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RESEARCH ARTICLE

Organic Farming under *Paramparagat Krishi Vikas Yogana* scheme : A need to address the lack of availability of Farm Yard Manure.

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Abstract

Farm Yard Manure (FYM) which is the most commonly used organic manure in India is in short supply. Under the recently launched Paramparagat Krishi Vikas Yogana (PKVY) scheme, the Government is planning to bring 5 lakh acres of land under organic farming over the next three years. The achievement of this target may be in jeopardy due to non-availability of farm yard manure. Measures suggested to overcome this shortage are rearing more cattle, enhancing the production of organic manure through incentives, increasing the land under fodder crops and permanent pastures, encouraging the maintenance of cattle through subsidies and incentives and kraaling of cattle on the fields.

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Organic Farming:-

The Finance Minister has announced in his budget speech for the year 2016-17, that 5 lakh acres, over a period of three years, will be brought under organic farming under the newly launched Paramparagat Krishi Vikas Yogana (PKVY) scheme. This scheme was launched in the year 2015-16, with an allocation of Rs. 300 crores, to increase crop yields in rain-fed areas, which account for nearly 55% of India's arable land. For the financial year 2016-17, a combined sum of Rs. 412 crores has been allocated for the schemes, PKVY and "Organic Value Chain Development in North East Region".

The global market for organic products continues to be positive (Willer and Lernoud 2016). In 2014, the retail sales of organic food and drinks touched 80 billion US dollars (Willer and Lernoud 2016) up from 72 billion US dollars in 2013 (Willer and Lernoud 2015). In 2014 the area under organic farming was 43.7 million hectares (Willer and Lernoud 2016), a slight increase from 43.1 million hectares in 2013 (Willer and Lernoud 2015), representing a share of 0.99% of total agricultural land worldwide. India had 720,000 hectares of organic agricultural land (including in-conversion areas) in 2014 which was 0.4% of total agricultural land (Willer and Lernoud 2016). The corresponding figure for India in 2013 was 510,000 million hectares which was 0.3% of total agricultural land (Willer and Lernoud 2015).

Organic farming avoids use of external inputs, synthetic fertilizers, pesticides and other harmful chemicals, relies on crop rotations, natural predators, promotes biodiversity, recycles crop residues, animal manure and other organic matter, promotes soil health and fertility, eschews mechanization, and is adapted to local conditions. Conventional agriculture, on the other hand, is characterised by the excessive use of chemicals and mono cropping. The harmful effects of which are degradation of soil, water and environment (Report of the Working Group on Organic and Biodynamic Farming, Planning Commission 2001; Narayanan 2005; Shiva 1991; Greenpeace India Society 2012), adverse effect on the physical, chemical and biological properties of the soil (Narayanan 2005) and depletion of soil micronutrients (Nicolaysen 2012; Shiva 1991; Punjab State Council for Science & Technology 2007). A decline in

the yield of rice and wheat has been reported in Punjab, in spite of increased use of chemicals (Shiva 1991; Punjab State Council for Science & Technology 2007). Cotton which is the third most important crop in Punjab has been affected by pest and its yield has also declined (Punjab State Council for Science & Technology 2007). Recently, the cotton grown in the states of Haryana, Punjab and Rajasthan has been affected by whitefly infestation. It has been reported that over 95 per cent of the affected crops is hybrid Bt crop (Jitendra 2015). Intensive fertilizer application has led to accumulation of nitrates in the soil, contamination of rivers, lakes, groundwater, wells and other water bodies (Narayana 2005; Greenpeace India Society 2012). Toxic chemicals used in conventional agriculture have also penetrated into our food chain (Committee on Estimates 2015-16).

Organic farming, on the other hand, is more environmentally friendly than conventional farming systems. Organic farming systems have greater soil carbon levels, higher moisture retention, better soil quality (Sharma et al. 2015) and less soil erosion (Howard 1940). Organic farming contains no risk of synthetic pesticide pollution of ground and surface waters (Reganold and Wachter 2016). Under severe drought conditions, organically grown crops have been shown to produce greater yield than conventional crops (Reganold and Wachter 2016). Organic farming is most suitable for low rainfall areas (Sharma et al. 2015). An organic farmer in Tamil Nadu reported that paddy grown by him using organic manures was more resilient during floods (Venkatasubramanian 2015).

Organic manures:-

Organic manures are necessary to restore soil fertility (Howard 1940). Organic manure provides nutrients to the plant, helps in maintaining C:N ratio in the soil, increases soil fertility and productivity, improves physical, chemical and biological properties of the soil and increases water-retention capacity of the soil (Chandra 2005). The most commonly and traditionally used organic manure in India is farm yard manure (FYM) that is readily available (Chandra 2005; Gaur, Neelakantan and Dargan 1995). Cattle provide good manure and should be an integral part of sustainable agriculture (Greenpeace India Society 2011).

