INTRODUCTION

*I believe a leaf of grass is no less than the journey-work of the stars.*

~Walt Whitman

1.1 Introduction

Integrated management of crop is a technique of cultivation and management of crops in a sustainable manner. Agriculture is a science or practice of cultivating the soil and rearing animal.

India is basically an agriculture oriented country. About 70% of Indian population lives in villages and engaged in agricultural pursuits. Their livelihood depends mainly on agriculture therefore “agriculture is not only merely an occupation; it is the way of life which for centuries has shaped the thoughts and outlook of millions of people (Jhingan 1976). Development of agriculture plays a predominant role in development and socio-economy of the country.”

It is distressing that the latest government statistics indicate an abnormally high rate for Indian farmers’ suicide. The new Census 2011 data shows shrinking farmer populations when put together with the National Crime Records Bureau (NCRB) suicide data indicate that farmers’ suicide were 47 per cent higher than they were for the rest of the population and were well over 100 per cent higher in the state worst hit by agrarian crisis. It is disturbing that farmers’ suicides which first caught the nation’s attention in the 1990s in a big way continue to occur in large numbers even today. According to official figures at least 2,70,940 farmers have taken their lives since 1995 and the trend that is discernible. There is a steady increase in farmers’ suicide over the years with a host of factors intensifying the pressure on them. (Online editorial article date 20 may 2013, Millennium post no half truths, New Delhi). To enhance more agricultural yield farmers had to spend more money for buying pesticides, chemical fertilizers and some part of money is used for eradication of weeds and buying herbicides. Thus increasing production value of agriculture results in higher debt burden on farmers’, falling prices of the product and rising cost
## Price list of Inorganic fertilizer

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the fertilizer</th>
<th>Percentage</th>
<th>Price of 50 kg fertilizer (Rs)</th>
<th>Increase in the Prices (Rs)</th>
<th>Company</th>
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<td></td>
<td></td>
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<td>2001</td>
<td>2014</td>
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<tr>
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<td>Ammonium Chloride</td>
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<td>250</td>
<td>943</td>
<td>693</td>
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<td>2</td>
<td>DAP</td>
<td>18:46:00</td>
<td>415</td>
<td>1183</td>
<td>768</td>
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<tr>
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<td>Mixture</td>
<td>10:26:26</td>
<td>-</td>
<td>1109</td>
<td>-</td>
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<tr>
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<td>Mixture</td>
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<td>939</td>
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<td>Muriate of Potash</td>
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<td>7</td>
<td>Single Super Phosphate (Cry)</td>
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<td>159</td>
<td>317</td>
<td>158</td>
</tr>
<tr>
<td>8</td>
<td>Single Super Phosphate (Pow)</td>
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<td>206</td>
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<td>9</td>
<td>Urea</td>
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Information collected from local market of Shevgaon on 4/6/2014
of production squeezed the farmers’ even further debt and hence finally resulting into suicides of farmers. India in year 2008 had spent one trillion rupees in subsidies for global corporations to buy chemical fertilizers (Shiva, 2008). We can minimize cost of production, increase output per hectare by using organic manures like compost, vermicompost prepared from weed biomass and biofertilizer etc.

Indian agricultural production strategies are being managed and implemented in such a way to raise socio-economic status of farmers’ holding small piece of land. Urbanization, industrialization, education, improved communication and transport facilities are helping to improve prevailing socioeconomic disparities. If it comes true, the situation will arise, in which people in India instead of being viewed as “Problems and Liabilities” will be looked upon as “Opportunities and Assets”. However much efforts will be required for such situation through intensive food production with available resources and advanced technologies. This optimistic production will prevail provided, agricultural research continues with an intention to conserve traditional system of farming and application of technological skill for increased food and feed grade agricultural products.

