
UNIT 14 INSTITUTIONAL AND TECHNOLOGICAL FACTORS

Structure

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14.0 OBJECTIVES

This unit introduces you to the agrarian structure on the eve of independence. It critically evaluates the various land reform measures implemented in India after independence. The role the technical factors have played in the growth of agricultural development. After going through this unit you would be able to :

- identify the reasons for initiating land reforms;
- discuss the reasons for success and failure of the various land reforms; and
- describe the role various technological factors can play towards agricultural growth.

14.1 INTRODUCTION

Although increased investments and enlarged markets are basic requirements for agricultural development, it also involves complex processes and procedures of institutional change, redistribution of economic and political power and concerted deliberate public policy efforts for redistributing the gains of economic growth. Land reforms in narrow sense refer to measures to redistribute land in favour of peasants and small farmers. Land reform is obviously not a modern phenomenon. In its traditional sense, it has taken place over the years primarily in response to demand for greater equality or social justice.

14.2 PRE-LAND REFORM AGRARIAN SCENARIO

The pre-independence or precisely pre-land reform Indian agriculture was dominated by a large class of poor peasants and landless labourers, the two groups together formed the majority within the agricultural sector. Substantial area was owned by a small percentage of rich peasants and landlord-cum-money lenders. The modes of production were primitive and intensity of land use was less than that on the small farms. Nearly a fifth of the area was under tenants and more than a third of this being

under shared tenancy, and most of it being under informal arrangements. It was obvious that the structure was inequitable. It lacked also the potential for growth. The poor peasants and landless labour was a deficit section in all respects. Rental incomes and consumption loans to impoverished peasants were more rewarding for the landlord than cultivation. Both equity and growth demanded changes in agrarian structure.

14.3 POST INDEPENDENTS AGRARIAN REFORMS, LEGISLATION AND IMPLEMENTATION

Therefore immediately after attaining independence, the first task to be initiated was agrarian reforms to accomplish the desired objectives. The term agrarian reforms in the present context would be interpreted to mean the reforms relating to the abolition of intermediaries, re-distribution of land through imposition of land ceiling, security of tenure and consolidation of holdings. There are no dearth of documents prepared in the process of agrarian reforms by various committees panels and commissions beginning with the congress Agrarian Reforms Committee showing concerns about the situation and providing radical solutions. Nevertheless these documents were the outcome of the good intentions. There seems to be big gap between intentions and practices. So various legislative laws enacted and implemented to give practical shape to the diverse aspects of agrarian reforms policy.

In short rural India was characterised by feudal and semi-feudal agrarian relations. The peasantry was exploited in terms of rack renting, in security of tenure, forced labour, usually and so on. This resulted in the impoverishment of the peasantry on the one hand and the stagnation of agricultural production on the other. This called for an immediate restructuring of the agrarian relations in order to emancipate the peasantry from the semi-feudal production relations and foster the agricultural growth.

14.3.1 Abolition of Intermediaries

Since Land reforms change the base of economic and political power the policy content and implementation cannot but be influenced by the class alignments in the power structure. The earliest of the programmes of land reforms to be implemented with some success in India was the abolition of intermediaries. Abolition of intermediaries was initiated soon after independence. The anti nationalist character of the intermediaries, the prolonged struggle of the peasantry against zamindars as a part of nationalist struggle, the alienation of zamindars for political power in rural areas, the character of reform under which the interests of the upper class in the rural areas were little affected - all these contributed to the success of these reforms. As a result of this measure, by the middle of fifties the state assumed direct responsibility for revenue administration in the whole of the country. It meant better records of land ownership and the basis for transferability of land for mortgage or sale was placed on a much firmer footing as in the Rayatwari areas. There was also a better basis for administration of agricultural development.

These measures were criticized on two major grounds. Firstly, the high rates of compensation was wasted in luxurious consumption or spent on buying urban property and only a very small percentage of it was invested to step up agricultural production. Secondly, the exclusion of sir, Khudkasht and Khas lands from the purview of the Acts as personal property of the intermediaries under self-cultivation constituted a damaging loophole in the law and was utilised with deadly effect by the intermediaries. These loopholes helped to keep alive the social and economic base of feudal vested interests in the country and denied the benefits to the tenants. On the contrary the bigger landowners carved out their own sir and Khudkasht lands, and resorted to large-scale eviction of tenants and sharecroppers. The mass evictions exercised adverse

effect materially and morally on village life and foiled largely the new hopes and aspirations generated among the rural poor by land reform.

In fact abolition of intermediaries left inequalities of land ownership and the position of the sharecroppers and labourers unchanged though it helped to confer permanent, heritable and transferable rights on occupants. However the abolition of statutory landlordism covering a variety of intermediary tenures has now more or less been accomplished bringing nearly 20 million cultivators into direct contact with the state. Yet by skimming off the top layer of great absentee landlords it brought about spectacular improvement in the pre-reform situation.

