Adjoining areas.

Survey of land and soil resources

In the conduct of the land and soil resources survey, the total land area was subdivided into 25 unit’s with this was done in order to collect the characteristics of the area so as to determine the total area suitabilities for relevant farm crops and activity.

Soil sampling was then carried out within each area to a depth of 20 cm using a cutlass marked at 20cm Each soil sample was now carefully labeled, packed and sent to the soil analysis laboratory for analysis for mechanical , pH, organic matter, N,K and available phosphorus. The results are as shown. And with the aid of USDA textural triangle, the soil texture was obtained for the 25 soil units with the results as shown.

|  |  |
| --- | --- |
| SOIL SAMPLE NO | TEXTURAL CLASS |
| 1 | SANDY LOAM |
| 2 | SANDY LOAM |
| 3 | SANDY LOAM |
| 4 | SANDY LOAM |
| 5 | SANDY LOAM |
| 6 | SANDY LOAM |
| 7 | SANDY LOAM |
| 8 | SANDY LOAM |
| 9 | SANDY LOAM |
| 10 | SANDY LOAM |
| 11 | SANDY LOAM |
| 12 | SANDY LOAM |
| 13 | SANDY LOAM |
| 14 | SANDY CLAY |
| 15 | SANDY LOAM |
| 16 | SANDY LOAM |
| 17 | SANDY LOAM |
| 18 | SANDY LOAM |
| 19 | SANDY LOAM |
| 20 | SANDY LOAM |
| 21 | SANDY CLAY |
| 22 | SANDY CLAY |
| 23 | SANDY LOAM |
| 24 | SANDY LOAM |
| 25 | SANDY LOAM |

A water survey of the project site for underground and surface water resource reveals a river that drains from the hinterland towards the lagoon side transversing completely one side of the project area .The river named Itoikin is about five metres wide at the project outer edge. Elsewhere, an observation of boreholes constructed by Ogun state government in the adjoining communities some distance from the project area shows evidence of good water yields as the boreholes have been servicing all the communities very well, in both dry and wet seasons.

This is an indication of good yield with good ground water storage in its aquifer as reports from the villagers interviewed indicated that the existing boreholes have not dried since their construction, while being used to service both commercial and municipal uses.

The area topography is undulating rising from low heights at the road to relatively high points close to river after which there occurs a valley before the river.At the outer edge of the project area close to river Itoikin there exists a valley as a result of the lower elevation of the valley bottom, all other water into valley bottom thereby making it and the adjoining areas ideal locations for fish pond construction. And this valley and other areas parallel to river could cut out for fish pond construction whereby flows are channelled to the pond from the river.

**EVALUATION OF SOIL AND LAND SUITABILITY**

In evaluating the project site for oil palm plantation establishment, it will first be pertinent to state the best conditions for oil palm growth in terms of ecological conditions, water supply(rainfall), temperature,, solar radiation. The site will then be assessed based on these. Water supply i.e. rainfall under natural conditions is the major aspect of oil palm's climatic requirement Oil palm does very well in areas with rainfall above 2000mm annually evenly distributed ,does moderately well in areas of 1500mm to 2000mm annual rainfall and marginally in areas of 1200 to 1500 mm annual rainfall. (Aduayi et al 2002). And the average yields with corresponding rainfall suitability class in Nigeria have been obtained in the various rainfall suitability classes by Aduayi et al 2002 as follows:

**Oil palm rainfall suitability class/yields**

|  |  |  |
| --- | --- | --- |
| Suitability | Rainfall | Average yield\* |
| High | 2000 <3000mm | 15-18tons ffb\*\*/ha,  3-3.6 tons of palm oil,  0.6 - 0.72 tons palm  kernel |
| Moderate | 1500-2000mm | 10-14 tons ffb/ha,  2-2.8 tons of palm  Oil. 0.4 - 0.6tons of  palm kernel |
| Marginal | 1,200 - 1,500mm/yr | 5-8 tons ffb/ha,  1-1 .6tons palm oil  0.2 - 0.32 tons N/ lis |

\*Aduayi etal (2002)

\*ffb fresh fruit bunches

Palm kernel

\*Aduayi et al., (2002)

\*ffb fresh fruit bunches

Oil palm does not tolerate more than three months of dry spell after which its production drops, several producing areas in Nigeria are affected by 2 -4 months of the dry period in a year. ie periods when monthly rainfall falls below 100mm and production in these areas is suboptimal as result of water supply insufficiency. Similarly oil palm does not tolerate prolonged waterlogging as this adversely affects its production and reduces yields. The suitable soil type for oil palm cultivation is sandy loam to sandy clay with sandy clay being the most suitable. These soils have good water holding capacity and since periods of dry weather adversely affect oil palm growth and yields, these soils are ideal for oil palm production as they help hold enough water for the crop growth during moderate drought Lateritic soils containing concrentionary ironstone and relatively deep peat soils does not support oil palm production.