In India after the success of “green revolution” in achieving the rural prosperity and self sufficiency of food, the yield of major crops is approaching a plateau. At the same time resources like land, water and nutrients are diminishing fast. In this situation increasing the crop productivity in sustainable manner to feed the ever-growing population by conserving the natural resources is a great challenge to plant scientist and agriculturist. Indian agriculture has made spectacular advances since independence in achieving self sufficiency in food grain production (Mungikar A.M. 1999).

The Government of India also recorded high priority to sustainable growth in 10th five year plan.

Modern Agriculture relies heavily on fertilizers, so the consumption of chemical fertilizer is increasing during passing years. The use of chemical fertilizer is the quickest way of boosting crop production. The chemicals no doubt increase the production, quantity and reduce the occurrence of diseases but also produce many harmful effects like air, water and soil pollution. The chemical fertilizers are manufactured by using coal and petroleum as a source of energy which themselves
are decreasing very fast. The prolonged and excess use of chemicals causing serious hazards to the soil, soil become more and more hard and impervious to water. It worsens soils physical properties and causes environmental pollution. It decreases quality of feed and fodder by increasing total nitrates and nitrites which are toxic to cattle and human beings (Jadhav and Joshi 1982).

Applying nitrogen fertilizer in excess of the amount which is removed each year by the crop can lead to loss of nitrogen from the soil environment because nitrate is negatively charged; it does not bind to negatively charged soil particles and so is poorly stored in the soil. When soil water exceeds plant needs (Through rain or irrigation), nitrate leaches into soil ground water. This can contaminate the well and nitrate in drinking water pose health problems to the animal and people who use such wells. If this persists for longer period it causes serious health problems (Dahama A.K. 1997).

Nitrate level above 100 mg/L in ground water can cause ‘blue baby syndrome’ (acquired methemoglobinemia), leading to hypoxia (which can lead to coma and death if not treated) (www.ecifm.rdg.ac.uk/bluebabs.htm).

The country at present is not in a position to completely eliminate the use of chemicals especially fertilizers. However, it would not be difficult and unrealistic to phase out the use of these chemicals systematically. For this, on one hand, the doses of fertilizer need to be gradually reduced and be balanced by increasing the use of optimum quantity of organic manures and bio-fertilizers.

The ICAR is an apex body at the national level mainly responsible for adding, promoting and coordinating agricultural research in the country. It has concurrent responsibilities of research, education and extension education. ICAR, during IXth plan in 1996 in its objectives gave emphasis on Integrated Nutrient Management System (ICAR, 1996).

The present research emphasized on integrated management of crop by using agricultural waste and plant biomass like weeds, biofertilizers, neem cake i.e. management of crop by using organic fertilizers viz organic farming for sustainable agriculture.

The maintenance of the fertility of the soil is the first condition of any permanent and sustainable system of agriculture. In the ordinary process of crop production fertility is steadily lost; its continuous restoration by means of manuring
and soil management is therefore imperative (Howard Albert and Wad Yeshwant, 2004). For developing countries residue management is especially important because the amount of nutrient in crop residue is several times higher than the quantities of these nutrients applied as high cost chemical fertilizer (Singh Hema, 1993). In maintaining the fertility of soil, the most careful attention should be paid to the utilization of the waste products of agriculture itself (Howard Albert and Wad Yeshwant, 2004).

Liebig J.1840 emphasized that a soil may remain fertile, all that is necessary is to return to it, in the form of manure, the mineral constituent and the nitrogen that have been taken away in the crop. When fresh remains of plants or animals are added to the soil, a portion of this organic matter is at once attacked by a large number of the microorganisms. Rapid and intense decomposition ensues. The nature of these organisms depends on soil condition (Mechanical, chemical or physical condition) and the soil environment (moisture content, aeration and the presence of available minerals).