14.3.2 Tenancy Reform

The specific features of tenancy legislation arise from the basic framework of land reforms policy, which favoured neither the wholesale expropriation of landlordism nor the wholesale expropriation of tenant cultivators. The middle course was adopted. During the first phase of the then existing tenancy laws were carried out, along with legislation for abolition of intermediaries, extending the scope of protection to the tenants of ex-intermediaries particularly in areas of statutory landlordism. The provision of larger measure of protection to tenants, however, set into motion a contradictory social process, namely that of mass eviction of tenants and sharecroppers. So powerful was the eviction drive, the old tenancy arrangements broke down and it took years for new arrangements to take shape.

Most of the States, however, tried to enact or amend tenancy laws in the subsequent years and tried to plug certain glaring loopholes in the existing enactments to enlarge the area of protection to the tenants. The major aspects incorporated in tenancy legislation in different states during the last two and a half decades can be identified as (i) security of tenure; (ii) termination of tenancy; (iii) resumption for personal cultivation; (iv) surrenders; and (v) regulation of rent. Tenancy reforms in different States exhibited considerable variations though maintaining a broad similarity of pattern.

While considerable progress has been made in the field of tenancy reform many deficiencies still persist in the laws. The definition of the term 'tenant' generally excludes the sharecroppers who form the great bulk of the tenant cultivators. Exclusion of sharecroppers from the scope of protection deprives the real tillers of the soil of the protection and rights provided for the tenants.

Ejection of tenants from their holdings is still permissible on flimsy grounds like non-payment of rent, failure of payment within a given period, failure to deliver share of the produce within specified time, to execute agreement to cultivate land properly etc. Total eviction from land is one of the besetting evils of the existing reforms.

Voluntary surrenders, as provided in the laws, are hardly ever voluntary, and have become the biggest instrument in depriving the tenants of their due protection. In fact the Fourth Plan suggestion that the landowners should not be allowed to regain possession of the surrendered land has not been acted upon by most of the States.

The right of resumption was sought to be justified as it would help to convert non-working rent-receiving landowners into owner cultivators who could step up agricultural production, the accent being on 'personal cultivation'. The term 'personal cultivation' has been so defined as to cover cultivation through hired labourers paid in cash or kind. Even personal by the landowner or his family is not an essential requisite of personal cultivation. With such a definition, the right of resumption has become an instrument in the hands of the unscrupulous landowners for land grabbing,

more so when the factor of personal labour does not find any place in the definition. This provision resulted in concealed tenancies which the actual tenant is characterised as a farm servant or an 'agricultural partner'.

The major drawback of tenancy reforms has been not to be able to regulate rents as recommended in the Plans. Fair rents have not been defined uniformly in the State laws. Besides, it is extremely difficult to implement the provisions of fair rents in the case of sharecroppers and tenants who are not enjoying any security of tenure.

One of the principal aims of tenancy reforms was to convert tenants into owners of land they cultivated. This object of conferring occupancy rights on as large a body of tenants as possible did not materialise because of high rates of compensation to be paid by the tenants. Besides, the purchase of ownership was made optional in certain states.

The provision of acquiring occupancy right by tenants on producing proof of continuous possession for twelve consecutive years totally negates the spirit of the principle of 'land to the tiller; because under the peculiar character of landlord-tenant nexus in India, it is virtually impossible for an ordinary tenant to prove it. It should have been provided that once a tenant puts forward his claim to occupancy right or any right under the tenancy law, the burden of proof to the contrary should be on the landlord in order to protect the mass of tenants.

14.3.3 Ceiling Legislation

In the pre-independence era, the principal of limiting private landholding was advanced by the All India Kisan Sabha. The existing landholders, both in Zamindari and Rayatwari area, shall be allowed to possess land for self cultivation only upto the maximum limit of 25 acres per land holder.' The problem of imposition of a ceiling on landholdings was also treated in the programme documents of the Indian National Congress. Nevertheless the question of a ceiling on landholdings gave rise to for greater disagreement in the ruling circles, firstly, because a ceiling directly affected the entire landlord class and not only the zamindars; secondly this measure applied not only to feudal and semi-feudal landed properties, but to big landholders in general and thirdly, with considerable concentration of lands in the hands of upper stratum of the peasantry, there was genuine fear among the latter that their interests, too, might be affected. The basic aims to be attained by fixing a ceiling on land holdings were (i) to meet the widespread desire of the tillers to possess land, (ii) reducing glaring inequalities in ownership and use of land; (iii) reducing inequalities in agricultural incomes; and (iv) enlarging the sphere of self-employment. However the third five-year plan document distinctly declared that one of the principal aims of the agrarian policy, and particularly of the imposition of a ceiling on land holdings, is to eliminate all elements of exploitation and social injustice within agrarian system. Nevertheless the declared policy of the government on the ceiling does not give a clear picture of the future of the landlord class.

