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## UNIT 21    AGRICULTURAL POLICY

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## 21.0 OBJECTIVES

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This unit is concerned with agricultural policy. While going through this unit, you will be able to:

- point out the need for an agricultural policy;
- explain the various factors responsible for slow growth rate of Indian agriculture;
- highlight the appropriate policy interventions by the Government;
- appreciate issues concerning the small size of Indian farms and associated affordability problems;
- examine the reasons for increasing cost of farming and low productivity;
- describe objectives of agricultural policy; and
- narrate various policy actions being taken by the Government to improve the condition of agriculture.

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### 21.1 INTRODUCTION

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In continuation of what we have studied in Unit 8, it hardly needs to be re-emphasised that agriculture dominates change in India through its causal links with factor and product markets. Importance of agriculture to the Indian economy is that it provides livelihood to nearly 55 per cent of the population and contributes 15 per cent of GDP. Agriculture is India's largest private sector activity. Because it employs people in very large numbers, farming ensures growth with equity. So, it may not be an exaggeration to state that *if agriculture survives, India survives*. Relatively lower productivity in agriculture results in concentration of the poor in this sector. Theoretically, it is possible to reduce poverty as well as expand domestic market for industry by raising the per capita productivity in agriculture and spreading its gains among the low income groups. There is a widely shared view that in a large size country like India, demand stimulus for industrialisation would come from agriculture with less social and economic costs than exports. The policy concern for greater participation of the poor in economic growth also accords priority to agriculture.

*Farming never pays* is a familiar slogan among agriculturists across the world, and especially so in India. Nevertheless, many continue to cultivate their fields year after year, barely eking out an existence, toiling in the hope that the tide may turn in their favour one of these days. A good deal of year-on-year variation in output is seen. *There are a large number of small producers, traders and trade intermediaries. The supply chain for agri-produce is rather long and inefficient.* Too many intermediaries add to the cost but little to the value. Long-term solutions include raising productivity of both crops as well as labour, reducing transaction costs between farmer and the consumer and encouragement of private sector participation on a large scale for which the regulatory framework has to be changed. Globally, technology and subsidies are the two major drivers of output growth. Agricultural biotechnology (also known as genetic-engineering technology) is driving up the output of crops such as soyabean, corn and cotton, especially in the US and other countries.

## 21.2 NEED FOR A RATIONAL AGRICULTURAL POLICY

### 21.2.1 Farming Becoming an Unviable Occupation

With the *growing fragmentation of holdings*, farming is fast becoming an *unviable standalone occupation* incapable of supporting entire households. Agriculture is in decline. *Crop yields are stagnating*. Farming has ceased to be remunerative and no longer attracts people. Fertile fields are being steadily devoured by *urbanisation*. There is an element of truth to these statements that add up to a ‘crisis’ narrative engulfing discussions on Indian agriculture.

### 21.2.2 Slow and Lower Growth Rate of Agriculture

As seen in Unit 8, in the 60 years since 1950 Indian agriculture has recorded an *average growth rate* of 2.7 per cent per year. In the past 30 years, the rate has crept slightly above three per cent, and during the last fifteen years, the rate of growth has been less than 2 per cent, well short of the four per cent target set in successive recent Five-Year Plans.

However, the performance has varied from State to State. It’s striking that agriculture in seven sizeable states (Gujarat, Chhattisgarh, Rajasthan, Maharashtra, Andhra Pradesh, Madhya Pradesh and Orissa) grew faster than four per cent between 2000-01 and 2007-08. And that fact doesn’t change when the relatively bad agricultural years of 2008-09 and 2009-10 are included. What’s more, most of these states are more water-stressed than average. It implies that what these States have achieved, other can emulate. That presents a bright sight. Most analysts infer that it would take great good luck (with weather) or a sweeping revolution in policy design and implementation to achieve and sustain four per cent growth.

### 21.2.3 Shortage of Labour: A Paradox

Today’s conditions reflect *labour shortages* that were earlier sporadic and confined to certain pockets, but have now become *structural and widespread*, as a growing economy has opened up alternate employment avenues in industry, construction and other services. The availability of labour was never an intractable problem, despite there being pockets or occasional periods of scarcity. One of the grave problems affecting Indian agriculture today is the continuing pressure of manpower on the limited land resources, due to inadequate generation of employment opportunities outside agriculture. This is not a price problem, but a more difficult and basic one.

The scenario has completely changed now – particularly in the last two-three years – with high food prices pushing up agricultural wages through a feedback loop and the resultant wage-price spiral turning into a zero-sum game for farmers. That, in turn, has been made possible by economic growth, in general, besides MGNREGA and other welfare schemes. These have altered old labour equations, enabling even farm workers to pass on their costs. Further, the spurt in construction and other urbanisation-induced economic activities has enhanced migration options for rural labour, which is no longer cheap and pliable like before. The irony is that if farming were to be reasonably remunerative in future, a great deal depends on moving *people* away from farms so as to ensure minimum viability of holdings (not to be confused with moving *land* away from agriculture, as some believe the present special economic zones policy is encouraging). And that calls for creating

more non-farm jobs in the countryside and further de-linking rural livelihoods from agriculture. These trends establish the inevitability of mechanisation.

#### **21.2.4 Increasing Mechanisation**

Ten years ago, if not less, the frontier of *farm mechanisation* in India was limited to tractors or machines for harvesting paddy and wheat in the northern Green Revolution belt. Now, the mechanisation universe has extended to even sugarcane harvesters and milking machines. The emergence of a market for herbicides to replace manual weeding operations is also, in a sense, a manifestation of the same phenomenon, although herbicides are not mechanical implements but chemical. Maharashtra and Andhra Pradesh governments are currently giving 25 per cent subsidy on cane harvesters. Gujarat has pegged it at 50 per cent, while extending it to milking machines as well. There is a need to have a close look at these and explore the possibility and viability of extending these schemes to the national level. A one-time capital concession on *direct paddy-seeding machines* is definitely more preferable to recurrent fertilizer subsidies. Besides, it should help promote a vibrant industry in *providing farm equipment services*. Farmers could outsource many of their field operations to these firms, so that they are left to simply *manage* their farms.

#### **21.2.5 Farm Size and Affordability: Issues Concerning the Small Size of Indian Farms and Associated Affordability Problems**

A striking feature of modernisation of agriculture in India is the contrasting scenario through which it is unfolding. The aggregative physical parameters of agriculture show remarkable achievement. Paradoxically, despite the good performance of agriculture, the rural communities in India have poor development indicators. Harnessing modernisation of agriculture for the development of rural areas and people is a distant goal which needs to be approached through a sequence of phases.

