CHAPTER-III
A CASE STUDY OF SAMPLE VILLAGES

Agricultural productivity is influenced by many physico-socio-economic factors of a region e.g. slope of the land, quality of the soil, sources of irrigation, method of cultivation, variety of crops and many other. The agricultural productivity data are collected by revenue department i.e. yield of major crops ton/hectare and are published for different districts and even for a state or a nation. Below district level productivity, data are not available. And hence, in order to understand the spatial variation in agricultural productivity within the district, it is essential to collect the productivity data by visiting the farmers. Here, an attempt is made to understand the association between agricultural productivity and various physico-socio-economic factors at the village level. For this purpose, four villages i.e. Khondamali, Talwade BK, Waghale and Nandpur were carefully selected. These four villages represent different relief and socio-economic conditions. Khondamali and Talwade BK are non-tribal villages and even Khondamali is located in the plain of river Tapti while Talwade Bk is situated in the southern hilly ranges of the Sahyadri. On the other hand village Waghale and Nandpur are totally tribal settlements but Nandpur is situated in the plain of Tapti and Waghale is in the hilly areas of Sahyadri ranges.

The following discussion is related to the locational aspect, agricultural landuse, general landuse, socio-economic status of the farmer i.e. tribal and non-tribal and input output structure of selected crops in all the villages.

(1) **Khondamali** -

Khondamali a village located about fifteen kms to the north-east of Nandurbar. The village is close to the left bank of river Tapti and covers an area of 726.3 hectares. The total population of the village is about 3264 (2011, Talathi record).
Khondamali is located in the plain of Tapti with small undulations in physiography. The total area of the village has slope towards the north and therefore all the streams originate from this region join left bank of Tapti. The soils of this region are of deep black cotton soil with ample fertility. The sloping lands have relatively thin layers of the soil and having low fertility.

Due to the good quality of the soil the village has no area under forest, but the sloping lands and undulations are kept as fallow. The area receives low rainfall (below 600 mm annually) therefore, it supports thorny scrubs and the trees like Neem, Mango are along the sides of the fields and small streams.

Agricultural productivity is the functional outcome of the physical base of the agriculture and socio-economic and cultural determinants (Vishwakarma 2003). It is becoming increasingly important as the world’s population continues to grow. India, one of the world's most populous countries has taken steps in the past decades to increase its land productivity. Agricultural productivity is the result of inter relationship among a number of growth factors and soil is one of them. Productivity is the ability of the soil to produce crops. Soil fertility, good management practices, availability of water supply and a suitable climate contribute towards soil productivity. In order to understand the physiography and soil characteristics the villages were visited many times and found that there is not much more variation in soil type and characteristics. It is difficult to measure a fertility of the soil from its colour as it denotes the status of plant nutrients in the soil while soil productivity can notes the resultant of various factors influencing crop production both within and beyond the soil.

Plants take ninety or more elements from the soil. Only sixteen of which have been proved essential for their growth. These are as follows - Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorous, Potassium, Sulphur, Calcium, Iron, Magnecium, Boron, Zink, Mangenese, Copper, Molybdenum and Chlorine.
Fertile soil helps in raising good crops. The soil must deliver all sixteen essential elements at the exact time when a plant is ready to use them. This is itself would not be so difficult if all plants had the same requirements at all growth periods. But this is not the case. Not only do crops differ in their soil nutrient requirements but the some crop at different growth periods requires varying amount of the essential elements (Arakeri et al. 1967)

In order to understand farmers economic condition out of the total households of this village a sample of twenty-five house holds representing different categories of size of holding was selected. Twenty-five soil samples were collected representing the farms of different households and also different part of the village. These soil samples were analysed in the PSGVPMS Agriculture College, Shahada, District Nandurbar. The results of the mechanical and chemical analysis and their scale are represented in the following paragraphs.

**Table-3.1: Limits of the Major Elements in the Soil**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Type of Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percentage of Hydrogen - pH</strong></td>
<td></td>
</tr>
<tr>
<td>below 5.5</td>
<td>Acidic</td>
</tr>
<tr>
<td>5.5 to 6.5</td>
<td>Slight Acidic</td>
</tr>
<tr>
<td>6.5 to 7.5</td>
<td>Useful to crop</td>
</tr>
<tr>
<td>7.5 to 8.5</td>
<td>Useful to crop</td>
</tr>
<tr>
<td>8.6 or more</td>
<td>Harmful</td>
</tr>
<tr>
<td><strong>Electrical Conductance (millimose) (mm)</strong></td>
<td></td>
</tr>
<tr>
<td>below 1.0</td>
<td>Good</td>
</tr>
<tr>
<td>1.0 to 2.0</td>
<td>Unfavourable</td>
</tr>
<tr>
<td>2.0 to 4.0</td>
<td>Not useful</td>
</tr>
<tr>
<td>above 4.0</td>
<td>Harmful</td>
</tr>
<tr>
<td><strong>Percentage of Organic Compound</strong></td>
<td></td>
</tr>
<tr>
<td>below 0.20</td>
<td>Very low</td>
</tr>
<tr>
<td>0.21 to 0.4</td>
<td>Low</td>
</tr>
<tr>
<td>0.41 to 0.6</td>
<td>Medium</td>
</tr>
<tr>
<td>0.61 to 0.8</td>
<td>Slight more</td>
</tr>
<tr>
<td>0.81 to 1.0</td>
<td>High</td>
</tr>
<tr>
<td>More than 1.0</td>
<td>Very High</td>
</tr>
<tr>
<td>Nutrients</td>
<td>Limit ppm.</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>Iron - Fe</td>
<td>4.5</td>
</tr>
<tr>
<td>Zinc - Zn</td>
<td>06</td>
</tr>
<tr>
<td>Copper - Cu</td>
<td>0.2</td>
</tr>
<tr>
<td>Mangenese - Mn</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Soil is the surface material covering much of the earth, composed of mineral particles and humus, water and air, in which plants grow. It is the product of two processes i.e. the decomposition of rocks, decay of plant and animal life. Soil is studied on the basis of its physical and chemical properties including its biotic life like flora and fauna. The soils are also composed of solid, liquid and gaseous components e.g. minerals and organic matter are solid, water as liquid and air as gaseous. Soil supplies various nutrients to the plants. The nutrients like nitrogen, phosphate, potassium are taken by plants through their roots. But, the land does not provide all those nutrients always in sufficient quantity. Therefore, organic and inorganic fertilizers are used. Absorption of the nutrient change according to the type of crop or nutrient absorption depends on variety of crops.

