UNIT 2 LAND UTILISATION AND CROPPING PATTERN

Structure

2.0 OBJECTIVES

After going through this unit, you will be able to:

- explain why it is important to study the trends in land utilisation;
- identify the factors influencing land utilisation trends in India;
- distinguish between gross/net cropped area and cropping intensity;
- discuss the factors contributing to changes in cropping pattern in a region; and
- critique the long-run effects of the trends in the cropping pattern of India.

2.1 INTRODUCTION

The availability of land in a country is constant limited by its geographical boundaries. Given the need for meeting the needs of land requirement by competing sectors (e.g. industry, town/city development) which quite often needs to be done by reducing the land used for agricultural purposes, there is little scope to expand the available land for cultivation. The requirement of food grains, on the other hand, is ever increasing owing to increasing population, changing tastes and

preferences due to improved income levels, and factors dominating the globalised economic scenario. While it might be argued that producing agricultural products within a country is not so important in a globalised world, in a developing country like India where large majority of population depends on subsistence agriculture as a means of sustenance for their very livelihood, agricultural production needs to be supported by policy measures (e.g. credit supply, extension services). The commercial viability of an agricultural activity has assumed critical significance in the context of globalised economy. Many factors, therefore, underscore the importance of studying the underlying factors responsible for influencing the land utilisation pattern in general, and within it, the pattern of crop production in particular. The present unit seeks to address the twin themes of land utilisation and cropping pattern in the Indian context.

2.2 PROFILES OF LAND UTILISATION

It is a fact that various parts of land meant for agriculture also cannot be used effectively for cultivation. This will become clear when we take a look at the alternative uses to which land is generally put into. Further, as said before, a large portion of available land is used for non-agricultural purposes. In effect, therefore, actual land available for cultivation (called 'gross cropped area') is always limited. We begin by first of all familiarising ourselves about the classification of land by their 'type of use'. Subsequently, we take a look at the profile of the distribution of land in India by their 'type of use' with a focus on what changes have taken place in their pattern of usage over a period of time. For this, we will take the two points of time for comparison: the point near to the time of independence (1950) and the latest year for which data are available (2008). We will see that the total area under cultivation, despite increased land usage for non-agricultural purposes has, in fact, increased over time. How has this become possible? What has contributed to this achievement? These are the aspects on which we will be able to know in this section.

2.2.1 Classification of Land by Type of Use

The total land area is broadly classified by their 'type of use' into the following: (i) cultivated land (i.e. net sown area); (ii) fallow land (area ploughed but left without being sown); (iii) area under non-agricultural use; (iv) barren and uncultivable land; (v) permanent pasture and other grazing land; (vi) land under miscellaneous tree and crops (outside of 'net sown area'); (vii) area under 'forest'; and (viii) area classified under 'cultivable waste'. An example of area under non-agricultural use is land used for industries. Land under forest and permanent pasture/grazing is needed for maintaining ecological balance in terms of the need of animals and other organisms in the universe. The classification of land by their broad profile of use, therefore, suggest that the agricultural output by crop cultivation can only be increased by better practices and application of technological advances. Better and innovative practices of agriculture are, thus, imperative from the point of view of meeting the concerns of food security in general and poor farmers in particular.

There are some important issues related to land utilisation in the context of developing economies like India whose large share of population is dependent on agriculture. First and foremost is the presence of large number of fragmented holdings. While agriculture continues to dominate the employment-income profiles of families dependent on such small holdings, the scope for implementing new

methods of cultivation is limited in such cases. Many factors like capital constraint, low literacy level, etc. hinders from pursuing a path of innovative practices. Along side, there are issues of poor/mis-utilisation of land and its impact/effect on environmental degradation. Secondly, making available land for industrialisation is always a major thrust of developmental policy. This is owing to a trend that is prevalent the world over where, the developmental path is leading to a structural shift from a higher dependence on agriculture to that in industry. This trend, besides underscoring the competing claims on land by industry, also points out to the policy dimension of dealing with disturbed livelihood, relocation and environmental concerns. In recent years, under the policy of rehabilitation and resettlement (R and R), there have been measures under which, job assurance, in addition to financial compensation for the acquired land, is guaranteed by legislative provisions. Initiatives like afforestation measures, aimed at increasing the share of forest land and address environmental concerns, have been among the policy thrust of the government.

