

AGRICULTURE FOR SUSTAINABLE DEVELOPMENT IN INDIA

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Abstract: Agriculture has been a way of life and continues to be the single most important livelihood of the masses in India. The country is the second largest economy in Asia after China, as measured in terms of its gross domestic product (GDP). The main objective of the study is to examine the role of agriculture in sustainable economic development of the Indian economy. India ranks among the top countries of the world with regard to production of food grains, fruits & vegetables, commercial crops, livestock and animal products. Agriculture has been acting as a driving force for our economy as it generates employment, national income, foreign exchange, food for people, feed for livestock, etc. However, since 1950-51, the focus of the successive governments on agricultural development has been declining which is evident from the declining budget allocated for agriculture and allied activities; from about 15 per cent during the first five year plan to a mere 3.7 per cent during the eleventh five year plan. Despite the struggle for growth without any preferential assistance, agricultural sector still provides employment to about 53 per cent of the total Indian population. The growth rate of agriculture including allied activities is 1.91 per cent and it accounted for 13.69 percent of GDP of the country in 2012-13. On an average the percentage share of agricultural imports and exports to total national imports and exports in 2010-11 was 3.50 percent and 10.47 percent, respectively. India's livestock sector is the largest in the world which provides milk, wool, hides, meat and also, draught power for farm operations. Such a vast number of livestock needs to be fed and agriculture is the source for it. The public sector investment in agriculture sector has been declining since 2004-05 as it was 21.27 per cent of the total investment which declined to 15.11 per cent in 2010-11. Contrastingly, private investment in this sector has been increasing during the same period. Sustained development can be assured through the fulfillment of basic needs of employment, food and shelter, for which agriculture plays a pivotal role. For agricultural sector to evolve and for sustainable

economic development, focus needs to be laid on substantial increase in public investment, agriculture research and development of rural infrastructure. Efforts are also needed to create strong research-extension-farm linkages. For this purpose, there must be promotion of farmers' organization groups. Thus, a complementary state cooperative strategy may play a key role to improve agricultural production and productivity. Appropriate agricultural policy, food procurement and distribution policy are needed for agricultural development. In addition, pricing of inputs such as seeds, chemicals, electricity and irrigation water must be controlled by the government. Farm subsidies should be rationalized and better targeted to benefit the small and marginal farmers. These subsidies are justified as they benefit not only small producers but the society at large. Efforts are being made to increase the crop intensity but emphasis also needs to be laid on making optimum use of dry lands which are about two-thirds of the total arable land. National policies should aim at and encourage the efficient use of rainwater for dry land farming which can be facilitated by constructing adequate infrastructure. This will facilitate agricultural development after centuries of stagnant agriculture, in the semi-arid areas. There is ample evidence that agriculture has both contributed to and been impacted by climate change. More research is needed to understand climate change in order to enhance the resilience of agriculture. Though agriculture plays a vital role in the economic development, the urgency to protect, sustain and develop it has been left in the hind side. All the sectors of an economy are important, but only a developed agricultural sector will lead to comprehensive growth. Revitalisation of cooperative institutions, improving rural credit system, reorganising research, human resource development, trade and export promotion, land reforms and education among masses are the fundamental issues for an all-round development of the economy and to build an egalitarian society.

Keywords: Agriculture; employment; role of agriculture; Indian economy and sustainable development