The imposition of ceiling on agricultural holdings is pre-eminently a redistribute measure. The almost compelling case of land ceiling arises from the absolute and permanent shortage of land in relation to the population dependent on it, the limited prospect of transfer of population to non-agriculture and the need to step up production along with increase in employment. But this necessity was not effectively transformed into spearheaded action. Thus, for nearly fifty years after attainment of freedom, ceiling on big holdings remained a nebulous item in the scheme of agrarian reforms. It remained a vague politico-economic concept lurking in the background. It was justified on consideration of social justice but not on grounds of increasing production and developing agriculture.

Ceiling laws were enacted and enforced in two distinct phases, the earlier phase covering the period upto 1972, and the later from 1972 after the adoption of 'National guidelines'. As ceiling legislation is a State subject; each State enacted its own ceiling law, which obviously gave room for variations. There were two units of application, namely, the individual landholder and the family. Again, the definition of the term 'family' as also the classes of land, which were exempted from the operation of ceiling laws, also varied widely in the States. These legislative measures were also full of loopholes and the big landowners took full advantage of them to circumvent the laws. They resorted to partition of their holdings and fictitiously transferred them to other individuals through what is called 'beamy' transfers on a very large scale in anticipation of ceiling laws with the result that very little surplus land became available for redistribution. Besides, implementation was extremely unsatisfactory. The absence of any penal measure to restrict or control such breaches of law accelerated such evasion.

The major loopholes that existed in the ceiling laws were the high ceiling limits, scope for manipulations and clandestine transfers and exemption of various types of land from the ceiling laws were more serious. These loopholes provided an object lesson for today. It is now generally recognised that if redistribution of land was the main objective of the ceiling laws, this was not realized at all. The ineffectiveness of the ceiling laws of the earlier phase, the exigencies of agricultural production, agrarian unrest in the country, all these factors called for immediate review. The National Guidelines formulated on basis of this review provided the basis of ceiling legislation in the post 1972 phase.

The ceiling legislation in the post 1972 phase has been improved, rationalised and put on a more or less uniform basis throughout the country. This represents a national consensus on the question. The ceiling limits have been appreciably reduced, the long list of the exempted categories of land has been considerably cut and measures to control clandestine transfers have been provided for. There, however, still remain some variations in the amending legislation from State to State relating to the level of ceiling on lands with assured irrigation, outer limits of ceiling, rates of compensation and the date of retrospective effect. The main problem now is that of effective implementation of the amending legislation.

14.3.4 Implementation

The agrarian reforms not only failed to solve the land question through abolition of land lordism and redistribution of the land to the tillers of the soil; they did not even completely eliminate the semi-feudal exploitation of the peasantry. According to the 8th round of NSS, in 1953-54, 20.34 per cent of the cultivated land was held under leases. It also showed that the principal lessors were big landholders while for India as a whole only 12.03 per cent of total rural households owning land leased it out. It was found that households owning above 50 acres of land were leasing 36.26 per cent of the area and those owning 30-50 acres of land leasing out 28.07 per cent. These households together constitute 3.31 per cent of rural households leasing out land, accounted for 40.15 per cent of the leased out area. This was the position after the occupancy tenants in the zamindari area were declared owners.

The ruling circles depended primarily on legislation as the instrument of agrarian reforms to the serious neglect of implementation. They believed that once legislation has been enacted the required socio-economic results would follow automatically. In fact, implementation lag in the field of land reforms is still colossal and has been almost chronic.

The lack of political will has been a key factor behind ineffective implementation. The enforcement of land reforms has been treated as the sole responsibility of certain

administrative agencies without a time-bound programme and without any obligation on their part to associate the peasants with the process of implementation. Implementation is in a large measure a function of the degree of consciousness and organisation of the potential beneficiaries. The absence of links between the State and the potential beneficiaries through local popular organs has perpetuated the drift in the process of land reforms. The up-to-date records of rights, so crucial for effective implementation, were also wanting. Besides, the influential landowners made use of the existing laws and certain implementation procedures to get the land reform measures invalidated or stalled through judicial pronouncements and decrees. So, with all the moderate stance of land reform legislation in India, the performance, by and large, has been disappointing. Since land reforms involve certain basic structural changes in rural society affecting property rights in land, the officials cannot on their own function as a change agency in this field. In fact, the official machinery has not been conditioned to act as such, and without a powerful will of the State, explicitly defined and forcefully asserted from above, land reform programmes in the hands of officials alone would continue to fail. In this situation participation of the potential beneficiaries in the practical process of implementation assumes even greater significance.

Check Your Progress 1

1) Describe the Agrarian Scenario in the pre-land reform period.

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2) Explain what you understand by Agrarian reforms.

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3) Explain the reasons behind 'Abolition of Intermediaries' having some success among various land reform measures.