2.2.2 Trends in Land Utilisation Pattern in India

The trend in land utilisation pattern over the period 1950 to 2008 is presented in Table 2.1. Major features of land utilisation profile flowing from the data in the Table are as follows:

- Gross cropped area has increased by 63.94 million hectares (mha) [from 131.89 mha in 1950 to 195.83 mha in 2008] over the period of 1950-2008. Further, close to 70 percent of total land area (68.9 percent in 2008 as compared to 56 percent in 1950) is covered by the net cropped area and area under 'forests'.
- The net sown area (i.e. land actually used for cultivation) has increased by 22.1 mha from 41.8 to 46.1 percent of 'total reported area on land utilisation' over the period 1950-2008.
- Area under non-agricultural use, which mainly includes land used for industrial and town/city development, has increased from 3.3 percent in 1950 to 8.4 percent in 2008. This is an indication of increasing urbanisation and industrialisation in the country.

Table 2.1: Land Utilisation Pattern (in mha)

Land by Type/Use	1950		2008	
	Area	%	Area	%
A Total geographical area	328.73		328.73	
(i) Net sown/cropped area	118.75	41.8	140.86	46.1
(ii) Fallow land	28.12	9.9	25.15	8.23
(iii) Area under non-agricultural use	9.36	3.3	25.54	8.4
(iv) Barren uncultivable land	38.16	13.4	17.3	5.7
(v) Permanent pasture/grazing land	6.68	2.3	10.4	3.4
(vi) Land under miscellaneous trees/crops/groves	19.8	6.96	3.3	1.1
(vii) Areas under 'forest'	40.5	14.2	69.7	22.8
(viii) Area under 'cultivable waste'	23.0	8.1	13.1	4.3
B Reporting area for land utilisation	284.37	100.0	305.35	100.0
C Gross cropped area	131.89		195.83	
Cropping Intensity (%) [percentage of **C** to **A** (i)]	110.1		139.0	

Note: Percentage indicated in columns 3 and 4 are to total reported area on land utilisation which is addition of figures indicated under (i) to (viii).

Source: Ministry of Environment and Forests (MoEF), 2010.

- Proportion of barren/uncultivable land has decreased from 13.4 percent in 1950 to 5.7 percent in 2008. This is an indication of the progress made in the area of waste land development.
- Area under permanent pasture/grazing land has increased from 2.3 percent to 3.4 percent over the period 1950-2008.
- Area under forest has increased from 14.2 percent to 22.8 percent over 1950-2008.
- Area under cultivable waste has decreased from 8.1 percent to 4.3 percent over 1950-2008.

The net effect of improvement in land utilisation pattern is indicated by 'cropping intensity'. In simple terms, cropping intensity indicates the number of times a field is used for growing crops in a year. This is expressed as a percentage of 'gross cropped area' to 'net cropped area'. Interestingly, this has increased from 110 percent to 139 percent over the period 1950-2008. Evidently, as the above analysis reveals, this achievement has been possible by a reduction in the *proportion of barren/uncultivable land* and *area under cultivable waste*, both of which have been steeply reduced (i.e. improved) indicating more efficient use of land over time. What is equally important to note is that this has been achieved by a simultaneous steep increase in the area under 'forest' and land under 'permanent pasture/grazing' both of which are important from the point of view of maintaining the larger ecological balance.