INTRODUCTION

The green revolution of the 1960s and 1970s which resulted in dramatic yield increases in the developing Asian countries is now showing signs of fatigue in productivity gains. Agriculture plays a crucial role in the life of an economy and is the backbone of our economic system. Agricultural development is a precondition of all the sectors of the economy as well as national prosperity. The model of green revolution was introduced in the selected regions of India during mid-1960s which was based on a set of measures aimed at technological transformation of primitive modes of production along with a set of compatible institutional and policy changes. In spite of the increasing urbanization that has been taking place since many decades agriculture determines the fate of our country where about two-thirds of the population still lives in rural India with agriculture as its livelihood. Therefore, if agriculture goes wrong it will be dreadful for the economy as the falling of agricultural growth not only affects employment but gross domestic product (GDP) also [1]. The larger objective for the improvement of agricultural sector can be realized through increasing the area of cultivation, cropping intensity and productivity. But for a country like India, increasing productivity is more important than the rest of the two because of the increasing urbanization, industrialization and the limited land size of the country. The productivity can be increased by two ways: first, increasing output by efficient utilization of available resources, and second, increasing output by variation of input. The first method is better with respect to productivity and sustainability. But due to increasing population, this method cannot provide a permanent solution. Thus, we can go for the second method which may potentially cause environmental degradation in the economy and affect its sustainability. Therefore, there is need to tackle the issues related to sustainable agricultural development [2]. Intensive agriculture practices without adherence to the scientific principles and ecological aspects have led to loss of soil health, depletion of freshwater resources and agro-biodiversity. With progressive diversion of arable land for non-agricultural purposes, the challenge of feeding the growing population *without*, at the same time, annexing more forestland and depleting the rest of life is indeed daunting [1].

Agriculture plays a significant role in generation of employment, national income, foreign exchange, source of raw material for industries, production of food grains to feed the masses, etc. An average

Indian still spends almost half of his/her total expenditure on food, while roughly half of India's work force is still engaged in agriculture for its livelihood. Agriculture is critical to maintain food sustainability as development of agriculture can help fight the problem of poverty [3]. Further, it may be noted that in the last two Five Year Plans, it is clearly mentioned that for the economy to grow at 9 per cent, it is important that agriculture should grow at least by 4 per cent per annum. Achieving an 8 to 9 percent rate of growth in overall GDP may not deliver much in terms of poverty reduction unless agricultural growth accelerates.

Being both a source of livelihood and food security for a vast majority of low income, poor and vulnerable sections of society, its performance assumes greater significance in view of the National Food Security Act and the ongoing Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) scheme. The experience from BRICS countries (Brazil, Russia, India, China and South Africa) which indicates that one percentage growth in agriculture is at least two to three times more effective in reducing poverty than the same growth emanating from non-agriculture sectors. Given that India is still home to the largest number of poor and malnourished people in the world, a higher priority to agriculture may achieve the goals of reducing poverty and malnutrition as well as of inclusive growth. The sustainable agriculture development of any country depends upon the judicious mix of their available natural resources. In fact agriculture dominates the fate of a country like India where large chunk of its population still lives in rural areas with agriculture as its livelihood. The main objective of the study is to examine the role of agriculture in sustainable economic development of the Indian economy.

India's Position in World Agriculture

Although India occupies only 2.4 per cent of the world's land area, it supports over 18 per cent of the world's population (Table 1). India with second largest agricultural land in the world has 20 agro-climatic regions which have a potential to grow almost all type of crops round the year. The country also possesses 46 of the 60 soil types in the world. In terms of agricultural production, India stands first in pulses production, second in case of wheat, rice and groundnut production and third for rapeseed production in the world. In fruit and vegetable production, our country is next to China only though it bags second and third positions except jute production. Over 2300 high yielding types and varieties have been developed and approved for commercial cultivation. India ranks first in buffalo population as well as milk production and second for cattle population in the world. Thus, due to

geographical advantages, India is way ahead from the rest of the world with regards to opportunity for developed agricultural sector.

Agricultural Development during Planning Periods

In the post-independence era, stagnant production, low productivity coupled with traditional technology and poor rural infrastructure were the major challenges for the Indian economy. Not surprisingly, food self-sufficiency became a key national policy goal. To achieve this goal, agricultural development received the highest priority and in the first five year plan, about 15 per cent of the plan outlay was allocated to agriculture and allied sector (Table 2). However, in the second five year plan, the emphasis shifted from labour-intensive agriculture and small scale production to large-scale capital-intensive heavy industry. Further, the share of agriculture sector in different five year plan outlays declined with time indicating continuous neglect of the agriculture sector. Moreover, outlay in agriculture and allied sectors has reduced to a mere share of about 3 per cent in 11th five year plan. Agriculture has to be kept at the centre of any reform agenda or planning process, in order to make a significant dent on poverty and malnutrition, and to ensure long-term food security for the people. Apart from meeting the domestic food requirements, agriculture is an important tool to earn foreign exchange, hence more focus needs to be laid on the development and growth of agriculture sector.

