Proceedings of International Conference
Organic ++ : Livelihood - Biovillages - Markets

Editors
- Manoj Kumar Menon
- Jaydip Roy
- Suruchi
- Sujatha N

On the sidelines of:
BIOFACH INDIA
into organic
India Organic
The market place for organic people
‘ Organic ++: Livelihoods – Biovillages – Markets’

Editors
Manoj Kumar Menon
Jaydip Roy
Suruchi
Sujata N

International Competence Centre for Organic Agriculture (ICCOA)
# 58/3, 39 ‘A’ Cross, 11th Main, 4th T Block, Jayanagar
Bangalore – 5600941, Karnataka, India
Tel: 080 26641153, 26641153, Fax: 080 26641153
Email: info@iccoa.org Web: www.iccoa.org
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The editors on behalf of International Competence Centre for Organic Agriculture (ICCOA) express their sincere gratitude to all who supported for organizing this International Conference. We are highly grateful for their valuable guidance and constant encouragement.

Firstly we would like to pay our sincere thanks to all our co organizers and partners namely Nurenberg Messe, Department of Agriculture, Govt. of Kerala, APEDA and NABARD. The ministers and officials from these ministries and departments were always a big source of support and guidance in particular Hon’ble Agri Minister, Govt. of India Kerala, Chairman of APEDA, Principal Secretary (Agriculture), Govt. of Kerala, Director of Agriculture, Govt. of Kerala. We are equally thankful to our International Guest of Honors, H.E Mayor, Goesan County, Republic of Korea and H.E Consul General, Federal Republic of Germany, Bangalore.

Our gratitude also goes to our close partners and organizers of the Biofach India together with India Organic trade fair, Nurnberg Messe, Germany and IFOAM Asia who were always a big source of support since the trade fair and the conference are the twin-events that runs together. Our special thanks to Ms. Sonia Prashar, Managing Director of Nurnberg Messe and Ms. Jennifer Chang, Executive Director and Mr. Konrad Hauptfleisch, Academy and Program Manager from IFOAM Asia for their help throughout this event.

The editors express their sincere gratitude and indebtedness to ICCOA Board of Directors including Shri. Sompal, Chairman Emeritus and Shri. H.R. Jayaram, Treasurer for supporting this International Conference with their priceless guidance. We are grateful to the entire team of ICCOA especially, Mr. Rohitashwa Gakhar, Mr. Ranjith Kumar, Mr. Santosh Phadke, Ms. Piya, Ms. Veena, Ms. Reena, Ms. Philomina, Mr. Manish, Mr. Saurav, Mr. Vipin and Mr. R.P Choudhary.

We avail this opportunity to thank all the speakers for the contribution of paper and for sharing the knowledge and experiences in this platform. Last but not the least we thank all the delegates/participants for their active participation to make this event a grand success.

Because of scantiness, if we have not mentioned anyone who helped directly or indirectly in this endeavor, we convey our best complements and lots of thanks to all of them.

Editors
Manoj Kumar Menon
Jaydip Roy
Suruchi
Sujata N

ICCOA
MESSAGE

India has achieved an enormous progress in Agriculture sector since independence. Farming which was subsistence once, has developed into commercial farming today. Although, our country has achieved self sufficiency in food, agriculture in general has no more remained as remunerative profession. The fact is that, the farmers are using a lot of external costly inputs, the price of which is increasing continuously, which has not only increased the cost of production but also reduced the soil fertility and yield levels.

Considering these aspects I am proud that Agriculture and Animal Husbandry Department of Kerala have formulated an Agricultural Policy 2013 emphasising the importance and promotion of organic farming in the State. Considerable progress has been achieved in promotion of organic farming in the State. Today, there are considerable numbers of farmers engaged in organic farming, producing varieties of agriculture and horticulture produces which are safe to eat. But, the organic farmers are facing problems in marketing their produces at remunerative prices. At this juncture the Global Agro Meet being organized joined with Bio-fach India from 6th to 8th November 2014 t gains greater importance.