The organic matter found in the soil consists of two very different classes of material- 1) the constituent of plants and animals which have been introduced into the soil and are undergoing decomposition: various unstable intermediate products which have been formed under certain environmental conditions. Substances like lignified cellulose which are more resistant to decomposition and which may persist in the soil for some times and 2) a number of valuable materials which have been synthesized by the numerous groups of microorganisms which form the soil population. The soil organic matter is thus a heterogeneous mass of substances which is constantly undergoing changes in composition. When its composition reaches a certain stage of equilibrium, it become more or less homogeneous and is then incorporated into the soil as “humus”. Soil organic matter or humus is not merely the residue left when vegetables and animal residues decay. It contains in addition the valuable materials synthesized and left behind by the fungi and bacteria of the soil population (Howard Albert and Wad Yeshwant, 2004).

Recently there has been a resurgence of interest in alternative agriculture that is organic farming and sustainable agriculture. In 1989 the Board on Agriculture of the National Research Council of the United States lent credence to this movement with the publication of a major study called “Alternative agriculture.” It is not a single
system of organic, low input, regenerative or sustainable farming. All these systems share an emphasis on management practices and on biological relationship between organisms. Alternative agriculture recognizes that a piece of land on which crop plants are grown in first and foremost an ecosystem and not a factory. An ecosystem has many interacting organisms that must remain in balance. Many natural processes occur in such an ecosystem and farmers should take advantage of these natural processes, rather than try to circumvent them or destroy them with chemicals. Alternative agriculture rejects certain practices such as heavy use of inorganic fertilizers. **Organic farming is defined as production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives.** To the maximum extent feasible organic farming systems rely upon crop rotation, crop residues, animal manures, legumes, green manures, off farm organic wastes, mechanical cultivation, mineral bearing rocks and aspect of biological pest control to maintain soil productivity to supply plant nutrients to control insect, weed and other pests (USDA, 1980) (Dahama A.K.1997).

Since 1990 the market for organic products has grown at a rapid pace, to reach $55 billion in 2009. This demand has driven a similar increase in organically managed farmland which has grown over the past decade at a compounding rate 8.9% per annum (Paull John., 2011). Approximately 37 million hectares worldwide are now farmed organically, representing approximately 0.8 percent of total world farmland (Organic world. http://www.organic-world.net/).

Organic agricultural methods are internationally regulated and legally enforced by many nations, based in large part on the standards set by the **International Federation of Organic Agriculture Movements (IFOAM, 2005),** an international umbrella organization for organic farming organizations established in 1972. IFOAM defines the overarching goal of organic farming as “Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. **Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and good quality of life for all involved”** (IFOAM).
Organic residues of plant and animal origin have been considered as a source of immense practical value for crop productivity. Organic residues including green manures, animal and municipal wastes serve as effective sources of plant nutrients and humus. Tropical and subtropical soils, as those in India are generally deficient in organic matter and plant nutrients due to rapid loss of these components by biodegradation. To make up these losses extensive utilization of organic residues in agriculture can pay dividends, provided suitable technologies to achieve these are available.

The potential of crop residues / straw of some of the major cereals and pulses in India revealed that there is huge quantity of renewable crop residues produced in the country. The five major crops alone yield approximately 141.2 million tonnes of straw which at even most practical level will contribute about 0.7, 0.84, and 2.1 million tonnes of N, P\textsubscript{2}O\textsubscript{5} and K\textsubscript{2}O respectively (Gaur et al, 1984). Even if 50% of these crop residues are utilized as animal feed, the rest could be mobilized for recycling of plant nutrients.