2.3 SOILS AND THEIR VARIABILITY

The type and quality of soil greatly determines the type of crops that can be grown in a region. It is an important input to plant growth and a natural material found everywhere but with differing type/quality. The type of soil benefits different type of crops through their unique physical, chemical and biological properties. For instance, 'alluvial soil' is rich in potassium and is well suited for crops like paddy, sugarcane and plantain. Likewise, 'red soil' has high iron content and is well suited for growing different type of grams (e.g. red, bengal, green), groundnut and caster seed. High yields and good produce can be achieved only when the right type of soil is used for crops to which it is most well suited. The quality of soil available in an area can be tested at soil testing laboratories. For areas in which suitable soil is not available, nutrients in the form of fertilizers can be added to enrich it. This is where scientific testing of soil is useful. Soil also gets depleted of its fertility if a particular crop is cultivated repeatedly in the area. Soil is also susceptible to erosion by natural factors like wind and rain, besides others. The depth/quality of soil therefore varies across regions. In this section, we shall briefly familiarise ourselves with the types of soil prevalent in different parts of India and the factors contributing to its erosion.

2.3.1 Types of Soil

The classification of soil depends upon the region/factor of its influence. Depending on the regional and the natural factor endowments (e.g. mountainous area, desert area, soil near to sea coast, etc.), the colour of the soil and their fertility levels vary. While some soil are distinguished for their colour (e.g. red soil, black soil, etc.), certain others (e.g. laterite, alluvial, etc.) are identified for their properties based on their chemical/geographical characteristics. A profile of types of soil and

the regions in the country where they can be found can be broadly stated as follows.

i) **Red Soil**: These are soil that is reddish in colour due to the presence of various iron oxides. Soils of this kind are deficient in organic content which are important in keeping the fertility characteristic of soil high. Nearly 2/3rd of the cultivated area in Tamil Nadu consist of this type of soil. Other parts of southern India (viz. Karnataka, Goa, Daman and Diu, Andhra Pradesh), South Eastern Maharashtra, Chattisgarh, Orissa and Jharkand, parts of Bihar and West Bengal (i.e. south-western belt touching up to the Eastern Indian frontier) are also abundant with red soil.

ii) **Black Soil**: These are soil derived from the deccan plateau. They vary in colour from dark brown to deep black. Soil of this kind are rich in organic matter and is well suited for growing cotton. They are also rich in useful chemicals like calcium, potassium and magnesium. Crops like cotton, tobacco, chilly, oil seeds, jowar, ragi and maize grow well in this type of soil. These are found in large parts of Mahrashtra and parts of western M. P., Gujarat and Tamil Nadu. Black soil found in uplands are relatively less productive than those in the lower reaches.

iii) **Brown Soil**: This is the third type of soil distinguished by its colour with its surface being brownish in colour. This is the normal soil found in most parts of the country and are moderately rich in organic content.

iv) **Laterite Soil**: Laterite soils are found in the hills of Karnataka, Kerala, M.P., eastern ghats of Orissa, W. B. and T. N. They are rich in organic matter in the lower elevations and are suitable for growing paddy. In the higher elevations, they are suitable for growing tea, cinchona, coffee and rubber. These soils prevail in those regions where there is an intermittently moist climate.

v) **Alluvial Soil**: This is the largest and most important soil group in India contributing to the highest share of soil variety in agriculture. Formed by the depositions of Ganges and Bramhaputra rivers in the North and East (i.e. the regions of U. P., W. B. and Assam) and by the deltaic/coastal regions of West/South (i.e. Gujarat, T. N. and Kerala), these are rich in lime but is also considerably saline and alkaline.

vi) **Desert Soil**: These are sandy soil low in organic content. They are found in western Rajasthan, Haryana and Punjab. Influenced by the Indus rivers and the Aravalli range of hills, these soils are also alkaline to saline. In spite of many water soluble minerals, they are low in nutrient content. They are, however, suitable for growing coconut, cashew and casuarinas in areas where there is high rainfall.

vii) **Terai Soil**: Terai soil are found in the hills of Himalayan region spanning the states of J and K, U. P., Bihar and W. B. They are formed by the downward movement of materials from the lower Himalayan regions.

viii) **Saline and Alkaline Soils**: These contain high amounts of soluble salts rendering an estimated 7 million hectares of land in India unsuitable for cultivation.