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4) Mark "T" for True and "F" for False.

- i) Land reforms broadly refer to measures to redistribute land in favour of peasants. ()
- ii) Self-cultivation constituted a damaging loophole in the law and was used by the intermediaries for denying the benefits to the tenants. ()
- iii) Tenancy laws were broadly used for mass eviction of the tenants. ()
- iv) The definition of the term 'tenant' included the sharecroppers. ()
- v) The imposition of ceiling on agricultural holdings was primarily a re-distributive measure. ()

14.4 ROLE OF TECHNOLOGICAL FACTORS IN AGRICULTURAL GROWTH

The food situation in India on the eve of the introduction of new high yielding varieties was alarming. Poverty, malnutrition and starvation were quite widespread. Unemployment has increased out of proportion because of stagnation in the industrial sector. There was serious risk of breaking down of the socio-political order if the situation did not improve. The food imports were continuously rising. The possibility of importing further were declining due to the uncertainty in world supply of foodgrains in the face of increasing demand from the food deficit regions of the world. Moreover, food prices in the world market were high and increasing, where as the economies capacity to import was limited. The possibility of increasing production by bringing more land under cultivation through land reclamation measures and cultivation of cultivable wasteland was not much. For the future, an overwhelming part of the increased production had to come by way of increased land productivity. Therefore in 1965 a 'new strategy' for agriculture for the fourth plan was outlined with the following objectives:

- i) to apply scientific techniques and knowledge of agriculture production at all stages, particularly in the fields;
- ii) to select a few areas with assessed rainfall and irrigation for concentrated application of a package of inputs based on improved varieties of seed responsive to heavy doses of fertilizers and on other modern inputs.
- iii) to achieve higher production of subsidiary foods both through intensive production programmes and overall development.

The above strategy was independent of the new HYV of seeds and would have been put in operation even if the former were not available.

14.4.1 High Yielding Varieties (HYV) of Seeds

However it was a sheer coincidence that, by this time, after years of international research and experimentation, the new high yielding short duration, short stem, fertilizer responsive varieties of seeds (HYV's) of wheat and rice became available for commercial cultivation in India. With this agricultural development strategy went under a dramatic change. The change was from traditional to modern agriculture based on the use of non-farm purchased inputs like fertilizers, pesticides, electric and diesel pumpsets, tractors and later on harvester combines. The adoption of the HYV technology yielded such spectacular results that it was termed as 'Green revolution'. It led to significant increases in the production of foodgrains in the five years (1967-68 to 1971-72) to average of 100 million tonnes compared to the average of 83 million tonnes of the pre-green revolution period of five years (i.e.1960-61 to 1964-65). In spite of the fact that it was limited to some cereal crops only and that too in the regions with good irrigation potential. As such its success depended on the availability of assured irrigation use of fertilizers and the HYV seeds.

Progress of HYV is indicated in the table 1. The area under High yielding varieties of paddy, wheat, maize, jawar and bazra increased from 0.88, 0.54, 0.21, 0.19 and 0.06 million hectares in 1966-67 to 28.71, 22.12, 3.02, 6.76 and 5.20 million hectares respectively by 1993-94. The total area under HYV crops increased from 1.88 million hectares to 66.99 million hectare over the same period. In 1966-67 it constituted only 2.5 per cent, 4.2 per cent, 4.1 per cent, 1.05 per cent and 0.5 per cent to the total area under the respective crops. However in 1993-94 share of HYV area to total area under these respective crops is 67.5 per cent, 88 per cent, 50 per cent, 53.2 per cent

and 54.5 per cent. However total HYV area as a proportion of total foodgrains area has increased from 1.63 per cent in 1966-67 to 54.3 per cent in the year 1993-94.

Table 1: Area under HYVs and Progress in Use of Agricultural Inputs

Area under HYV	1960-61	1970-71 (in unit million Hact.)	1980-81	1990-91	1994-95
Paddy	0.89@	5.59	18.23	27.39	31.02
Wheat	0.54@	6.48	16.10	20.97	23.25
Jowar	0.16@	0.80	3.50	7.06	7.08
Bajra	0.06@	2.05	3.64	5.70	5.39
Maize	0.21@	0.46	1.60	2.61	3.38
Total:	1.89@	15.38	43.08	64.98	71.27
Consumption of Chemical- Fertilizers: (in Lakh Tonnes)					
Total (N+P+K)	2.92	21.77	55.16	125.46	185.64
Per Hact (Kg.)	1.90	18.18	31.83	67.49	75.68

@ relates to 1966-67.

Source: Agricultural Statistics at a Glance DE&S, Ministry of Agriculture, Govt. of India, 1996.