Mainly carbon, hydrogen, oxygen, nitrogen, pottash and phosphorous are the six major elements used by crop therefore, they are called major nutrients carbon, oxygen and hydrogen require on large scale which naturally absorbed from water and air.

Calcium, sulphur and magnessium are secondary elements which are not much required. But manganese, zinc, copper, iron, molybdevium, boron, chlorin and nickel are called the micronutrients. All these nutrients may provide through organic and inorganic of chemical fertilizers. (Sakal, daily newspaper, Feb.2013)

Analysis of the soil samples show the existance and importance of the physical and organic matter for the agricultural production or for the growth of crops. Chemical analysis shows the following elements and limits from the soil samples of the selected villages. About twenty samples from each village were analysed to show their existence in the soil. From these samples pH, electrical conductance, organic matter in percentage, nitrogen (N), phosphorous or phosphate (P), pottassium (K), other micro nutrients like iron (Fe), zinc (Zn), copper (Cu) and manganese (Mn) are taken out i.e. as given below.
1) **pH (Percentage of Hydrogen)**-

The fertility of soil is determined by its plant nutrient content and by availability of these nutrients to plants. The nutrients are derived almost entirely from the weathering of parent material and from the decomposition of organic matter. The quantity of available hydrogen ions (H+ ions) is measured by the pH scale, which indicates the logarithmic concentration of H+ ions. Each whole number of pH below seven means the soil is increasingly acidic and number above seven means alkaline. Soil ranges in pH between approximately three and ten, in general a soil pH between five and seven is best for most agricultural crops. Highly alkaline soil is generally infertile because it lacks H+ ions to exchange for bases and also possibly contain toxic concentration of Sodium (Table 3.1).

2) **Ece (Electrical Conductance (millimose))**-

Ece means the ability of a substance to conduct electric current. Such conductivity is measured in mm/cm$^3$ (millimose per cubic centimeter). Ece above 1.01 mm is harmful to crops (Pawar, 1985) (Table 3.1).

3) **Organic Matter** -

Many cropping system bring about the destruction and loss of soil organic matter. Crop yield tend to decline in proportion to the reductions of organic matter. The organic matter can be fulfilled through the animal manure, legume and non legume green manures and crop residues. Extream amount i.e. very low and very high per centage of organic matter are harmful for the growth of crop. 0.4 to 0.8 per cent of organic matter is favourable for the growth of agricultural crop (Table 3.1).

4) **Nitrogen** -

Organic matter is the source of soil that supplies nitrogen. The climatic condition and type of method of farming provides high level of nitrogen supply with animal manures and the residue to legume crops used in association with
each other. Nitrogen from the soil is measured in kg/hectare. About 300 to 550 kilogram per hectare nitrogen is good for the crop growth (Table 3.1).

5) **Phosphates** -

Phosphorous is supplied from both mineral and organic soil constituents. Good concentration of phosphorous is from fifteen to thirty kilogram per hectare for agricultural crops (Table 3.1).

6) **Potash** -

Potassium is another important nutrient for crop. Crops acquire potassium from various potash minerals. Some soils are not abundantly supplied with these minerals and some soils are unable to provide potash to some crops with sufficient quantities for good yields. Range in between 150 to 250 kilogram per hectare potash is good for the yield of crop (Table 3.1).

7) **Other Micro-nutrients** -

The micro-nutrient includes iron (Fe), zinc (Zn), copper (Cu) and manganese (Mn) which are measured in ppm (part per million). The limit of iron compound in the soil should be 4.5 ppm while zinc 0.6, copper 0.2 and manganese 2.0 ppm respectively. Any type of the soil in the world has an ideal condition of the existence of all these micro nutrients. These are provided as fertilizers and spread in the agricultural fields (Table 3.1). Such analysis reveals the amount of all the elements in the soil and if it is less how much can be provided to the soil and on the contrary if it is in excess amount then it can not be supplied artificially or manually, (Encyclopedia Britanica Vol. 20).

3.1 **Elements in the Soil of Village Khondamali** -

1) **pH (percentage of hydrogen)**-

Most of the village area has useful soil have pH seven to eight. The highest value of pH is 8.33 which is to alkaline and there are two patches of such category. While the lowest value of pH is 6.73 and is slightly above acidic soils in (above 6.5) the northern part has below seven pH. But the
remaining all area of the village has soil is useful for crop (pH is in between seven to eight) (Fig. 3.1).

2) **Ece (Electrical conductance (millimose)) -**

The ability of substance to conduct electrical current is called conductivity. Such conductivity is measured in mm/cm³ (millimose per cubic centimeter) (Pawar, 1985). Ece above 1.01 is harmful to crops. In this village there are two small patches in the north-west have Ece above one (1.81 and 2.05). Most of the area has below 0.5 and in the eastern part and a belt to the western part has Ece in between 0.5 to 1.0. These soils are good for the growth of the crop (Fig. 3.2).

3) **Organic Compound -**

Organic compound is a basic need of the crop which forms from the decomposition of organic matter. It is measured in percentage. The percentage of organic compound is lower in the northern part, western parts which have two small patches, where it is below 0.5 per cent. Medium percentage of organic matter is in the central and eastern part i.e. in between 0.5 to 0.6. Besides, there is slightly more percentage of organic matter in two patches in the south and in the northeast respectively (Fig. 3.3).

4) **Nitrogen -**

Nitrogen in the soil is measured in kg/hectare. All the village areas have low to medium scale. There are two patches i.e. in the north and in the south-west has low amount of nitrogen in the soil i.e. in between 180 to 185 kg/hectare from east to the west through central part of the village area has 250-300 kg/hectare of nitrogen and on the other hand above 300 kg/hectare of nitrogen is in the south-eastern and north-western part. But above all the soil has good amount of nitrogen (Fig. 3.4).

5) **Phosphorous -**

Phosphorous or Phosphate is a major nutrient in the soil, which is also measured in kg/hectare. Most of the village area has medium amount of
phosphorous i.e. in between eight to twenty one kg/hectare. One block in the
north has below eight kg/hectare of phosphrous. Large area of the village has
phosphorous above sixteen kg/hectare and is in medium amount. Phosphorous
in between ten to sixteen kg/hectare indicates low to medium amount of
phosphorous. The low area has to increase or to provide the phosphorous
through external forms (Fig. 3.5).

