THE ROLE OF INFRASTRUCTURES IN ORGANIC FARMING

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Abstract

India is bestowed with considerable potential for organic farming due to a variety of reproductive health impacts in women and pesticide exposure associated with inorganic farming system. Organic farming is becoming popular form of sustainable agriculture all over the world and not new to Indian farming community. Organic farming is important pillar of sustainable agriculture that is beneficial for both the producers and consumers. India has a great potential for organic farming using traditional wisdom prevails in the villages of India. In this context , the study has undertaken to examine the role of infrastructure in organic farming at farm level in Karnataka. Rural infrastructure for agriculture, agro-industries and overall economic development of rural areas are very urgent; therefore the development and expansion of infrastructures essential pre-condition for increasing not only agricultural production but also industrial production in a country. In the context of globalization of the economies including, agricultural based economies, there is a need for reorienting the present attitude of various organizations involved in providing infrastructure. Our agricultural sector operates today in a new and evolving business and social environment. It is competitive global and rapidly changing with enormous implications for the place and role of agricultural sector in the overall economic development. Simultaneously, very strong integration is needed in research, education and extension for efficient and effective delivery system. An effective system needs to be evolved in a continuum right from basic/ strategic research to location-specific technology development, so that technologies generated are adopted at the farm level. Therefore, rising organic farming growth on a sustainable basis requires substantial increase in public investments.

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Introduction

In India, agriculture is a mainstay of our population and very crucial for sustainable development. Development ultimately emerges from the agriculture sector, which in turn promotes the development in other sectors like industry, trade, commerce etc. India is bestowed with considerable potential for organic farming due to a variety of reproductive health impacts in women and pesticide exposure associated with inorganic farming system. Increase incidence of miscarriage, birth malfunctions, still births and delayed pregnancy have been documented among women agricultural workers and wives of men employed in pesticide mixing and spraying (Ranson,2002). The organic farming system is regarded as the potential agricultural technological system that provides benefits in terms of environmental protection, conservation of non-renewable resources, improved food quality and the reorientation of agriculture towards areas of future social demand. Besides, the Indian government has recognized and responded to these potential benefits by encouraging farmers to adopt organic farming technologies, either directly through financial incentives or indirectly through support for research and marketing initiatives. In this background, the adequate and quality infrastructure is significant for promotion of organic farming in India. Strengthening rural infrastructure like, roads and bridges, irrigation, post-harvesting facilities, etc. results in improved productivity, reduced production costs, and post-harvest losses, which further enhance income and employment for the rural farming community.

Rural infrastructure for agriculture, agro-industries and overall economic development of rural areas are very urgent; therefore the development and expansion of infrastructures essential pre-condition for increasing not only agricultural production but also industrial production in a country. Infrastructure facilities often referred to as social overheads, which help to sustain the growth in production and income generation in the rest of the economy rather than within the enterprises. The link between infrastructures is not once for all affairs, but is a continuous process and ongoing progress. It is in this context, this study has undertaken to study the role of infrastructure in Organic Farming at Farm level in Karnataka.

2. Objectives of the study

The following are the specific objectives of the study

- To know the concept of infrastructure

- To distinguish between the organic and inorganic farming
- To study the infrastructures in organic farming.

3. Methodology

The study is based on the secondary data and has been collected from the NGOs, journals, reports published by various authorities and government departments. The farmers who are following organic farming methods without rely upon external inputs in farm operation and animal husbandry is categorized as organic farming respondents. Respondents using organic inputs along with inorganic inputs in raising crops and rearing animals are termed as inorganic respondents.

3. Results and Discussion

The results of the study are presented and discussed in this part. The entire paper is designed based on objectives specified for the study and the results of the study are being discussed in the following sub headings:

4.1 The Concept of Infrastructure

Infrastructure is an umbrella term for many activities referred to as social overhead capital by development economists as Arthur Lewis, Rosenstein-Rodan, Ragner Nurkse and Albert Hirschman. Lewis included public utilities, ports, water supply and electricity as infrastructure (Lewis, 1995) whereas Hirschman outlined four conditions that characterize infrastructures or social overheads capital: the services provided to facilitate or basic to economic activity; the services are usually public goods because of economic externalities; these services cannot be imported; these investments tend to be indivisible or lumpy (Hirschman, 1958)

The American Heritage Dictionary, defines the term "infrastructure" that "the basic facilities, services, and installations needed for functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons".