Despite a strong growth linkage between agriculture and other economic sectors, and poverty reduction, agriculture has not received the required attention during the reform period. The neglect of agriculture and rapid growth of non-agriculture sector has led to serious agrarian crisis and increased disparity between urban and rural incomes. There has been some revival in the recent period as agricultural GDP growth accelerated from 2.9 per cent in 2002-07 to 3.6 per cent during 2007-12 but is still below the target level of 4.0 per cent.

Policy makers and academicians realised that self-sufficiency in food production is an absolute pre requisite for sustainable agricultural development. For this purpose, the policies were considered as a mile stone. During this period of mid-1960s, the package of programmes like, Intensive Agriculture District Program (IADP), setting up of National Bank for Agriculture and Rural Development (NABARD), emphasis on high yielding varieties (HYV) along with other modern inputs like chemicals, fertilizers, pesticides and mechanisation were carried out so that

agricultural productivity could be raised without having substantial influences on increasing area under cultivation. The introduction of HYV yielded spectacular results and subsequently, the country, which was threatened by hunger and high dependence on imports became self sufficient in the food grains. During mid-1990s, the phase of ever green revolution was started. The conservation of biodiversity, maintaining soil fertility, increasing climate resistance of food crops combined with modern technological innovations were the main issues to enhance crop productivity. The main aim of this revolution was to produce bumper crop through the minimum use of natural resources to achieve the objective of food security. Similarly, to increase the nutrition level of consumption, white and yellow revolution were initiated. Attention to all links in the production-consumption chain was taken keeping in view the food habits of the people. For this purpose, the focus has shifted from conventional practices toward bio-technology research. India is well positioned to emerge as a significant player in the global bio-tech arena. In agri-biotech sector, India has been growing at 5 per cent growth rate since last five years. India has been growing at 5 per cent growth rate since last five years.

Contribution of Agriculture in Sustainable Development

Source of Livelihood

In India about 69 per cent of population dwells in villages where agriculture is the main source of livelihood (Table 3). Although, the growth rate of population declined after 1970s, the total population has increased from 361 million in 1951 to 1210 million in 2011. Increasing population, rising income levels, and other demographic changes are key drivers of demand for food which will require increased contribution of agriculture sector in future also. It is the agriculture sector that has been meeting the increased food requirements of the growing population as indicated by the rising net availability of food grains which increased from about 395 grams per day in 1951 to about 463 grams per day in 2011.

Large chunk of the Indian population is dependent on agriculture for sustenance; though, share of agriculture total employment generation has reduced particularly after 2004-05 (Table 4). Despite the declining capacity to create employment still about 53 per cent of the total population of the country depends upon agriculture for livelihood. Such a vast proportion being dependent on agriculture gives all the more reasons to sustain and develop this sector.

Table 1: India's Position in World Agriculture

S. No.	Item	India	World	% share	Rank	Next to
1	Total area (million hectares)	329	13442	2.4	7 th	Russian Federation, Canada, U.S.A, China, Brazil, Australia
	Arable land	159	1411	11.3	2 nd	U.S.A
2	Total population (million)	1214	6909	17.6	2 nd	China
	Agriculture	661	2617	25.2	2 nd	China
3	Crop production (million tonnes)					
	Wheat	81	654	12.4	2 nd	China
	Rice (paddy)	121	672	17.9	2 nd	China
	Total pulses	17	67	25.5	1 st	
	Groundnut(in shell)	6	38	14.9	2 nd	China
	Rapeseed	6.4	59.0	10.9	3 rd	Canada, China
4	Fruits & vegetables (million tonnes)					
	Fruits	75	603	12.5	2 nd	China
	Vegetables	100	1036	9.7	2 nd	China
5	Commercial crops (million tonnes)					
	Sugarcane	292	1711	17.1	2 nd	Brazil
	Tea	0.99	4.5	22.1	3 rd	China, Turkey
	Jute & jute like fibres	1.85	3.30	56.0	1 st	
	Cotton (lint)	5.70	23.30	24.4	2 nd	China
6	Livestock (million heads)					
	Cattle	210	1430	14.7	2 nd	Brazil
	Buffaloes	111	194	57.3	1 st	
7	Animal products					
	Total milk (000 MT)	121847	723143.31	16.8	1 st	
	Eggs (000 MT)	3378.1	69102.73	4.9	3 rd	China, U.S.A
	Total meat (000 MT)	6190	295462	2.1	5 th	China, U.S.A, Brazil, Germany