6) **Potassium -**

Below 200 kg/hectare (189.28 and 194.36) potassium is in the central to
north patch and in the south-western corner where potassium can be provide
through external processes. The south-eastern and north-western patches have
potash above 250kg/hectare (278.88 and 292.32 kg/Hectare). Remaining
village area is having medium amount of potassium. Thus there is no need to
provide potash externally (Fig. 3.6).

7) **Iron/Ferrous -**

Ferrous compound is measured in part per million (ppm). Iron above 4.5
ppm is harmfull to the crop and exactly the same is observed in this village
area. The lowest ppm in the village area is 6.91, which is actually more than the
limit central and the south-eastern corner has patches have extreme iron i.e.
above fourteen ppm. The northern and the south-western part has minimum
amount of ferrous i.e. below ten ppm (Fig. 3.7).

8) **Zinc -**

Zinc is another micro-nutrient, which is helpful for the crop growth.
More than 0.6 ppm of zinc is harmful in the soil for crop. This is also more
than the limit in the village area of Khondamali. The lowest amount in this
village area is 0.71 ppm and is found in the northern and south-eastern patches.
The highest i.e. above 1.1 ppm is in the central small patch and in the eastern
part. In general all the village area has more than the limit i.e. 0.6 ppm of zinc
and is harmful to the crops (Fig. 3.8).
9) Copper - 

Above 0.2 ppm of copper is harmful for the crop and in this village area it has crossed the limit. Below one ppm is near the southerm and northern boundary of village. Besides it the area is having extreme (above one ppm) limit of copper (Fig. 3.9).

10) Manganese - 

Manganese is harmful when it is more than two ppm. Here, in the village area has lower limit of manganese i.e. 7.06 ppm and is found in the north-east corner, south-west corner and in the south. The highest ppm i.e. above twelve ppm is in the south-east area of village. Remaining area has in between nine to twelve ppm of manganese (Fig. 3.10).
3.2 Elements in the Soil of Village Talwade Bk -

Village Talwade Bk is situated near the left bank of river Amravati, a tributary of Tapti. The village covers an area of 636.28 hectares. The total population of village was 1290 in 2001 and 1674 in 2011 (thirty per cent rise in a population during the period of ten years). The village is located in the southern hilly ranges of the tahsil. The total village area has a slope towards the south and all the small streams of the area join the river Amravati. Most of area has shallow, brown and somewhere black colour soil. It is not containing with ample nutrients and hence the soil has low fertility. Many small undulations are devoted to the forest and fallow land.

To understand the quality of the soil, about twenty soil samples were collected from the various parts of the village and analyzed. The analysis of the soil reveals the existance of different elements is as given below.

1) pH (percentage of hydrogen) -

Most of the area has soil pH below seven which is ‘slightly acidic - to - useful for crops’. The south eastern part near the boundary of the village has pH above eight but eventhough these are useful to crops. Generally pH should be in between 6.5 to 8.5 where agriculture can be developed or the land can be useful to crops (Fig. 3.11).

2) Ece (Electrical conductance (millimose)) -

The soils of the village show Ece below one, therefore these are good soils. The northern part has small hilly ranges where nearby in the fields Ece is below 0.3. The south-eastern, western and eastern patch has 0.3 to 0.4 Ece and from central part to the southern boundary of the village having Ece 0.4 to 0.5. Very small farms or patches have above Ece 0.5. Eventhough it is favourable for the crop (Fig. 3.12).

3) Organic compound -

Organic compound has direct relationship with crop. The percentage from 0.41 to 0.8 is most favourable and below 0.4 per cent is not much more
useful for crop and above 0.8 per cent is higher and also not useful for the agriculture. The western and northern belt and the western small patch has low organic compound due to the shallow soil that contains higher amount of sand and silt. The central crescent shaped belt holds 0.5 to 0.6 per cent of organic compound. One small patch in the north and in the south-east has more per cent (above 0.8) which is slightly more and harmful to the crops (Fig. 3.13).

4) **Nitrogen** -

The amount of nitrogen is in between 200 to 300 kg/hectare is low to medium. The northern and the south-eastern patches have more than 300 kg/hectare and are in the medium range of nitrogen in the soil.

Only two small patches in the east and west respectively have low nitrogen (below 200). Overall the nitrogen is at useful level to the crops (Fig. 3.14).

5) **Phosphorous** -

Phosphate, in the village area is from low to medium level i.e. in between ten to sixteen kg/hectare. Most of the area has low amount (below fourteen kg/hectare) of phosphorous is available in the soil. The south-west, central and eastern part has ten to twelve kg/hectare of phosphorous in the soil. The central part again ranges from fourteen to sixteen kg/hectare of phosphorous. The picture clearly shows that some area has a need to supply the phosphorous in external forms (Fig. 3.15).

6) **Potassium** -

The good limit of potassium is in between 150-200 kg/hectare. Here, one patch in the central has less i.e. about 160 kg/hectare of potassium is available. Most of the area has slight more amount of potash, and the southern margin of village has slight high amount of potassium i.e. 250 to 300 kg/hectare (Fig. 3.16).
7) **Iron / Ferrous -**

Ferrous or Iron compound is important micro-nutrient for crop. Ferrous in the soil of Talwade Bk is at harmful level (above 4.5 ppm). The central part has six to seven ppm and northern and southern part has seven to eight ppm of ferrous in the soil. While the south-west corner and in the north-east and eastern part has two small patches where it is more than eight ppm in the soil (Fig. 3.17).

8) **Zinc -**

Zinc the micro-nutrient above 0.6 ppm is at harmful level and all over in the soil has above 0.6 ppm. The central patch has below one ppm zinc is observed and remaining the whole region has in between 1 to 1.5 ppm of zinc. Thus, the zinc is at its excess level (Fig. 3.18).

9) **Copper -**

The limit of copper above 0.2 is at excess amount or harmful level. Except southern border and the central small patch of the village area has good amount of copper (one to two ppm) (Fig. 3.19).

10) **Manganese (Mn) -**

Manganese in the village area is at the highest level of existance (above two ppm). Central, northern and southern patches have eight to nine ppm of Manganese while near the south border of village has above nine ppm. Thus, the whole area has extreme level of manganese (Fig. 3.20).
3.3 **Elements in the Soil of Village Waghale**

Village Waghale is situated in the south-western hilly region of Nandurbar Tahsil. The total population of the village was 2808 in 2001 and has increased up to 3680 in 2011 i.e. twenty four per cent rise in the population. Due to the undulating area it has shallow soil having low mineral and nutrient content. Twenty soil samples are collected from the various locations of the fields and analysed from the laboratory. Their results are as given below.

