

TFYP WORKING GROUP Sr. No. 46/2001

**REPORT OF
THE WORKING GROUP ON**

**ORGANIC AND BIODYNAMIC
Farming**

**FOR
THE TENTH FIVE YEAR PLAN**



**GOVERNMENT OF INDIA
PLANNING COMMISSION
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ORGANIC AND BIODYNAMIC FARMING

I. INTRODUCTION

1. Although, as yet infancy, Organic Farming is becoming important in the agriculture sector in India, largely through the efforts of small groups of farmers. It has come out of the exploitative agriculture that has been followed by in all these years, resulting into damaging impacts on environment, human and animal health, soil and water resources. It is well known now that increased use of chemical pesticides (rather abuse) and fertilisers have created chain of problems of soil, environment and water degradation. The intensive chemical agriculture that has been followed after green revolution successes is causing heavy pollution of our food, drinking water, air, the life expectancy has improved, but the quality of life has substantially deteriorated. The rural economy is in ruins because of over-dependence of outside inputs in agriculture such as seed, fertilisers, pesticides, growth-promoting chemicals etc. It is even said that the chemical agriculture has destroyed our ability to think about the right way to go forward. Fortunately, alternatives to chemical agriculture are available in organic, biodynamic and eco-technological farming approaches. Though a small percentage of farmers are expected to take up organic farming, consumer demand for organically produced food and fibre products provide new market opportunities for farmers and farm-business around the world. In fact, Government of India has been clearly aware of the importance of organic and bio-dynamic farming approaches and the Ninth Five year plan document laid emphasis on 'Environment and sustainable agriculture', promotion of organically produced commodities, particularly in plantation crops, spices and condiments. The Plan document emphasised the use of biofertilisers, bio-control agents, organic manures with infrastructural support.

2. It is interesting to note that Food & Agricultural Organisation (FAO) Committee on Agriculture, during the 15th Session, has discussed the topic, "Organic Agriculture" and concluded that FAO has the responsibility to give organic agriculture a legitimate place within sustainable agriculture programmes. In several developed countries, organic agriculture has come to represent a significant portion of food system (Austria, Switzerland) and many other countries such as Japan, Singapore, France, United State of America etc. are experiencing growth rates that exceed 20 percent annually (FAO Committee on Agriculture – Agenda Item 8, pages 1-12). Many developing countries

began to seize the lucrative export opportunities presented by organic agriculture (e.g., export of cotton from India, Uganda and many other countries export of Mexican coffee, organic spices etc.).

3. Realising the importance of organic and bio-dynamic farming, the Planning Commission, Government of India has constituted a Working Group (**ANNEXURE I**) on the subject. The Terms of reference of the working Group are:

- i) To review the performance of various programmes of Department of Agriculture and Co-operation (DAC) and ICAR undertaken on organic and bio-dynamic farming.
- ii) To assess the technical soundness of organic and bio-dynamic farming practices to provide balanced nutrition and their efficiency to exploit the full genetic potential of the recommended crop varieties.
- iii) To assess the techno-economic feasibility to such practices and their potentials and limitations to increase crop productivity and sustain food security of the country.
- iv) To suggest measures/programmes for encouraging organic and bio-dynamic farming practices for which these are considered feasible and viable.

4. In consultation with Chairman of the Working Group, all members and some of the co-opted members were contacted by providing them with available literature in the form of bulletins, books etc. and were asked to provide inputs for preparing this draft paper. M/S T.G.Kutty Menon, W.R.Deshpande, V.N.Shroff, D.V.Ragnekar, Labangalatika Dasi, Kapil Shah etc. immediately responded by providing their learned inputs, which have been taken into consideration in preparation of the paper. Personal discussions of the Member Secretary with Shri Kuwarji Bhai Jadhav at New Delhi on 7th August provided some additional information, since he is Chairman of the Committee for the promotion of organic farming has been engaged in preparing a report for the Ministry of Agriculture, Government of India.

In view of the shortage of time, the group could not meet to discuss the issues. The draft paper thus presented before the Steering Group on Agriculture and Allied Sections (constituted by the Planning Commission) on August 21, 2001. The suggestions of the members are also incorporated in this Final Report.

II. Definitions and variants

5.Organic farming is basically a holistic management system, which promotes and improves the health of the agro-ecosystem related to biodiversity, nutrient biocycles, soil

microbial and biochemical activities. Organic and bio-dynamic farming emphasises management practices involving substantial use of organic manures, green manuring, organic pest management practices and so on. It has also come to mean that it is a system of farming that prohibits the use of artificial fertilisers and synthetic pesticides. **Bio-dynamic farming** is an alternative variant where the chemical fertilisers are totally replaced by microbial (biological) nutrient givers such as bacteria, algae, fungi, mycorrhiza, actinomycetes. Biological Pest management of crops is undertaken by employing predators, parasites and other plethora of natural enemies of pests, in addition to all the rest of option that help to avoid resorting to chemical pesticides. These agents could be augmented into farms or promoted through such activities that favour their flourished activities. Composting, Green manuring, crop rotations, Intercropping, mixed cropping etc. as well as bird perches, trap crops promote such biological activities. Although interpreted differently by various proponents, organic farming, biological farming, regenerative farming, bio-dynamic farming. Low external input sustainable agriculture (LEISA), low input sustainable agriculture (LISA) and sustainable agriculture connote the same ideology that provide integrated efforts to maintain agro-ecosystems with futurism. Organic farming could then signify all such farming practices. Shri Kapil Shah indicated that a Organic farming is a philosophy for sustainable rural development and a not a technological or market option alone. This is a very important because organic farming cannot be viewed in isolation as for export market, but also could be a way of life in the Indian rural context. Therefore, organic farming can be defined as socially just, environment friendly and economically viable alternative to chemical-oriented farming.