#### **21.2.6 Increasing Cost of Farming and Low Productivity**

Cost escalation renewed erosion of farmers' margins. For a long time, from 2002-03 to 2009-10, fertilizer prices were kept unchanged. From April 2010, prices of non-urea fertilizers were decontrolled, following which they have become costlier by 30-40 per cent. With the Government planning to decontrol *urea* prices as well, there would be further cost pressures on this front — from which farmers were largely insulated till recently. Low productivity and high cost of farm products are among the key challenges to agriculture. Fragmented land-holdings, low levels of input usage, poor pre- and post-harvest practices and strong dependence on uncertain monsoons are well-known weaknesses of Indian agriculture that lead to low yields and high cost of production.

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### **21.3 OBJECTIVES OF AGRICULTURAL POLICY**

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The above challenges, however, also present opportunities for corporates, agricultural departments and research institutes to work closely with farmers: To come out with innovative mechanisation solutions, introduce customised fertilizer products delivering nitrogen or phosphorous more efficiently to plants, and promote water- and energy-saving agronomic practices. *Here, there is need for policymakers to be more proactive, especially when it concerns issues of*

*technology*. There is no reason to deny farmers the choice to plant herbicide-resistant maize or cotton that helps save on manual weeding costs. Let the farmer, and not those who do not farm and yet claim to speak for him, decide.

### 21.3.1 Integrated Reform Measures

Agriculture continues to under perform. The sector cries out for major reforms, from *marketing to investment and institutional change, especially in water management, new technologies (seeds), land markets and creation of efficient value chains*. This needs to come uppermost in the reform agenda during the Twelfth Five-Year Plan (2012-17), if we have to reduce poverty faster than has been the case so far. In agriculture, normally our Five-Year Plan also, rural families increasingly want to see their children spending more time in school than in the farms. The spread of education, in turn, generates a disdain for manual labour, with the cane cutter's son not inclined to follow his father's calling — a choice the latter did not even have target increasing production of almost everything. True, with rising incomes and population, India will perhaps need more of most of things. Yet, a strategic vision must factor in three important elements: (1) India's comparative advantage; (2) efficient markets at home and/or abroad; and (3) environmental sustainability. Plan schemes have to fit within this *three-dimensional architecture*. We often forget that besides the farmers and the government, there are several other actors in agriculture, especially private companies and NGOs working at the grassroots. These various stakeholders should come together in an institutional framework that can incentivise and unleash a new change in agriculture.

### 21.3.2 Private Sector and Strengthening Successes in Agriculture

Three biggest successes in agriculture during the last decade seems to be in *cotton, maize and basmati rice*, each one of these successes giving the nation a benefit of almost 10,000 crore each year. These three agri-cheers in the last decade yield an important lesson. That future breakthrough technologies in agriculture will perhaps come increasingly from the private sector (foreign or domestic), and that India's private sector has its strength in multiplying those technologies and reaching millions of farmers (big and small) in the fastest possible way. But the private sector is driven by incentives (profits), and to see that farmers also gain reasonably well from these technologies, *government has to facilitate and regulate the process as a fair referee. This is where the question of deficit of trust between the government, private sector, and farmers comes in*. We need to innovate institutions/practices such as producers organisations to negotiate with large companies, farmer equity in these companies or purchase by the government of new technologies from the private sector for transfer to some others for distribution. It is here that *NGOs* working in rural areas at the grassroots can be of great help in building these *bridges of trust*. It needs a clearer vision, a positive mind to recognise our strengths in the private sector, and finding ways and means to tap that potential in a manner that can also enrich the farming community. Only then Indian agriculture can turn around, and we can hope for 5-6 per cent growth in agriculture in a sustainable manner for at least a decade. That would be the most powerful engine for poverty reduction. Can the second phase of economic reforms take up this challenge?

In this context, *contract farming* is suggested as a way out. Certainly, if properly implemented, contract farming arrangements can mitigate at least the market induced risks. Contract farming is not new to India. We have a long tradition of contract

farming, particularly in sugar and to a large extent in milk. Experience has shown that in areas where contract farming is organised in the co-operative mode, with a major say of the producers at all the stages in the value chain, it has not only contributed in improving productivity on the growers' farms, but has also afforded them an assured income and a larger share of the consumer's rupee. Contract farming with the involvement of large private firms as collaborators has shown mixed results, with more failures than successes. Problems of moral hazard and adverse selection are rampant, and complaints about inadequate guidance in input use and farm practices as well as non-enforcement of contracts are voiced frequently.

*Producer Groups* incorporated in the Companies Act do not get working capital since the rules are there only for coops. The Producers Company legislation now on the statute book provides an important method of strengthening farmer groups to take advantage of strategic alliances for growth, following the co-operative principle. Farmers' groups, stakeholders organisations and cooperatives, apart from playing a larger role themselves, will also play a larger role in strategic partnerships with business groups. The more we encourage organisations of smaller producers to organise themselves to serve their interests and strategise their relations with large companies, the better and more enduring will be the working systems.

***Agricultural Marketing:*** Organised marketing of agricultural commodities is being promoted in the country through a network of regulated markets. The advent of regulated markets has helped mitigate the market handicaps of producers/sellers at wholesale assembling level. Internet connectivity is being provided to important agricultural markets in the country to establish a nationwide information network for speedy collection of prices and market-related information. But rural periodic markets in general and tribal markets in particular have remained outside the ambit of the APMC Act.

Farmers need to realise the market price for their produce. Setting up of efficient supply chains is not only essential for ensuring adequate supplies of essential items at reasonable prices but also to ensure that producers get adequately compensated. Linking farmers to the market is, therefore, very important. The successful experience of co-operatives in the milk sector in managing the supply chain and providing remunerative prices to the producers may be emulated in the case of agricultural products.

An *institutional mechanism* in the form of producer companies or farmers associations needs to be put in place to use intelligence efficiently. For instance, if an early warning system predicts a sub-normal or delayed monsoon, information on cultivation of short-duration crops must be conveyed to farmers. Producer companies would be the right vehicles to disseminate such information quickly and mobilise farmers to shift their cropping patterns. The bargaining power of farmers would also improve if they organise themselves into producer companies. This could be effectively leveraged to strike better deals for purchase of inputs as well as sale of farm produce.

### 21.3.3 Meeting Demand and Supply Mismatches

This difficult task should not be ignored any longer. Even a cursory look at food inflation numbers tells one about the *serious demand and supply mismatches inherent in the Indian economy*. These are bound to grow in the years ahead. The move from rural to urban areas and the swelling of workers in the services

sector are fuelling it. A 4 per cent rate of growth in agriculture simply cannot arrest this situation, leave alone reverse it. According to a working paper by the *Indian Council for Research on International Economic Relations (ICRIER)*, India would have to double its food production by 2020. This rising demand will create further pressure on land and water in India over next 10-15 years. Between 1991 and 2007, the crop yields in India have been stagnant, except in the case of cotton. The current rate of growth in crop yields cannot help us meet the challenge of doubling our food production by 2020. We need to think of ways and means to achieve this objective. One important way to increase the availability of food is to increase the productivity of land and water in the country. This is not an easy task in view of pressure of industrialisation, lack of arable land and depleting water tables. However, *there is great scope for increasing crop yields through improved agronomic practices and crop improvement*. It is estimated that *improved agronomic practices* can increase yields by about 50 per cent, while crop improvement can increase yields by more than 50 per cent. All these measures like minimising wastage in the supply chain, improving the productivity of land, water and saline soils, improving agronomic practices and crop improvement have to be used as a package to make adequate food available to our growing population in the next 25-40 years. Against the above realities, agricultural biotechnology offers a key solution to meeting these growing challenges.