2.3.2 Factors Influencing Soil Erosion

Soil gets eroded by factors like rain, wind, overgrazing of animals and human activities like construction. Erosion by ***water*** is the most serious problem in India

particularly in the eastern parts which experience serious problem of flooding during rainy seasons. Soil erosion by water is estimated to affect about 5334 million tonnes of soil per year. Of this, close to 30 percent is permanently lost out to sea. Next to water, ***wind*** is a major factor contributing to soil erosion. This is a serious problem in 'arid (i.e. dry having no rain) and semi-arid' regions of Rajasthan, Haryana, Gujarat and Punjab. Erosion by wind is also prevalent in coastal areas where sandy soil predominates. Besides these natural factors, human induced factors like excessive removal of natural vegetative cover (by extension of agriculture to marginal areas and excessive grazing) also contribute to higher soil erosion by wind.

Another major cause of soil erosion and degradation is ***water logging***. Due to floods during rainy season (a natural factor) and excessive application of water in irrigated areas and canal seepage (a man made factor) the problem of water logging persists affecting large parts of cultivated land in India. Besides hampering crop growth, water logging has the potential of reducing/degrading soil productivity. The adverse effect of water logging is estimated to have exposed close to 8 million hectares of land in India. An yet another factor of soil quality degradation, which is but a form of erosion of soil quality, is ***salinization***. Due to increased application of canal irrigation by drawing on water from deep inside the ground level, the distance between ground water level and the upper layer of soil is increased. This is also what is referred to as falling ground water table levels. By a process of evaporation of water from the soil surface, the shifting water level causes 'soil salinization'. This process further leads to a chemical reaction called 'alkalization' whereby the quality of soil gets deeply eroded. In other words, disturbing the natural factors by drawing water excessively from deep within the earth's interiors has the potential of reducing the quality of soil by salinization/alkalization. This is also a man-made process of disturbing the ecological balance for which many socio-political factors have contributed in India.

Check Your Progress 1 (Answer in about 50 words in the space given below)

1) Mention the different uses of land into which the total land area is classified?

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2) Does the available trends on land utilisation in India indicate a decline in the total land area used for crop cultivation? Do you see any indication of progress in waste land development?

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3) Which type of soil is well suited for growing: (a) tea, coffee and rubber; and (b) coconut and cashew nuts? In which state(s) are these type of soils found? Are saline/alkaline soils good for crop cultivation?

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4) Mention the four factors which contribute to soil erosion indicating any two of them which are man-made.

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2.4 CROPPING PATTERN IN INDIA

Cropping pattern has many dimensions. We shall specify two of its main types here. In one of its first dimension, it could be viewed in terms of number of crops grown in an area/field. From this perspective, it refers to the type of cropping system pursued (e.g. mono-cropping, multiple cropping, etc.). We shall elaborate more on this in section 2.4.1. In another one of its profiles, it is indicated by the type of crops grown (e.g. rice based cropping pattern, maize based cropping pattern, etc.). This is also linked to the two popular cropping seasons commonly heard about in India as *rabi* season cropping pattern (post-monsoon crops) and *khariff* season cropping pattern (monsoon crops). Under this, the crop occupying the highest percentage of the sown area of the region is taken as the **base** crop with all other crops sown considered as ***substitute*** crops. Under this base-substitute referencing, the *rabi* season cropping pattern is distinguished for 'wheat/gram-based' and 'jowar-based' cropping patterns. On the other hand, under the *khariff* season cropping pattern, the base crops grown/sown are many viz. rice-based, cereal-based, maize-based, jowar-based, bajra-based, groundnut-based, cotton-based, etc.