Public utilities-power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection and disposal and piped gas. Public works-roads, major dam and canal

works for irrigation and drainage. Other transport sectors-urban and inter-urban railways, urban transport, ports and waterways, and airport (World Bank, 1994)

Rangarajan Commission (2001) indicated six characteristics of sectors, a) Natural Monopoly, b) High Sunk Costs c) Non-tradability of output d) Non-rivalness in consumption, e) Possibility of Price exclusion, and f) Bestowing externalities on society. Based on these features, the commission recommended inclusion of following in infrastructure in the first stage: Railway tracks, signaling system, stations, roads, bridges, runways and other airport facilities, Transmission and Distribution of electricity, Telephone lines, telecommunications network, Pipelines for water, crude oil, slurry, waterways, port facilities, Canal networks for irrigation, sanitation or sewerage. The Commission further recommended that considering characteristics of infrastructure, the above list may be extended to include the following, Rolling stock on railways, Vehicles, aircrafts, Power generating plants, Production of crude oil, purification of water, Ships and other vessels.

The Empowered Sub-Committee of the Committee on Infrastructure (2008) has identified the broad infrastructures, including the electricity (including generation, transmission and distribution) and R&M of power stations, non-Conventional energy (including wind energy and solar energy), water supply and sanitation (including solid waste management, drainage and sewerage) and street lighting, telecommunications, roads & bridges, ports, inland waterways, airports, railways (including rolling stock and mass transit system), irrigation (including watershed development), storage and oil and gas pipeline networks.

The nature of infrastructure is concerned, there are different kinds of infrastructures such as economic infrastructure, social infrastructure, technological infrastructure, financial infrastructure, and agricultural infrastructure, etc are defined in broad terms (Venkatachalam, 2003). All kinds of infrastructures are complimentary to each other and are essential and integral part of economic development. In the case of agricultural infrastructure, many people recognize the growing importance of its role in economic development: the related literature includes agricultural research, extension services, financial institutions, and irrigation as part of a wider concept of infrastructure. The authors such as Fosu et al.(1995), reflecting this broader definition, distinguish up to 11 components of agricultural infrastructure: irrigation and public access to water; means of transportation; storage services; commercial infrastructure; processing

infrastructure; public services; agricultural research and extension services; communication and information services; land conservation services; credit and financial institutions; and , finally, health and education services. This listing makes reference to "agriculture infrastructure" thus all these services not only facilitate the development of agricultural activities, but also rural activities, hence are known as rural infrastructures. Hence, the conscious efforts must need for creating of basic infrastructure to support agriculture. Moreover, the emerging areas that have a high potential for growth in agriculture are horticulture, floriculture, organic farming, genetic engineering, food processing, branding and packaging, and future trading.

All the studies mentioned above, are considered as the infrastructure from the point of view of macro level however, infrastructures may at micro level are equally important for the expansion and development of particular economic activity i.e. organic farming. Problems and challenges facing agriculture sector require immediate action on several fronts–technology, policy, infrastructure, finance, markets etc. Though all factors are important, infrastructures are of high potential to trigger expansion of other drivers. Thus, among all kinds of infrastructure, agricultural infrastructure plays an important role especially in a developing country context a larger percentage of poorer section of the society depends on this sector for subsistence

Inorganic Farming System advocated the necessity of organic farming as a result of over exploitation of the natural resources (land, water and Vegetation), appearance of contaminants in the eatables, disturbances accrued in ecosystem leading to reduce the immunity to incurable disease as a result of the non-use of organic inputs in production of crops and livestock in agriculture. Moreover, organic agriculture in general is a system of crop and livestock production that promotes and enhances the health of agricultural ecosystems while providing health food and reflects the profound inter relationship that exists between farm biota, its production and the overall environment(Jacob Abraham, 2009). In this way extensive use of chemicals and anti-biotic in inorganic food production technology has compelled the health conscious people to explore and support organic farming methods in agriculture