6. An alternative system is called 'Eco-technological farming' has often been equated to organic and bio-dynamic farming in the Indian context. This system is an effective bend to traditional practices of wisdom with appropriate modern advances of science. Integrated nutrient management (INM), integrated pest management (IPM) with optimum use of inorganic inputs is advocated.

7. In fact, organic and bio-dynamic farming signify the production of a kind of chemical residue-free organic labelled products to sensitive consumers. In other words, Organic is a 'process claim' rather than a 'product claim'. This is because the agricultural products such as cereals, pulses, grams, fruits, spices or cotton cannot be distinguished into organic type or inorganic type. Several countries and multitude of private certification

organisations have defined in similar ways organic farming as agriculture. There were wide differences initially that the demand for constituency by multinational traders has led to great uniformity.

8. Internationally networked non-governmental organisation, called International Federation of Organic Agriculture Movement (IFOAM), has permitted the use of certain products for soil conditioning and for pest and crop growth management. The basic rates of organic production are that natural inputs are approved and synthetic inputs are prohibited). The Hanoi declaration of IFOAM (1994) emphasises that the Asian history of agriculture spanning into thousands of years, is in deep connection with cultural and ecological diversity. The erstwhile colonial rule as well as misdirected policies have undermined this balance. The increased food production in certain countries also paid for the cost of degradation of traditional diversity of crops and animals. Other international movements are Commission on Sustainable Development (CSD), Society for International Development (SID), International Union for Conservation of Nature (IUCN) and Bread for the world.

9. The Codex Committee of World Health Organisation on Food Labelling has been guiding the approval of such products. The broad definition of organic agriculture recommended by *Codex Alimentarius* Commission is more useful for practical purposes under Indian situation. "Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasised the use of management practices in preference to the use of 'off-farm' inputs, taking into account the regional conditions require locally adapted systems. This is achieved by using where possible agronomic, biological and mechanical methods, as opposed to using any synthetic materials to fulfil any specific function within the system.

III. Promotion of organic farming by ICAR and Department of Agriculture and Co-operation

10. The seeds of commercial Indian "Organic cotton" cultivation were sown for the first time in Maharashtra in the early 1990s. Some progressive farmers, distressed by the negative effects of pesticides for insect suppression in cotton crop, reduced the chemical inputs and increased the use of organic manure, developed their own techniques to optimise resources in order to develop sustainable farm. The pioneers, in this field, are M.V.

Wankhede, S.P. Wankhede, R.S. Wankhede (from 1978 onwards) of Amaravati dist., Anantrao Subhedar, Om Prakash Mor and Tukaram Bhimsingh Jadhav of Yavatmal dist. (from 1990 onwards, after being introduced to the "Fukuoka" type of farming to them by Shri Dabholkar of Pune), or Shri Jain (for at least 60 last years) of Karanja-Lad who has a historical cultivation background of a few decades. They tested the 'Fukuoka' principles of farming, and stabilised their farms due to their ingenuous approaches. A team of CICR scientists visited the Yavatmal farms in 1992 crop season to analyse their package of practices. A brief history of Organic farming in Maharashtra is given in Table 1. The productivity of various cotton cultivars in certain organic farms during 1996 is given in Table 2.

Similar efforts of promotion of organic farming have been made in many states. Efforts have been made by the NGOs to study organic farming in Gujarat, Madhya Pradesh, Kerala, Karnataka, Tamil Nadu. Agricultural Universities organised workshops, Group meetings. Seminars and Conferences on this topic drew attention of scientists to the need of research in this area. The use of biofertilisers, biopesticides, vermicompost, Farmyard manure, green manure, crop residues have been based on long experimentation. In fact, a number of farmers, NGOs and even some Universities/Institutions are practising organic farming, using traditional sources and methods of nutrient supplies to the crops and non-chemical forms of plant protection measures with varying degree of success. However, the technology adopted and methods followed are not well-documented.

There has been a good suggestion from Shri Kapil Shah who emphatically proposed that the Universities and institutions that are undertaking organic farming trials should not only go about INM and IPM. It is essential that the philosophy of organic farming are percolated to them properly. It is for the scientists, basically to evolve separate protocols for the conduct of organic farming trials. A distinction is necessary at this stage between the trials of organic farming and biodynamic farming including the eco-technological approach wherein the organic inputs approved by the certifying agencies are tested in replicated or large-plot trials instead of combining INM and IPM.

11. Due to indiscriminate use of hazardous insecticides for controlling cotton pests, the resistance of insects against the insecticide hiked up and in turn compelled the use of more number of sprays, and thus a vicious cycle is created, escalating cost of cultivation. Organic farming will help in reversing this trend. Evidences on poorer choice of multiplication rate of pests on organically grown cotton are encouraging factors to pursue this protocol.

12. Scientists of Central Institute for Cotton Research, Nagpur had begun research in 1988 for identifying optimal practices for conserving soil moisture and also for improving organic matter content of marginal soils (Tarhalkar and Venugopalan, 1995). The results of these experiments led to the thought of comparing the three options, viz., inorganic, organic and an even mixture of both these in the third. It was proposed to begin a long-term demonstration trial at CICR on organic cotton cultivation and with comparative plots of inorganic and an integrated crop management plot, having 50% each of organic and inorganic components of inputs.