Impressive success of this programme has resulted in phenomenal increases in the production of these cereals as well as total foodgrains during this period. Productivity of rice increased from mere 863 kgs per hectare in 1966-67 to 1888 in 1993-94 i.e. more than doubled, wheat productivity from mere 887 kgs per hectare to 2380 kgs per hectare i.e., by around 2.7 times in the same period. However the overall production of rice and wheat has risen much faster by 2.6 and 5.3 times respectively during this period because increases in area under these crops due to relatively higher yield rates. The remaining crops like maize, jawar and bajra did not show much improvement. That is to say the success story of HYV programme is limited to the major two foodgrain crops i.e. rice and wheat. Besides this it was also localized to the few states of the Indian Union and it was equally true about wheat rather than rice. It was a spectacular success in case of wheat in Punjab, Haryana and UP to be precise western U.P. where water was available in plenty. To an extent incentive price support policy of the government also played a crucial role in the increased use of new seeds.

In fact the increase in wheat output has become an important stabilizing factor in foodgrains production in the country of late wheat cultivation is spreading in the non-traditional areas such as West Bengal, Maharashtra, Assam, eastern Bihar and Orissa. In case of cultivation of HYVs of paddy there is a visible significant progress made although the pace of development is not as fast as in the case of wheat. This is due to the fact that the bulk of the crop is grown in the Kharif season, which suffers from the vagaries of the monsoon, characterised by drought or floods, and its vulnerability to attack by pests and diseases is very high. However in the rabi season (or winter) when rainfall is low and water management is easier the HYVs of paddy have shown much better results. As a result of the introduction of HYVs, paddy production has increased at a faster rate in the non-traditional rice growing states like the Punjab, Haryana and Western Uttar Pradesh, which are therefore contributing a significant

proportion of the total procurement for the central pool because of limited local consumption.

14.4.2 Irrigation and Water

Water is a crucial input for plant growth. Annual precipitation is a major source of water in India. Average annual rainfall is about 1200 mm but it is seasonal and highly uneven in its geographical distribution over the country. In some areas of the country e.g. West Rajasthan, the annual rainfall is less than 200 mm; in others e.g. Southwest India and parts of Assam it is as high as 4000 mm. Nearly 75 per cent of the rainfall in many regions of India is contributed by the Southwest monsoon and it is therefore confined to four months of the rainy season i.e. from June to September. Very few regions in India receive rainfall during the winter and summer season. As much as 34 per cent of the net sown area lies in low rainfall regions i.e. with annual precipitation of less than 750 mm. Another 36 per cent of the area receives 750 mm to 1150 mm. Only the remaining 30 per cent of the net sown area enjoy benefit of more than 1150 mm i.e. high rainfall. Besides, prolonged dry spells during the rainy season and/or late commencement or early withdrawal of monsoon further aggravates the uncertainty of crop prospects. In view of such uncertainties in rainfall irrigation is a critical requirement not only in low and medium rainfall regions but is necessary in even high rainfall regions as a supplementary source of water in the Kharif season.

The importance of irrigation to India's agriculture cannot be over stated. Apart from its vital importance for healthy crop growth, irrigation has attained crucial significance in view of the country's expanding needs of food production. The availability of water all the year round through irrigation networks facilitates double cropping as well as reduces the impact of vagaries of nature. Given the limited opportunities for bringing the additional acreage under cultivation in future, irrigation is capable of playing a useful 'land augmenting' role in India. In other words increase in agricultural production in general and foodgrains production in particular for the growing population would have to come largely through higher intensity of cropping and increased productivity per unit of land.

Most of the successful 'green revolution' areas of India and elsewhere in south Asia were known for their developed canal irrigation systems during the pre-HYV period. Irrigation is a pre-condition for the successful introduction of the new varieties even in areas known for heavy rainfall, such as the rice producing deltas of south India. the dwarf-sized new varieties can not be cultivated in flooded low lying areas which have traditionally been planted with taller varieties adapted to growing with water in the fields. Although attempts are presently being made to breed high yielding varieties, which can cope with deep-water conditions.

According to the Irrigation Commission, 1972, net area irrigated went up from 17.1 Mha (Million hectares) during the quinquennium ending 1934-35 to 19.4 Million hectares during the quinquennium ending 1949-50 i.e. by 18.5 per cent. Area irrigated from government canals went up during the same period by 28.0 per cent compared to wells, which increased by only 10.4 per cent.