Source: FAO, Regional Office and the Pacific, Bangkok, India and figures refer to year 2010

Table 2: Plan Outlay in Agriculture and Allied Sectors (Rs crores)

Five year plans	Total plan outlay	Agriculture & allied sectors	% share
I plan (1951-56)	2378	354	14.9
II plan (1956-61)	4500	501	11.3
III plan (1961-66)	8577	1089	12.7
Annual plans (1966-69)	6625	1107	16.7
IV plan (1969-74)	15779	2320	14.7
V plan (1974-79)	39426	4865	12.3
Annual plan (1979-80)	12177	1997	16.4
VI plan (1980-85)	97500	5695	5.8
VII plan (1985-90)	180000	10525	5.9
Annual (1990-91)	58369	3405	5.8
Annual plan (1991-92)	64751	3851	6.0
VIII plan (1992-97)	434100	22467	5.2
IX plan (1997-2002)	859200	42462	4.9
X plan (2002-07)	1525639	58933	3.9
XI plan (2007-12)	3644718	136381	3.7

Source: Plan Documents and Budget Documents, Planning Commission

Table 3: Rising Population in India

Year	Total population (million)	Av. Annual exponential growth rate (%)	Rural population	Net availability of food grains (gms/day)
1951	361.09	1.25	298.6 (82.7)	394.9
1961	439.23	1.96	360.3 (82.0)	468.7
1971	548.16	2.22	439.0 (80.1)	468.8
1981	683.33	2.20	523.9 (76.7)	454.8
1991	846.42	2.14	628.9 (74.3)	510.1
2001	1028.74	1.95	742.6 (72.2)	416.2
2011	1210.19	1.64	833.1 (68.8)	462.9

Note: Figures in parentheses indicate percentage to total population

Source: Agricultural Statistics at a Glance, various issues

Table 4: Employment across Various Sectors in India

Employment (millions)	Agriculture & allied sectors	Industry	Services	Others	Total
1999-00	237.67	44.05	94.20	20.84	396.76
2004-05	258.93	55.77	112.81	29.96	457.46
2009-10	243.21	48.54	112.33	56.10	460.18
Employment elasticity					
1999-00 to 2004-05	0.84	0.76	0.45	0.92	0.44
2004-05 to 2009-10	-0.42	-0.31	-0.01	1.63	0.01
Employment CAGR					
1999-00 to 2004-05	1.44	4.01	17.00	6.23	2.40
2004-05 to 2009-10	-1.04	-2.29	-4.48	11.02	0.10
Growth rate of GVA (CAGR)					
1999-00 to 2004-05	1.71	5.34	7.05	6.83	5.60
2004-05 to 2009-10	2.53	7.85	8.52	6.47	7.10
Share of employment					
1999-00 to 2004-05	59.9	11.1	23.7	5.3	100.0
2004-05 to 2009-10	52.9	10.5	24.4	12.2	100.0
Share of GVA					
1999-00 to 2004-05	23.8	15.5	48.9	11.8	100.0
2004-05 to 2009-10	19.0	15.3	53.0	12.7	100.0

Source: NSSO (61st and 66th round survey, 2009-10; Working group on Twelfth plan-Employment, Planning & Policy