2.4.1 Types of Cropping Pattern

Mono-cropping and Multiple-cropping: If a single crop is grown on a piece of land year after year it is refereed to as monoculture or ***mono-cropping***. Such a practice may be followed either because of extreme suitability of climate or due to the socio-economic condition of the farmer involved. It also can be due to the specialisation of the farmer in growing that particular type of crop. For instance, in canal irrigated areas, under waterlogged conditions, only rice is grown because no other crop is possible to be grown in such conditions. Growing more than one crop on the same piece of land in one calendar year is known as multiple-cropping. Multiple-cropping therefore implies intensification of cropping in time and space dimension i.e. more crops at one time and more crops on same amount of land at any given period. Three other types of cropping pattern (discussed

below) viz. inter-cropping, mixed-cropping and sequence-cropping are all variants of this particular type of multiple-cropping system practiced.

Inter-cropping: Inter-cropping refers to growing more than one crop simultaneously on a single piece of land with a definite row pattern. The practice can be followed with a certain defined ratio like 5 : 1 in which after every five rows of a particular crop the sixth row would be of a different crop. The system affords cropping intensity to be achieved over space dimension. Initially, the system of inter-cropping was practiced as an insurance against crop failure. More recently, the objective of inter-cropping has changed to achieving higher productivity besides stability in production. For successful inter-cropping, certain conditions are required to be ideally fulfilled. These are: (i) competition for light should be minimum among the different crops sown; (ii) complementarity must exist between crops sown; (iii) the time of peak nutrient demand of component crops should not overlap; and (iv) the difference in maturity of component crops should be at least 30 days.

Mixed-cropping: Mixed-cropping refers to growing two or more crops simultaneously without any definite row pattern. This practice is most commonly followed in dry land tracts. Under this system, seeds of different crops are mixed in certain proportion and sown. The objective is to meet family requirement of cereals, pulses and vegetables.

Sequence-cropping: Sequence-cropping refers to growing more than one crop in a sequence on the same piece of land in a farming year. Depending on the number of crops grown, the system may be called as double, triple, quadruple cropping pattern for crops involving two, three and four crops respectively.

Relay/Ratoon-cropping: A system of cropping in which the next crop is sown before harvesting the produce of the earlier crop is known as relay-cropping. Ratoon-cropping (or ratooning) refers to raising a crop with re-growth coming out of roots or stalks of previously harvested crop.

Integrated Farming System: This refers to following different types of cropping systems besides pursuing other allied areas of animal husbandry like dairying, poultry, fishery, bee-keeping, etc. The emphasis is on following a holistic method in a harmonious manner so as to maximise returns with efficient utilisation of resources subject to least damage to soil and environment.

2.4.2 Reasons Why Cropping Patterns Differ

The basic reason why cropping patterns differ over regions is that the amount of rainfall received varies widely from place to place. Based on the average amount of rainfall received in a season, the cultivated area in the country is broadly classified into three categories viz. (i) area receiving rainfall above 1150 milli meter (mm), (ii) area receiving rainfall within the range of 750-1150 mm and (iii) area where rainfall is below 750 mm. Most areas of Assam, Kerala, Orissa and West Bengal come under the first group. Basic problem in these area is limited irrigation and poor drainage. The major crop grown in these areas is rice. The states of T.N., U.P. and Andhra Pradesh come under the second category. These areas provide ample potential for setting up minor and major irrigation facilities. Areas coming under the third category, which offer little scope for improving cropping intensity due to relatively less rainfall, include parts of A. P., Karnataka, Maharashtra and Rajasthan. Besides the factor of variation in rainfall and irrigation facilities in a region, other reasons which contribute to differences in cropping pattern are:

- traditional social practices and dietary habits;
- crops with practicable disease/pest control management suitable to local ecological environment;
- crops which are most profitable or high yielding i.e. considerations of commercial viability; and
- combination of crops which ensure stability and risk coverage yielding profit maximisation and cost minimisation.