Farmers since ancient times have recognized significant benefits of soil organic matter to crop productivity. These benefits have been the subject of controversy for centuries and some are still debated today. The following list includes many of the recognized benefits of soil organic matter (Stevenson.1982)

1. It serves as a slow release source of N, P and S for plant nutrition and microbial growth.
2. It possesses considerable water holding capacity and thereby helps to maintain the water regime of the soil.
3. It acts as a buffer against changes in pH of the soil.
4. Its dark color contributes to absorption of energy from the sun and heating of the soil.
5. It acts as “cement” for holding clay and silt particles together thus contributing to the crumb structure of the soil and to resistance against soil erosion.
6. It binds micronutrient metal ions in the soil that otherwise might be leached out of surface soil.
7. Organic constituents in the humic substances may act as plant growth stimulants

Enhancement and maintenance of soil fertility is a pre-requisite for increasing and sustaining the crop production. To sustain the agriculture, it becomes imperative to take care of soil, health and environment. Sustainable crop production is possible when the natural resources on which the production activity depends is not eroded or harmed in any manner, which will damage it or jeopardize production and progress at any time in the future.

**Organic agriculture is natural in the Indian context. It is not just a philosophy but is also a mean to stabilize our food products through maintenance of soil health and avoiding the use of hazardous chemicals, fertilizers and pesticides which have been disturbing our ecosystem on large scale.** Organic farming is the use of biomass to increase, improve and maintain the soil fertility that increases the crop production.

The term *biomass* includes every organic matter derived biologically which include weeds, plant residues, wood and wood residue, leaf litter and animal manure. Since this type of biomass is a renewable source of organic carbon, there is no fear of its exhaustion because of its continuous bioconversion into food, feed and fuel. The major part of biomass is drawn from the land and provides the primary energy source. Biomass is composed of mainly cellulose, hemicelluloses and lignin along with starch, protein and other useful nutrients. Recycling of biomass as compost, vermicompost for increasing soil fertility has gained importance in recent years due to high cost of fertilizer.

The development of an alternative source is of vital importance today in view of the increasing cost of chemical fertilizers. Utilization of ecofriendly and naturally occurring compost, vermicompost, neemcake, biofertilizers, weed compost and weed vermicompost can minimize the problems at a large extent.

1.2 Compost: composting is an ancient practice where a farmer has converted organic waste into resources that provide nutrients to the crops and enhance soil tilth, fertility and productivity. Compost from source-separated organic household wastes and yard trimming (biowaste compost) is a valuable organic fertilizer and soil conditioner, which supplies the soil with nutrients and organic matter. It also improves soil structure, aggregate stability and water holding capacity (Vogtmann *et al*.
al, 1993; Giusquiani et al, 1995; Diez and Krauss, 1997; Wells et al, 2000). The management of bio waste compost for beneficial use in agriculture, however must take into account strategies to meet crop nutrient needs and protect the environment. Therefore it is necessary to know the availability of nutrients and particularly of nitrogen from composts. On average bio waste compost contains 1.55% N (Zethner et al., 2000). Only a small part of that is present as mineral nitrogen (0.4% as No$_3$-N and 0.1% as NH$_4$-N), which is readily available to plants. The greatest part of nitrogen is bound to the organic N-pool and its availability to plant is low.

Compost provide a more stabilized form of organic matter than do raw wastes and can vastly improve the physical properties of soil. Addition of sludge compost to sandy soil will increase their ability to retain water and render them less droughty. In heavy textured clay soils the added organic matter will increase the permeability and water infiltration and clay soils have been shown to reduce soil compaction, lower the bulk density and increase the rooting depth (Mays et al, 1973).

1.3 Vermicompost: It is a method of making compost with the use of earthworms which generally live in the soil, eat biomass and excrete it in digested form. This compost is generally called vermicompost.

Vermicomposting is a simple biotechnological process of composting. The process is faster than composting because the material passes through the earthworm gut, a significant but not yet fully understood transformation takes place whereby the resulting earthworm castings (worm manure) are rich in microbial activity and plant growth regulators, the fortified with pest repellence attributes as well. In short earthworms through a type of biological alchemy are capable of transforming garbage into gold (Vermi Co 2001, Tara Crescent 2003).

Vermicomposting converts household waste into compost within 30 days reduces the C:N ratio and retain more N than the traditional method of preparing compost (Gandhi et al 1997).