1) **pH (percentage of hydrogen)**

There are two groups of pH in the village. The half of the northern part has below 7.5 i.e. upto 7.12 while the northern small patch and southern half of the region has pH above 7.5. Though pH is high the soil is useful to the crops (Fig. 3.21).

2) **Ece (Electrical conductance (millimose))**

The soils of the village are good i.e. Ece is below one. But eventhough very low (0.2) Ece is there in the southern half and in the northern small patch. The area having 0.2 to 0.3 Ece is less and has covered central to northern part.

But on the contrary, very small patches have Ece is in between 0.3 to 0.4 and above (Fig. 3.22).

3) **Organic Compound**

There are two patches have very low organic compound (below 0.5 per cent) in the northern part. Most of the area has organic compound in between 0.5 to 0.6 per cent. The southern part has a big patch have above 0.6 per cent of organic compound. Above 0.7 per cent of the organic compound in the north has no considerable variation (Fig. 3.23).

4) **Nitrogen**

Overall the area of the village has low amount of nitrogen (below 300 kg/hectare). Below 200 kg/hectare nitrogen is in the small patch of north-east
and most of the area has 200 to 250 kg/hectare. Again two patches, in the south
and north respectively has 250 to 300 kg/hectare (Fig. 3.24).

5) **Phosphorous** -

Amount of phosphorous is low in all over the region i.e. below fourteen
kg/hectare. The eastern boundary of village has only one small patch (below
ten kg/hectare).

While ten to twelve kg/hectare is in one major patch in the north and on the
other hand there are two patches in the north and central part is having twelve
to fourteen kg/hectare. Similarly, southern part and small patch in the north
boundary has fourteen to sixteen kg/hectare phosphorous and the southern
boundary has one patch having phosphorous above sixteen kg/hectare (fig
3.25).

6) **Potassium** -

The amount of potassium is at medium level (below 200 kg/hectare)
near the north boundary of the village. There are three patches where potassium
is above 250 kg/hectare and the remaining all over the region has 200 to 250 kg
of potassium per hectare (Fig. 3.26).

7) **Iron / Ferrous** -

All over the area of the village has excess of ferrous i.e. more than 4.5
ppm which is harmful to the crop. There is southern boundary area and two
patches near the western boundary have ferrous below ten ppm (below 9.66
ppm). The southern half has ten to twelve and northern half has above twelve
to fourteen ppm of ferrous is concentrated in the soil (Fig. 3.27).

8) **Zinc** -

Zinc is at the harmful level in all over area of the village (above 0.6
ppm). There are two small patches have 0.96 and 0.88 ppm of zinc. Similarly
major two patches in the north and south has from 1.0 to 1.2 ppm. The western
boundary has the highest ppm (above 1.4 ppm) and north to south belt spread
from the eastern boundary has 1.2 to 1.4 ppm of zinc (Fig. 3.28).
9) **Copper** -

Copper level in the soil of 0.2 ppm, is the limit favourable for the crop growth. But none of the part of village has copper within the limit. The south-eastern and north-eastern corner has below two ppm. Again two strips of the region have 2.0 to 2.5 ppm of copper which is at harmful level. Similarly remaining all part ie. North to south strips of land has above 2.5 ppm of copper (Fig. 3.29).

10) **Manganese** -

Manganese a micro-nutrient is at very harmful level in all the village area. Near the south boundary and small patch in the north has below ten ppm of manganese, while it is ten to eleven ppm in the northern big patch. Central part has manganese from eleven to twelve ppm.(Fig. 3.30).
3.4 Elements in the Soil of Village Nandpur -

Nandpur is a tribal village located at twenty-one kilometres in the west of Nandurbar. The village is located in the plain of Ranka Nalla a tributary of river Tapti. The total population of the village was 796 (2001) and 917 (2011) i.e. thirteen per cent rise in the population within the period of ten years. The village is small and tribal that covers 344 hectares area. The soil of the area is fertile having black cotton soil. Twenty soil samples are collected from the various locations of the fields and analysed from the laboratory. There results are given below.

1) pH(percentage of hydrogen)-

The area of the Nandpur village has pH in the soil is at useful level for crop (above 6.5 and below 8.5). The central part has pH is 7.25 and small patch in the north also holds pH of 7.25. The eastern and western part has pH from 7.25 to 7.50 and remaining two small patches have above 7.5 i.e. 7.68 and 7.78 respectively (Fig. 3.31).

2) Ece (Electrical conductance (millimose)) -

Most of the area of the village has Ece at useful level. There are two patches in the north and west where Ece is below 2.20. On the contrary the south-eastern part, western and north western part have three patches has Ece above 0.30. The other part ranges in between 0.2 to 0.3 of Ece (Fig. 3.32).

3) Organic Compound -

Organic compound is an essential element and in the soils of Nandpur village it is at useful level (below one per cent). There are two patches i.e. in the north and stretch in the south has below 0.5 per cent. Above 0.7 per cent of organic compound (0.72 to 0.79 per cent) is observed in the eastern boundary and south-western part of the village. Nearby the same patches there are major three patches where organic compound is 0.6 to 0.7 per cent and from central to the western part has 0.5 to 0.6 per cent of organic compound (Fig. 3.33).
4) Nitrogen -

Nitrogen in the soils of village Nandpur is in between 185 to 290 kg/hectare (low to medium range). The south-eastern part has a big patch have 200 to 225 kg/hectare of nitrogen and the highest is at the northern boundary and south-west corner (above 250 kg/hectare). The remaining central and western part has 225 to 250 kg/hectare of nitrogen (Fig. 3.34).

5) Phosphorous -

Phosphorous in the village area is at low level (eight to fourteen kg/hectare). Very small area of the village i.e. in the northern boundary and south-western patch has above fourteen kg/hectare (14.17 to 16.03 kg/hectare). The south eastern part has below ten kg/hectare (9.14). While from south boundary to eastern boundary again one patch has ten to twelve kg/hectare of phosphorous and most of the area has twelve to fourteen kg/hectare (Fig. 3.35).

6) Potassium -

The area of the Nandpur village has two patches i.e. in the central and at the west (small) has below 200 kg/hectare, which is at medium level. Potassium amount in between 200 to 225 kg/hectare is in most of the area of the village. While in eastern part and two other small patches in the north-west and south-east has 225 to 250 kg/hectare. And in north-east and north-west small patches have above 250 kg/hectare (from 255 to 268 kg/hectare) (Fig. 3.36).