2.4.3 Factors Influencing Cropping Pattern

Various factors like socio-economic conditions of farmers, cultural factors, climatic conditions, etc. determine or influence the cropping pattern in a region. Major factors in this respect can be stated as follows.

i) **Size of the Land Holding**: As stated in the introduction to the unit, in India small and marginal farmers constitute the majority of farming community. Due to this reason, mono-cropping pattern has been highly prevalent as it fulfils the food requirement of the farmers' household. The situation is characteristic of subsistence farming offering little scope for commercial crop husbandry.

ii) **Literacy**: Practicing better cropping methods require a certain level of educational level. This is hindered in the Indian context due to prevalence of high illiteracy among the small and marginal farmer community who dominate the sector. The application of scientific methods involved in mixed/mono-cropping patterns requiring technological inputs is hindered due to this factor.

iii) **Financial Requirement/Stability**: Owing to poor economic condition of large number of farmers, cropping patterns involving medium to high capital requirements cannot be practiced by farmers. They are compelled to adopt low cost cropping pattern which will also yield low output and income.

iv) **Disease and Pest Management/Control**: This is linked to factors of poor financial and educational status of small farmers mentioned above. Owing to this, farmers cannot adopt modern disease/pest control measures.

v) **Ecological Suitability**: The cropping pattern of a region highly depends on ecological suitability to crops. Adoption of cropping pattern suitable to the local ecological factors require application of soil testing and usage of inputs required for the prevailing conditions. Once again, socio-economic status become the hindering factor in coping with this type of natural endowment condition.

vi) **Moisture Availability**: This is linked to climatic factor vis-à-vis amount of rainfall in the region. To counter this, modern irrigation facilities are needed. Besides, adoption of dry land farming techniques also could be required. All this requires a certain level of knowledge and economic base which is not supportive of adopting best farming practices in India.

The various factors enumerated above are essentially inter linked with counter influencing effects of one with the other. Emerging trends, however, indicate improvement in these ground realities in spite of large sections continuing to suffer from similar disabilities. We shall now take a look at these trends in the next section.

2.4.4 Emerging Trends in Cropping Pattern

India leads world in agricultural production enjoying the second position in the world with regard to overall agricultural production. Nonetheless, there are some disturbing trends continuing to dominate the cropping pattern in India. These may be stated as follows:

- Of all the types of agricultural production (viz. food grains, cereals, pulses, fruits and vegetables, etc.), there is a dominance of cereal crops. Since cereals indicate the basic needs of poor people, the trend is suggestive of large number of poor people engaged in subsistence farming. Since majority of farming community comprise of 'small and marginal farmers' (i.e. whose average holding is between 0-5 acres: see 'key words' at the end of the unit), the trend is one of dominance of poor people engaged in agricultural activities for self-consumption. The same fact also conveys that their inability to divert to non-food cash crops which require higher level of inputs. Although there has been an increase in the supply of farm loans and grants, the basic trend continues to be still disturbing.

- Second, despite improvement in agricultural productivity over time, it is still much lower when compared to global productivity levels. Worldwide evaluation studies reveal that the mean agricultural output in India is just 30-50 percent of the maximum average output in the world.

- The low productivity levels is also underscored by the ratio of employment to GDP. While more than 50 percent of an estimated total labour force of close to 500 million persons continue to remain in agriculture, the net contribution to agricultural production (i.e. GDP) is about 15 percent. While it is significant that the dependence of people in agriculture has come down from the level of close to 70 percent at the time of independence to about 50 percent now, it is still far higher than the corresponding level in developed countries (where about less than 5 percent of workforce produce far higher than India's average production levels). The trend is signifying of lower usage of scientific advances owing to the low level of socio-economic status of small farmers.