Vermicompost is composting by utilizing various species of worms, specifically red wigglers, white worms and earthworms creating the heterogeneous mixture of decomposing vegetable or food waste, bedding materials and vermicast produced during the course of normal Vermiculture operations. Vermicast similarly known as worm castings, worm humus or worm manure is the end product of the breakdown of organic matter by the species of earthworm containing water soluble
nutrient and bacteria. Vermicompost is an excellent nutrient rich organic fertilizer and soil conditioner (Coyne, Kelly and Erik used earthworms in vermicompost Knutzen.2008). The Process of producing vermicompost is called vermicomposting.

The Earthworm species (or composting worms) most often used are red wigglers (*Eisenia foetida* or *Eisenia Andrei*), but European night crawlers (*Eisenia hortensis*) may also be used. European night crawlers are called by a variety of other names including dendrobaenas, dendras and Belgian night crawlers. Blue worms (*Perionyx excavatus*) may be used in the tropics (Vermicompost- Wikipedia the free encyclopedia)

1.4 Biofertilizers: Biofertilizers are low cost, renewable source of plant nutrients which supplement chemical fertilizers. These are nothing but selected strains of beneficial soil microorganisms cultured in the laboratory and packed in a suitable carrier. They can be used either for seed treatment or soil application. Biofertilizers generate plant nutrients like nitrogen and phosphorous through their activities in the soil or rhizosphere and make available to plants in a gradual manner. Biofertilizers are gaining momentum recently due to the increasing emphasis on maintenance of soil health, minimize environmental pollution and cut down the use of chemicals in agriculture. In rain fed agriculture these inputs gain added importance in view of their low cost, as most of the farmers are small and marginal and cannot afford to buy expensive chemical fertilizers. Biofertilizers are also ideal input for reducing the cost of cultivation and for practicing organic farming. Biofertilizer is most commonly referred to the use of soil microorganisms to increase the availability and uptake of mineral nutrients for plants. “**Biofertilizer**” be defined as a substance which contains living microorganisms which colonizes the rhizosphere or the interior of the plant and promotes growth by increasing the supply or availability of primary nutrient and growth stimulus to the target crop when applied to seed, plant surfaces or soil (Murleedharan Hari, 2010).

1.4. 1 Types of Biofertilizers

The following types of biofertilizers are available to the farmers in India.

* **Nitrogen** fixing biofertilizers eg. *Rhizobium, Bradyrhizobium, Azospirillum* and *Azotobacter.*

* Phosphorous solubilizing biofertilizers (PSB) eg. *Bacillus, Pseudomonas* and *Aspergillus*
* Phosphate mobilizing biofertilizer eg. *Mycorrhiza*
* Plant growth promoting biofertilizers eg. *Pseudomonas* sp.

### 1.4. 2 *How biofertilizers work?*

1. Biofertilizers fix atmospheric nitrogen in the soil at root zone and root nodules of legume crops and make it available to the plants.
2. They solubilize the insoluble forms of phosphates like tricalcium, iron and aluminium phosphates into available forms.
3. They scavenge phosphate from soil layers.
   They produce hormones and anti metabolites which promote root growth.
4. They decompose organic matter and help in mineralization in soil.
5. When applied to seed or soil, biofertilizers increase the availability of nutrients and improve the yield by 10 to 25% without adversely affecting the soil and environment (Murleedharan Hari, 2010).