13. Improvement of marginal soils where cotton is extensively cultivated in Maharashtra, Madhya Pradesh and some parts of Andhra Pradesh, through certain methods such as *in situ* live green mulching, green manuring and addition of compost and recycled farm waste were in progress in the late eighties at Central Institute For Cotton Research. The data of these are given in **ANNEXURE II**. The continuous crop failure of farmers in the early '90s in spite of cultivation of hybrids was analysed to be due to poor expression of heterotic potential in marginal lands under rainfed conditions. Associated techniques of farm waste recycling including cotton stalks using *Trichoderma viride*, the cellulolytic fungus were perfected. The sharp rise in cost of cultivation due to extensive applications of pesticides for hybrid cotton cultivars was found to be due to improper understanding of pest dynamics in cotton cultivation under high pesticide umbrella, which was the recommendation *in vogue*. The institute was involved in the search for alternate techniques of pest suppression in cotton such as by the use of bio-agents, pesticides of botanical origin etc. During these field experiments as well as on-farm demonstrations, it became clear that there is a good scope for the reduction of agro-chemicals in cotton without any deleterious effects on crop yield. An ad-hoc field experiment was begun in 1991 at CICR farm in 600 sq.m. plot to marry the agronomic techniques to reduce the fertiliser component while the pest management was exclusively through biological means. LRA 5166 was the variety that was invading central zone from southern zone and was chosen as the cultivar for the experiment, although it was known to be more susceptible to jassids. Parallel plots of similar dimensions were kept with the recommended practice of fertilisers and insecticides. A third plots received 50% of the inputs of both the other plots. Another set of 3 plots was cultivated with *G. arboreum* (Des) cotton variety, AKA 5 and later with AKA 8401. This was planned as a long-term trial. The breeders had criticised the selection of LRA 5166, but the scientists went

ahead with that since we had a conviction that crop husbandry could modify the growth pattern of cotton cultivars, as was seen in some farmers' fields in Vidarbha. The scientists working in CICR had, by then, equipped for the research necessary in optimising the organic inputs for effective crop management. The yield data of the above experiments is given in the Table: 3. It explicitly brings out the fact that after third year, the yield of organic plots, which did not receive fertilisers and insecticides produced as much cotton as that cultivated with them. Simultaneously, it reduced the bollworm damage (Table:4). The effect on soil organic Carbon and P content are explicit from the Table: 5 & 6. The long-term trial had another set of plots with the hybrid, NHH-44 from 1994. The yield data of this hybrid over five years is given in Table: 7. This long-term experiment at CICR ended up in the production of suitable package of practice for organic cotton cultivation that was published in ICAR Newsletter Vol.4 in 1998. CICR also studied the cost of cultivation and the economics of growing organic and conventional cotton in Maharashtra (Table 8 & 9).

14. The following crops are currently cultivated under organic farming methods in our country.

Cereals: wheat, paddy, jowar, bajra, maize

Pulses: Pigeonpea, chickpea, greengram, blackgram, *chana*,

Oilseeds: groundnut, Castor, mustard, sesame

Commodities: Cotton, sugarcane, particularly for Sugarcandy (*gur*)

Spices: Ginger, Turmeric, Chillies, cumin

Plantation Crops: Tea, Coffee, Cardamom

Fruits : banana, sapota, custard apple and papaya

Vegetables: Tomato, brinjal, cucurbits, cole crops, leafy vegetables

15. The initiatives taken by Bombay Burmah Trading Corporation (BBTC) to convert Singampatti group of estates in southern India to market organic tea internationally is the first of the few efforts for commercial organic agriculture. A number of organisations such as The Ecological Development Society in Pondicherry, Institute for Integrated Rural Development at Aurangabad, The Society for Equitable Voluntary Actions (SEVA) in West Bengal, The Indian Agency for Organic Agriculture (IAOA), Peekay Tree Crops Development Foundation (PTCDF) at Cochin undertake training of personnel towards organic farming. All India Federation of Organic Farmers promotes organic farming in the country.

16. It has been realised that India can play a major role in International organic spices market. The Spices Board (**K.S. Nair in Business News**) has emphasised the expansion of Indian spice market because it is felt that the spices growers have a natural

advantage in terms of large tracts of land in the tribal belts of Orissa, north-eastern states, Nilgiri hills and Andaman & Nicobar islands where traditional practices are still in vogue. The Board has already launched the Schemes to assist the organic spice growers by publishing national standards for organic spice production. It has received approval from the National Standards Committee of IFOAM. During 1997-98, India has exported 32.01 tonnes of different organic spices as against 25.32 tonnes in previous years. The exports are expected to rise in the coming years as the Spice Board is assisting overseas buyers in sourcing organic spices from India. According to **Shri Kapil Shah**, organic farming lead to the consider a good national food security option of healthy food for teaming population instead of creating an export-oriented business alone. In fact, it suggestesd that ICAR should take the lead for development of standards fore organic cultivation rather than APEDA of Commerce Ministry.

17. During the early part of last decade, the concept of Sustainable Agriculture and Rural Development (SARD) was introduced in one FAO conference held in Netherlands to attain food security, employment and income generation in villages and natural resource conservation leading to environmental protection. The intense development and progress of organic farming in our country also synchronised with this resolution as well as similar resolve of United Nations Development Programme (UNDP, 1994).

18. Besides these efforts of ICAR and other NGOs in promoting organic and biodynamic farming, a real government support either in the form of subsidising the organic inputs or production promotion schemes of FYM, NADEP and other biological composting methods, *AMRUTPANI*, green manuring, recycling of farm wastes using earthworms or *Trichoderma* spp., botanical pesticides, biocontrol agents etc. has not been visible.