7) Iron / Ferrous -

The ferrous content in the soils of Nandpur are at harmful level (above 4.5 ppm.). North-western and south-western part has two small patches where ferrous is below ten ppm (9.75 ppm). Similarly, the patches in the nearby area have the level within ten to twelve ppm of ferrous. Again the eastern, western and northern boundary of the village has ferrous content upto fourteen ppm (14.68 to 17.20 ppm) (Fig. 3.37).
8) **Zinc** -

Zinc in the soils of Nandpur is also at harmful level (above 0.6 ppm). Near the southern boundary of the village has below one ppm (0.98 ppm) of zinc and from central to north have above 1.5 ppm of zinc. All over in the region has in between 1.0 to 1.5 ppm of zinc. Thus, overall, zinc is at its excess level in the soils of Nandpur (Fig. 3.38).

9) **Copper** -

Copper, a micro nutrient is below two ppm in the north-east and south-west (1.75 to 1.91 ppm) from central to north part has above 2.5 ppm. While remaining all the area has 2.00 to 2.5 ppm of copper is observed (Fig. 3.39).

10) **Manganese** -

The limit of the manganese is two ppm, but here in this village area it is at excess level. Two small patches i.e. in the east and west have below ten ppm (9.85 to 9.92). In the north-west and from west to east nearby the border of the village has above eleven ppm of manganese and remaining most of the area has in between ten to eleven ppm of manganese (Fig. 3.40).
3.5 General Landuse and Agricultural Landuse at micro-level (2001-02, 2005-06, 2009-10)

The study of landuse is based on the secondary data collected from the revenue department and the talathi record of the village for the year of 2001-02, 2005-06 and 2009-10. An outline of the villages was obtained from the talathi of the villages. All the villages have distinct characteristics of agricultural and general landuse. During the period of ten years of landuse, the changes have been observed. These changes are related to physical as well as socio-economic characteristic.

Village wise landuse can be studied and explained as given below-

3.6 General Landuse - Village Khondamali (2001-02, 2005-06 and 2009-10)

The general landuse is mainly divided in three categories i.e. net sown area, fallow and forest. The area not available for cultivation (NAC) is the fourth category. But, in this village it is very negligible and hence is not considered.

1) NSA -

Net sown area was ninety-two per cent in 2001-02 and it has increased by two per cent i.e. ninety-four per cent in 2005-06 and 2009-10 (Table 3.2).

2) Fallow -

Fallow area in this village was five per cent of total village area in 2001-02, while it has decline in 2005-06 by one per cent (four per cent) in 2005-06 and again in 2009-10 it has increased by one per cent i.e. five per cent. Thus it shows minor fluctuations in the fallow land (Table 3.2)

3) Forest -

Area under forest has decreased by one per cent from 2001-02 to 2005-06 and 2005-06 to 2009-10 i.e. from three per cent, two per cent and one per cent respectively (Table 3.2).
### Table-3.2: General landuse, Village Khondamali

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Type of Landuse</th>
<th>Percentage to TVA in 2001-02</th>
<th>Percentage to TVA in 2005-06</th>
<th>Percentage to TVA in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>NSA</td>
<td>92</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td>2.</td>
<td>Fallow</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Forest</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source - Revenue Records

#### 3.7 Agricultural Landuse, Village Khondamali (2001-02, 2005-06 and 2009-10)

In Khondamali, a variety of crops are grown in kharif and rabi season. Jowar, bajra, corn, pulses, cotton and chilly etc. are grown in kharif while wheat, gram and other vegetables are in rabi season. The changing agricultural landuse of village Khondamali is as given below.

The agricultural landuse of village Khondamali can be described as under -

1) **Cotton** -

Cotton is an important cash crop grown widely in Khondamali. Area under cotton was 39.47 per cent of total cropped area in 2001-02 and it has increased upto fifty-five to sixty-four per cent of total cropped area in 2005-06. In 2009-10 it has tremendously rise in area i.e. 77.66 per cent and become a dominant crop (Table 3.3).

2) **Jowar** -

Area under jowar in Khondamali was 10.32 per cent of total cropped area in 2001-02. It has increased about one per cent (11.56) in 2005-06. But, in
the year of 2009-10, the area under jowar reduced considerably i.e. upto 4.88 per cent (Table 3.3).

3) **Bajra** -

Bajra, a major food crop, has occupied fifteen per cent of total cropped area in 2001-02, but it has decreased by about ten per cent (5.67) in 2005-06, while, in 2009-10 there is slight increase in the area (8.30) per cent of total cropped area (Table 3.3).

4) **Pulses** -

Pulses include gram, mung, tur, urid, muth etc. The area under these crops was 10.83 per cent of total cropped area in 2001-02 and there is decline in the area i.e. 6.64 per cent of total cropped area in 2005-06 while it is almost absent in the year of 2009-10. This may be due to the increase in the area under cotton (Table 3.3).

5) **Corn** -

Corn is not only a food crop but it is also grown as a cash crop in Khondamali. In 2001-02, 9.33 per cent of total cropped area was under corn and it has decreased (4.31 per cent of total cropped area) in 2005-06 and there is a huge decrease in 2009-10 i.e. 1.35 per cent of total cropped area (Table 3.3).

6) **Other crops** -

It includes chilly, vegetables, fruits etc. The area under this category was 15.05 per cent in 2001-02 and has just risen by one per cent (16.18 per cent of total cropped area) in 2005-06. But, sudden decrease in this area i.e. 7.81 per cent of total cropped area in 2009-10 (Table 3.3).
Table 3.3: Agricultural Landuse, Village Khondamali

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of crop</th>
<th>Percentage of TCA in 2001-02</th>
<th>Percentage of TCA in 2005-06</th>
<th>Percentage of TCA in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cotton</td>
<td>39.47</td>
<td>55.64</td>
<td>77.66</td>
</tr>
<tr>
<td>2.</td>
<td>Jowar</td>
<td>10.32</td>
<td>11.56</td>
<td>4.88</td>
</tr>
<tr>
<td>3.</td>
<td>Bajra</td>
<td>15.00</td>
<td>5.67</td>
<td>8.30</td>
</tr>
<tr>
<td>4.</td>
<td>Pulses</td>
<td>10.83</td>
<td>6.64</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Corn</td>
<td>9.33</td>
<td>4.31</td>
<td>1.35</td>
</tr>
<tr>
<td>6.</td>
<td>Other</td>
<td>15.05</td>
<td>16.18</td>
<td>7.81</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.8 Number of fragments and land holders, Village Khondamali 2010 -

The agricultural land at village Khondamali is divided in number of fragments. These fragments are grouped according to the area occupied by the land holders and have their size from below 0.5 hectares (small size) to above two hectares. Such study gives us the knowledge about the intensive use of land and the cropping pattern.