### 1.4. 3 *Azobacter:*

Belongs to family Azotobacteriaceae are aerobic, free living and heterotrophic in nature. Azotobacters are present in neutral or alkaline soils and *A. chroococcum* is the most commonly occurring species in arable soils. *A. vinelandii, A.beijerinckii, A. insignis* and *A. macrocytogenes* are other reported species. The number of Azotobacter rarely exceeds of $10^4$ to $10^5$ g$^{-1}$ of soil due to lack of organic matter and presence of antagonistic microorganisms in soil. The bacteria produce anti-fungal antibiotics which inhibits the growth of several pathogenic fungi in the root region thereby preventing seedling mortality to a certain extent (Subba Rao, 2001a). The isolated culture of Azotobacter fixes about 10 mg nitrogen g$^{-1}$ of carbon source under in vitro conditions. Azotobacter is also known to synthesize biologically active growth promoting substances such as vitamins of B-group, indole acetic acid (IAA) and gibberellins. Many strains of Azotobacter also exhibited fungistatic properties against plant pathogens such as *Fusarium, Alternaria* and *Helminthosporium*. The population of Azotobacter is generally low in the rhizosphere of the crop plants and in uncultivated soils. The occurrence of this organism has been reported from the rhizosphere of a number of crop plants such as rice, maize, sugarcane, pearl millet, vegetables and plantation crops (Arun, 2007a).
1.4. 5 Phosphate solubilizers: Several reports have examined the ability of different bacterial species to solubilize insoluble inorganic phosphate compounds such as tricalcium phosphate, dicalcium phosphate, hydroxyapatite and rock phosphate. Among the bacterial genera with this capacity are *Pseudomonas, Bacillus, Rhizobium, Burkholderia, Achromobacter, Agrobacterium, Micrococcus, Aereobacter, Flavobacterium and Erwinia*. There are considerable populations of phosphate-solubilizing bacteria in soil and in plant rhizospheres. These include both aerobic and anaerobic strains with a prevalence of aerobic strains in submerged soils. A considerably higher concentration of phosphate solubilizing bacteria is commonly found in the rhizosphere in comparison with non rhizosphere soil (Raghu and Macrae, 2000). The soil bacteria belonging to the genera *Pseudomonas and Bacillus* and Fungi are more common. The major microbiological means by which insoluble-P compounds are mobilized is by the production of organic acids accompanied by acidification of the medium. The organic and inorganic acids convert tricalcium phosphate to di and monobasic phosphates with the net result of an enhanced availability of the element to the plant (Mahdi *et al* 2010).

1.5 Neem Cake Neem cake organic manure is the by-product obtained in the process of cold pressing of Azadirachta tree fruits and kernels and the solvent extraction process for neem oil cake. It is a potential source of organic manure under the Bureau of India Standards, Specification No. 8558. Neem has demonstrated considerable potential as a fertilizer. For this purpose neem cake and neem leaves are especially promising. Puri (1999) in his book on neem has given details about neem seed cake as manure and nitrification inhibitor. Neem cake seems to make soil more fertile due to an ingredient that blocks soil bacteria from converting nitrogenous compounds into nitrogen gas. It is a nitrification inhibitor and prolongs the availability of nitrogen to both short duration and long duration crop. Neem cake has adequate quantity of NPK in organic form for plant growth. It contain 100% natural NPK content and other essential micronutrients as N(2.0% to 5.0%), P (Phosphorus 0.5% to1.0%), K (1.0% to 2.0%), Ca (0.5% to 3.0%), Mg (0.3% to 1.0%), S (0.2% to 3.0%), Zn (15 ppm to 20 ppm ), Fe (500 ppm to 1200 ppm), Cu (4 ppm to 20 ppm), Mn (20 ppm to 60 ppm). It is rich in both sulphur compound and bitter limnoids.

Neem cake organic manure protects plant root from nematodes, soil grubs and white ants due to its contents of residual limnoids. It also acts as a natural fertilizer with pesticidal properties. Neem cake widely used in India to fertilize paddy, cotton
and sugarcane, usage of neem cake have shown an increase in the dry matter in *Tectona grandis* (Teak), *Acacia nilotica* (Gum arabic) and other forest trees.

