide firewood to most of head loaders for sale in the market. The forest dwellers are among the poorest of the poor and depend significantly on forests for their livelihood. Their sustainable development is a major challenge to the sector and the nation.

2.55 On account of limited forest area and growing demand, the supply of timber is progressively falling short of requirements. In respect to industrial wood, the deficit in the year 2000 was of the order of 29 million cubic meters. This is expected to exceed 43 million cubic meters by the year 2020¹¹. The withdrawal of fuel wood from forests in the year 2000 was estimated at 86 million tonnes annually against the sustainable level of 17 million tonnes¹⁴. Public forests cannot meet demands for various forest products and they cannot sustain the rising pressure of demand for fuel wood, grazing, etc. Therefore, there is a need to meet such demand from forestry outside public forest and from agriculture.

2.56 Though the extent of forest land in the country is 77.5 million hectares, satellite data of 2002 indicate a green cover of only 23.7 percent. This indicates a scope to raise production of wood and other forest products in the country. Considerable scope also exists to raise productivity of grasses and other fodder in the public forest.

Fishery Resources

2.57 Development programmes in fisheries and aquaculture focus on enhancing the production of fish from the Indian waters, both marine and inland, on an environmentally sustainable and socially equitable basis, strengthen infrastructure in harvesting, post harvest value addition and marketing, uplifting of fisher and aqua-farmer communities with gainful employment opportunities, and capacity strengthening. Various schemes related to the fishery sector exist under two umbrella schemes, i.e. (a) development of inland fisheries and aquaculture, and (b) development of marine fisheries, infrastructure and post harvest operation.

2.58 The inland macro scheme covers all aspects related to inland fisheries such as reservoirs, lakes, canals, rivers, aquaculture in ponds, brackish water area and use of waterlogged areas. The scheme envisages encouraging leasing of water areas, expanding aquaculture by construction of new ponds, creating a cadre of trained fishers, popularizing shrimp/fish farming, utilizing available brackish water land for brackish water aquaculture and providing suitable technology packages for promotion of cold water fisheries. The emphasis is to increase fish production in inland waters as well as to involve Fish Farming Development Agencies (FFDA) and Brackish-water Fish Farming Development Agencies (BFDA's) for the

development and delivery of sustainable aquaculture throughout the country.

2.59 The development of marine fisheries, infrastructure and post harvest envisage improving production and productivity in the marine fishing and thereby improving food security, export earning and the livelihood of coastal fishing communities.

2.60 The deep sea fisheries resources are poorly exploited. There are about 490 vessels operating against recommended 725 vessels for sustainable exploitation of harvestable resources of 1.36 million tonnes. Therefore, the Government of India has introduced a scheme for the introduction of resource specific deep sea fishing vessels. There is also an emphasis on improving minor fishing harbours and providing new landing centres as well as new model retail fish markets in the Eleventh Plan.

2.61 A major initiative in the fishery sector is the establishment of a National Fisheries Development Board (NFDB) in September 2006 with its headquarters at Hyderabad. NFDB has initiated various development activities such as intensive aquaculture in ponds and tanks in ten states, establishment of hatcheries for fish seed production in three states, assistance for imparting training to beneficiaries in 26 states, financial assistance for development of reservoirs in eight states. Other activities undertaken are establishment of a feed

mill for trout feed in Jammu and Kashmir, seaweed cultivation, coastal aquaculture and improving the quality of fish by establishing fish dressing centres and solar dryers.

2.62 Due to poorly regulated fisheries, the sector is facing biodiversity loss and depletion of stock. Water quality and quantity, neglect of traditional water bodies and collapse of traditional fish and water management institutions are serious issues in inland fishery.

Centre State Dichotomy

2.63 According to the Indian Constitution, agriculture (including higher education and agricultural marketing) is a state subject with the Ministry of Agriculture at the Centre laying down the major policy guidelines. Significant resources flow from the centre to the states for various development activities. These constitute useful means to persuade the states to follow policies and strategies that are consistent with national objectives and goals. The Union Government initiates planning processes and the Centrally Sponsored Schemes (mostly on matching funds basis), there is hardly any conflict between what both the centre and the states desire to achieve and the strategies

they profess to follow. The states however, struggle on occasion to provide matching funds because of their straight-jacketed financial position. Similarly, the central government substantially influences research, education and extension activities at the state level through research activities, overseeing agricultural education (ICAR), designing and financing and monitoring several central sector extension and development programmes and laying down all major policy guidelines. There are in-built mechanisms in the system to involve the states and to take their viewpoint in what is proposed at the national level.