#### 21.3.4 Towards a Self-Regulating System

A remarkable feature of agriculture is the wide gap between what the technologist gets in the experimental farm and what a farmer gets on his farm and also a wide gap between the *best-practice* farmer and the common run of farmers. The government's interventions through providing subsidies and organising extension services have had an impact only in a few areas with large parts of agriculture remaining barely touched. As a long term goal, the objective should be to have an agricultural system *operating through well-organised markets*, efficient farmers and a smooth process integrating technology generation, its adoption on farms and optimum production basket for end uses. Such a process would need well-behaved markets providing clear signals for farmer decisions, farmers able and willing to respond to the signals and supply and demand responses occurring with reasonable speed and accuracy. In the real world, the process would be far from smooth as it would be buffeted by succession of shocks and disturbances.

#### 21.3.5 Overcoming Limits to Growth

The extensive margin of cultivation has already reached its limit in Indian agriculture. Apart from the looming threat of reaching the physical limits of land and water resources, Indian agriculture also faces the challenging task of establishing effective arrangements for conservation of resources and protection to environment. We identify the following priority tasks in relation to conservation and optimum use of our land and water resources:

- i) Building up and maintaining an updated data base on the extent of land and water resources, their location, present status, potentialities, ownership, use, regulation and control. *Panchayati-raj Institutions (PRIs)* should be given the primary responsibility for collecting, recording and verifying data. Remote sensing and other advanced technologies should be used to explore the potentialities of the resources and to complement the collection of data at the ground level.

- ii) Preparing a detailed perspective plan to extend irrigation as quickly as possible to make full use of the ultimate potential.
- iii) Ensuring that the market, institutional and policy environment, are conducive to conservation-oriented and judicious use of land and water resources.
- iv) As we approach the limits of land and water resources, search for a technology appropriate to the emerging situation should be intensified. Experts suggest that biotechnology would be a promising field to explore. Attention must also be paid to technologies available in research stations but not reaching farms. One way to get out of this trap would have been to raise the level of public investment in agriculture. Modernisation of food storage and management infrastructure is only one area that needs money. There are many such areas.

### 21.3.6 Public Investment in Agriculture

Agriculture is basically a private activity in India and, hence, public investment has a crucial role to play in creating infrastructure in terms of irrigation, roads, markets, storage facilities, rural electrification and technology development, besides education and health. Another view gaining ground in recent times is that the decline of capital formation in the public sector has been compensated by the private sector. Logically, the argument looks sound but its fallacy comes out when one examines the composition of private capital formation. Private sector capital formation is essentially taking place for short-term asset building and it is mainly in the areas of mechanisation, ground levelling, private irrigation, etc. However, public sector capital formation is mainly in the form of construction of dams, roads, marketing yards, rural electrification, etc., where private sector capital formation is hard to come in. Therefore, public sector capital formation needed to be augmented with a definite content and targeted focus, especially in case of rain fed areas, which lack not only in irrigation facilities, but also in other infrastructural facilities. The priority tasks identified for these policies could be of help in guiding this process along the right direction.

### 21.3.7 Pricing Policy

Economic sanity should be restored to administered pricing, user charges and government operations like procurement, storage and distribution of foodgrains. Micro-level decision-makers like producers and consumers should get signals consistent with the social objective of conservation and economic use of valuable but scarce resources like land and water. *The prices of fertilizers, water and electricity need rationalisation.* The present practice adversely affects the efficiency of the main stakeholders. The pricing policy on fertilizers has been ad hoc, hotchpotch and uncertain ever since the advent of economic reforms. The pricing of water, from canals, irrigation projects or elsewhere, is not consistent with the reality that farmers in irrigated regions have so far been the main beneficiaries. The same principle may be considered to determine the price of electricity used in agriculture.

Pricing of agriculture produce in India is both state-controlled and market-driven; a paradox that sometimes threatens to derail the entire system of appropriate pricing and generates conflict between government, farmers and agriculture-based industries. For most food grains, pulses, oilseeds and coarse cereals, the government determines the minimum support price (MSP). The MSPs of as many as 26 commodities is determined by the Commission of Agriculture Costs and Prices (CACP), which, after taking into account all aspects of cost of production, comes



out with a model price. However, for years, MSPs have become the base price at which the government purchases commodities, largely food grains and sometimes oilseeds. With the state purchasing more than 80 per cent of the grains produced in the country, determining and calculating MSP is no longer just meant to ensure due price for a grower; it has become a big political tool through which various lobbies are satisfied. Invariably, during elections, MSPs are hiked sharply, not only by the central government, but by states as well, who announce bonus on top of the Center-fixed MSP to placate growers.

The hikes have served their purpose and resulted in strong upward swing in production of food grain and availability, but they have played their part in distorting the market. The whole question of market-driven prices is questionable, given the active state intervention in setting the price for some. “Price of agriculture commodities should be based on demand and supply and government should not distort price signals. However, it has to do so sometimes to ensure appropriate returns to growers and also to avoid a collusion between millers and processors to deprive farmers their due. A market-driven pricing mechanism is needed to smoothen such distortions.

The inadequate supply of storage and godowns not only destroys food items, but also kills their competitiveness in global markets. If our system is inefficient, our policies don’t make it any better, because of which consumers end up paying more, while farmers don’t get adequately compensated. “India is still divided into many markets and what should have been our advantage in terms of geographical spread and variety has now become our biggest stumbling block in ensuring remunerative returns to farmers.”

### 21.3.8 Promotion of Human Development

There is substantial potential for expansion of employment in rural areas through diversification of agriculture and the resulting rise in rural incomes and improvements in rural lifestyles. The specific objectives which would be of help in exploiting this potential are the following:

- i) Diversification of agriculture creates wide-ranging opportunities for value addition, supplementary activities and additional employment;
- ii) Rising rural incomes would expand the demand for goods and services;
- iii) This emerging context would be favourable for acquisition of training and skills by the rural people, particularly the rural poor, to take up new occupations. It may also be expected that in response to rising demand for new goods and services, the supply of facilities for training and for acquisition of skills would expand. The government would have to be watchful to ensure that the facilities match the requirements and remain within the reach of the poor.