5.2 Concept of Organic Farming

Organic farming is becoming popular form of sustainable agriculture all over the world and not new to Indian farming community. It has very long history even during Vedic period our

farming community practiced organic farming. Several forms of organic farming are being successfully practiced in diverse climate, particularly in rainfed, tribal, mountains and hill areas of the country (Mangala Rai, 2008)

"Organic farming is a 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 system rely upon crop rotations, crop residues, animal manures, legumes, green manure, off farm organic wastes, mechanical cultivations, mineral bearing rocks and aspects of bio-logiscal pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects weeds and other pests"(USDA, 1980). This is authoritative definition and clearly revealed that organic agriculture is one of several approaches to sustainable agriculture and many of the techniques used (e.g. rotation of crops, integration of crops and livestock) are practiced under various agricultural systems.

The Codex Alimentarius Commission (1999) defined that "Organic agriculture is a holistic production management system which promotes and enhances agro-eco system health, including biodiversity, biological cycle and soil biological activity. It emphasizes the use of management practices in preferences to the use of off-farm inputs, taking into account that regional conditions require locally adopted systems. This is accomplished by using, where possible, agronomic, biological and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system." Therefore, basic rules of organic production are that natural inputs are approved and synthetic inputs are prohibited, however there are some exceptions.

In addition, most recently a modern definitions of organic farming given by Lampkin(1994), an authoritative source states that the aim is "to create integrated, humane, environmentally sustainable production systems, which maximize reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human nutrition, protection from pests and disease and an appropriate return to the human and other resources".

Above mentioned definitions clearly revealed the fact that organic farming is just a polite word for sustainable agriculture. It is, therefore, as a sustainable agriculture is capable of

maintaining its productivity and usefulness to society over the long run. It must be environmentally sound, resource conserving, economically viable and socially supportive and commercially competitive.

5.2 Organic versus Inorganic Farming

Organic farming though is not a 'new' concept; it was marginalized against the large-scale inorganic based farming practices that have steadily dominated food production over the years (50 years). The difference between organic and inorganic farming accounts for the most of the controversy with claims and counter claims surrounding organic agriculture methods and organic food. They are as follows;

Terry Cacek and Lind, L Langer (1986) have distinguished the organic farming from inorganic farming in the following ways. The term inorganic farming refers to a production system which employs a full range of pre and post-plant tillage practices (eg. plow, disk, plant, cultivate), synthetic fertilizers and pesticides. Therefore, inorganic farming is characterized by a high degree of crops specialization. By contrast, organic farming is characterized by a diversity of crops. Organic farmers need to borrow less money than inorganic farmers do because organic farmers buy fewer inputs such as fertilizers and pesticides. Moreover, costs and income are more evenly distributed throughout the year on diversified organic farms. The technology used in organic farming is nature based, environment friendly and sustainable. However, inorganic farming is based on synthetic fertilizer which is harmful to environment.

Subhash Chand and Sunil Pabbi (2005) made difference between organic and inorganic farming in the following ways. Products produced by organic farming are good in taste, flavor, nutritional and free from chemicals whereas products produced under inorganic farming are tasteless, less nutritious, may contain toxic residues of chemicals. Organic farming may not lead to higher production and income in the short-run as its returns are of a long-term nature. But inorganic farming leads to higher production and income in the short-run and returns are declining in the long run. Therefore, returns from organic farming are of a long-term nature whereas returns are of short-run nature under inorganic farming.

It is increasingly felt that inorganic farming is becoming unsustainable as evidenced by declining crop productivities, damage to environment, chemical contaminations. The necessity of having an alternate agriculture method that can function in a friendly eco-system and could

sustain the crop productivity is widely spread. Hence, organic farming is recognized, as the best know alternative to the inorganic agriculture.