2.64 In order to address state specificity and to provide flexibility to the states in different development schemes, a special mechanism in the form of the Macro Management Scheme was started in the year 2000. The Macro Management approach is meant to overcome the problems due to the rigid uniformity in centrally sponsored schemes, and accord greater flexibility to state governments to develop and pursue activities on the basis of regional priorities. It is thus, a major step towards achieving decentralization in pursuance of restoring primacy of the states in agricultural development planning.

3 THE COMPARATIVE ADVANTAGE OF FAO IN INDIA

3.1 India is a founder member of FAO and participates actively in the governance of the organization. This partnership has benefited both FAO and India. FAO is widely known in India as it has played a catalytic role in India's progress in the areas of crops, livestock, fishery, food security and in the management of natural resources. Experts from India have served in important positions in FAO Headquarters, regional and country offices and in executing FAO projects in various countries. They have been members of scientific experts' meetings related to food safety. FAO publications and its reports on emerging issues and information available at its website are very popular among different sections of society in India. There is a particular appreciation for the role of FAO in sensitizing national and international communities on different aspects of food and nutrition security and in highlighting the plight of poor, hungry and vulnerable people, as well as in food safety. This imparts a comparative advantage to FAO in the country in terms of its image.

3.2 FAO has high level expertise in many areas of food and agriculture and it has global reach through its active presence in a large part of the developing world. Another advantage of FAO is its credibility as UN agency and its unique advantage as a neutral adviser in technical and policy matters.

3.3 Given the size and diversity of India, the value of FAO in the country does not reside in undertaking large or mega projects and activities to address national concerns *per se*. India has reached a certain stage of development in most fields of agriculture and it is launching big initiatives to harness the potential of existing and new technologies. However, India will need higher order global expertise to address emerging needs and access to best practices in programme design and implementation to resolve some of the problems in agriculture. It was noted in Chapter 1 (paragraph 1.9) that systematic improvements in governance and implementation are needed to obtain the results expected from centrally sponsored government schemes; FAO can provide independent advice on technical and implementation issues. It is suggested that FAO can play a catalytic role based on its comparative advantage in the following thematic areas:

- a. High quality technical assistance and capacity building.
- b. Piloting innovative approaches in critical areas.
- c. Multilateral collaborations on trans-boundary problems.
- d. Harnessing Indian expertise for other developing countries.
- e. Advocacy and a neutral adviser and broker.

High Quality Technical Assistance and Capacity Building

3.4 FAO is highly regarded as a knowledge organization by all stakeholders in India. They generally expect FAO to provide high quality technical assistance to meet the niche gaps that Indian organizations may have, in particular on emerging issues. Before committing to deliver such advice a cross check was made with the technical divisions of FAO to determine their perceptions of the comparative advantage to them in meeting the expectations of India.

3.5 The Forestry Department considers that its strengths lie in facilitating the development of a network of strategic thinkers and planners in the forest sector at the national and state levels who could improve the strategic planning capacity of the central and state governments. Such a process would create opportunities to understand the larger social and economic changes, their implications on the forest sector and how the sector may respond to the emerging challenges.

3.6 In the fishery and aquaculture sector FAO is of the view that its greatest capacity lies in advising state governments regarding aquaculture and fishery sector development policy. They can bring international experience related to trade and food safety for fish products and expertise in the development of,

and compliance with, international agreements.

3.7 FAO is essentially a knowledge management organization and as a result it has developed expertise in the development of information and communication services. The Knowledge and Communication Department has a high level of expertise in the development of methods and tools for organizing agricultural knowledge resources and it is currently providing support to India.

3.8 The FAO Law Development Service is unique in the UN system and brings knowledge and expertise on the drafting of legislation on agricultural issues. When this is combined with detailed technical expertise on a particular topic, FAO can deliver support to federal and state level legislators that are not replicated elsewhere.