Village Khondamali has an area of 726 hectares which is divided in 615 fragments and land holders. The fragments are grouped in different size and area. These groups are as follow i.e. below 0.5, 0.5 to 1.0, 1.0 to 1.5, 1.5 to 2.0 hectares and above. There are 124 fragments have an area of below 0.5 hectares which is twenty per cent of the total fragments. On the other hand number of fragments are more i.e. 265 (forty four per cent of the total) and have area between 0.5 to 1.0 hectare. Similarly, the land holding of 1.0 to 1.5 hectares have 145 fragments i.e. twenty four per cent of the total fragment.

The land holding of 1.5 to 2.00 hectares and above two hectare have thirty nine fragments each which is six per cent of the total fragments.
Thus, lower the area of fragment means more the number of fragments. It also indicates that lower size of farm is convenient for the methods of cultivation. The size and area of the fragment also declines according to the inheritance (Table 3.4).

**Table-3.4: Number of fragments and land holders, Village Khondamali - 2010**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Area in Hectares</th>
<th>Number of Fragments</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>below 0.5</td>
<td>124</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>0.5 - 1.00</td>
<td>265</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>1.0 - 1.50</td>
<td>145</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>1.50 - 2.00</td>
<td>39</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>above 2.0</td>
<td>39</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>615</td>
<td>100</td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.9 General Landuse - Village Talwade Bk. (2001-01, 2005-06 and 2009-10)

The general landuse of village Talwade Bk. is divided in four categories i.e. net sown area, fallow, forest and area not available for cultivation. Hilly and undulating area of the village represents the area not available for cultivation.

1) Net sown area -

There are minor changes in the net sown area from 2001-02 to 2009-10. The net sown area was 65.66 per cent in 2001-02 and it has increased by just 0.5 per cent i.e. 66.17 per cent in 2005-06 and again it is declined by two per cent i.e. 64.50 per cent in 2009-10 (Table 3.5).
2) **Fallow** -

The fallow land in the village is of 10.10 per cent to total village area in 2001-02 and has remained more or less constant i.e. 9.59 per cent of total village area in 2005-06. But, in 2009-10 it increased upto 11.26 per cent of total village area. Thus, slight changes are observed in fallow land (Table 3.5).

3) **Forest** -

Area under forest has no change from the period of 2001-02 to 2009-10 in this village i.e. it remains 18.54 per cent (Table 3.5).

4) **Land not available for cultivation** -

The land not available for cultivation to total village area is constant from 2001-02 to 2009-10 i.e. 5.70 per cent (Table 3.5).

**Table 3.5: General Landuse, Village Talwade Bk.**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Type of Landuse</th>
<th>Percentage to total village area in 2001-02</th>
<th>Percentage to total village area in 2005-06</th>
<th>Percentage to total village area in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>NSA</td>
<td>65.66</td>
<td>66.17</td>
<td>64.50</td>
</tr>
<tr>
<td>2.</td>
<td>Fallow</td>
<td>10.10</td>
<td>9.59</td>
<td>11.26</td>
</tr>
<tr>
<td>3.</td>
<td>Forest</td>
<td>18.54</td>
<td>18.54</td>
<td>18.54</td>
</tr>
<tr>
<td>4.</td>
<td>NAC</td>
<td>5.70</td>
<td>5.70</td>
<td>5.70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source - Revenue Records
3.10 Agricultural Landuse - Village Talwade Bk. (2001-02, 2005-06 and 2009-10)

In the village Talwade Bk. agriculturist have a tendancy to grow variety of crops, i.e. cotton, bajra, jowar, pulses, wheat, chilly etc. The change in the area under these crops is as given below.

1) Cotton -

Cotton a major cash crop has occupied 51.84 per cent in 2001-02 and has increased by two per cent i.e. 53.60 per cent of total cropped area in 2005-06. But it has considerable rise in area of cotton in 2009-10 i.e. 62.10 per cent of total cropped area (Table 3.6)

2) Bajra -

Bajra has 21.66 per cent of total cropped area in 2001-02 and it has decrease upto 19.87 per cent in 2005-06. But the area under bajra has reduced considerably i.e. 8.70 per cent of total cropped area in 2009-10 (Table 3.6).

3) Pulses -

Pulses have occupied ten per cent of total cropped area in Talwade Bk in 2001-02 and it has increased by one per cent in 2005-06 (eleven per cent) and again declined upto ten per cent of total cropped area in 2009-10. Thus more or less the area under pulses is constant (Table 3.6).

4) Groundnut -

Among oil seeds, groundnut is a major crop which can be said as a cash crop. In 2001-02, the area under groundnut was 5.44 per cent of total cropped area and it has decreased slightly upto 4.74 per cent of total cropped area in 2005-06, while very less area i.e. 2.36 per cent of total cropped area is occupied by groundnut in 2009-10 (Table 3.6).

5) Wheat -

Wheat, a rabi crop, has four per cent of total cropped area in 2001-02 and is increased by just one per cent i.e. five per cent of total cropped area in 2005-06. But in 2009-10 there is a sudden rise i.e. seven per cent of total
cropped area under wheat. This is an indication of area under irrigation has increased (Table 3.6).

6) **Onion and Chilly**

Onion and chilly mainly include in the vegetable crops. Onion has 3.36 per cent of total cropped area in 2001-02 and it remained constant i.e. 3.27 per cent in 2005-06, but there is tremendous rise i.e. 8.42 per cent of total cropped area in 2009-10. The area under chilly has remained below one per cent from 2001-02 to 2009-10. But the decrease in area is also very low (Table 3.6).