- There is a distinct shift from food grains production to cash crops like fruits and vegetables (with about 10 percent of global production of fruits today being from India and holding the first position in the world in respect of some fruits like papaya, mangoes, sapota, banana, etc.). In spite of this, the shift towards high valued commercial crops, in terms of global commercial standards, is still very small. The result is an insignificant impact on the global crop output and India's overall share therein.

- The population of India is increasing at a faster pace than its capacity to produce wheat and rice. This trend needs to be reversed and improved if the import of these commodities from other countries needs to be curtailed.

2.4.5 Long Run Effects of Current Trends in Cropping Pattern

The long run effects of current cropping pattern can be stated in terms of the following.

Increased Use of Fertilisers and Pesticides: Increased use of inorganic fertilisers and pesticides has led to increased toxicity in the agricultural produce. Heavy use of chemical fertilisers and pesticides have also caused extensive water and environmental pollution. This has led to many health problems in the community. Along side, there has been an immunity among pests leading to pesticides used becoming ineffective.

Use of Hybrid and High Yielding Varieties: Increased use of hybrid and high yielding varieties have resulted in the extinction of local varieties which were known for their higher nutritional levels. This has led to awareness on the importance of adopting natural and organic farming techniques. However, the scale in which such practices are operated needs to be enhanced in order to make a real dent into the system. It must be noted that these very methods were also the ones which contributed to the realisation of green revolution benefits. A balance between the traditional practices and the modern methods needs to be established.

Increased Water Demand: The agricultural sector is estimated to take up close to 70 percent of total water used. Further, with increased cropping intensity the requirement of water for agriculture would increase. This has deprived the demand for water from other competing sectors. The higher requirement of water has depleted the ground water levels. Consequent to increased irrigation facilities, many minor and major irrigation projects have had to be launched. Quite often, these projects have created social and environmental disturbance. The trend has been one of increased acquiring of agricultural land for non-agricultural purposes. While this trend in itself cannot be questioned, as the labour absorptive and the productivity levels of agriculture cannot match with that of industry, it has required the adopting of water conservation methods and practices.

Depletion of Forest Areas: One of the feared long run effects of higher cropping intensity was reduced forest area which is important for maintaining ecological balance. However, we noted in section 2.2.2 that measures of afforestation has contributed to not only maintaining but improving the overall forest cover in the country in general. Nonetheless, in specific areas and pockets local disturbance of ecological standards is a reality due to increased crop production and other non-agricultural activities. This is a matter of concern which needs to be tackled at the local levels.

In short, each of the factors identified above as areas of long term concern, is also a two-edge potent tool having both the beneficial and harmful effects. Striking a balance to get the benefits of a practice/method without undermining the consequential ill impacts is the developmental challenge that needs to be faced effectively.

2.5 INDIA'S POSITION IN WORLD

India ranks first in the production of buffalo milk in the world. There are a number of other products in which India ranks first in the world for its production (e.g. fresh fruits, coriander, jute, spices, pulses, castor oil seed, millets, safflower seeds, limes, lemons, cashew nuts, dry chillies and pepper, ginger, turmeric, goat milk, etc.). We rank second in the world in the production of paddy rice with an overall production of close to 148 million tonnes (mt) in 2008. Other items in which India

ranks second as the biggest producer in the world are: wheat, cow milk, fresh vegetables, sugar cane and ground nuts, cabbages, fresh vegetables, cotton seed, brinjal, garlic, silk, cardamom, wheat, onions, sugarcane, dry beans, tea, groundnut, cauliflower, green peas, pumpkins, potatoes, inland fish, etc. The number of products in which India ranks third in the global market include: sorghum, tobacco, coconuts, rapeseed, tomatoes, hen's egg, etc. In coffee production, India ranks sixth in the world. Thus, having noted in the earlier sections the various profiles of Indian agriculture together acting as challenges confronting the sector in general, it is equally important to know that we are also among the world leaders in many products of agriculture.