3.9 In the livestock sector, FAO has significant comparative advantage in pro-poor livestock policy analysis that has been developed through a recent global programme and a South Asia hub that covers three countries from its base in India. It also has capacity in animal productivity improvement that is relevant to India. The capacity of FAO to assist with trans-boundary animal diseases is addressed in paragraph 3.16.

3.10 FAO has unique experience, tools and methods to identify and address

pesticide related problems throughout the world. Pesticides differ from other chemicals in that they are designed to be toxic and are intentionally dispersed in the environment and onto food crops by largely untrained people. Farmers Field Schools (FFS) and IPM approaches could be strong tools in addressing not only this but also promoting sustainable production systems such as in pulses. The link between pesticide management and sustainable intensification of crop production as well as food safety and quality is clear and can only be fully supported by FAO as an organization concerned with a holistic view of food production.

3.11 Finally, FAO has significant capacity in cross-cutting issues that underpin development paradigms such as nutrition; gender; participatory processes; sustainable agriculture; and rural employment. FAO has certain comparative advantages in some of these areas ensuring specific gender components with regard to climate change, food security, water etc. India has a thriving NGO sector that has embraced and successfully applied many of the techniques, approaches and tools used in this work. It is anticipated that collaboration in this area of work would benefit both partners.

Piloting Innovative Approaches in Critical Areas

3.12 India has been the proving ground for innovative work by FAO in

groundwater management and in raising the performance of agricultural water management assets and institutions. FAO has won global recognition for its implementation and upscaling of local, decentralized groundwater management. FAO is also a regional leader in the area of irrigation management; it has led the design and application of an irrigation modernization programme (MASSCOTTE) which is now being expanded in a number of states.

3.13 The Land Tenure and Management Unit of FAO has cooperated with the World Bank on a number of state level activities in recent years. FAO has core capacities that complement those of the Bank and has an excellent working relationship with the Bank staff on this topic. FAO and the World Bank have significant comparative advantage in delivering support to innovative pilots on land tenure issues.

3.14 FAO can play a lead role in providing advice on the development of agribusiness and food industries, including aspects related to food safety and quality. FAO is the sole multi-lateral organization that has an official mandate to deliver services relating to public sector policies and regulations in the agricultural sector. Several other UN agencies have supportive roles (e.g. UNIDO, UNDP, ILO, UNCTAD) but cannot take the lead advisory role in food and agriculture. Several technical divisions across FAO can provide support on public sector policies to enhance private sector investment in the establishment of

well coordinated and modernized food industries that link to small scale farmers.

Multilateral Collaboration on Trans-boundary Problems

3.15 Solving trans-boundary problems such as those associated with climate change and plant and animal diseases is a classic global public good because no single country can solve such problems and it is only when the countries of a region or the globe come together that solutions may emerge. As a multilateral organization, FAO brings unique capacity to the delivery of global public goods in the food and agriculture sectors. This is particularly the case in fisheries and forestry where FAO is the only multilateral agency with a mandate in these sectors. Even where there are other multilateral actors, such as Office International des Epizooties (OIE) in the case of livestock, the actors have agreed on a demarcation of work and responsibility to eliminate overlap and waste.

3.16 FAO brings to this work its standing as a neutral adviser, specific technical expertise and experience in the application of ICT and geomatics (the discipline of gathering, storing, processing and delivering spatially referenced information) such that relevant data is available to support multilateral discussions. FAO has the capacity to continue to support India in this area of work and to draw on relevant knowledge

and experience from within India. FAO can assist India further with work related to avian influenza, the wheat rust UG 99, management of large marine ecosystems, foot and mouth disease and harmonization of food standards.

3.17 FAO maintains by far the largest and most comprehensive set of basic statistics in the areas of its mandate⁸. In pursuit of this work FAO has developed the capacity to guide and assist countries with the statistical systems for monitoring production systems as well as hunger.

3.18 FAO together with WHO provides the secretariat for Codex Alimentarius. FAO has unique comparative advantage in providing support for member countries to enhance their capacity to participate in the Codex Alimentarius Commission and to assist countries to develop food safety systems.

