Intensification of agriculture through massive adoption of high yielding cultivation, increased use of synthetic inputs like chemical fertilizers and pesticides, greater exploitation of irrigation potentiality of surface and ground water resources and farm mechanization have largely been responsible for a spectacular achievement in the food grain production that we have achieved over past three decades. Paradoxically however overexploitation of natural and renewable resources and indiscriminate and irrational use of synthetic inputs like inorganic fertilizers and pesticides in view of producing more and more from unit piece of land are being increasingly realized to seriously impair the ecological balance and putting the environment in jeopardy. High yielding cultivation is more fertilizer responsive which often led to aggravation of pest problem as the plants become succulent enough to be fed upon by a variety of crop pests. This in turn necessitates increasingly huge amount of pesticides to combat pest problem. Increased use of pesticides has emerged as a potential source of danger to sustainability of environment that endangers the existence of all forms of life on this planet. Perils and pitfalls of pesticides have been well evidenced due to their residual toxicity in our food chain. From a number of trials conducted across the country, toxic residues of pesticides have been revealed in the food stuff not only of plant but also of animal origin like milk and milk products, fish, meat and egg etc. at concentrations much higher than the permissible level of human body. Therefore the apparent contradiction of our necessity for nutritional security on one hand and environmental sustainability on the other makes it inevitable to resort to the organic or eco-farming system as it appears to be a possible option to meet both these objectives. The later implies a farming system that primarily aims at cultivating land and raising crops under ecologically favourable condition. It emphasizes restricting the use of chemical inputs whether it is inorganic fertilizers or pesticides and instead, relies more on an integrated approach of crop management practices making use of cultural, biological and natural inputs. Addition of organic manures such as FYM, recycling of organic wastes through composting, green manures and biological inputs like vermicomposts and biofertilizers etc. constitute important components for plant nutrient management in organic farming. similarly it also takes utmost advantage of the natural mechanism for pest management with utilization of bioagents such as predators and parasites available in nature in plenty and the botanical pesticides which
are effective in controlling crop pests posing no risk to the environment. Agronomic practices such as crop rotation with judicious selection of crops, inter cropping and companion cropping, stubble mulching and use of resistant varieties are among the important factors contributing to organic farming.

**Organic Manures in Organic Farming**

Organic manure in a broad sense includes composts from rural and urban wastes, crop residues, agro industrial bio wastes and green manures, apart from the commonly used FYM. Organic manure improves soil physical condition including soil porosity and water holding capacity and microbial environment, replenishes essential micronutrients in soil, increases the utilisation efficiency of applied fertilizers and favours micronutrient availability to the plant. Organic manure is of paramount importance not only in augmenting the crop production but also for making the agriculture sustainable as an ecofriendly means of soil health management. It is well established that FYM plays an additional role than its capacity to contribute NPK. Unlike chemical fertilizers that supply only the major nutrients, FYM is a store house of several plant nutrients and acts as a good soil conditioner.

Green manuring has recently been under practice by our farmers for decades. Estimates suggest that a 40-50 days old green manure crop can supply up to 80-100 kg. N/ha. Even if half of this N is crop utilizable, a green manure crop can be a substitute to 50-60 kg. fertilizer N/ha. Some of the potential green manuring legumes are dhanicha, sunhemp, cowpea, mung, bean, guar and berseem etc. Dhanicha, sunhemp, mung bean and guar grown during kharif season as green manure crops have been reported to contribute 8-21 tones of green matter and 42-95 kg. of N/ha. Similarly, Khesari, cowpea and berseem grown during rabi season can contribute 12-29 tons of green matter and 67-68 kg of N/ha.

**Vermicomposting**

Vermicomposting is an effective means of composting the decomposable organic wastes using earthworms naturally present in the soil. Vermicomposting is a mixture of worm casts enriched with macro and micronutrients (N, P, K, Mn., Fe, Mo, B, Cu and Zn.), some growth regulating substances such as gibberellins and auxins) and useful micro flora (Azospirillum, Actinomyces and Phosphobacillus) etc. The nutrient level of vermicompost (1-1.5%N, 0.6-0.8% P and 1.2-1.5 K) is higher than any other compost. From the available information it is well documented that earthworms can consume all types of organic matter and convert them into available form of nutrients. Vermicompost improves the physical and biological condition of soil, improves soil fertility and pulverizes it through their churning and turning action in addition to contributing plant nutrients, improves aeration and water holding capacity. It is reported that soils with casts contain 5 times nitrogen, 7 times phosphorus, 11 times potash, 2 times magnesium and 7-8 times actinomyces more than in soils without earth worm casts. It being a natural means of soil fertility management fits well into integrated plant nutrient management strategy for sustainable agriculture.