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## 21.4 AGRO-CLIMATIC REGIONAL PLANNING (ACRP)

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An important building block is the *Agro-climatic Regional Planning (ACRP)*. The exercise undertaken by the Planning Commission since 1988 to construct a national level planning perspective for agriculture based on detailed regional studies to assess resource endowments, strategies for balanced development of the region, comparative advantages, choice of priority activities, infrastructure needs and

investments. The regional level studies were done by teams of experts from agricultural universities and research institutions. The exercise began with delineation of 15 regions which were in the second step disaggregated into 73 sub regions. When the ACRP approach focussed on the spatial aspects of resources and their potentialities is combined with institutionalisation of the decentralised-cum-participatory planning at the district and lower levels, the agricultural system would not only gain in capacity for self-regulation but it would also have a much stronger thrust on development of rural areas and people which has lagged so far behind the improvement in the physical parameters of agriculture. Smaller and inaccessible villages which have been neglected so far would get an opportunity to enter the mainstream society owing to improvements in infrastructures, accessibility and availability of services. Broad based rural growth and diversification of rural economic activities resulting from area planning would expand the economic space available to the rural poor. The programmes to improve the human development status of the poor would become more effective in terms of both costs and benefits. Updated information on weather and crop conditions, market prices and prospects and extension messages and advice would get communicated more quickly and widely. It would also be reasonable to assume that the handing over of the development tasks to the PRIs – and through them to the local people – would keep in check populist programmes, leakages and wastages characteristic of the present system and bring out the potential among the people for self-reliance, local initiative and leadership.

ACRP has been recognised and accepted as the logical planning paradigm at the state, the sub-state levels. The Planning Commission has made a major contribution in the acceptance of the ACRP approach through prescription and persuasion. This has to continue along with efforts for “acceptance without imposition” at different layers of “formal and informal systems”. Sample of the output of Zonal Planning Teams is given below which forms the basis of various activities at different levels.

#### Issues and Strategies in Different Zones under ACRP

No.	Zone	Issues	Strategies
1	Western Himalayan	Steep Slopes, Soil Low Ground Water	Rational Land Use, Soils and Water Conservation
2	Eastern Himalayan	High runoff, Chaur lands, Shifting Cultivation	Soil and Water Conservation, Settled Farming
3	Lower Gangetic Plains	Floods and Poor Drainage	Reduced Water Conservation in Low Land through Embankments, Gully Controls and Runoff Diversions
4	Middle Gangetic Plains	Water logging and Salinity	Water Resource Management, Conjunctive use of Canal and Ground Water, Soil Amendments

No.	Zone	Issues	Strategies
5	Upper Gangetic Plains	Saline-alkaline lands, Water logging in Canal Irrigated areas and Low Cropping Intensity	Land Reclamation through Soil Amendments, Water Scheduling, Introduction of Intensive Cropping Patterns
6	Transgangetic Plains	Saline Land and Saline Ground Water deteriorating Soil Health	Soil and Water Managements, Restriction of Heavy Duty Crops
7	Eastern Plateau and Hills	Undulating Topography, Poor Ground Water Development, Degraded Tanks	Soil and Water Conservation, Ground Water Development and Renovation of Tanks
8	Central Plateau and Hills	Soil Erosion, Low Irrigation Development	Soil and Water Conservation, Development of Irrigation and Waste Land Development
9	Western Plateau and Hills	Shallow Soils, Low Irrigation Potential and Drought Prone Areas	Conservation of Rain Water, Development of Irrigation, Encouraging Dryland Horticulture
10	Southern Plateau and Hills	Waste Land, Saline Soils, Low Irrigation, Reduced Tank Potential	Waste Land Development, Encouraging Horticulture, Soil Correction, Restoration of Tanks
11	East Coast Plains and Hills	Soil Salinity, Low Ground Water, Poor Drainage	Treatment of Soils, Rescheduling Canal Water, Irrigation Development, Encouraging Brackish Water Fish Development
12	West Coast Plains and Hills	High runoff and erosion, Large amount of waste lands, Low Ground Water development	Soil and Water Conservation, Horticulture Development, Ground Water Development

No.	Zone	Issues	Strategies
13	Gujarat Plains and Hills	Over Exploitation of Ground Water, Saline Soils, Drought prone areas	Rationalisation of Ground water, Soil Correction, Soil and Water Conservation
14	Western Dry Region	Irregular Rainfall, Shifting Sand Dunes	Rain Water Conservation, Stabilisation of Sand Dunes, Development of Agro-forestry
15	Islands	Undulating topography, High runoff, Low NSA	Soil and Water Conservation, Rain Water Harvesting

### Check Your Progress 1

- 1) Why is farming becoming an unviable occupation? Answer in 100 words.

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- 2) Farmers are increasingly resorting to mechanisation. Give three reasons.

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- 3) What should be the objectives of agricultural policy?

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- 4) Point out limits to agricultural growth. Suggest measures to overcome them.

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- 5) Highlight the critical areas of public investment in agriculture.

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## 21.5 AGRICULTURAL POLICY STRATEGY

*Strategy of Agricultural Change:* Based on the facts on capital formation, we identify the following priority tasks:

- i) *Capital formation in the public sector should be augmented. Money saved from the reduction in subsidy for agricultural inputs should be utilised for this purpose.*
- ii) *In view of the resource constraints, capital formation requirements need to be prioritised. As ACRP gets operationalised, it would be possible to do prioritisation in a rational manner.*
- iii) *Inter-state variations in capital formation need to be reduced by stepping up investments in backward regions.*
- iv) *Delays in disbursement of funds under Rural Infrastructure Development Fund (RIDF) should be eliminated.*

The public expenditure for technology-led agricultural growth must accord higher priority to: (i) Agricultural research, education and extension; (ii) Irrigation and flood control; (iii) Soil and water conservation and harvesting on a watershed basis; (iv) Rural infrastructure such as soil-testing laboratories, roads, electricity, regulated markets, *Amul*-type co-operatives for perishables, rural financial institutions and employment guarantee schemes that concentrate on building community assets that directly contribute to agricultural growth. A significant scaling up of public expenditure is also needed for other farm and livestock inputs. Major examples are seeds, breeds, fertilizers, compost manure, vermicompost, cattle feed, veterinary services and modern handheld and bullock-drawn farm implements, all of which are interrelated.