With the advent of planning greater emphasis was placed on increasing area under irrigation to enhance the foodgrains as well as agricultural output. By 1990-91 net irrigated area moved up to 47.78 Million hectares as compared to 20.85 Million hectares in 1950-51 and 26.34 Million hectares in 1965-66 i.e. before the advent of the green revolution (table 2). That is it has grown at a faster rate of 2.41 per cent per annum in the post-green revolution period as compared to 1.57 per cent in the

pre-green revolution period. Even the growth rate of gross irrigated area in the post-green revolution period is higher than the pre-green revolution period. It only shows that the available irrigation facilities are being more intensively used in the post green revolution period. Alternatively one finds that the net irrigated area as a proportion of net sown area and gross irrigated area as a proportion of gross cropped area increased from 17.56 and 17.11 per cent to 19.34 per cent and 19.90 per cent respectively during the period 1950-51 to 1965-66 i.e. pre-green revolution period. This is also reflected in the increase in the cropping intensity, which have increased from 111.1 in 1950-51 to 129.9 in 1990-91 (table 2). In the initial stages increase in net irrigated area were brought about mainly through canals and wells. According to table 3, the percentage area irrigated by these two sources of irrigation in 1950-51 was 68.5 per cent, which increased 71.1 per cent by 1960-61. However after the mid sixties a much faster growth was registered by tube well irrigation, which is assured irrigation a prerequisite for the successful adoption of HYV technology. By 1990-91 the proportion of net irrigated area to net sown area increased to 33.59 per cent and that of gross irrigated area to gross cropped area to 33.60 per cent. Over and above the quality of irrigation has improved that is it has become more assured as compared to pre-green resolution period.

Table 2 : Selected Categories of Land use Classification

Year	NSA	NIA	PSAI	GSA	GIA	PGAI	CI
1950-51	118.75	20.85	17.56	181.89	22.56	17.11	111.1
1955-56	129.16	22.76	17.62	147.31	25.64	17.41	114.1
1960-61	183.20	24.66	18.51	152.77	27.98	18.32	114.7
1965-66	186.20	26.34	19.34	155.28	30.90	19.90	114.0
1970-71	140.27	31.10	22.17	165.79	38.19	23.04	118.2
1975-76	141.65	34.59	24.42	171.29	43.36	25.31	120.9
1980-81	140.00	38.72	27.66	172.63	49.78	28.84	129.9
1985-86	140.90	41.86	29.71	178.46	54.28	30.42	126.7
1990-91	143.00	47.78	33.41	185.74	62.47	33.60	180.7
1994-95	142.82	53.00	37.11	188.15	70.64	37.54	181.7

NSA : Net Sown Area, NIA : Net Irrigated Area, PSAI: Percentage of Net Sown Area Irrigated

GSA : Gross Sown Area, GIA : Gross Irrigated Area, PGAI : Percentage of Gross Area Irrigated

CI : Cropping Intensity

* Source : Indian Agriculture in Brief.

Table 3 : Area Irrigated by Sources

(Area in thousand hectares)

Sources	Year				
	1950-51	1960-61	1970-71	1980-81	1990-91
Canals	8,295 (39.8)	10,370 (42.1)	12,838 (41.3)	15,292 (39.5)	16,900 (35.7)
Tanks	3,618 (17.3)	4,561 (18.5)	4,112 (18.2)	3,182 (8.2)	3,245 (6.2)
Tubewells	(a)	185 (0.6)	4,461 (14.3)	9,531 (24.6)	14,211 (29.9)
Other wells	5,978 (28.7)	7,155 (29.0)	7,426 (23.9)	8,164 (21.1)	9,999 (21.1)
Other Sources	2,967 (14.2)	2,440 (9.8)	2,266 (7.3)	2,551 (6.6)	3,079 (6.5)
Total	20,853	24,661	31,103	38,720	47,434
Net Irrigated Area	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

(figures in the brackets are percentages)

a) included under "other wells" as separate figures were not collected during this year.

Source: Indian Agriculture in Brief 25th ed., Ministry of Agriculture, Government of India.

14.4.3 Fertilizers

Rapid population increases coupled with increasing demand for land for non-agricultural purposes has led to increasing pressure on land. Therefore the major emphasis has to be on raising the yield per acre of cropped land and on increasing cropping intensity of land used for cultivation. The net sown area is inelastic and has not increased much since 1970-71 to 1992-93. It was 140.27 million hectares in 1970-71 and increased to only 142.51 million hectares by 1992-93 i.e. has grown at paltry rate of 0.07 per cent per annum. It has already been pointed out that the new varieties are responsive to fertilizer intake. Therefore with increasing dosages of fertilizer, the output from traditional varieties grows only to a limited extent, whereas the new varieties show increasing yields up to a very high level of fertilizer input. The adequacy of the fertilizer supply, is for this reason, considered by many as a major pre-condition for the success of the technology associated with the new varieties.

Traditionally the level of consumption of fertilizer in India has been very low at less than a kg per hectare. However it increased to 1.90 kgs per hectare of cropped area in 1960-61 to increase to 9.40 kg per hectare at the time of introduction of HYVs in India. It rose to around 31.83 kgs per hectare of cropped are and touched a all time high figure of around 66.5 kgs per hectare in the year 1992-93(table 1). In comparison other Asian countries like DPR Korea and Japan per hectare application of fertilizers is as high as 399.7 kg and 345.3 kgs respectively. Total consumption rapidly increased with the introduction of HYV's. The domestic production of nitrogenous fertilizer increased from 98 thousand tonnes in 1960-61 to 10438 thousand tonnes in 1994-95,

but for a large part of the consumption the Indian farmers are still heavily dependent on imports. Fertilizer imports have increased over the years and they are at a level of 2.965 million tonnes i.e. around 22 per cent of the total consumption.