Neem seed cake also reduces alkalinity in soil as it produces organic acids on decomposition. Being totally natural it is compatible with soil microbes, improves the rhizosphere micro flora hence ensures fertility of the soil. Neem cake improves the organic matter content of the soil, helping improvement in soil texture, water holding capacity, soil aeration for better root development. Neem cake is effective in the management of insects and pests. The bitter principles of the soil and cake have been reported to have seven types of activities -

1. Antifeedant
2. Attractant
3. Repellent
4. Insecticide
5. Nematicide
6. Growth disruptor
7. Antimicrobial.

The cake contains salannin, Nimbin, Azadirachtin and Azadiradione as the major components. Of these, Azadirachtin and Meliantriol are used as locust antifeedants while salannin is used as an antifeedant for the housefly (http://en.wikipedia.org/wiki/Neem_cake

1.6 Weed compost and weed vermicompost: Weeds have been associated with human being from the very dawn of agriculture. They make their presence felt in crops, lawns, orchards, gardens, along highways, rail way tracks, irrigation channels and water bodies and so to say everywhere, weeds offer competition to crop and other desirable plants for all the growth factors viz. nutrients, light, air, space, water, etc. Their competition results into drastic reduction in productivity and quality. On a very conservative estimate the annual losses in our agricultural produce due to weeds alone is around 30 per cent which is more than total loss by pathogens (16%) and insect (12%) (Singh *et al* 1996).

The harmful effects of weeds are like slow poisoning unlike other pests like insects and diseases as the actual extent of damage done is noticed only when crop is
harvested. Management of weeds below threshold level in all the eco systems has become important to sustain our crop productivity.

In simple terms weeds are unwanted and undesirable who interfere with the utilization of land and water resources thus, adversely affect human welfare at particular place. Commonly, the plants growing at a place where they should not are referred as weeds.

**Weed biomass form a free crop of great potential value, it is highly productive crop that require no tillage, fertilizer, seed collection and cultivation.** The weed biomass is an open treasure for plants which can be used as a nutrient source. The productivity of the weed plants depends upon the types, ecological condition and age of the plants. Normally the terrestrial weeds are available only in monsoon and their productivity studies get restricted to the few months in the rainy season. **Weeds add the cost of cultivation, impair the quality as well as reduce the market value of the farm produce, harbor insects, fungal and viral pest that attacks crop plants.** Noxious weeds are major barrier to food production and economic development. A weed in a general sense is a plant that is considered by the use of the term to be nuisance and normally applied to unwanted plants in human made settings (Singh *et al* 1996). This lot of biomass which is considered as unwanted plants if we utilize this wasting biomass for preparation of organic manure like compost and vermicompost, it will act as good source of nutrients to the crop. Whenever they produced in large quantity they may not be required or used there but there is a yawning gap between the sight of production and its utility in the field, moisture content and transportation cost limits its use. To overcome this problem attempts had been made that whether it can be used through Dry manure, Compost or Vermicompost formation.

Leguminous weeds being rich in protein nitrogen were used with higher nitrogen efficiency ratio as *Cassia tora* L. *Crotalaria notonii* wt and Arn and *Tephrosia hamiltoni*, Drumm (Bharati Jadhav and Suryavanshi 1998). These weeds contain high nitrogen percentage and their speed of decomposition is better as compared to other weeds. In the given experiment leguminous weeds mixed with non leguminous weeds, it has given good quality compost and vermicompost.

*Achyranthes aspera* L.commonly known as aghada and *Tephrosia hamiltoni* Drumm. Unhali, *Cassia auriculata* L. Tarawad, are common invasive weeds in
irrigated and dry areas growing along road sides and on waste land these weeds are used for the preparation of compost and vermicompost. **In these experiments we are not using the weeds which are used as cattle feed for grazing animals.**

When agricultural waste, tree leaves and weeds used for composting and vermicomposting, it will reduce the bulk and volume. **Therefore our motto is to reduce, reuse and recycle wastes for effective, efficient and economical use of bio-resources for the preparation of compost and vermicompost which will give rugged, reliable, profitable and better solution for the maintenance of soil fertility and additional environment benefits that flow from compost use.**