7) **Jowar**

Jowar has less importance in this village i.e. only 1.12 per cent of total cropped area is in 2001-02 and has decreased below one per cent from 2005-06 to 2009-10 (Table 3.6).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the crop</th>
<th>Percentage of total cropped area in 2001-02</th>
<th>Percentage of total cropped area in 2005-06</th>
<th>Percentage of total cropped area in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cotton</td>
<td>51.84</td>
<td>53.60</td>
<td>62.10</td>
</tr>
<tr>
<td>2.</td>
<td>Bajra</td>
<td>21.66</td>
<td>19.87</td>
<td>8.70</td>
</tr>
<tr>
<td>3.</td>
<td>Onion</td>
<td>3.36</td>
<td>3.27</td>
<td>8.42</td>
</tr>
<tr>
<td>4.</td>
<td>Wheat</td>
<td>4.00</td>
<td>5.00</td>
<td>7.00</td>
</tr>
<tr>
<td>5.</td>
<td>Chilly</td>
<td>0.94</td>
<td>0.79</td>
<td>0.57</td>
</tr>
<tr>
<td>6.</td>
<td>Pulses</td>
<td>10.00</td>
<td>11.00</td>
<td>10.00</td>
</tr>
<tr>
<td>7.</td>
<td>Groundnut</td>
<td>5.44</td>
<td>4.74</td>
<td>2.36</td>
</tr>
<tr>
<td>8.</td>
<td>Jowar</td>
<td>1.12</td>
<td>0.98</td>
<td>0.85</td>
</tr>
<tr>
<td>9.</td>
<td>Other</td>
<td>1.64</td>
<td>0.75</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source - Revenue Records
3.11 Number of Fragments and Land holders Village Talwade Bk. 2010

The village Talwade Bk. has about 636 hectares area which is divided in 300 fragments. There are below one and one to two hectares land has 132 fragments and forty-four per cent each. But above two hectares land has thirty-six fragments i.e. twelve per cent of the total (Table 3.7).

Table-3.7: Number of Fragments and Land holders, Village Talwade Bk. 2010

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Area in hectare</th>
<th>Number of fragments</th>
<th>Percentage to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>below 1</td>
<td>132</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>1 – 2</td>
<td>132</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>above 2</td>
<td>36</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.12 General Landuse - Village Waghale (2001-02, 2005-06 and 2009-10)

1) Net sown area -

Net sown area is 67.71 per cent of total village area in 2001-02 and it has slightly increased in 2005-06 i.e. 68.10 per cent of total village area and remains about constant even in 2009-10 (Table 3.8).

2) Fallow -

Area under fallow land was 4.29 per cent in 2001-02 and has decreased upto 3.88 per cent in 2005-06, but in 2009-10 it has been almost constant i.e. 3.86 per cent of total village area (Table 3.8).
3) **Forest -**

Forests have occupied 17.75 per cent in 2001-02 and there is no change even in the year of 2005-06 and 2009-10 respectively (Table 3.8).

4) **Not available for cultivation -**

Area not available for cultivation has no change during the period from 2001-02 to 2009-10 i.e. 10.25 per cent of total village area (Table 3.8).

**Table-3.8: General Landuse, Village Waghale**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Type of Landuse</th>
<th>Percentage to total village area in 2001-02</th>
<th>Percentage to total village area in 2005-06</th>
<th>Percentage to total village area in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>NSA</td>
<td>67.71</td>
<td>68.10</td>
<td>68.13</td>
</tr>
<tr>
<td>2.</td>
<td>Fallow</td>
<td>4.29</td>
<td>3.88</td>
<td>3.86</td>
</tr>
<tr>
<td>3.</td>
<td>Forest</td>
<td>17.75</td>
<td>17.75</td>
<td>17.18</td>
</tr>
<tr>
<td>4.</td>
<td>NAC</td>
<td>10.25</td>
<td>10.27</td>
<td>10.23</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.13 **Agricultural Landuse, Village Waghale (2001-02, 2005-06 and 2009-10)**

1) **Jowar -**

Jowar is a major food crop grown in village Waghale. It has occupied 39.72 per cent of total cropped area in 2001-02 and has decreased by seven per cent i.e. 32.40 per cent of total cropped area in 2005-06, while in 2009-10 it has decline again by one per cent of total cropped area i.e. 31.31 per cent of total cropped area (Table 3.9).
2) **Rice** -

The area receives quite high rainfall and most of the agriculturists grow rice in the streams according to the slope of the area. The rice was 23.35 per cent of total cropped area in 2001-02 and decreased by one per cent i.e. 22.22 per cent of total cropped area in 2005-06. But there is again rise by two per cent of total cropped area i.e. 24.44 per cent in 2009-10 (Table 3.9).

3) **Bajra** -

Bajra is an important cereal in this village. It is 14.66 per cent of total cropped area in 2001-02 and quite remains same in 2005-06 i.e. 14.54 per cent. It has increased i.e. 17.31 per cent of total cropped area in 2009-10 (Table 3.9).

4) **Corn** -

Corn has occupied just five per cent of total cropped area in 2001-02 and is increased upto 13.88 per cent in 2005-06. The area under corn again is increased by two per cent i.e. 15.37 per cent of total cropped area in 2009-10 (Table 3.9).

5) **Cotton** -

The agriculturists are less interested in cotton that it requires deep soil having good fertility and more capital than other crops. Therefore, it is just 2.13 per cent of total cropped area in 2001-02 and has increased upto 3.94 per cent in 2005-06. Again area under cotton is increased by almost three per cent of the total cropped area i.e. 6.61 per cent in 2009-10 (Table 3.9).

6) **Pulses** -

The area under pulses is 10.14 per cent in 2001-02 and has decreased in 2005-06 by two per cent i.e. 8.02 and in 2009-10 the pulses have occupied only four per cent of total cropped area. Thus, there is a great fall in the area under pulses (Table 3.9).
7) **Wheat** -

Wheat, a rabi crop have occupied only five per cent of total cropped area in 2001-02 and 2005-06, but there is sudden decrease in 2009-10 i.e. 1.96 per cent of total cropped area (Table 3.9).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the crop</th>
<th>Percentage of total cropped area in 2001-02</th>
<th>Percentage of total cropped area in 2005-06</th>
<th>Percentage of total cropped area in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Jowar</td>
<td>39.72</td>
<td>32.40</td>
<td>31.31</td>
</tr>
<tr>
<td>2.</td>
<td>Rice</td>
<td>23.35</td>
<td>22.22</td>
<td>24.44</td>
</tr>
<tr>
<td>3.</td>
<td>Bajra</td>
<td>14.66</td>
<td>14.54</td>
<td>17.31</td>
</tr>
<tr>
<td>4.</td>
<td>Corn</td>
<td>5.00</td>
<td>13.88</td>
<td>15.37</td>
</tr>
<tr>
<td>5.</td>
<td>Cotton</td>
<td>2.13</td>
<td>3.94</td>
<td>6.61</td>
</tr>
<tr>
<td>6.</td>
<td>Pulses</td>
<td>10.14</td>
<td>8.02</td>
<td>4.00</td>
</tr>
<tr>
<td>7.</td>
<td>Wheat</td>
<td>5.00</td>
<td>5.00</td>
<td>1.96</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.14 **Number of Fragments and Land holders, Village Waghale- 2010**