Note: GVA is Gross Value Added

Table 5: Share of Different Sectors in Gross Domestic Product (GDP) in India

Year	GDP (Rs lakh crores)	Share to total GDP at constant (2004-05) prices			
		Agriculture & allied activities	Industry	Services	Others
1950-51	2.79	51.88	16.19	29.54	2.39
1955-56	3.34	50.01	18.07	29.62	2.3
1960-61	4.10	47.65	20.09	30.19	2.07
1965-66	4.70	40.53	24.38	33.76	1.33
1970-71	5.90	41.66	23.62	33.26	1.46
1975-76	6.85	39.86	23.62	35.06	1.46
1980-81	7.99	35.69	25.66	37.65	1
1985-86	10.14	32.91	25.94	40.36	0.79
1990-91	13.48	29.53	27.63	42.55	0.29
1995-96	17.38	25.73	28.44	45.69	0.14
2000-01	23.48	22.26	27.25	50.49	0
2005-06	32.53	18.27	27.99	53.74	0
2010-11	49.37	14.45	28.23	57.32	0
2011-12	52.43	14.1	27.51	58.39	0
2012-13	55.05	13.69	26.75	59.57	-0.01

Table 6: Growth Rate of GDP in Different Sectors in India

Year	GDP annual growth rate				
	GDP	Agriculture & allied activities	Industry	Services	Others
1955-56	2.56	-0.86	10.51	4.96	7.83
1960-61	7.08	6.74	11.25	5.66	8.3
1965-66	-3.65	-11.04	4.09	2.8	0.93
1970-71	5.01	7.09	0.74	4.95	2.35
1975-76	9	12.89	7.08	6.65	2.11
1980-81	7.17	12.89	5.24	4.62	0.19
1985-86	4.16	0.31	4.38	7.67	3.19
1990-91	5.29	4.02	7.33	5.19	4.77
1995-96	7.29	-0.7	11.29	10.11	15.46
2000-01	4.15	-0.01	6.03	5.07	7.3
2005-06	9.48	5.14	9.72	10.91	10.1
2010-11	9.32	7.94	9.16	9.75	9.73
2011-12	6.21	3.65	3.49	8.2	2.69
2012-13	4.99	1.91	2.08	7.11	1.05

Table 7: India's Imports and Exports of Agricultural Commodities (Rupees Crore)

Year	Agri. Imports	National Imports	%age of Imports	Agri. Exports	National Exports	%age of Exports
1990-91	1205.86	43170.82	2.79	6012.76	32527.28	18.49
2000-01	12086.23	228306.64	5.29	28657.37	201356.45	14.23
2001-02	16256.61	245199.72	6.63	29728.61	209017.97	14.22
2009-10	59528.34	1363735.55	4.37	89341.33	845533.64	10.57
2010-11	56196.20	1605314.63	3.50	120185.48	1148169.56	10.47

Source: D. G. C. I. & S., Ministry of Commerce, Kolkata.

Table 8: Public and Private Investment in Agriculture & Allied Sectors in Total GDP at Market Prices (2004-05 prices) (Rs crores)

Year	Public investment	Private investment	Total investment	GDP at market	Share (%) in total GDP		
					Public	Private	Total
2004-05	21.27	78.73	76096	3242209	0.5	1.8	2.3
2005-06	23.02	76.98	86604	3543244	0.6	1.9	2.4
2006-07	24.97	75.03	92057	3871489	0.6	1.8	2.4
2007-08	21.99	78.01	105741	4250947	0.5	1.9	2.5
2008-09	16.18	83.82	127127	4416350	0.5	2.4	2.9
2009-10	17.32	82.68	131139	4780179	0.5	2.3	2.7
2010-11	15.11	84.89	142254	5236823	0.4	2.3	2.7

Source: Central Statistical Organisation, New Delhi

Contribution to National Income

Agriculture is the premier source of our national income. The agriculture sector in India has undergone significant structural changes in the form of decrease in share of GDP. The share of agriculture and allied activities in total GDP declined from about 52 per cent in 1950-51 to about 48 per cent in 1960s and further to about 36 per cent in 1980s (Table 5). Even when the budget outlays for agricultural development are declining over a period of time still agriculture sector contributes about 14 per cent to the national product. On the other hand, the contribution of industry and service sector is on a continuous rise throughout. The share of industry increased from about 17 per cent in 1950s to about 28 per cent in 2012-13 while that of service sector almost doubled from about 30 per cent to about 60 per cent during the same time period. All this indicates a shift from the traditional agrarian economy towards a service dominated one.