The phenomenal increase in production and productivity in agriculture since the mid sixties have been achieved through exploitation of the potential of HYVs with the help of increased use of fertilizers. Fertilizers along with better seeds and irrigation hold the key to the expected achievements. Thus although the importance of increase in the use of fertilizers was known from the beginning of the planning, the major break through in the consumption of fertilizers came with the introduction of new farm technology, which underlined the need for increased availability and use of non-conventional scientific inputs.

The annual growth rate in the use of fertilizers since 1968-69 is presented on the accompanying table. The annual rate of growth in the first four years from 1968-69 to 1971-72 was in the range 18 to 18 per cent. The pace of growth slowed down considerably during the period 1972-74 culminating in 1974-75. That was the period of energy crisis; the availability of fertilizers in the world market had shrunk; the prices had skyrocketed; ocean freight costs had galloped and profitability of fertilizer use had reached a low point. The steep rise in the price of chemical fertilizers had a dampening effect on the use of fertilizers. In northern India where selling fertilizers was never a problem, sales met with resistance from the peasants. The situation changed due to corrective action taken by the government, and supported by the industry and facilitated by the distinct improvement in the world situation.

Massive increase in fertilizer consumption would require a matching effort to strengthen the production and marketing infrastructure so as to make the right type of fertilizer available to the farmer at right place, at the right time and at the right price. It would also need a matching effort in providing strong extension support and making available other inputs such as irrigation water, credit and quality seeds to the farmers.

14.4.4 Mechanisation

Mechanisation is induced by the secular tendency for the biological sources of energy to become costlier as compared to mechanical sources. This is due in part to the labour saving bias of the technological change as well as increasing ease with which capital can be substituted for labour in agriculture. Further with the rise in incomes of farmers, the desire to reduce the drudgery of manual work asserts itself. Farm Mechanisation can give the farmers greater leisure apart from making work more agreeable. It may even raise the participation rate among those who could afford to abstain from the drudgery of manual work. Further, as Hanumantha Rao has argued labour in the sense of effective energy or efficiency units cannot be abundant when food is in short supply and the cost of labour can rise despite the growth of population. Besides these economic compulsions, the presence of mechanical sources of energy particularly tractors adds to the prestige (status) of farmers.

Many agricultural economists would dispute the inclusion of an indivisible factor of production like a tractor as a component of the new technology alongside divisible inputs like new seeds, fertilizer, pesticides and irrigation. Their opposition follows from their narrow definition of the new technology as scale-neutral, which can be introduced by both the large and smallholdings alike, whereas the inclusion of tractors is likely to give it the appearance of being biased towards the large farmers. However in most of the cases where the new technology has been successful, it is difficult to

assess its impact independent of the influence of tractorisation. The general experience is that the areas which were having a high degree of agricultural mechanisation in the past, such as Punjab, Haryana or west Godavary in A.P. were among the first to respond favourably to the new high yielding varieties of seeds.

Many factors have contributed to the growth of tractor use in the country with the introduction of the new varieties. On the supply side, the HYV seeds have been launched with an accompanying generous credit policy , which has made the purchase of agricultural machinery easier. However, easy financing cannot by itself explain the shift to tractor ownership, since according to available estimates, until 1970 only 10 per cent of the tractors were purchased with the institutional loans. Most of the money for their purchase came from private sources, part of it from the increased profits accruing to the large farmers from the cultivation of new varieties. Another important factor was the governments decision of liberalizing import of tractors and to encourage their domestic production. The number of tractors in the country grew in the first twenty years after the Green Revolution from 54 thousand in 1966 to 738 thousand by 1987 i.e. it has increased fourteen times. On the demand side, the tractor is used mainly for three kind of operations - ploughing, threshing and transport and in all these operations the tractor replaces both bullock power and human labour. Although bullocks serve many functions in a typical rural households in India besides their use as a source of energy for ploughing, harvesting, transport and water lifting, they are a source of farmyard manure also. However an advantage of the tractor is that it saves time and enables a particular agricultural operation to be completed within a given time limit. The need for timely ploughing is greater with the new seeds and in this tractors are more reliable than bullocks, which takes much longer. The tractor is also extensively used as a means of transport for carrying fertilizers, seed, crops output and even people.

Check Your Progress 2

- 1) Describe the food situation in India on the eve of introduction of HYV in fifty words.
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.....