19. There are sporadic efforts on the part of the State governments to organic and bio-dynamic farming. For example, the Maharashtra Cotton Marketing Federation has purchased organic cotton separately and helped the growers in exporting to EU regulations and other countries.

III. Major R& D issues

20. Examine the current economics of organic crop production system in the light of institutional support and based on the Chapter 10 agenda 21 of the Action Programme

on Environment and development in Rio de Janeiro conference. On-farm research on standardised protocols for feasible cropping systems and their package of practices.

21. Study and assess the likely environmental and economic values and externalities associated with the above conversion and its implications for future incentives to organic farming in the country. Comparative evaluation of social and environmental economics are very much require to study both chemical and organic agriculture. While studying this, it is necessary to include all indirect costs including subsidiaries for the comparative analysis. Shri Jagdish Nazareth has given a very good suggestion on the nutritional security. It is now evident that food grains in the hands of government agencies at the central level are no insurance against hunger deaths, amongst landless labourer and tribal sections of rural community. There have to be an alternative approach to deal with this problem, according to him. In fact, the centrally procured and stored food grain are not fit for exports, as evidenced by the recent rejection of 90,000 tonnes of wheat exported to Iraq under UN supervision. It is in this context, he suggests that there should be some crops and lands reserved for organic production only. Currently, medicinal plants, many of which are exported, are being cultivated using banned pesticides, on the basis of recommendations of the agricultural universities. Pesticide residues in milk and milk products exceed the maximum permissible limits as specified by the *Codex alimentarius*. These are legal and not safety limits. It is therefore necessary to review all the pesticide recommendations made by agricultural universities and institutions. Pesticides pose the greatest hazard to our international export. In the light of their renewed resistance to pests, as well as the enhanced dosages applied by the users, the scientific recommendations of pesticide application for the control pests, diseases and weeds needs a critical review by an expert team.

IV. Major developmental strategies:

22. Various organs under different Ministries such as Commerce, Textiles and Agriculture should have an inter-ministerial group to promote the organic crop production and business interests. For example, the Agricultural Processed Products Export Promotion Development Agency [APPEDA] under Ministry of Commerce has brought out in March, 2000 the National Programme for organic Production containing the STANDARDS FOR ORGANIC PRODUCTS. APPEDA is known to further refine this 48-

page document and also authenticate all the current organic certifying agencies of the world, which have set up offices in India for being licensed for this job.

23. Organic farming brings earnings back to the rural area. In the western countries, most farm expenses are made to capitalistic factories to pay for machinery, fertiliser, pesticides and additives. In our small holdings we do not need heavy machinery (some drudgery easing machines should however be designed), and if our manure and IPM agents are made on our farms, we keep our people employed and their wealth with themselves without transferring it to townfolk. This may be bad for the government since as no cash is transacted no taxes can be levied. This economic insight should be properly developed with some case examples to show increase in rural wealth.

24. All sources of organic material that can (or presently cannot) be used as manure should be identified, this should include industrial wastes also. Gaps in technology that prevent the utilisation of some wastes should then be identified. This should be done to satisfy critics that not enough organic material is available for organic farming. Another intermediate farming practice that uses a stimulatory dose of fertilisers along with manures should be also be developed. As a lot of organic carbon and fixed nitrogen is lost in the process of composting, other methods of stabilising organic manure should also be looked into. In today's climate of scepticism and lack of encouragement towards organic farming, and subsidies for fertiliser use, one needs to be a die-hard believer to practice organic farming. Such people tend to get carried away when talking about their beliefs and some loose statement is caught hold of by the opponents to ridicule a whole set of otherwise proper arguments. The analogy of manure as food and fertiliser as tonic should be developed and widely disseminated. It is something people find easy to understand and correlate the consequences.

VI. Marketing infrastructure

25. Strong linkages between growers and consumers with minimum influence of middlemen should be developed. If only, government infrastructure such as agriculture, horticulture, animal husbandry and fisheries are integrated, this could be successfully organised. Sensitisation the philosophy and ideals of organic farming as a way of life to these agencies through a 'bottom up' approach with suitable delegation of powers and authority would accelerate the facilitation of marketing in the country in the line of many

such success stories that are paradigms for dairy and processed food in the last few decades. Farmer friendly *shanties*, in the model of 'Ritu bazars of Andhra Pradesh could be opened through non-profit organisation or farmers' groups. Suitable marketing strategies and designs should be developed for the build up of native markets in all the states. **Shri Kapil Shah** has suggested that for certification of organic farms and their products, it is necessary that the regional level organic standards be first developed which could be then be coalesced to form the National standards.

In this regard, **Shri L.N. Modi** suggested that there is enough potential for exploring the organic products markets. Motivation of hotels, large restaurants, airlines, railways, departmental chain shops is becoming possible now with awareness of quality food. It is learnt that Swiss Air has switched over to organic meals to be served world-wide on all their flights. There are already departmental supermarkets in large cities of Delhi, Mumbai, Chennai and Bangalore where the organic agricultural produce are marketed in small scale and in the years to come, there is growing demand for organic food, not only outside India, but within India also.