Comparison of growth in different sectors of our economy (Table 6) shows a similar picture as it was found that presently service sector was growing at the fastest pace of about 7 per cent followed by industry (2.08 per cent), agriculture & allied sectors (1.91 per cent) and others (1.05 per cent). With time the share of service sector in national income generation has improved a lot while that of other sectors has declined. Agriculture forms the base of development of any economy. Emphasis on a need for prioritizing the growth strategies in favour of agricultural sector is need of the hour.

Generation of Foreign Exchange

India is among 10 leading exporters of agricultural products in the world. The country accounted for 2.07 per cent of global agricultural trade in 2012. Table 7 presents the India's imports and exports of agricultural commodities during 1990-91 to 2010-11. The performance of agriculture sector has been spectacular in the post-independence era. The

country which faced a serious food shortage has now started generating exportable surpluses. In 2010-11, the value of exports of agricultural products increased by almost four times as compared to Rs 28657.37 crore in 2000-01. However, the value of imports of agricultural products increased seven times during this period. It is significant to mention that agricultural exports formed about 10 per cent of the national exports and agricultural imports were about 3 per cent of the national imports.

Supply of Feed and Fodder

Livestock sector provides protective food in the form of milk, meat, wool, hides and skin and they also provide draught power for farm operations. Moreover, it also meets the food requirements of the people. India has a broad spectrum of native breeds of cattle, buffalo, goats, sheep, swine, equine, camel and poultry. India's livestock sector is one of the largest in the world as it has 56.7 per cent of world's buffaloes, 12.7 per cent cattle, 3.2 per cent chickens, 3 per cent ducks, 2.5 per cent camel and 1.5 per cent pigs (FAOSTAT, 2008 and Livestock Census). Such a vast number of livestock needs to be fed. Agricultural sector provides fodder for livestock sector.

Strategies for Sustainable Agricultural Development

The World Commission on Environment and Development (WCED, 1987) defined sustainable development as 'the development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Considering that agriculture is the mainstay of the Indian economy, rapid sustainable development and inclusive growth of the economy is not possible without agricultural growth. For broad-based and inclusive development of the agriculture sector, there are three strategy options: (i) extensive farming – bringing more area under farming; (ii) intensive agriculture – increasing use of inputs such as land, labour, fertilizers, irrigation, etc., and (iii) technological change [4 and 5]. However, the first two approaches are agro-economically and ecologically unsustainable in the long run. The only sustainable strategy for growth in agriculture is continuous technological change, which shifts the production function upwards. In order to implement this strategy, three types of policy instruments, namely, technological, economic, and institutional are needed. Strategies that may be adopted to achieve sustainable development include-

Focus on agricultural research

Agricultural research which was initiated in mid-1960s played an important role in the transformation

of the Indian agriculture but of late large numbers of problems have emerged in the area of productivity and profitability. Agriculturally developed economies have been facing economic and environmental problems. For addressing these problems, there must be substantial increase in public investment, agriculture research and development of rural infrastructure. Efforts are also needed to create strong research-extension-farm linkages. For this purpose, there must be promotion of farmers' organization groups. Thus, a complementary state cooperative strategy may play a key role to improve agricultural production and productivity. Restructuring of the existing research and development institutions to make them demand driven and more responsive to the needs of users like farmers and industry, and active involvement of small farmers, particularly in post-harvest activities including storage, food processing, and marketing may address the problems of post-harvest losses.