5.3 Role of Infrastructure in Organic Farming

Obviously, organic farming has been extending not only in India, even all over the world; it has become an alternative for inorganic farming. In the beginning, we have discussed the significance of infrastructure in agriculture. However, it is equally important to discuss the infrastructure from the point of view of organic farming. The four basic infrastructure of organic farming are

Organic Standards

Certification Mechanism

Technology Packages, and

Market Network

5.3.1. Organic Standard: Though the organic farming is different from inorganic farming, the product produced under both the system cannot recognize easily. There are more than 60 standards for organic farming at international level. Because, the production methods adopted under organic farming are different in different countries even in the same country in different regions for the same crop. It is therefore, necessary to determine the common standards that must be acceptable for everyone at international level. Several agencies have set the organic standards at international level including India and have accepted many countries in production, processing, packaging, labeling and marketing of organic products. The few international organic agencies engaged in determining the standard are given in the table no.1.

Table 1: International Certification Agencies

Sl.No	Institutions	Functions
1	IFOAM	Established in 1972 and its headquarters at Germany. Develops institutes basic standards of organic agriculture.
2	Codex	Codex Alimentary Commission-a joint FAO/WHO intergovernmental body established in 1962 and determines a set of guidelines for organic production.
3	EU Regulations	Prepare a list of basic regulation for European Union's organic

		standards in council regulations no 2092/91 and these regulations give guidelines for the production of organic crops in the European Community.
4	Demeter	It is worldwide net work of 19 international certification bodies in Africa, Australia, Europe and developed guidelines for biodynamic Farming
5	JAS	A set of guidelines Japan Agricultural Standards for organic for production.

Source: Indian Journal of Fertilizers (2005)

The Government of India has developed 'National Standard for Organic Export' under National Programme for Organic Production that was set up in April 2000 by the Union Ministry of Commerce. Indian Agriculture Ministry also accepted those standards for domestic production. The scope of those standards is

1. Implement the policies for development and certification of organic products.
2. Facilitate certification of organic products conforming to National Programme containing the standards for organic production.
3. Institute a logo and prescribe its award by certified bodies on products qualifying for bearing organic label. A National Steering Committee (NSC) comprising Ministry of Commerce, Ministry of Agriculture, APEDA, Spice Board, Coffee Board, Tea Board and various other government and private organizations associated with the organic movement in monitoring the overall activities under NPOP has constituted. NPOP standard has already got equivalency with standards of EU Commission. Now efforts are made to be equivalency with US NOP (National Organic Production) is under process (Rajendraprasad, 2007).

5.3.2 Cost of Inspection and Certification: Certifiers are charging inspection and certification fees based on the number of persons involved, plus fees for the issue of certificates. Sometimes, different fees are applied for small farmers, large farmers, and processors or traders. An example of the fee structure of a certification body operating in India is given below;

Table 2: Cost of Inspection and Certification

Sl.No.	Category	Details	Fees(Rs)
1	Small Farmers and Cooperatives	Travel and Inspection Report Preparation Certification	12000/day 5000 flat fee 5000/Certificate
2	Estate Manufacturers and Exporters	Travel and Inspection Report Preparation Certification	19200/day 5000 flat fee 5000/Certificate
3	Large and Medium-Sized Processors	Travel and Inspection Report Preparation Certification	16800/day 5000 flat fee 5000/Certificate

Source: Org-Marg, (2002)

At present, several international certifiers opened branch offices at different parts of our country operated by Indian staff. Thus, the costs for certification came down considerably. Besides, local certification bodies started to emerge, partially with the aim of further reducing certification costs. It can be assumed that cost of certification will soon reach the lowest level.