26. Certification of organic farms, their produce and products along with providing logos and accreditation powers should be initiated by regional non-profit organisations, who could be empowered for this by the government with the condition that they will not commercialise these efforts and exploit the growers and consumers alike. FAO believes that it is important for developing countries such as India to certify organic food products so that they can compete in the extra-ordinarily growing International market. The return from organic agriculture can potentially contribute to food security by increasing farm income. **Shri Jagdish Nazreth** is of the clear opinion that there are some vested interests that wish to use organic standards to erect non-tariff barrier against Indian exports. The December 2000, Stockholm convention on POP ,means that the most Indian agricultural exports will be affected and can because of pesticide residues that are commonly found in most Indian agricultural commodities. The government of Indian regulation banning uncertified organic agricultural products will mean that organic exports from India will face to sets of regulations and at least for some years, very little will pass through them for exports. By following the lead set by some vested interests, perhaps, with the best of intentions, we will be *shooting ourselves in the foot*, with the complex armchair organic standards that are being devised in certain quarters. Therefore, he suggested that one should bring down the pesticide residues in general

agriculture by organic methods. This will certainly work rather than trying to create unreachable standards for a niche market, which might never develop.

V. QUALIFIED AREAS FOR GOVERNMENT SUPPORT AT VILLAGE-LEVEL IN LIEU OF CURRENT FARM SUBSIDIES

27. The following items deserve attention of the Planning Commission for being recommended for government support in the Tenth five year plan.

- Manufacture of composts
- Manufacture of biofertilisers
- Manufacture of bio-pesticides
- Manufacture of small-farm implements
- Market intelligence and information system
- Establish credit-linked and market-assured production units
- Development of certification agencies through on-profit organisations
- Development of marketing systems through non-profit organisations and organic farmers' groups

The major concern in organic farming, which has been raised time and again by agricultural scientists and planner alike, is regarding the timely non-availability of several such useful products that are permitted for inorganic agricultural products. For example, the soil fertility (Table 11, 12 & 13) that has to be maintained by periodic application of compost of different origin such as vermicompost, trichocompost, FYM, *AMRUTPANI*, biofertilisers are not available to the farmers. Hence, there is often a setback in the input chain and the farmers, even though desirous to adopt the organic recommendations, are deprived of the opportunity. Promoting the production of these inputs at village level can mitigate this situation. This would ensure generation of employment and income in rural areas. There are several small units in the country that are producing these inputs for organic and bio-dynamic farming. For example, several units for massproduction of bioagents such as friendly insects, pathogens etc. are operational. However, they are unorganised and scattered. The products such as *neemjeevan* spray from the wonder-tree are also marketed. Several herbal products have been tested in the Agricultural Research system and have been reported to be efficient in management in pests, soil fertility etc.

Smt. L. Dasi suggested that there should be a change for discontinuing the subsidy for export of leather and meat, enhancement of cattle heads to meet the hiked national needs of urine and dung for organic compost preparation. The government must stop all kinds of subsidies for export of leather and meat, which will help preserve the cattle population. Simultaneously a massive programme for increasing healthy cattle

population is necessary so that the organic compost inputs of urine and dung are freely available.

Qualified subsidies should be for indigenous bullocks for draught purposes and for preservation of native animal biodiversity. One of the significant promotion activities that has been suggested by **Smt. Dasi** is regarding the improvement of the fodder situation by rejuvenating the cultivation of common fodder species. The trend of butchering of the draught animals need to be arrested and their population need to be supported by proper availability of feed. This will encourage for more production of organic inputs such as urine and dung.

Shri Jagdish Nazareth has given very important suggestions. He suggests that the Green revolution model has limits in application to approximately 50 million hectares. Thus, the remaining 50 million hectares out of the officially 100 million hectares needs fresh approach. He also suggests that 40 million hectares of unofficial farm land that is degraded can be placed in the organic farming strategy.

28. Drawing inspiration from the recent Cuban agriculture experience, it is wise to consider the production of compost in large scale through industrial plants utilising earthworms and other biological converters as well as by extensive adoption of green manuring of agricultural lands. Cuba produced 93,000 tonnes of worm humus through 172 vermicompost centres, spread across the island way back in 1992. Each Indian State government could emulate this. Similarly, Cuba has also developed several centres for production of predatory ant through low-cost techniques for the management of various pests in sweet potato. Our country also could invest to patronise such efforts through NABARD and other such agencies that have been already sensitised in this regard by CICR.

VI. Summary Viewpoints – Recommendations & Conclusions

The hon'ble members of the Working Group has responded to the Draft Paper and their original responses are given in **ANNEXURE III** of this document. Their salient view points are given herein.

- **Dr.G.S.Sirohi**, Chairman of the Working Group visited a farm of Rajasthan Agricultural University along with its Vice Chancellor of this SAU recently. A large portion of the land was cultivated under rainfed conditions and the cereals and

legumes were in gross terms organic in origin. Thus, organic and Biodynamic farming has special significance in 'dryland agriculture', constituting 65% of our cropped area. It is time that we assess the comparative nutritional quality and flavour of these agricultural produce under both high-input based irrigated and organic rainfed systems. The quality issue adds another dimension to the business of organic farm products, which are pollution-free, residue free, poison-free, as claimed by the organic growers. A recent communication of the Vice-Chancellor of the Rajasthan Agricultural University, Bikaner has provided the vast stretches of *MOTH*, as dry land lentil being cultivated in low rainfall areas such as Barmer, Churu, Sikar, Nagaur, Hhunjhunu and Jaisalmer districts of Rajasthan, where resource poor farmers do not have funds for chemical fertilisers and pesticides. The industrial production of various Rajasthani food products such as *Bhujia*, *Papad*, *Mogar*, *Nuggets* etc. has wide domestic agri-business scope for this *kharif* crop, whose production is to the tune of 100-300 lakh quintals worth Rs. 510 crores. If these farms could be certified as organic, we have a great potential to enhance the value of this lentil to the poor farmers.