### 21.5.1 Agricultural Credit

Credit is one of the important supply side factors which contributes to agricultural production. An efficient and effective rural credit delivery system is imperative for providing timely, adequate and equitable access to credit for raising agricultural productivity and incomes. Equitable access to institutional credit is important in the context of relative scarcity of credit and the high cost of informal credit. In India, the emphasis on agricultural credit has continued through progressive institutionalisation for providing timely and adequate credit to farmers at reasonable rates of interest. Broadly, over the years, India has followed three pronged strategy for developing rural credit, viz, i) *promotion of institutional structure*, ii) *directed lending*, and iii) *concessional or subsidised credit*. In respect of rural credit, the following priority tasks are identified:

- i) *Increase the outreach of the formal financial institutions, especially to the small and marginal farmers.*
- ii) *Continuation of credit targeting for ensuring adequacy of credit in the agricultural sector.*
- iii) *Progressively link SHGs with formal credit institutions for reducing transaction cost and high recovery.*

### 21.5.2 Agricultural Insurance

In the context of increasing commercialisation and globalisation, the scope and relevance of agricultural insurance are not widely understood in India. Crop insurance, which is generally restricted to field crops, is generally considered synonymous with agricultural insurance. However, agricultural insurance covers a wide spectrum of activities like horticulture, plantations, livestock, poultry, aquaculture, sericulture, etc. Further, it extends to the entire production process including post-harvest storage, processing and transportation of produce to the final markets. On crop insurance, the following priority tasks are identified:

- i) *Enhance the coverage of agricultural insurance scheme to the entire production process including post-harvest storage and processing.*
- ii) *Integration of agricultural insurance with credit institutions.*
- iii) *Encourage private participation in crop insurance.*

### 21.5.3 Globalisation

We now come to the role of the government in the context of opening up of Indian agriculture to global markets. The following priority tasks are identified for the government to help Indian agriculture adjust to globalisation:

- i) *Food self-sufficiency at the national level is desirable so that the reliance on trade can be kept within limits.*
- ii) *Safety nets are needed to protect the interests of crops, people and regions which are likely to be affected by globalisation.*
- iii) *Precautions on imports in view of the removal of quantitative restrictions.*
- iv) *Agricultural export policies need to be synchronised with the import policies to avoid price fluctuations. There is a need for sequencing of measures. In view of the removal of quantitative restriction in the coming days, tariffification process needs to be done judiciously.*

### 21.5.4 Watershed Development

According to Planning Commission about 9.6 million hectares of arable land and 6.9 million hectares of non-arable land have been treated under various watershed programmes. There are still about 60 million hectares of arable land and 15 million hectares of non-arable land which remain to be covered. Studies reveals that watershed development programmes undertaken thus far, have a mixed story of success and failure. In case of watershed development, the following aspects need to be considered:

- i) *Development and diffusion of appropriate location specific technologies and infrastructure, with people's participation in various rainfed areas.*
- ii) *Watershed programmes should be more people oriented and panchayats should be actively encouraged with financial and administrative powers.*

### 21.5.5 Research and Development

Besides land and water resources, one of the major issues relating to overcoming limits to growth is the low productivity of Indian agriculture. In India research support for the agricultural sector is provided by: (i) governmental agencies, (ii)

international agricultural research centers, (iii) imported technology and (iv) private Indian research. India is considered as having the largest public agricultural research establishments in the world. Therefore, for achieving greater gains, public investment in research and extension needs to be increased. We identify the following priority tasks for R and D:

- i) *Greater public investment in R&D.*
- ii) *Encourage private sector participation in frontier areas like natural resource management and biotechnology.*

### **21.5.6 Development of Non-Farm Sector**

Till seventies, the significance of Non-Farm Sector (NFS) in generating employment and income to the rural households did not receive adequate attention in India. We suggest the following priority tasks for a policy agenda for agriculture to counter the marginalisation process operating in agriculture.

- i) *Development of a sound and enduring non-farm sector for creation of employment in the rural sector.*
- ii) *Credit requirements of NFS need to be met by financial institutions. SHGs can be feasible intermediaries to finance non-farm activities.*

Policies to help the farm sector and enhance the synergies between the farm and non-farm sectors should focus on efficient transport and distribution systems, as well as efficient storage systems. Market prices will have to include all these costs of investment in supply systems at some point in time. However, it is necessary to nudge the system to build this infrastructure now.

Agricultural research can effectively reduce poverty if the voice and influence of small farmers is strengthened in any market-integrated agricultural system. The disproportionate influence of large farmers often leaves smallholders facing the problem of technologies that are inappropriate for reasons of scale, cost managerial complexity, or simply due to the absence of market integration. *The goal of agricultural research must be to assist in the competitive market integration of small farmers.* Since major productivity gains tend to take place more in regions where the poor do not live, and linkages between farm and non-farm economies are also strongest in the more dynamic and more productive agricultural regions, it is prudent to assist small farmers to diversify into cropping systems that are coherent with the types of market incentives they face.

### **21.5.7 Need for Understanding Regional Disparity**

There is a greater need for understanding the implications of the persistence of regional disparity. Growing disparity should not lead to deterioration of income levels for farmers in the low productivity regions. There is a need for measures to promote regional balance in development in the form of policy responses countering regional productivity differences. Development of rural infrastructure on a normative basis rather than any income-based approach is one leveller in terms of access to connectivity. But this alone would not be adequate. There will be a need to invest in institutions and technology improvements in the low productivity regions. Low productivity will have to be compensated by greater efficiency and less wastage of resources. What remains to be seen is at what stage local policies will take the initiative to raise the flow of resources for local development. The unfolding regional complexion of Indian agriculture is likely to be more balanced if there is a happy

coincidence of more investments, technology diffusion and enabling policies in the less productive regions.

## 21.6 OPTIONS FOR CONTINUOUS TECHNICAL CHANGE

The three options for continuous technical change in the agricultural sector are: (i) *seed-centered* (as in the green revolution); (ii) *resource-centered* (as with new technology for dry/rain-fed farming); or (iii) *seed/breed-cum-resource-centered* (as in an integrated farming system). The need for a second green revolution has been recognised ever since economic reforms were initiated, but has not been fully committed to, as Bt cotton technology transfer which was approved by the Union Government in 2002. Likewise, the need for new dry/rain-fed farming technology has been recognised but its explicit agenda has not yet been spelt out. The *third option* of seed-cum-resource-centered technology has been acknowledged as an integrated system that agricultural scientists advocate, but its need on a continuous basis has not been recognised or proactively pursued since the mid-1980s or so. *An integrated farming system such as the seed/breed-cum-resource-centered technology aims to achieve the integration of farm inputs and resources as well as all farm commodities – field crops, livestock and horticulture.* It consists of a range of resource-saving practices that aim to achieve acceptable profits and high and sustained production levels, while preserving the environment and minimising the negative effects of intensive farming. Based on the principle of enhancing natural biological processes above and below the ground, it represents a winning combination that reduces erosion; increases crop yields, soil biological activity and nutrient recycling intensifies land use, improving profits; and can therefore help reduce poverty and malnutrition and strengthen environmental sustainability. Accelerating the growth rate of productivity of all farm commodities is urgently needed to achieve the employment-led agricultural growth and overall economic progress.

### 21.6.1 Implementation of Continuous Technical Change

The implementation of technical change in agriculture requires a *multi-institutional model of organisation and management*. The model of single institution is not enough given the size, diversity and complexity of the agricultural sector. There is a view that agriculture being a state subject, it is the states that have to bring about technical change. What is, however, required is that the central government play three catalytic roles when the Planning Commission consults each state government for the formulation of its annual and five-year plans. The *first* such role the central government should aim at is visualising the “outcomes” related to seed/breed-cum-resource-centered technical change. The *second* catalytic role the central government has to play is creating an institutional structure to integrate agricultural research, education and extension by forming an organisational committee representing the agriculture departments of the central and state governments, SAUs and the ICAR at both the state and district levels to plan and guide the implementation of integrated farming. The *third* catalytic role the central government has to undertake is reviving organisational committees at the state level that used to oversee implementation of agricultural growth.