Harnessing Indian Expertise for Other Developing Countries

3.19 The strength of some individuals and institutions within India is a particular attraction to FAO and its other partner countries. Although India has participated in south-south cooperation initiatives with FAO in the past, the current thinking within government circles is that FAO does not add any value beyond that which their own missions can bring about on a bilateral basis. FAO can bring other

dimensions to this cooperation that have not previously been featured in work with India. These include: collaboration of Indian think-tanks with FAO work on regional trade agreements in the SAARC region, training in India on groundwater management and irrigation management for countries in Asia and linking laboratories and research centres into regional networks.

3.20 The FAO Investment Centre calls on experts from India to assist in its work in India and in other countries. The Investment Centre has significant comparative advantage in promoting greater investment in agriculture and rural development. Its primary advantage is the capacity to identify and formulate effective and sustainable agricultural policies, programmes and projects. It does this with funding from multilateral institutions such as the World Bank, regional development banks and international funds.

Advocacy and a Neutral Adviser and Broker

3.21 FAO has traditionally raised issues of food security, hunger and nutrition in the country by organizing World Food Day and encouraging civil society to participate in the malnutrition debate in the country. The Food and Nutrition Security community of “Solution

Exchange”, hosted by FAO India has been a very popular platform for the exchange of ideas on food and nutrition security and a large number of other issues concerning poverty, social welfare, effectiveness of nutrition interventions, organic farming, traditional knowledge and practices and many more aspects. This has indirectly contributed towards policy advocacy. The fact that India is not on-track to achieve MDG One and that it is moving in a negative direction on this goal reinforces the importance of renewed efforts. Moreover, new issues continue to arise which require strong articulation and advocacy. With strengthened support from HQ and RAP, FAO India would be in a good position to take a more proactive role in advocacy.

3.22 FAO has international reach and as a United Nations body it can facilitate theme focused collaborations between India and other countries in South Asia. This currently occurs in the context of avian influenza, fisheries management in the Bay of Bengal, the wheat rust UG99 and pro-poor livestock policy. Further opportunities exist to utilize the technical capacity and international credibility of FAO in the areas of food safety regulations, other cross-border pests and diseases and water management involving countries having riparian rights on international river systems.

4 MAPPING THE PRIORITIES OF INDIA TO THE CAPACITIES OF FAO

4.1 India seems to have reached a stage where the scope for conventional FAO projects is more limited as compared to the past, although in training, inter regional projects and areas like standards and statistics, it is still relevant. But more requirements - especially in the areas of knowledge sharing and information linkages - will emerge during the anticipated transition of the Indian agricultural economy. They will relate to increasing commercialization of agriculture, its sustainability and links with larger markets. They will be related to the diversification of the economy and will have inter sector significance. Newer institutional mechanisms in production and marketing apart from the state will be involved. Cutting edge technologies will have a compelling relevance, particularly in relation to India's renewable resource crises and large agricultural work force.

4.2 India will need higher order global expertise to adjust to the changes in and around agriculture and to address anticipated problems like climate change and energy stress. As the Eleventh Plan shows, agricultural policy making and planning will have to be undertaken with new mindsets. One of the objectives of the NMTPF process is to set up a mechanism and structure to coordinate FAO input to this process of policy change.

4.3 Given the diverse needs of Indian agriculture it is important to look at the comparative advantage of FAO in relation to specific sectors and aspects. In this chapter, the needs of India (Chapter 2) are mapped to the areas of comparative advantage that FAO has in working in India (Chapter 3). The outcomes presented below utilize the framework used in paragraph 3.3, namely the thematic areas of:

- a. High quality technical assistance and capacity building.
- b. Piloting innovative approaches in critical areas.
- c. Multilateral collaborations on trans-boundary problems.
- d. Harnessing Indian expertise for other developing countries.
- e. Advocacy and a neutral adviser and broker.

The needs of India have been drawn from the ten 'sector' papers (see annex 1) that were commissioned by FAO and which were the subject of a five day consultation workshop.

High Quality Technical Assistance and Capacity Building

4.4 FAO capacity in forestry should be applied to strengthen capabilities for

policy analysis and strategic planning at the national and state levels. It should also provide technical support to organizations at the grassroots level, build institutions and empower communities in the forested regions with the twin objectives of sustainable forest management and poverty reduction.