Farm Yard Manure (FYM):-

Farm Yard Manure is partially composed dung, urine, bedding and straw (Chandra 2005). FYM contains approximately 5 - 6 kg nitrogen, 1.2 - 2.0 kg phosphorus and 5 - 6 kg potash per tonne. The quantity and quality of FYM depend upon the type and age of the animals, feed and the care taken to collect and store the dung. If properly preserved, the quantity of manure that can be produced per animal per year would be as much as four to five tonnes containing 0.5 per cent nitrogen (Chandra 2005). FYM supplies organic matter and nutrients to the soil and increases carbon content in the soil (Singh and Singh 2014; Raj, Jhariya and Toppo 2014). It enhances the physical, chemical and biological properties of the soil (Greenpeace Society International 2011). Manure improves soil tilth, aeration, water-retention capacity of the soil and reduces the bacterial and fungal pathogenic diseases of plants (Raj, Jhariya and Toppo 2014).

A serious concern prevails on the availability of farm yard manure to meet the requirements of organic farming in India. Total farm yard manure available in the country is approximately 1200 million ton including availability of 268 million ton dung from livestock (Singh and Singh 2014) and 50% FYM is used to improve soil fertility while the remaining quantity is used for fuel (Singh and Singh 2014; Reddy et al. 2005). On an average 1.5 - 4.5t ha⁻¹ organic manure was available at farm level in the form of crop residues and animal dung in a survey conducted in low rainfall (below 500 mm year⁻¹) districts of Jodhpur, Nagaur, Pali and Balmer in Rajasthan (Sharma et al. 2015) this is much lower than the recommended 5 to 7t ha⁻¹ in dry areas where the rainfall is low (below 50 cm) (Gaur, Neelakantan and Dargan, 1995).

The shortage of organic manures is well documented. Against a requirement of 710 million tonnes of organic manure, only 105 million tonnes are available (Committee on Estimates 2015-16). The biggest constraint is the insufficiency of animal manure (The Indian Express 2016). A major concern in organic farming is the non-availability of organic inputs such as vermicompost, trichocompost, FYM, *amrutpani*, biofertilisers (Report of the Working Group on Organic and Biodynamic Farming, Planning Commission 2001). In a survey conducted by Greenpeace, it was found that 72.9% of respondents stated that reasons for not using organic matter was its unavailability (Greenpeace Society International 2011). The number of livestock owned by a farmer has a direct impact on the availability of cow dung, which in turn, influences the consumption of agrochemicals (Singh and Singh 2004).

Suggestions to increase organic manure:-

1. The rearing of livestock is imperative for increasing organic manure (Committee on Estimates 2015-16; Report of the Working Group on Organic and Biodynamic Farming, Planning Commission 2001; The Indian Express 2016).
2. Production and sale of compost, organic manure and micro nutrients should be encouraged on a large scale through informal as well as, organized production systems by providing appropriate incentives (Report of the Steering Committee on Agriculture and Allied sectors for formulation of the Eleventh Five Year Plan, Planning Commission 2007).
3. Feed of livestock is one of the determining factors of the quality of FYM (Chandra 2005; Gaur, Neelakantan and Dargan 1995). Making available fodder crops and increasing the availability of permanent pasture land would lead to fewer cattle deaths and better quality of manure (Pandey and Singh 2012; Report of the Working Group on Organic and Biodynamic Farming, Planning Commission 2001). In India, the area under permanent pastures is rapidly declining (Pandey and Singh 2012). In 2005-06 the area under permanent pastures and other grazing land was 10,444,000 hectares which declined to 10,301,000 hectares in 2010-11, a decline of 1.39%. The area under fodder crops was 8,066,000 hectares in 2005-06 and declined to 7,769,000 hectares in 2010-11, a decrease of 3.82% (Basic Animal Husbandry Statistics 2014).
4. Kraaling of cattle is followed in Nepal, parts of Indian Himalayas (Singh and Gaur 2013) and in semiarid Africa south of the Sahara (Powell and Ipke 1992). The urine and dung excreted by the cattle on the fields helps in restoring soil fertility. It was found that the yield of millets in plots that were kraaled was 2.3 times higher than when only manure was applied (Powell and Ipke 1992).
5. Cattle that are not productive or old can be used for the production of dung and urine. The animals may not give milk but provide manure in substantial quantity. Cattle provides 4.6 to 11 kg ha⁻¹ year⁻¹ nitrogen through urine (Sharma et al. 2015).
6. Subsidies and incentives should be given to farmers for maintaining cattle (Report of Task Force on Organic Farming, 2001), particularly those that have become old and unproductive.

Conclusion:-

The environmental and health benefits of organic farming are widely recognized and the market for organic products is huge and growing annually. The Government of India, has rightly evinced interest in promoting organic farming under the flagship scheme, Paramparagat Krishi Vikas Yojana. But there is concern that the targets for organic farming may not be achieved due to impediments, such as, lack of organic manures and marketing (Ong Kung Wai 2016). The shortage of organic manure can be overcome to a large extent by providing suitable subsidies and incentives for rearing and maintaining cattle, thereby, increasing the availability of farm yard manure.

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