5.3.3 Certification Mechanism: Certifying agencies play an important role for producers in facilitating access to organic markets, both domestic and international market. The buyers of organic products in the largest markets of USA, Europe and such other countries are very much aware and conscious of purity and quality of organic produce. International markets particularly the largest markets of USA, and European Union accepts organic products only if the farms have required organic certification and the products meet their standards. In India, to regulate the export of certified organic products, the Director General of Foreign Trade, Government of India has issued a notice according to which no certified organic products may be exported unless they are certified by an inspection agency duly accredited by one of the accreditation agencies designed by government of India (Garibay and Katke Jyothi, 2003). At present, there are 12 certifying agencies approved by the central government's Ministry of Commerce (Table: 3). The following certified bodies were fully accredited under the Indian National Programme for Organic Production.

Table 3: List of accredited Certifying and Inspection agencies in India

Sl. No.	Name of the Certifying and Inspection Agencies	Addresses
1	Association for Promotion of Organic Production(APOP)	Allumni Association Building, Bellary Road Hebbal, Bangalore-560024
2	Indian Society for Certification of Organic Production(ISCOP)	"Rasi Building" 162/163, Ponnaiyaraja Coimbatore Tamil Nadu-641001
3	Indian Organic Certification Agency(INDOCERT)	Thoumugham PO Aluva-683105 Cochin Kerala.
4	Skal Inspection and Certification Agency	Mahalaxmi Layout, No.181 Ist Main Road, Bangalore-560086
5	IMO Control Pvt. Ltd.	26, 17th, Main HAL, 2nd Stage Banglore-560008
6	Eco Cert International	54A, Kanchan Nagar, Nakshathrawadi, Aurangabad-413002 Maharashtra
7	Bio inspectra	C/o Indocert, Thoumugham PO Aluva-683105 Cochin Kerala.
8	SGS India Pvt. Ltd.	250, Udyog Vihar, Phase IV Gurugaon-122015
9	LACON	Mithradham, Chunangardi.
10	International Resources for Fair Trade(IRFT)	Sona Udyog Unit No.7 Parsi Panchayat Road, Andheri (East) Mumbai-400069
11	One Cert Asia	Agrasen Farm Vatika Road Off ton Rd. Jaipur, Rajasthan
12	National Organic Certification Association (NOCA)	Pune, Maharashtra

Source: Indian Journal of Fertilizers (2005)

Several other Indian initiatives have applied for accreditation but had not been accredited by that time. Increasing competition can be expected in the Indian certification market in the near future.

5.3.4: Technology Packages: Organic agriculture is one of several approaches to sustainable agriculture and many of the techniques used (e.g. inter-cropping, rotation of crops, double-digging, mulching, integration of crop and livestock) are practiced under various agricultural systems. Inorganic farming practices cannot be followed for growing crops organically. The basic rules of organic production are that natural inputs are approved and synthetic inputs are prohibited. Organic farmers manage soil fertility (often-called crop nutrition by inorganic

farmers) and combat pest problems (including insects, weeds, fungi, nematodes and diseases) in different way than inorganic farming. One area in which organic farmers encounters problems in the production of crops and livestock is in the maintenance of soil fertility and avoidance of pest attacks, while minimizing the environmental effects of their action. However, technology packages for different crops are being prepared but it will take some time because these will differ even for the same crop in different region of the country.

5.3.5 Market Network: Demand for organic food has been growing rapidly in recent years throughout Europe and many other parts of the industrialized world, including the US and Japan. However, the market for organic products is still immature. The demand for organic products has created new export opportunities for the developing world. As result, many developing countries have begun to export organic products successfully. India a developing country is in a very nascent stage when it comes to export of organic produce. During 2004-2005, the total export was 6472 tonnes worth Rs 80-90 crores. Some of the products exported from India are tea, pineapple, spices, honey, rice, sesame, cashew nut, walnut, fruits, pulses sugarcane etc. The domestic market for organic products is as yet not as developed as the export market. The products available in the domestic market in organic quality are rice, wheat, tea, coffee, pulses, fruits and vegetables. Major markets for organic products lie in metropolitan cities- Mumbai, Delhi, Kolkata, Chennai, Bangalore and Hyderabad. According to the interview results, domestic sales of organic products are barely 7.5 percent of the organic production (Garibay and Katke Jyothi, 2003).