The three catalytic roles of the central government must be complemented by a change in how the auxiliary institutions function. Agricultural research, education and extension institutions, line departments of the government, and other agencies



should have autonomy alongside accountability. Moreover, both for planning and implementation of the programmes, a *bottom-up-cum-top-down* approach must be adopted in their design, execution and monitoring. All the implementing institutions must be reorganised so that they together look like an erect pyramid, rather than an inverted one, as is often now the case. Since India's agriculture is land scarce and labour surplus, its growth requires *augmenting land and labour using new technology. Such technology could be seed-centered, resource-centered or seed/breed-cum-resource-centered; the last being an integrated farming system. Agricultural policy in the reforms era has neglected all these options.*

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## 21.7 CONTRIBUTION OF LIVESTOCK

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Policy makers in India are finally acknowledging a *structural shift* in the agriculture sector they have been noticing for a decade. *Economic contribution of livestock is today more than that of foodgrain crops.* Traditionally, of the three components of the sector—crops, livestock and fisheries—crops drove the growth, and foodgrains are a major part of it. As a result, policy and programmes focused on crops. When in 2002-03, monetary contribution of livestock surpassed that of foodgrains, policy makers ignored it as a temporary coping mechanism of the poor in the face of sluggish agriculture due to repeated droughts. Livestock contribution has since remained higher by 5-13 per cent. *Livestock output is the fastest growing among the three components.* Its contribution to the total output of the agriculture sector increased from 15 per cent in 1981-82 to 26 per cent in 2010-11. This provided a cushion to agriculture growth. Driving livestock growth are changes in the utility of livestock for farmers and in food consumption pattern. Small and marginal farmers, landless labourers and women are more dependent on livestock for supplementing incomes and generating gainful employment in rural areas.

Policy makers are taking a serious note of this new economy. It is now seen as a major support for the crops sector to project decent overall agriculture growth. *The livestock sector is expected to emerge as an engine of agriculture growth in the 12<sup>th</sup> Plan and beyond in view of rapid growth in demand for animal food products.* Livestock has assumed the most important role in providing employment and income generating opportunities. While crops still employ the maximum people, employment in livestock is fast catching up. Rise of the livestock sector has implications for poverty. Rural poverty is less in states where livestock contributes more to farm income. Punjab, Haryana, Jammu and Kashmir, Himachal Pradesh, Kerala, Gujarat and Rajasthan are case in point. Mostly, marginal farmers and those who have quit farming and are joining the livestock business. About 70 per cent of the livestock market in India is owned by 67 per cent of the small and marginal farmers and by the landless. One way, prosperity is now more dependent on per capita livestock ownership than on farms. "This implies that the growth of the livestock sector would have more effect on poverty reduction than the growth of the crops sector". But this is not the full potential of the sector.

Absence of policy focus has stifled the sector that caters to the poorest. India's livestock productivity is 20-60 per cent lower than the global average. Deficiency of feed and fodder is the biggest factor responsible for 50 per cent of the total unrealised production potential, followed by inadequate breeding and reproduction, and increasing diseases among animals. As livestock is less prone to global warming and climate change, it can be considered more reliable than rain-fed agriculture. But livestock receives only 12 per cent of the total public expenditure on the agriculture and allied sector and four-five per cent of the total institutional credit

flow into the sector. Hardly six per cent of the livestock are insured. The only Centrally sponsored scheme on livestock extension, with a budget of Rs. 15 crore in 2011-12. Adoption of livestock-related technologies is poor because of absence of animal husbandry extension network. During the 11<sup>th</sup> Plan it was decided to establish the *Indian Council of Veterinary and Animal Science Education and Research*. It is yet to take off. The working group for the 12<sup>th</sup> Plan has repeated the suggestion.

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## 21.8 ENSURING FOOD SECURITY AND TASK AHEAD

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As the country plans to implement an ambitious *food security* law that would put pressure on the farm sector to scale up productivity like never before. Farm mechanisation and the National Mission for sustainable agriculture are the priorities, with specific focus on micro-irrigation and rain-fed areas. The government wants to offer a legal guarantee to 75 per cent of rural and 50 per cent of urban households for supplies of subsidised grain to ensure food security, and so it will have to buy more than 60 million tonnes of produce a year from farmers to implement the proposed Food Security Bill. Significantly, the government has never procured 60 million tonnes a year. This requires government's enhanced focus on farm productivity and output so that the idea of food security can be sustainable. For improving productivity, we have to improve farm mechanisation. It also brings down the cost of production and contributes to curbing inflation

No promises on *inclusiveness* and long-term food security will be sustainable unless growth in agriculture is propelled to more than 4 per cent per annum. And this growth needs to be widely spread out to eastern region and rainfed areas of western and southern regions. The north-west belt is coming to its saturation level, especially in rice-wheat, given its fast depleting water table. The experience of the last decade and a half is not something to be proud of. Agriculture growth crawled at 2.5 per cent, 2.4 per cent, and 3.2 per cent, respectively in the last three Plans, way below the 4 per cent target. Fifteen years of continuous failure should be sufficient to teach any nation a lesson that *business as usual will not deliver*. According to Dr. Ashok Gulati what is needed for a higher growth trajectory? Three things are critical: (1) *getting the incentives right*; (2) *getting sufficient investment in public goods*; and finally (3) *getting institutional framework right, which facilitates private investments and fair distribution of gains in agri-value chains*. Let us elaborate on each one of this *trinity of three "I"*, *Incentives, Investments and Institutions*.

***Getting the incentives right:*** It relates to getting the *prices right and the markets right*. Government intervenes in both output and input markets to supposedly help farmers realise better returns, and also to keep a balance with consumer interests. Paddy and wheat are two prime examples (in a pack of 24 commodities) where government announces a minimum support price and has an elaborate procurement programme. But in much of eastern UP, Bihar, Jharkhand, West Bengal, Assam and Orissa, paddy is being sold way below the MSP of Rs. 1080/quintal. This is when farmers have given a record crop. Farmers feel frustrated and complain of slow or no procurement, and collusion between procurement agencies and rice millers/traders. This is the region from where we dream of getting our second green revolution and long term food security. At the Center, we often put the onus on states, and when we discuss the matter at the state level, they turn it back to the Center. Unfortunately, in this blame game, farmers are

being grinded. Those blaming states need to be reminded that the first green revolution was not brought about by a state. It was the vision of the Center and it took a few states along to realise that vision. We will have to do the same for a second green revolution. The technology is very much there. What is missing is critical infrastructure to reach farmers, and marketing network that can ensure at least MSP. States alone cannot do it. It needs political commitment at the Center, ample resources, fast and coordinated action, not rhetoric. *A marketing revolution needs to precede the second Green Revolution.*

**Putting investments and institutions in place:** Right incentives can unleash farmers spirits and invite private investments in agriculture. But there are critical areas where public sector has to take a lead; rural roads, public irrigation (including power supply for irrigation), agri-R&D, and marketing infrastructure. *States and the Center will have to work in tandem to ensure it is done.* Gujarat has done much of this, attaining an unprecedented growth of almost 9 per cent per annum (See Box). More than 80 per cent of farms being small, it needs major institutional changes to create a scale that is efficient in adopting modern technology.