- **Shri Kapil Shah** of JATAN, in addition to para-wise suggestions provided the following information. An Organic Farming Source book containing the public institutions and NGOs such as NAVADHANYA-NEW DELHI, research foundation for Science, Technology and Ecology-New Delhi, Sristi-Ahmedabad, Jatan-Vadodara Agricultural Renewal in India for Sustainable Environment, Chennai Natural Agricultural Research Centre, Nagpur & Human Technology Forum, Bharuch is to be prepared. The process of downsizing and conversion to organic is certainly not without controversy and set-back. A dynamic debate is underway in India, which cuts across the agriculture sector from government ministries, universities, research centres, farmers and associations of producers. One side argues that what is taking place need to be seen precisely not as a process of conversion rather than a temporary substitution during a period of crisis. The opposite point of view, put forth by organic farming associations holds that the green revolution model was import-dependant and environmentally damaging to be sustainable. This camp argues that the present change is long overdue and that further transformations are needed for a truly rational production system. Such debate aside, what may be most remarkable is the rediscovery of traditional knowledge and values available with the Indian farmers.

It is time that Government of India launches a programme to recover traditional farming knowledge, recognising that have always practised low input-based agro-ecologically sound agriculture. The government needs to organise a series of seminars and workshops where farmers can assemble to trade their farming secrets and share them with government officials and researchers.

- **Shri T.G.K. Menon**, who has spearheaded the organic farming in Malwa region of Madhya Pradesh is of the firm opinion that the increase in agricultural production should necessarily satisfy parameters that guide sustainability based on local adaptability, social acceptance, economic viability and ecological soundness. Thus, increased production by any means, which will not be sustainable, cannot be considered as achievement.
- **Dr.B.D. Kaushik** has communicated his views through a concept paper on organic farming, which has been appended with this draft. He has concluded that agricultural scientists should not focus their attention on discipline-wise-basis and rather organic farming, being a system approach, should be viewed and experimented using interdisciplinary programmes.
- **Shri Jagdish Nazareth** has suggested for attempting the alternative scientific basis in India. He opined that if we try to practise organic farming according to the scientific basis accepted for the Green revolution model, we shall not be able to create a viable basis for an alternative organic agriculture model. The green revolution model protagonists will continue to claim, with irrefutable deductive logic, that organic farming cannot be a national alternative, just a whim of the rich people. On the basis, they will continue to squander the precious resources of the Indian people. He further pointed out that the 'alternative theory of indirect nutrition' can be the scientific basis for a completely satisfactory alternative to the green revolution model. The theory of transmutation of elements, has to be rediscovered again by further studies through institutions in the country during the tenth five year plan and then it is possible to have comparative discussions for actual deployment of organic farming in times to come.
- **Smt. Labangalathika Dasi** suggested the large-scale use of cattle urine and manure as the most effective and cheap source of plant nutrients. Breeding of good indigenous breeds of bullocks for draught purposes and manure should be

emphasised. Improvement in quality of fodder for farm animals should be enhanced. The export of cattle feed and oil cake should be done only after satisfying the oemstic use in all sectors of agriculture. The orientation of dairy should not only be formilkand meat, but for overall farm development.

- **Dr. D.V.Rangnekar** was very particular about the benefits of organic and bio-dynamic farming to small farmers. In his suggestions, he foresee an eminent danger in commercial and large-scale farming under the organic farming umbrella which may take away all the benefits of small farmers and those from the tribal communities. The resource-poor farmers who neither benefited from the high external input-based green revolution could not be also benefited from the organic and bio-dynamic farming if we make the system commercialised. In order to ensure the above, he suggested that the certification processes should be simplified and mad accessible to small farmers . Simultaneously there is a need to ensure marketing linkages as well as making available improved composting methods, biofertilisers and bioagents to these small holders. This can be achieved by encouraging the involvement of NGOs and farmers' organisations. Its should be noted that in India, organic farming is not a new technology. Rather, this is a traditional approach to farming. The technical and scientific persons who are involved with R & D must understand the system, identify areas where it is till prevalent and then develop and promote it. A cautious warning, of Dr, Raingear is very important in organic and bio-dynamic adoption in India. We should not go for mass-production as we have done in the case of fertilisers and pesticides, but rather we should go for production for masses of the organic and biodynamic farming inputs such as biofertilisers, composting, bioagents etc.

- **Shri Laxmi Narain Modi**, one of the honourable members of the committee has been very kind to give useful inputs to this Working Group. He has suggested that training centres should be set up in all agricultural colleges and KVKs on preparation of manures and biofertilisers. He is of the clear view that the practical aspects of organic farming, particularly in the methodology of preparation of FYM, vermin-compost, NADEP composts, *Amrutpani*, organic recycling methods, biofertilisers, biopesticides etc. need to be popularised using modern methods of communication such as videos and CDs. Shri Modi also suggested that the benefits organic produce should be included in the general education, home-science, medical curriculum as

well as nutritional courses. The negative aspects of agro-chemicals should also be brought to the notice of the people by preparing pamphlets, bulletins, circulars and posters and advertisements.