4.5 In the fisheries and aquaculture sector, FAO should support government programmes in the following areas:

- a. Animal aquatic health issues and development and implementation of suitable quarantine systems.
- b. Building capacity to analyse the impact of climate change and to develop adaptation strategies of both marine and inland fisheries.
- c. Improvement of small harbour management.
- d. Sustainable management of in-shore (including riverine and lacustrine) fisheries, and marine ecosystems.
- e. Formulation and production of safe fish feed.
- f. Fishermen's participation in seeding and sustainable fish management in streams, reservoirs and water bodies.
- g. Support to industry development initiatives to diversify production and markets.

4.6 The sector papers and the stakeholder consultation identified a large

number of areas under the banner of knowledge generation and management. The needs are reported in this section on technical assistance and capacity building, however some link to other thematic areas:

- a. Promote new ways of working (consortia, partnering with private sector and CSOs, ways of integrating technologies, integrated extension delivery etc.) through training and facilitated institutional learning experiments.
- b. Synthesis of best practices and preparation of documents to capture lessons learnt from Ministry of Agriculture initiatives in order to bring about convergence of various development and extension programmes at district and state levels.
- c. Support state level reviews of extension organizations and facilitate institutional reforms and capacity development.
- d. Training on client oriented programme design and learning based monitoring.
- e. Facilitate pilot innovations involving new sector coordination mechanisms that link farmers, research, extension, input agencies and output markets.
- f. Organize policy dialogues and consultations to support cross learning among major stakeholders.
- g. Support the efforts of National Agricultural Research Systems

(NARS) in enhancing access to new technologies by way of international expertise and linkages to different sources of new generation science and technologies.

4.7 Solution Exchange was noted as a valuable platform for the exchange of ideas on food and nutrition security and a large number of other issues (paragraph 3.21). This platform should be mainstreamed into the work of FAO in support of government programmes. This would provide Solution Exchange with financial stability, focus its discussions to specific programmatic needs and drive an expansion of language coverage that could help the membership grow and give greater regional relevance.

4.8 In the livestock sector FAO should support government programmes to:

- a. Upgrade skills and expertise in frontier areas of livestock science and technology - breeding, indigenous breed improvement, preservation of animal germplasm, animal healthcare and hygiene, nutrition, good management practices.
- b. Analyse potential impacts of climate change on the livestock sector and develop adaptation strategies.
- c. Conduct value chain analyses and risk assessments for selected livestock commodities and products especially those animals and birds

- d. Support for the comprehensive development strategies of small ruminants and piggeries as a potent livelihood option for poor people living in rainfed and marginal areas.
- e. Facilitate regional and global cooperation and help formulate action for trans-boundary animal pests and diseases, including national quarantine and bio-security umbrella (paragraph 4.11).

The crop sector in India is strongly influenced by government interventions such as the MSP scheme and its development is driven through national missions and the ICAR system. FAO should forge a strong working alliance with government programmes. FAO technical assistance and capacity building could include:

- a. Improvement in productivity of pulses - lentil, gram 'kabuli', cow pea, and cluster bean.
- b. Sustainable intensification of crop production, including facilitating conservation and utilization of germplasm.
- c. Build institutional capacity to implement regulations pertaining to the safe use of pesticides to protect users and consumers.
- d. Strengthen government programmes related to dry land agriculture

Large government development programmes are very often implemented without adequate monitoring and evaluation for mid course correction. FAO should bring both its own experience of monitoring and evaluation and best practices from other countries and sectors to help the implementation of government programmes that FAO might be associated with.

Piloting Innovative Approaches in Critical Areas

4.9 FAO is using a National Execution modality for projects on land and water that are very innovative and which address the most serious challenge that India faces in sustainable natural resource use. These innovative experiences, such as demand side groundwater management (APFAMGS project), irrigation water management and managing soil salinity in water logged canal commands (APWAM project) and capacity building for modernization and efficiency of irrigation systems (MASSCOTTE) should be replicated to the greatest extent possible. At the same time, the innovative approaches need to be extended to develop new means of managing agricultural water under climate change scenarios and improving water use efficiency.