### Box

In a recent monograph, *High Growth Trajectory and Structural Changes in Gujarat Agriculture* compiled by Indian Institute of Management, Ahmedabad, Professors Ravindra Dholakia and Samar Datta: identify six factors that were given a concerted push by the Gujarat government from 2002-03 onwards:

- a sustained programme of water conservation and management;
- a massive and well-coordinated extension effort;
- a successful overhaul of rural electricity distribution;
- a strong emphasis on non-food crops like horticulture, Bt cotton, castor and isabgol;
- sustained and comprehensive support to livestock development;
- major revamping of agriculture-supporting infrastructure, including roads, electricity and ports.

Some of these factors merit elaboration. With only a quarter of its agricultural land irrigated, efficient conservation and management of water has been a continuing challenge for Gujarat's agriculture. Three major programmes received a fresh impetus from 2000 onwards. With assistance and encouragement from the Planning Commission, watershed development programmes were rapidly scaled up. *Second*, the *Jal Kranti* programme for constructing check dams, recharging wells and reviving village ponds/tanks was vigorously pursued by the Water Resources Department". *Third*, micro-irrigation (through drips and sprinklers) received an enormous boost in the past decade spearheaded by the Gujarat Green Revolution Company. During 2006 to 2010 nearly 2 lakh hectares were covered, benefiting a similar number of farmers.

Along with revamping water management and extension services, the Gujarat government also achieved a major breakthrough in rural electrification. The Jyotigram Yojana was launched in 2003 and ensured 100 per cent electrification of the state's villages and reasonably regular supply in three years. The scheme included a crucial component of power supply for

groundwater management with eight hours a day of full voltage power made available on a pre-announced schedule.

These major initiatives on the supply side facilitated a robust response of the agriculture sector to the changing composition of demand as Gujarat's overall economy grew at double-digit rates during the decade. The state was quick to seize the opportunities for diversification into non-food crops. Despite some controversy, Gujarat was an early and successful adopter of Bt cotton, which fuelled rapid growth in cotton production. Other commercial crops such as castor and psyllium (*isabgol*) also did very well. Household incomes grew apace, so did the market for horticulture products. The production of both fruit and vegetables was about four times higher in 2008-09 compared to 1991-92 and the output of spices was almost five times greater. This robust growth in horticulture owed a lot to improvements in infrastructure and marketing.

Apart from crop production, agricultural policies also encouraged rapid expansion of the livestock sector. During the past decade, milk production grew at five per cent per year, egg production at 19 per cent and meat output at 10 per cent. With rapidly rising incomes, the mainly vegetarian orientation of the state's population has gradually lessened. Besides, cross-border sales have also grown. How much of Gujarat's agricultural success story can be replicated in other Indian states? In the preface to their book, Professors Dholakia and Datta claim that "this story is certainly replicable by other states and regions within and outside the country". Well, maybe. A few sentences earlier they write *It is not a miracle that happened exogenously. It is fully endogenous, systematically led by long-term vision and comprehensive strategy requiring solid commitment and dedication to the cause, political will to pursue market-oriented reforms of policies and institutions, interdepartmental and inter-ministerial coordination and co-operation, and a responsive and entrepreneurial farming community.*

In marketing produce to processors and organised retailers. "This calls for freeing of land lease market and formation of producers' organisations on high priority. Free movement of agri-commodities across India, uniform and low taxation on primary commodities, reforms in APMC are some of the institutional reforms needed to get Indian agriculture cross the 4 per cent growth barrier. *The potential of Indian agriculture is surely much more, if only we knew how to tap it right!*".

In this context the following quote seems very apt: "It used to be said that agriculture in India was less of an occupation than a way of life. This is not necessarily the case today with the better-off cultivators who are able to use modern equipment. Although we should not exaggerate the speed with which the change is likely to occur, we can already detect the signs which presage the passing of the bullock, the lessening of the terrors of a fickle monsoon, and, perhaps later in the century, the industrialisation of agriculture itself. It is possible that in the first part of the twentieth century, the Indian peasant, as we know him today, will no longer be the representative cultivator; and by the middle of the 21<sup>st</sup>, it is even conceivable that over large stretches of the country, he will practically have disappeared" — *Daniel Thorner, The Shaping of Modern India (1980).*

**The way forward:**

What should be done to revitalise Indian agriculture? The following *mantras* deserve attention:

- i) Strengthen the input delivery system.
- ii) Rapidly expand the irrigation base and actual area under irrigated cultivation.
- iii) Improve the antiquated agronomic practices through revival of the extension mechanism.
- iv) Infuse technology — information technology, biotechnology, satellite technology/remote sensing, nanotechnology, and so on.
- v) Invest in building rural infrastructure.
- vi) Step up public investment in agriculture.
- vii) Use indigenous prowess in IT to deliver price and market information to stakeholders, mainly growers.
- viii) Incentivise private sector participation in revitalising agriculture.
- ix) Spare no efforts to make farming fashionable.

In India, a second green revolution is waiting for the right nudges to take off. The first made India self-sufficient in grains; now a grain mountain of over 50 million tonnes towers in government storage. The second green revolution will boost output and productivity of vegetables, fruit, meat, fish and milk. States like UP, Bihar and Bengal have the capacity to be major producers, but lag a state like Punjab in productivity. Purposeful action here can change much for the better. Farmers need freedom from middlemen to respond to price signals: states should amend or scrap the Agricultural Produce Marketing Committee Act that legitimises middlemen in farm trade. Farm storage and transport need a huge boost to smoothen out price cycles and cut wastage of vegetables and fruit.

We need to address the challenges of the agriculture sector through comprehensive and coordinated efforts directed at improving farm production and productivity of foodgrains as well as high value crops, developing rural infrastructure, renewing thrust on the irrigation sector, strengthening marketing infrastructure, and supporting investment in R&D with due emphasis on environmental considerations. These efforts will in time rejuvenate agriculture sector and bring about inclusive growth of the economy.

**Check Your Progress 2**

- 1) Explain the main components of Agro-climatic Regional Planning (ACRP).

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- 2) Why is institutional credit to agriculture considered desirable? Give five points.

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- 3) Point out the desirability of opening up of Indian agriculture to global market.

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- 4) What do you understand by continuous technical change? Suggest measures for its implementation.

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- 5) Highlight the contribution of livestock to Indian agriculture.