- Bio-dynamic farming uses scientifically sound organic farming practices that build and sustain soil productivity as well as plant and animal health. The philosophical tenets of bio-dynamics — especially those that emphasise energetic forces and astrological influences — are harder to grasp, yet they are part and parcel of the bio-dynamic experience. That mainstream agriculture does not accept the subtle energy tenets of bio-dynamic agriculture is a natural result of conflicting paradigms. In mainstream agriculture the focus is on physical-chemical-biological reality. Bio-dynamic agriculture, on the other hand, recognises the existence of subtle energy forces in nature and promotes their expression through specialised "dynamic" practices. A third view, expressed by farmers, accept the premise that subtle energy forces exist and may affect biological systems, but holds there is not enough information to evaluate these influences or make practical agronomic use of them.
- The fact remains that bio-dynamic farming is practised on a commercial scale in many countries and is gaining wider recognition for its contributions to organic farming, food quality, community supported agriculture, and qualitative tests for soils and composts. From a practical viewpoint bio-dynamics is proven to be productive and yield nutritious, high quality foods.
- A broad-based Think-tank with suitable sub-committees is to be established in the Country at apex level to formulate approach and line of direction for research to avoid routine approach, based on global market survey on supply and demand, price fluctuations etc. Planning of cropping for next season in the country, keeping in view the forthcoming market intelligence as well as by turning over raw materials into processed food and finalised products should be undertaken.
- Establishment of a Centre of Excellence under the National Agricultural Research System is recommended. This institution should undertake inventoriastion of available national resources for promoting large scale organic farming. It should document indigenous technological knowledge (ITK)and other affiliated technologies adopted by research centres/NGOs/individual farmer etc.

- There should be a regulatory authority that would be empowered to define and regulate the quality of all products that are marketed as organic and also those inputs that are recommended and marketed for use in organic agriculture, animal husbandry etc. so as to remove undesirable and unethical elements from exploiting farmers.
- Introduction of course curriculum on 'Concepts and practices of Organic Farming' in undergraduate and postgraduate levels in all State Agricultural Universities and affiliated colleges should be made mandatory.
- Organisation of Training of organic methodologies and philosophies to government officials and agencies at various levels in the country could be done to dovetail the development aspects of organic agriculture movement in the country with its development plans. FAO also recognises and recommends that the government s need to invest in training farmers about the production of organic food and other products.

It is apt to quote the statement of the founder of the Organic Farming Association and an Assistant Dean at University of Havana. “Many people think that farming is a simple and mundane act, but they are wrong. It is the soul of any great culture, because it requires not only a great deal of accumulated knowledge, but also putting this knowledge to use every single day. Knowledge of the weather, the soil, plants, animals, the cycles of the nature: all of this is used everyday by a farmer to make the decisions that have to be made in order to produce the food that we eat. To use it may seem like food comes from a factory, but in reality it comes from a culture that, generation after generation, has been created to produce that food”.

Selected Readings:

1. Agriculture of Tomorrow by E.Kalisko & L. Kalisko, Kalisko Archives, London 1939.
2. The Nature of Substances by Rudolf Hauschka Published by Vincent Stuart Ltd. London
3. Biological Transmutations by Louis C. Kervran Published by Swan House Publishing Company, Bingnampton, N.Y. 1972.
4. The Secret Life of Plants by Tamppkins and Bird.
5. Biodynamic Farming and Gardening by E. Pfeiller Published by Pauma Valley Company, California, 1973.
6. Agriculture by Rudolf Steiner---Published by R.Steiner Press London 1974.
7. Sensitive Chaos by Theodora Stew Published by Stockmen Books N.Y. 1976.
8. Fertilisers , organic manures, recyclable wastes and biofertilisers – components of integrated plant nutrients. Tandon, H.L.S. (Ed.) (1994) Fertiliser Development and Consultation Organisation, New Delhi pp.148+viii.
9. Organic Agriculture by P.K.Thampan (1995) Peekay Tree Crops Development Foundation, Cochin, Kerala 354 p.
10. Organic cotton from field to final product. Dorothy Myers and Suer Stolon (ed.) 1999. Intermediate Technology Publication, 250 p.
11. Organic Cotton Farming in India. Rajendran, T.P., Venugopalan, M.V. and Tarhalkar P.P., 2000. CICR Technical Bulletin No.1. 39 p + X. Central Institute for Cotton Research, Nagpur
12. Anthonis, G. 1994. Agro Chem. News in Brief **17(2):12-15.**

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Table:1 BRIEF HISTORY OF ORGANIC FARMING IN MAHARASTRA

- Linked with publication 'Eka Kaditun Kranti' (One straw Revolution by M. Fukuoka). Marathi Magazine organized workshop of natural farming 1991.
- No cultivation/No chemical failed in general except in some fruit crops in 1991-92.
- Switched over to Organic by supplementing traditional cultivation practices. Technology fined tune by farmers for field crops.
- CICR Nagpur planned the first field experiments in 1992 onwards.
- VOFA established in 1994 with 135 members.
- Eco farms India Ltd. commenced activities in 1996-97 for packed organic product.
- Nao, Natural Agricultural Research centre, Nagpur commenced popularising through radio, TV, Cassettes, publications, posters, pamphlets, books.
- Krishi Vigyan Mandal, Barad, Nanded actively engaged by one group.
- Socio economic organisation at Kerwadi, Parbhani formed a group.
- Organic Jaggery sold at Perimium from Hingoli.
- In Jalgaon organic banana experts achieved by a group of 80 farmers.
- KVK'S particularly Pal, Babhuleshwar, Ambajogai promoted the efforts.
- In Pune, Gram Parivartan has successfully organised farmers for grown sugarcane, flowers, grapes, vegetables by organic methods.
- Dharamitra, Wardha has general data from organic fields on soil fertilizer, meteorological conditions, C/N tra. on 400 small farms.

Table:2 HISTORICALLY ORGANIC COTTON PRODUCTION IN INDIA

All Arboreum in Vidarbha and Marathwada, Khandesh, Gujrat, Karnataka, A.P., M.P.

Ponduru and Nandicum cottons of coastal A.P.

Wagad cottons of Gujrat

Maljari cottons of M.P.