4.10 Diversification and increased commercialization of agriculture and horticulture necessitates that small holders are linked to markets and that post

harvest processing and value addition is emphasized. Several government initiatives and organizations have been put in place to contribute to commercializing agriculture and horticulture. An underlying philosophy is to improve farmer returns and sustainable land management. However, further technical input and policy assistance by FAO is warranted in new and existing crop sectors. Although there are a number of notable innovations in India, such as the dairy cooperatives, 'e-chaupals' and modern contract farming, there remain a large proportion of small scale farmers who cannot access more remunerative markets. FAO should develop and pilot commercial models that can bring these farmers into formal value chains in both the agricultural and horticultural sectors. The agribusiness sector paper emphasized the importance of underutilized crops that may have significant market potential.

Multilateral Collaboration on Trans-boundary Problems

4.11 The global public goods delivered by FAO continue to be of relevance to India (paragraphs 3.1 to 3.22). The sector papers and stakeholder consultation reinforced the importance of continued investment in these. FAO should continue to support India to access global public goods related to crucial areas such as trans-boundary crop, livestock and fish diseases and pests, fishery management, germplasm conservation and

management, food safety, management of water resources in international river systems and climate change. Moreover, FAO should assist India, when necessary, to contribute to the development of these global public goods.

Harnessing Indian Expertise for Other Developing Countries

4.12 The issue of India contributing to the solution of problems in other countries did not emerge within the sector papers and the related consultation. This is not surprising, given that the focus was on the needs of India. Therefore the content of this thematic area must, at first, be driven by FAO. Chapter 3 identified that India has the ability to work with FAO to assist other countries in *inter alia* water and irrigation management, policy analysis related to regional trade agreements, agricultural research employing advanced technologies and formulation of agricultural investment proposals.

Advocacy and a Neutral Adviser and Broker

4.13 The debate and policy on food and nutrition security in India seems to

have arrived at a conclusion that a low level of per capita energy intake in the country is not a serious matter and no serious thought is given to increasing per capita energy intake in line with the increasing per capita income. This is a misplaced understanding of food and nutrition security that is having an adverse impact on household nutrition security. FAO has been raising the issue of food and nutrition security and its severity in the country not only on World Food Day but also through debate in the country. FAO should work with the government to sensitize public opinion to the importance of achieving total nutrition security and zero hunger. Particular attention should be drawn to the growing economic disparity between rich and poor.

4.14 There is little or no consensus on many major issues such as input subsidies, GMOs, climate change, marine management, land tenure systems, joint forest management, corporate management of forest resources, food safety nets, and the role of the private sector in agricultural research and extension. FAO should be prepared to respond to any request from the government to provide independent analysis of these.

5 CONCLUDING REMARKS

5.1 The food and agriculture system of India is vast, diverse and complex. The country also has a diverse institutional set up, a centre-state dichotomy, and multiple agencies involved in the same tasks with weak accountability. Despite the inherent difficulties of the scale of the country and its problems, India has achieved notable successes in agriculture. Foodgrain production has more than quadrupled since Independence and the green revolution while the white revolution brought about the supply of good quality milk to cities from thousands of small-scale rural milk producers through their own cooperatives.

5.2 During last one and half decades several new challenges have emerged in Indian agriculture. The growth rate of agricultural GDP decelerated during the mid 1990s to the middle of first decade of the new century. The actual growth rate of the sector remained below the targeted growth of 4 percent. On the other hand, the non-agricultural sectors of the economy have seen accelerated growth. However, this growth has not helped shift the workforce from agriculture to non-agriculture sectors. As a result, per capita income for the population dependent on agriculture is growing at a very slow pace and the gap between the rural and urban economies has expanded sharply. The situation has

now become so serious that the available land is neither able to provide a decent living nor improve the standard of living of those dependent on it.

5.3 The natural resource base on which agriculture relies is shrinking and land and water resources are degrading. Foodgrain self sufficiency, which was achieved through significant investment over the last four decades is also under threat. Per capita energy intake is deteriorating with 21 percent of the population not eating enough food to meet their minimum daily energy requirement; this is despite high growth in household income. Domestic produce is finding it hard to compete with imports and to succeed in export markets. Inter regional variation in agriculture productivity is high and has been rising. Food quality and food safety are becoming serious issues. Climate change, other natural events, outbreak of pests and diseases, and global instability are causing concerns to stability of agriculture. Post harvest management and value addition remain poor and markets are not very favourable for small holders.