In the early days of global organic industry, the production problems of farmers emphasized and research topics often concentrated on soil fertility, pest and diseases. More recently as the industry matured and international trade of organic products grew, the importance of market related issues has come to fore. On the one hand, the need for harmonization of standards and acceptance of equivalency of market development that would facilitate the international trade is recognized, while on the other hand, more serious push towards domestic consumption seems afoot in several developed countries, which would give advantages to domestic farmers but would disadvantage in exporting countries (Wynen, 2003). In addition, the government must take some constructive steps towards the expansion of infrastructures for organic farming. Globalization of agricultural trade and signing by India of the WTO agreement have thrown open

the international market for export of organic produce. Certainly, it will help the Indian farmers to penetrate the growing global market for organic products. Since the organic farming has just started in India, we need to address the production as well as marketing problems. A few agencies have come up for domestic market expansion. Given below

Table 4: Some Agencies Involved in Domestic Marketing of Organic Products in India

Sl.No.	Name of the Organisation	Address
1	Navadnya Trust	A-60, Hauz Khas, New Delhi-110016
2	Divine Agro Industries Ltd.	C-9, Anoop Nagar, Uttam Nagar, New Delhi-110059
3	Devbhoomi	Rajput Road, Dehradun, Uttaranchal
4	Back to Nature	Near Kanak Cinema,Dehradun, Uttaranchal
5	Mahrishi Ved Vigyan Vidyapeeth	Dunda(Kunshi),Uttarkashi
6	Institute of Rural Development(IIRD)	54A, Kanchan Nagar, Nakshetravadi, Aurangabad-413001
7	ISCON Temple	Bangalore
8	FAB India Overseas Pvt. Ltd.	B-26,Okhla Industries Area Phase-I, New Delhi
9	ECO-Nut Health Food Shop	J's Heritage Complex, Opp. Milk Union, P.T.Road, Kodaikanal-124101
10	Sresta By-Product Pvt. Ltd	203, Pavani Annexes, Road No.2 Banjara Hills, Hyderabad-50034
11	IOCCA	951C, 15th cross, 8th Main, Ideal Home Township, Raja Rajeshwari Nagar, Bangalore-560098
12	D.R. Agro Organic AS	01, Sai Nagar, Ratnagiri, Kapadganj-387620 Gujarat.
13	Sunstar Overseas Ltd.	40KM Stone, Karnal Road, Bahalgarh, Sonepat, Haryana
14	IITC Organic India Ltd.	A306, Indira Nagar, Lucknow-227105

Source: Bhattacharya and Chakrabarty (2005)

Apart from primary infrastructures, the government has to take some steps for the promotion of organic farming through the scheme on National Project on Organic Farming aims at (a) capacity building through service provider;(b) financial support to production units of bio fertilizers, compost and vermicompost etc.; (c) human resource development through trainings on certification and inspection, production technology etc.; (d) field demonstration programmes

on Organic Farming; (e) development of model organic farms; (f) market development for organic standard; (g) development of organic standard (h) support to new initiatives on technology related to organic farming; (i) formulation of regulatory mechanism of organic farming; and (j) creation of awareness about organic farming. These infrastructures must provide for organic farming to further expansion and raising the level of income of farming.

Conclusion

Organic farming is important pillar of sustainable agriculture that is beneficial for both the producers and consumers. India has a great potential for organic farming using traditional wisdom prevails in the villages of India. In the context of globalization of the economies including, agricultural based economies, there is a need for reorienting the present attitude of various organizations involved in providing infrastructure. Our agricultural sector operates today in a new and evolving business and social environment. It is competitive global and rapidly changing with enormous implications for the place and role of agricultural sector in the overall economic development. Hence, the agriculture and allied activities, constant changes are taking place and the infrastructure facility once made may not relevant and adequate as for the changed circumstances are concerd. Simultaneously, very strong integration is needed in research, education and extension for efficient and effective delivery system. An effective system needs to be evolved in a continuum right from basic/ strategic research to location-specific technology development, so that technologies generated are adopted at the farm level. Therefore, rising organic farming growth on a sustainable basis requires substantial increase in public investments.

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