**Exploitation of Biological Nitrogen Fixation**

Atmosphere containing as much as 78% nitrogen can be a potential source of this essential nutrient to soil utilizing the nature's own mechanism of biological nitrogen fixation. It not only offers an economic and ecofriendly
source of nutrient supply, moreover evidences show that nitrogen so derived is less prone to loss than fertilizer nitrogen and as a long term effect it builds up a reserve of readily mineralizable organic nitrogen. Thus it plays an important role in sustainable agriculture, reduces the requirement of externally applied nitrogen fertilizer and favourably influences the soil microenvironment. BNF is a natural system of biological mobilization of atmospheric nitrogen which can be easily available to and utilized by plants mediated by microorganisms like some eubacteria, cyanobacteria, actinomycetes and a few archaeabacteria which are commonly called diazotrophs. They have the ability to convert atmospheric elemental nitrogen (N2) to ammonia (NH3) with the help of nitrogenase enzyme system. The efficacy of true bacteria like \textit{Rhizobium}, \textit{Azotobacter}, \textit{Azospirillum} and cyanobacteria like \textit{Anabaena}, \textit{Aulosira}, \textit{Nostoc}, \textit{Plectonema} and \textit{Tolypothrix} etc. have already been well established under field conditions and such microbial inoculants have gained wide acceptance due to their high nitrogen fixing potentiality.

\textbf{Cultural Recommendations}

\textbf{Minimum Tillage}

The conventional tillage operation has disastrous effect on soil erosion causing greater loss of nutrients. This has led to necessity of stubble mulching. In the stubble mulching the soil is protected by the crop residues left on the soil surface during fallow periods. This has now become well established that in stead of frequent tillage operations minimum tillage is more useful not only because it offers cost effectiveness but also contributes to conservation of soil and moisture. Available information reveals that it gives as good as or even better yield than the conventional tillage practices. It aims at reducing tillage to the minimum, necessary for ensuring a good seed bed, rapid germination, satisfactory crop stand and favourable growing conditions.

\textbf{Selection of Crops for Crop Rotation, Inter Cropping and Companion Cropping}

Crop rotation has an important role to play in organic farming. Judicious selection of crops in crop rotation helps in efficient utilization of plant nutrient from different depths of soil. The practice of inter cropping also helps in minimizing the risk of crop failure due to uncertain rainfall and infestation of pest and diseases. Available information reveals that in case of inter cropping of sorghum and red gram at 2:1 row ratio it resulted in 70\% higher yield over the individual cropping of both the crops. Besides it also reduced the wilt diseases of red gram. Another advantage was that nitrogen fixed by the red gram could be utilized by the sorghum crop. Another trial of companion cropping comprising of three rows of gram followed by one row of linseed revealed that incidence of pod borer in gram as well as fly in linseed was remarkably reduced and yield also increased by about 14\% in this inter cropping over the sole cropping of both the crops.

\textbf{Integrated Pest management}

The multifarious harmful consequences of indiscriminate use of pesticides have cropped up as a serious threat to the ecosystem. In view of the fact that increased use of pesticides has been drastically endangering the environmental sustainability, integrated approach to pest management needs adequate importance to make the agriculture ecofriendly.
Like integrated plant nutrient management, IPM also makes use of an ideal combination of physical, chemical, biological and cultural methods to contain pest damage with minimum ecological implication. It takes the utmost advantage of natural mechanism of pest suppression. Modifications of crop environment to make it unfavourable for infestation of pests, use of resistant cultivars and transgenic alongwith a judicious and need based use of preferably safer chemicals are the major components of IPM. Biocontrol is an integral component of integrated pest management strategy. It employs natural mechanism of pest suppression in which the natural agents like predators, parasites and microbial agents suppress the pest population. If the natural enemies can be effectively conserved, the need of other control will automatically reduce.

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