In agriculture, generally public investment is meant for infrastructural development which augments its productive capacity. The level of public investment is crucial for long term sustainable growth of the sector. But unfortunately, there was decline in the public investment in agriculture. The decline in public investment in agriculture that set in during early 1980s would have adverse impact on the growth of agricultural output [6]. As predicted, by Kumar decrease in share of agricultural investment in the total for the economy will cause a significant fall in agricultural GDP [7]. As seen from Table 8, of the total investment since 2004-05 majority of the investment in agriculture was made by private sector. The total investment by public sector since 2004-05 has been declining as it declined from Rs 21.27 crore in 2004-05 to Rs 15.11 crore in 2010-11. Unlike, the public investment, the private investment is following a rising trend, as it increased from Rs 78.73 crore in 2004-05 to Rs 84.89 crore in 2010-11. Similarly, the share of public sector in total GDP has decreased overtime as it was 0.5 per cent in 2004-05, as compared to the private sector which has increased from 1.8 per cent in 2004-05 to 2.3 per cent in 2010-11. Though, over a period of time agricultural GDP and its growth rate did not fall following the decline in public investment, as predicted, there is no disagreement about the importance of public investment for long run output growth.

Need for Effective Agricultural Policy

Appropriate agricultural policy, food procurement and distribution policy are needed for agricultural development. In addition, pricing of inputs such as seeds, chemicals, electricity and irrigation water must be controlled by the government. Farm subsidies should be rationalized and better targeted to benefit

the small and marginal farmers. These subsidies are justified as they benefit not only small producers but the society at large. Agricultural price policy has played an important role in Indian agriculture but is facing some challenges. The effective price support policy should follow the strategy of technological change which not only requires emphasis on economic factors but non-economic factors also. Moreover, there is a need to follow multi-dimensional model of organization and management especially for small farmers, which requires integration of agri-input, agri-production, agro-processing and marketing segments of the value chain through public or cooperative sector.

Emphasis on Dry land Framing

India has about 108 million hectares of dry land which constitutes 75 per cent of the total arable land in the country. Such lands are at the mercy of rainfall as they do not have access to life saving irrigational facilities and hence production of crops in these areas is difficult. Efforts are being made to increase the crop intensity but emphasis also needs to be laid on making optimum use of these dry lands which are about two-thirds of the total arable land. National policies should aim at and encourage the efficient use of rainwater in situation which can be facilitated by constructing adequate infrastructure. This will facilitate agricultural development after centuries of stagnant agriculture, in the semi-arid areas. Management of rain water is the key to success in dry land agriculture.

Focus on Environmental Issues

Increasing food demand along with policies encouraging production, technological and economic changes have led to intensification of agriculture and cultivation on fragile and forest land, which has caused adverse impact on natural resources and environment in some regions. These detrimental effects include soil degradation, water depletion, deforestation, biodiversity losses, etc. Environmental issues, if not addressed, could threaten future levels of productivity and food security of the country. Under-pricing of irrigation water and inappropriate irrigation practices have led to problems of overexploitation of groundwater, salinization and waterlogging in irrigated areas. For example, in Central Punjab, mainly rice producing areas, the water table has declined from 4-5 meters in mid-1970s to more than 14 meters in 2005, while in the Southern and Western regions, water table has risen, leading to the problem of water-logging [8]. Farming in fragile soils and unsustainable exploitation of soil nutrients have led to land degradation in the country. Rapid expansion of modern technologies has caused serious loss of traditional crops, species, and other germplasm. There is ample evidence that agriculture

has both contributed to and been impacted by climate change. More research is needed to understand climate change in order to enhance the resilience of agriculture.

CONCLUSION

A developed and growing agricultural sector is the key for growth and sustainability of the Indian economy. Sustainable development is a vision and a way of thinking and acting so that scarce and limited resources can be used optimally and efficiently which will help save the deterioration of environment for the future generations. Sustained development can be assured through the fulfillment of basic needs of employment, food and shelter, for which agriculture plays a pivotal role. No doubt, the strong political will and economic planning may be a guiding force for these issues. It is only agriculture which plays a significant role in generation of employment, food for masses, national income, foreign exchange, raw material for industries, etc. Therefore, the role and importance of agriculture for sustainable development and growth of the economy cannot be left in the hind side. In spite of the declining public investment and focus of the government on agriculture, the sector is still acting as the driving force for the economy. Agricultural development is a necessity to improve productivity, generate employment, and provide a source of income to poor segments of population. Revitalisation of cooperative institutions, improving rural credit system, reorganising research, human resource development, trade and export promotion, land reforms and education among masses are the fundamental issues for an all-round development of the economy and to build an egalitarian society.

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