Check Your Progress 2 (answer in about 50 words in the space given below)

1) In the context of cropping pattern, how is a 'base' crop distinguished from a 'substitute' crop?

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2) Mention the three variants of 'multiple cropping'? What is meant by 'integrated farming system'?

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3) Besides rainfall, which other factors contribute to differences in cropping pattern over regions?

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4) Mention any five factors that influence the cropping pattern in India? Which is a factor influencing the cropping pattern that can be tackled by modern irrigation facilities?

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2.6 LET US SUM UP

The unit has dealt with the twin themes of land utilisation and cropping pattern in India. We began with an understanding of the broad classification of land uses. These were grouped into 8 uses amongst which we noted that land for agricultural usage has remained the top ranking area right from 1950 to 2008. This trend, has not been at the expense of depleting forest reserves or the land required for permanent pasture and grazing. In fact, land available for both these purposes, which are important for maintaining the overall ecological balance, has increased over time. This fact tells us that other measures initiated like afforestation, general awareness campaign, etc. have had their positive effect on the land utilisation pattern in the country. In crop production, while different types of cropping pattern are practiced, there is a need to focus on some critical areas of concern like small land holdings, low literacy levels, improving the economic ability, etc. All these are contributing to the relative lower levels of application of scientific methods of cropping practice. Despite the several drawbacks hampering the Indian agriculture, in the production of many farm products India is among the world leaders.

2.7 KEY WORDS

Cropping Intensity : Ratio of Gross Cropped Area to Net Cropped Area

Net Sown Area : Same as Net Cropped Area. This can be expressed in the form of an equation as follows:Net Sown Area = Gross Sown Area – {fallow land + cultivable waste} + K times (area cropped more than once); where K is the number of times a piece of land is used for cultivation.

Small/Marginal Farmers : A term commonly used in the Indian context. It refers to farmers with land holding of less than 2.5 hectares (1 hectare = 2.5 acres) of land. A small farmer is defined as one with less than 2 hectares of land while a marginal farmer is defined as one with less than 1 hectare of land. RBI, for the purpose of priority lending [under 'weaker sections within the priority sector'], defines 'small and marginal farmers' as those with "land less than 5 acres of non-irrigated land or 2.5 acres of irrigated land" and land-less labourers, tenant farmers, and share croppers'. They are characterised by having to remain compulsorily on their farming work having no other option suitable to their situation. Being poor, they use the land to grow crops for self-consumption; hence the word 'subsistence farming or farmers' also. Since they are large in number, and their ability to adopt modern

methods of cultivation is low (because of factors like low level of literacy and lack of input required for practicing modern methods), raising their productivity and income levels is a major policy challenge. Changing the archaic land laws in a major way, called as land reforms, is advocated as much needed in this regard.

Salinity/Alkalinity : Refers to the content of salt making the water/ soil saline. When such soil comes into contact with hot sun rays it results in a chemical reaction rendering the soil 'alkaline' in nature. Such soil is most ill-suited for farming purposes.

2.8 SOME USEFUL BOOKS

Chadha G K , S. Sen and H. R. Sharma (2004), *Land Resources , State of Indian Farmer: A Millennium Study*, Vol. 2, Academic Publishers, New Delhi.

Govt. of India (2001), Report of the Working Group on Agricultural Statistics (for the X Five Year Plan), Planning Commission, New Delhi.

(http://planningcommission.nic.in/aboutus/committee/wrkgrp/wgagristat.pdf)

Rajiv Ranjan Shrivastava (2007), *Emerging Trends of Cropping Pattern in India*, DK Publishers, New Delhi.

2.9 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) See section 2.2.2 and answer.

2) See section 2.2.2 and answer.

3) See section 2.3.1 and answer.

4) See section 2.3.2 and answer.

Check Your Progress 2

1) See section 2.4 and answer.

2) See section 2.4.1 and answer.

3) See section 2.4.2 and answer.

4) See section 2.4.3 and answer.