Malmals of North East

Table: 3 COTTON CULTIVARS AND PRODUCTIVITY IN ORGANIC FARMS OF MAHARASHTRA

Cultivar	Mean yield (Kg/ha)	Number of farmers
PKV H-2 (AHH 468)	7.08	17
NHH 44	7.83	11
Anjali (LRK 516)	11.25	10
PKV 081	10.13	03
DHY 286	9.78	10
AKA 8401	18.85	05

Table: 4 MEAN AMERICAN BOLLWORM INCIDENCE

Incidence		Peak incidence	Final incidence
Larva	Organic	1-1.5	0.5-0.7
	ICPM	2-2.5	2.5-2.8
	NO	2.5-3.0	2.0-2.5
Eggs	Organic	>1	>0.5
	ICPM	2-2.5	1-1.5
	NO	4-4.5	2-2.5

Table: 5 ORGANIC COTTON CULTIVATION IN CICR EXPERIMENTS

G.hirsutum - LRA 5166 Yield data ('00 kg/ha)*

Year	Organic	ICPM	Non-organic
1993-94	464	807	1159
1994-95	530	740	652
1995-96	849	781	651
1996-97	898	710	623
SOYABEAN YIELD ('00 kg/ha)* - UNDER CROP ROTATION			
1998-99	2769	1961	1199

Table: 6 PERCENTAGE ORGANIC CARBON CONTENT*

Year	Organic	Non-organic
June 1993	0.38	0.38
Feb.94	0.40	0.36
Feb.95	0.46	0.35
Feb.96	0.52	0.38

Table: 7 PERCENTAGE ORGANIC P CONTENT*

Year	Organic	Non-organic
June 1993	12.1	12.1
Feb.94	12.6	12.0
Feb.95	14.5	12.9
Feb.96	15.0	12.0

Table: 8 Yield data ('00 kg/ha)

G.hirsutum – NHH-44 [HYBRID]

Year	Organic	Non-organic
1994-95	502	922
1995-96	724	1106
1996-97	825	915
1998-99	557	703
1999-2000	931	1046

Working Group on Organic & Biodynamic Farming

Dr.G.S.Sirohi
234, Surya Niketan, Vikas Marg Extension,Opp. Anand Vihar, New Delhi-110 092

Dr.T.G.K.Menon
8, Sambad Nagar, Indore (M.P.)

Dr.W.R.Deshpande
Secretary, General Indian Organic Agriculture Movement (IOAM),
Sector A,Sainath Colony, Indore (M.P.)

Shri Ajit Grewal
3/11, Shanti Niketan, New Delhi-110 021

Dr.D.Dhagya Raj
Emeritus Scientist, Departmenty of Agricultural Microbiology,University of
Agricultural Sciences, Hebbal, Bangalore – 560 024, Karnataka

Dr.V.N.Shroff
17, Lala Ram Nagar, Near Saint Paul Higher School, Indore-452 001 (M.P.)

Dr.B.D.Kaushik
Professor of Microbiology Division, IARI, New Delhi-110 012

Dr.M.R.Motsara
Additional Commissioner (Fertiliser Division),Department of Agriculture
&Cooperation, Krishi Bhavan, New Delhi-110 001

Mr.Banu Sanghani
Society for Organic Agriculture,13/1, Rasollpura, P.B.No. 1687,
Secunderabad-500 003 (A.P.)

Shri Kapil Shah
Saniv Kheti Farm, Vinoba Ashram, Gotri,Vadodara-390 021, Gujarat

Shri A.K.Abdul Rehman Haji
President, Kerala Karashaka Samiti, Palakad, Kerala

Shri Lakhsminarayan Modi
Bharatiya Cattle Resource Foundation, Ahimsal Sthal, Anuvrat Marg
Mehrauli, New Delhi

Shri Ramesh Rawal
Vice President, BAIF Dr. Manibhai Desai Nagar, National Highway No.4, Warje,
Pune-411 0502, Maharashtra
Dr.Jagdish Nazareth
Institute for Studies & Transformations,1, Raj-Laxmi Bhawan, June Wadaj
Ahmedabad-380 013, Gujarat

Dr.Kuwarji Bhai Jadhav
Retd. Additional Director (Agriculture),National Project Bharatiya Viswa Sangh
Yogi Raj, 1, Sortbawad, Rajkot-360 002, Gujarat

Shri D.C.Shrikantappa
Member of Parliament (Lok Sabha), Ambrutheswara Nilayam
Birur-577 116, Karnataka

Shri Anil Agarwal
Centre for Science & Environment,41, Tuglakabad Industrial Area
Near Batra Hospital, New Delhi

Ms.Rita Sharma
Joint Secretary
Department of Agriculture & Cooperation,Krishi Bhavan, New Delhi-110 001

Shri D.V.Rangnekar
BAIF Development Foundation
P.B.No.2030, Asarwa, Ahmedabad-380 016, Gujarat

Shri Labanga Latika Desai
B-6, Aprijat, Parikar Park, Roha, Raigargh-402 109, Maharashtra

Shri Anil Gupta
Srishti, C/O IIM, Vastrapur, Ahmedabad-380 013, Gujarat

Dr.C.S.R.Murthy
Manager, National Agricultural Banking and Rural Development
54, Wellesley Road, Shivaji Nagar, Pune-411 005, Maharashtra

Dr.V.K.Sehgal
Head, Entomology Division, IARI, New Delhi-110 012

Dr.Amerika Singh
Director, National Centre for Integrated Pest Management
Lal Bahadur Shastri Bhawan, IARI Campus, New Delhi-110 012