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## 21.9 LET US SUM UP

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Some of the salient features of Indian agriculture include fragmented landholding; rain-fed cultivation (irrigated farming is about 40 per cent); low level of input usage (seeds, fertilizers, agro-chemicals); varied agro-climatic conditions; antiquated agronomic practices; poor pre- and post-harvest technology adoption; inadequate marketing infrastructure; low yields and, often, unrealistic prices; and tardy flow of price and market information to primary producers. Agriculture employs more than half of labour force. Contribution of agriculture to GDP has been declining steadily; yet, it accounts for about 15 per cent. Indian agriculture fails to meet the criterion of modernisation, human development indices and the indicators of marginalisation of vast numbers in agriculture serve to underline this failure as also the urgent need to *orient policy-making towards modernisation*. The economic reforms being implemented since the beginning of the nineties do recognise the need for a new paradigm for policymaking for development though, as in the past, *agriculture tends to remain on sidelines until a crisis knocks on the door*. Abundant funds are promised for agriculture but there is no matching readiness on the part of the government to take up tasks which are crucial for modernisation of agriculture but have been grossly neglected so far.

If it is accepted that the government has to be less interventionist in future, it would follow that the government should choose to take up only the policies consistent with its new role towards agriculture. We have selected only a few policy areas in which, the government would have to play an active role for a long time to come. A self-regulating agricultural system would still need selective government interventions to keep it moving towards modernisation. Agricultural policies in India have to manoeuvre within the constraints imposed by the features of the policy regime. Improvements in technology-induced productivity changes are more perceptible in agriculture than in the other sectors. Food security will require investments in technology creation and adoption.

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## 21.10 EXERCISES

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- i) Why is rapid growth of agriculture essential? Give reasons for your answer.
- ii) Explain the need for a rational price policy for agricultural produce. What steps government have taken to meet the ends of justice both for producers and consumers?
- iii) Distinguish between farm and non-farm services. Point out the importance of both these services for increasing agricultural production and productivity.
- iv) Critically examine the role of agricultural policy in the following areas:
  - a) Public investment in agriculture;
  - b) Agricultural technology;
  - c) Financing of agriculture;
  - d) Subsidies of agriculture.

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## 21.11 KEY WORDS

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- Agro-Climatic Regional Planning** : The exercise undertaken by the Planning Commission since 1988 to construct a national level planning perspective for agriculture based on detailed regional studies to assess resource endowments, strategies for balanced development of the region, comparative advantages, choice of priority activities, infrastructure needs and investments. The regional level studies were done by teams of experts from agricultural universities and research institutions.
- Agricultural Biotechnology** : Also known as genetic-engineering technology is driving up the output of crops such as soyabeans, corn and cotton. In future, we have to have recourse of biotechnology for increasing yield. We have not got the technology policy for agriculture right. Agricultural biotechnology offers a key solution to meet growing challenges of agricultural production and productivity.
- Agri-Business** : Trading in agricultural produce. The government needs to shift its role from direct intervention and over regulation to create the enabling environment for private sector participation and competition for agri-business. Improving the rural investment climate includes building, key infrastructure and improving access to credit by creating an enabling environment for extending these facilities to rural areas.
- Agricultural Policy Strategy** : The need of the hour is for long term strategic direction that will address multifaceted issues

on productivity, mechanisation, newer technologies, crop diversification, increased public investments, food security and innovation. Major responses are required. The trend towards diversification in Indian agriculture is very decisive. This means that policy strategy cannot be only for a few crops and a few regions. A larger basket of crops, apart from wheat and rice, like fruits, vegetables, oil-seeds, pulses, coarse grains and exotic crops need to be included in the productivity missions as well as in research endeavours. And, if the recent years are any thing to go by then, vagaries of climate change will require crop insurance policies that offer crop protection and income security to small and marginal farmers. The agro climatic planning paradigms need very intensive pursuit. Trends in the growth of irrigation and cropping intensity are very disturbing. In the short run, we need major emphasis on technology – better seeds, soil nutrition and great care in terms of pesticides and insecticides. While the path ahead is clear, it is imperative to note that increased production and productivity need to be environmentally sustainable, by avoiding over use of fertilizers, pesticides and water.

**Area Approach to Agricultural Development**

: An area approach is required to be brought to bear on the development of infrastructural facilities. Irrigation development, command area development, soil and moisture conservation, milk production programme, etc. are examples which give best returns when developed on an area basis. In building up these facilities on an area basis, there should be built in provision for special assistance and attention to the weaker sections.

**Food Security**

: Economic access to food is a bigger problem in our country than availability of food itself. A legal guarantee to provide cheap food to the poor. The Food Security Bill intends to provide legal entitlement of food to three-fourth of the country's rural population and half its urban dwellers.

**Integrated Farming System**

: *An integrated farming system such as the seed/breed-cum-resource-centered technology aims to achieve the integration of farm inputs and resources as well as all farm commodities — field crops, livestock and*



*horticulture*. It consists of a range of resource-saving practices that aim to achieve acceptable profits and high and sustained production levels, while preserving the environment and minimising the negative effects of intensive farming.

### **Pricing Paradox**

- : Pricing of agricultural produce in India is both state-controlled and market driven: a paradox that some-times threatens to derail the entire system of appropriate pricing and generates conflict between government, farmers and agriculture-based industries. A rational pricing mechanism is needed to smoothen the distortions. India is still divided into many markets and what should have been our advantage in terms of geographical spread and variety has now become our biggest stumbling block in ensuring remunerative returns to farmers.

### **Regional Disparity**

- : There exist vast inter-state differences in yields of Crops which can be explained in large parts in terms of the observed spatial differences in the growth of infrastructure and level of input use. However, the conditions in one state may not be replicable in another. We are endowed with a large untapped production reservoir. This provides hope for a bright agricultural future.

### **Supply Chain**

- : It starts from production stage to final consumption stage. In India supply chain for agricultural produce is considered to be very weak and defective as there are so many intermediaries involved in the process. This does not provide reasonable return to farmers nor goods at lower price to the final consumers. A lot of work has to be done like modernisation of storage, using latest technology for efficient distribution which includes warehousing, cold storage and transport.

### **Sustainable Agriculture**

- : Technically sound, economically viable, environmentally non-degrading and socially acceptable use of country's natural resources, land, water and genetic endowment to promote sustainable development of agriculture. Future agricultural growth will have to be enabled through an integrated future policy framework that achieves environmental sustainability.

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## 21.13 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress I

- 1) See Sub-section 21.2.1
- 2) See Sub-section 21.2.4
- 3) See Section 21.3
- 4) See Sub-section 21.3.5
- 5) See Sub-section 21.3.6

**Check Your Progress 2**

- 1) See Section 21.4
- 2) See Sub-section 21.5.1
- 3) See Sub-section 21.5.3
- 4) See Section 21.6 and Sub-section 21.6.1
- 5) See Section 21.7