Total village area i.e. 1015 hectares is divided in 300 fragments according to the field area. There are 113 fragments i.e. 38.30 per cent have area below one hectares and 143 fragments i.e. 48.47 per cent have in between one and two hectares. But, above two hectares area is of only 39 fragments i.e. 13.23 per cent of total number of fragments (Table 3.10).
Table-3.10: Number of Fragments and Land holders, Village Waghale-2010

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Area in hectare</th>
<th>Number of fragments</th>
<th>Percentage to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>below 1</td>
<td>113</td>
<td>38.30</td>
</tr>
<tr>
<td>2</td>
<td>1 - 2</td>
<td>143</td>
<td>48.47</td>
</tr>
<tr>
<td>3</td>
<td>above 2</td>
<td>39</td>
<td>13.23</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.15 General Landuse, Village Nandpur (2001-02, 2005-06 and 2009-10)

1) NSA -

Village Nandpur is situated in the plain of river Tapti. Here the land is fertile and therefore supports the crop. In this village NSA has occupied eighty per cent of TVA in 2001-02 and has increased upto ninety two per cent of total village area in 2005-06 while, ninety four per cent of total village area is under NSA in 2009-10 (Table 3.11).

2) Fallow -

Area under fallow is fifteen per cent in 2001-02 and has decreased in 2005-06 by ten per cent i.e. five per cent of total village area and in the year of 2009-10 the fallow land again decreased upto four per cent (Table 3.11).

3) Forest -

Due to the plain area, forest cover is less and agriculturist use maximum land under the crop. Here, in 2001-02 five per cent of total village area is under forest and has decreased in 2005-06 upto three per cent and in 2009-10 again it has decreased upto two per cent (Table 3.11).
Table-3.11: General Landuse, Village Nandpur

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Type of Landuse</th>
<th>Percentage to total village area in 2001-02</th>
<th>Percentage to total village area in 2005-06</th>
<th>Percentage to total village area in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>NSA</td>
<td>80</td>
<td>92</td>
<td>94</td>
</tr>
<tr>
<td>2.</td>
<td>Fallow</td>
<td>15</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Forest</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source - Revenue Records

3.16 Agricultural landuse, Village Nandpur (2001-02, 2005-06 and 2009-10)

1) Cotton -

In this village, the area under cotton is fifty five per cent of total cropped area in 2001-02 and has increased by one per cent i.e. fifty six per cent total cropped area in 2005-06, but in 2009-10 it has again increased by five per cent and reached upto 61.41 per cent of total cropped area (Table 3.12).

2) Jowar -

Area under jowar is ten per cent of total cropped area in 2001-02, but it has declined upto five per cent in 2005-06 and again increased in 2009-10 i.e. 11.19 per cent of total cropped area (Table 3.12).

3) Rice -

The rice is also an important crop grown in kharif season and has occupied seven per cent of total cropped area in 2001-02, the area again has increased upto ten per cent in 2005-06, while in 2009-10 area is quite remain constant i.e. 9.25 per cent of total cropped area (table 3.12).
4) **Oil seeds** - Oil seeds in this village mainly include kardai and linseed. It was five per cent of total cropped area in 2001-02 and 2005-06 but has increased upto 6.41 per cent in 2009-10 (Table 3.12).

5) **Pulses** -

Pulses has occupied ten per cent of total cropped area in 2001-02 and just declined by one per cent i.e. nine per cent in 2005-06. But, in 2009-10 it has decreased considerably i.e. just 2.54 per cent of total cropped area (Table 3.12).

6) **Other** -

Other crops include bajra and vegetables and other. These crops have occupied thirteen per cent of total cropped area in 2001-02 and it has increased upto fifteen per cent in 2005-06, but it has declined by about six per cent i.e. 9.20 per cent of total cropped area in 2009-10 (Table 3.12).

**Table-3.12: Agricultural Landuse, Village Nandpur**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the crop</th>
<th>Percentage of total cropped area in 2001-02</th>
<th>Percentage of total cropped area in 2005-06</th>
<th>Percentage of total cropped area in 2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cotton</td>
<td>55</td>
<td>56</td>
<td>61.41</td>
</tr>
<tr>
<td>2.</td>
<td>Jowar</td>
<td>10</td>
<td>5</td>
<td>11.19</td>
</tr>
<tr>
<td>3.</td>
<td>Rice</td>
<td>7</td>
<td>10</td>
<td>9.25</td>
</tr>
<tr>
<td>4.</td>
<td>Oil seed</td>
<td>5</td>
<td>5</td>
<td>6.41</td>
</tr>
<tr>
<td>5.</td>
<td>Pulses</td>
<td>10</td>
<td>9</td>
<td>2.54</td>
</tr>
<tr>
<td>6.</td>
<td>Other</td>
<td>13</td>
<td>15</td>
<td>9.20</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source - Revenue Records
3.17  Number of Fragments and Land holders, Village Nandpur - 2010

The total village area of Nandpur is about 344 hectares and it is divided in 208 fragments according to the size of the field. Here, sixty two fragments i.e. 29.81 per cent have land occupied below one hectare and ninety five fragments i.e. 45.67 per cent have the area in between one to two hectares. Number of fragments declined as increase in the area of the field i.e. in between two to three hectare lands are of thirty five fragments i.e. 16.82 per cent of the total; while sixteen fragments i.e. 7.70 per cent have the land above three hectares. Here, the area of the field is mostly upto five hectares (Table 3.13).

Table-3.13: Number of Fragments and Land holders, Village Nandpur

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Area in hectare</th>
<th>Number of fragments</th>
<th>Percentage to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>below 1</td>
<td>62</td>
<td>29.81</td>
</tr>
<tr>
<td>2</td>
<td>1 – 2</td>
<td>95</td>
<td>45.67</td>
</tr>
<tr>
<td>3</td>
<td>2 – 3</td>
<td>35</td>
<td>16.82</td>
</tr>
<tr>
<td>4</td>
<td>above 3</td>
<td>16</td>
<td>7.70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>208</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source - Revenue Records