Attention however needs to be given to the nutrient status of these soils, as they are easily leached, dressing in potassium, magnesium and nitrogen are generally needed in the first year of planting.

Also the following soil nutrients status are ideal for oil palm(Moll ,2002):

|  |  |
| --- | --- |
| NUTRIENT | OPTIMUM VALUE |
| PH(%) | 3.5<5.5 |
| ORGANIC MATTER(%) | 0.8-0.25 |
| NITROGEN(%) | 0.08-0.25 |
| AV.PHOSPHORUS(Mehich P vg/g) | 8.25 |

In terms of solar radiation, oil palm requires at least five hours daily hours of sunshine for optimum performance.

Oil palm requires an average monthly mean maximum temperatures of 29-33°C and mean minimum temperatures of 22 24°C A mean minimum temperature below 18°C is unfavorable as growth stops and yields at a latter stage are reduced.

Another criteria usually considered is the existence /conditions of the wild oil palms in the area being assessed especially when all agro-climatological conditions have been met.

The existing topography is flat in some areas rising to a high towards the river dropping to a gully or valley close to the river. However care needs to be taken in its clearing as result of the unevenness of the area a bulldozer operator, not trained in the technique of agricultural land clearing as distinct from construction land clearing, may decide to make the area level thereby moving topsoil from

one area and leaving the other bare of the required topsoil and necessary soil nutrients. This can not be replaced easily as it takes several years for topsoil formation and this will adversely affect the yields of planted crops no amount of remedial action can repair the damage. So not all areas, especially areas around the valley, are deemed suitable in terms of the topography criteria. for Oil palm cultivation as oil palm requires flat to undulating topography. In terms of the solar radiation, all plots satisfy the criteria for optimum production as the average solar radiation for Mayin from weather data is 6.2hours daily likewise the project satisfy the temperature requirement, as Mayin mean minimum monthly temperature is 22°c -24°c while the mean maximum monthly is 27.5°c- 31.9°c.

However, in terms of water requirement ,which is largely met by rainfall, Mayin mean annual rainfall is 1503mm so could only support moderate oil palm yields not optimum industrial yields that could make for maximum profit as being envisaged by the project.

Comparison of the soils texture in terms of the desirable soil textural class criteria shows that all the project area is ideal for oil palm as all fall under the textural class ranges of sandy loam to sandy clay Generally soil nutrients may be considered adequate when compared to the nutrients criteria.

Specifically, all the sampled plots showed pH water within 3.5 - 5.5, which has been shown to be optimum for oil palm. except six samples and those are also slightly acidic which still with acceptable limits, although the level of phosphorus is suboptimal almost all the area with only one sample within limits, this can be easily augmented with an addition phosphate fertilizer such as Triple superphosphate or single superphosphate depending on which gives the highest phosphate level for the money i.e. price. per kilogramme phosphate.

The values for organic matter and Nitrogen falls largely within the optimum range for oil palm production with no exceptions however this needs to be sustained with appropriate cultural practices such as the cover crop planting in between the rows of oil palm. As well as application of manure and inorganic fertilizer as at when due.

In considering land suitability for oil palm one is readily impressed by the existence of a good number of oil palm grooves which have been able to grow essentially without apparent case for many years within the adjoining areas. There is the tendency to assume that this healthy survival of oil palm grown in semi-wild state is an indication of suitable growing conditions, such assumption could be misleading as:

(i) Most oil palms growing alone in small catches have the advantage of maximum feeding space and sunshine especially in non-forested areas.

(ii)Where palm is found in water it may not be unlikely deficit areas or waterlogged conditions, that the initial establishment allowed when these conditions were not very adverse.

(iii) These palms may produce fruits but the bunch sizes and the frequency of fruit may not come within if optimum. if suitable growing conditions are inadequate.

However the existence of wild oil palm grooves in project area becomes a positive phenomenon while considering other essential factors for oil palm crop growth like soil and climate which are present.

Though the project site meets all other conditions for optimum cultivation of oil palm, it fell short in water supply for optimum production i.e. the maximum dry period for optimum production is 3 months, beyond this production tails off, Mayin experienced at least four and half months of dry weather, with less than 100 mm of monthly water requirement for oil palm production the project site falls into areas for moderate yields.

However the project can obtain yields comparable to yields for industrial cultivation, if provision is made to augment its water supply with irrigation at periods of dry spells. An intake channel could be constructed on the river to pump irrigation water.250mm of water by direct pumping in each of the dry months to bring the water supply to the required level for optimum yields. This is connected to the palms through a network of hoses leading directly to the palms base with a ring basin constructed around the palm to impound the water.

This application of irrigation to boost oil palm yield have equally been demonstrated in Ivory Coast,at the Recherché pores hules et oleagineux(IRHO)