5.4 The policy, institutional and technological response to ongoing changes in agriculture is slow and sometimes inappropriate or missing. This is hindering the harnessing of the large potential of the sector and a transition

towards demand led, market oriented, modern science centric diversified growth.

5.5 India has a large pool of trained manpower and expertise in different areas of agriculture and it is launching some large scale initiatives to address agricultural issues. However, the country still needs higher order global expertise to adjust to the changes in and around agriculture and to address anticipated problems like climate change and energy stress. The country can learn and gain from improved agriculture practices, models of integration of small farmers in the value chain and relevant success stories in other countries. Also, there are some problems like trans-boundary pests and diseases where India cannot act alone and where global or regional initiatives are required.

5.6 Compared to the challenges of Indian agriculture and the expectations of India, the resources available to FAO are very modest. Therefore, it is critical for FAO to make strategic choices to prioritize areas of work in which it has comparative advantage in relation to other players and to promote partnerships with other development stakeholders.

5.7 The main strengths of FAO in relation to India's agriculture are its technical expertise, international reach and active presence in many developing countries, and reputation as a credible UN agency. Based on these strengths and appreciating the needs of India, the

broad areas identified for FAO assistance in India can be grouped under three major components:

- a. **Component 1: Facilitate multilateral cooperation** to reduce the risk to food security and economic growth through greater participation by India in multilateral technical programmes. FAO could continue to support India to access global public goods related to crucial areas such as trans-boundary crop, livestock and fish diseases and pests, fishery management, food safety and climate change. Moreover, FAO should assist India, when necessary, to contribute to the development of these global public goods. Advocacy for food and nutrition security and the role of FAO as a neutral adviser on contentious issues would also be part of this component. FAO can support other countries to access centres of excellence within India and integrate these centres into the work of the organization.
- b. **Component 2: Support Government of India** to strengthen the implementation of national missions and specific programmes aimed at reducing poverty and achieving food and nutrition security. FAO could provide high quality technical assistance and capacity building from national and international sources to

transfer best practices, to learn from success stories from other countries and to build the capacity of government officers to design and deliver programmes, including reliable information management systems. FAO could also assist to improve local capacity to monitor, evaluate and undertake mid term corrections in large government programmes.

- c. **Component 3: Pilot innovative approaches** with government, NGO and private sector partners in agricultural and rural development. This has been particularly successful in groundwater and irrigation management and could be expanded to include the development of value chains involving small scale farmers and

fishers. Similarly, upgrading post harvest processes, value addition, and the use and application of ICTs in agriculture demand innovative approaches involving sectors beyond government. The success in groundwater management could trigger further pilot-scale work related to climate change adaptation.

5.8 FAO resources are extremely limited in relation to the requirement for implementing the proposed agenda. It is therefore proposed that the funds required to deliver Components 1 and 2 are provided by the Government of India through a Unilateral Trust Fund and that FAO and its local partners explore alliances with funding agencies for financing of Component 3.

ANNEX 1: THE SECTOR PAPERS

A1.1 FAO commissioned ten papers covering the following sectors:

Sl. No.	Sector Papers
1	Crop Production
2	Horticulture
3	Livestock
4	Fisheries and Aquaculture
5	Forestry
6	Water Management for Agriculture
7	Natural Resources Management
8	Food and Nutrition Security and Food Safety
9	Agribusiness
10	Knowledge Generation and Management

A1.2 The authors were required to:

- a. Scan and review documents published by major stakeholders in the sector.
- b. Analyse the programmes of the major stakeholders in the sector to identify the core development strategies paying particular attention to the centre-state dichotomy and private enterprise initiatives.
- c. Identify and document relative weaknesses, gaps, and implementation hurdles faced by the sector.
- d. Identify specific needs that FAO could contribute to in a manner that would complement existing programmes.

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GLOSSARY

e Choupal - It is an initiative of an Indian company ITC Limited to empower the farmers to access market information through internet and develop direct linkages for procurement of agricultural products like soybeans, wheat, coffee, and aquaculture products like prawns.

Kabuli - *Cicer arietinum* L. (Kabuli Group)





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