- 2) What was the new strategy chalked out in the fourth plan to increase production explain in three sentences.
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- 3) Describe the major characteristics of new technology in three lines.
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- 4) Mark 'T' for True or 'F' for false.
- i) Possibility of increasing production by expansion of area had exhausted by mid sixties ()
 - ii) Mechanisation of agriculture was the major plank of the HYV technology ()
 - iii) Success story of HYV programme is limited to rice and wheat only. ()
 - iv) Fertilizer input per hectare in India is higher than DPR Korea & Japan. ()
 - v) Irrigation is a pre-condition for the successful introduction of HYV technology ()

14.5 LET US SUM UP

At the time of independence, Indian agriculture was dominated by a large class of poor peasants and landless laborers. A large percentage of the cultivated area was owned by small percentage of rich peasants and landlord-cum-money lenders. The modes of production were primitive. The agrarian relations could be characterised as feudal and semi-feudal. The peasantry was exploited in terms of rack renting, insecurity of tenure, forced labour, usuary and so on. This had led to the impoverishment of the peasantry and stagnation of agricultural production. Therefore immediately after independence agrarian reforms were initiated. The reforms were related to the abolition of intermediaries, redistribution of land through land ceiling, Security of tenure and consolidation of holdings. The agrarian reforms failed to solve the land question through abolition of landlordism. Abolition of intermediaries left inequalities of land ownership and the position of the sharecroppers landless laborers uncharged. Nevertheless it helped to confer permanent, heritable and transferable rights on the occupants. The principal objective of tenancy reforms to convert tenants into owners of the land they cultivated could not be achieved. It is now well recognised that if redistribution of land was the main objective of the ceiling laws, this was not realized at all.

The food situation in India on the eve of introduction of HYV was alarming. Even the possibility of importing foodgrains had exhausted due to the uncertainty in world supply of foodgrains especially in the face of increasing demand from food deficit regions of the world. On the other end possibility of increasing production by expansion of area had exhausted and the only option left was to increase productivity. Exactly at that time an improved varieties of seeds of wheat and rice, which were more responsive to fertilizer and irrigation, became available. This led to impressive growth of production of wheat and rice output by a spectacular increase in the productivities of these crops. Expansion of area under high yield varieties of seeds was matched by the increasing application of technical inputs. The adequacy of the fertilizer supply was a major pre-condition for the success of this technology. Another crucial input was the assured irrigation. The availability of water all the year round through the irrigation networks initially and tubewell irrigation later on not only helped in increasing the productivities of the HYV crops but also resulted in increasing cropping intensity to increase the per unit productivity of land. Although mechanization especially tractors and combine harvesters were instrumental in replacing both bullock power and human labour nevertheless they had an advantage in saving time by enabling certain agricultural operations to be completed within given time, thus leading to higher intensity of cropping on the one hand and increasing productivity by minimising losses on the other.

14.6 KEY WORDS

Agrarian Reforms: mean the reforms relating to the abolition to intermediaries, redistribution of land through imposition as land ceiling, security of tenure and consolidation of holdings.

Federal Agrarian Relations: Exploitation of formers in terms of lack renting insurity of tenure, forced labour usuary etc. which led to the impoverishment of the peasantry on the one hand and the stagnation of agricultural product on the other.

Abolition of Intermediaries : Removal of intermediaries (zamindar) because they exploited the farmers with abolition of intermediaries. A direct relationship had been established between the state and the farmer.

Tenancy Reforms : Means improvement in land tenure system. This reform includes (a) security of tenure, (b) regulation of rent, (c) providing ownership.

Fixation of Ceiling on Land Holding: This is a re-distributive measure, which includes redistribution of land among landless agricultural labourers and marginal farmers.

14.7 SOME USEFUL BOOKS

Khusro, A.M. (1973), *Economics of Land Reform and Farm Size in India*, Macmillan, Delhi.

Joshi, P.C. (1976) *Land Reforms in India, Trends and Perspectives* Allied Delhi.

Rao C.H.H. (1975), *Technological Change and the Distribution of Gains in India Agriculture*, Macmillan Delhi.

Rao C.H.H. (1994), *Agricultural Growth, Rural Poverty and Environmental Degradation in India*, Oxford University Press Delhi.

14.8 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) See Section 14.2 and attempt your answer.
- 2) Agrarian reforms means the reforms relating to the abolition of intermediaries, redistribution of land through fixation of land ceiling, security of tenure and consolidation of holdings.
- 3) Reasons for some success of abolition of intermediaries are : (a) Anti-nationalist character of the intermediaries, (b) Prolonged struggle of the peasantry against Zamindars, (c) removal of Zamindars for political power in rural areas, (d) providing better basis for admission of agricultural developments.
- 4) (a) T (b) T (c) T (d) T (e) T

Check Your Progress 2

- 1) See Section 14.4 and attempt your answer.
- 2) See Section 14.4 for your answer.
- 3) (1) T (2) T (3) T (4) T