I wish this endeavor would create a platform for showcasing organic products and to bring together all the stake holders of organic farming for improving marketing opportunities not only with in the Country but also at the Global level.

K. P. MOHANAN

Office : Secretariat, Thiruvananthapuram-1
Phone : Office: 0471- 2338449, 2333772; Fax : 2332239; Residence : 0471- 2334133, 2334144
E-mail : min.agri@kerala.gov.in
Website: www.minister-agriculture.kerala.gov.in
R.AJITH KUMAR  
Director of Agriculture  
Government of Kerala  

Message  

In the National Agricultural Scenario, Kerala has its own uniqueness. As the traditional land of coconuts and as a haven of spices, Kerala is well known for its crop diversity right from cereals to cool season vegetables. With a high density of population of 860 persons per sq.km., and a low per capita land holding size, our land resources are being put to more intensive use than in anywhere else in the country. However food production still hovers around just 25 per cent of the total market demand. The need of the hour is to attain more productivity in respect of food, to meet the domestic requirement.  

The introduction of protected cultivation methods, precision farming techniques, organic farming and better agro processing facilities will be the stepping stones to achieve food self-sufficiency. There present situation has to be improved for this. Reliance on inorganic inputs, now, not only pollutes the ecosystem but also leads to the incidence of health hazards like cancer. This invokes a need for the production of quality, safe to eat food. It is against this backdrop that the Government has embarked on a mission to establish Organic Agriculture in Kerala. The use of chemical fertilizers, pesticides and fungicides are to be phased out entirely. Considerable progress has been achieved in the promotion of organic farming. The first result has already emerged in Kasargod, which is now a fully organic district. Government has declared its intention to render the entire State organic by 2016. The use of organic manures, bio-fertilizers, bio-pesticides and bio-fungicides is being actively encouraged. Today, a considerable number of farmers are engaged in the organic farming, producing quality produce. But some of these the organic farmers are facing problems in obtaining the deserved premium prices. This calls for the introduction of branding in organic food products.  

I wish the organic trade fair of Biofach India from November 6 to 8 2014, at Ernakulam, makes a strong impact in popularizing organic agriculture in our State. I also hope it will provide a platform for showcasing organic products, and to bring together all the stake holders in Organic Farming.
Message

It is a matter of pleasure that the prestigious event of the organic sector in India, Biofach India together with India Organic is being held this year from November 6-8, 2014 in Kochi, Kerala. This exclusive annual event is a showcase of the growing organic sector in India and worldwide. The trade exhibition, buyer-seller meet, conference, organic food court and consumer connect/farmers workshop provide a good opportunity for everyone associated with the organic sector to interact and network.

Organic sector has come a long way in the last decade. India’s and now also Asia’s largest International Organic trade fair and Conference Program are held annually. It is organized by Nurnberg Messe India and International Competence Centre for Organic Agriculture, India. This event comprises of a hi-quality exhibition from leading companies in organic agribusiness, B2B Meetings, B2C events, International buyers delegation, International Conference of organic markets and opportunities. This international event is the biggest meeting place for organic networks, knowledge and businesses. It offers best opportunity to show case Organic production from different States’ farmers/groups for marketing. After three successful edition of organic trade fair in Bangalore the organizer moved the trade show to Kerala upon invitation from Govt of Kerala who has agreed to be co-organizer of trade fair. It was important for ICCOA to move the trade fair to different locations to encourage and propagate organic agriculture and market linkages across India through this fair. Kerala has got vast potential which can be tapped further.

Conference with experts from various spheres helps one to stay updated with current developments and challenges in the sector. The consumers connect programme spreads awareness among the consumers and public/school children. Producers and businesses can participate in the buyer-seller meets to explore potential tie-ups and markets.

My appreciation to the team of Biofach India including Nurnberg Messe, India and ICCOA for their untiring efforts. I understand the time, energy and resources required to make such a large scale event a success and once again laud the whole team of ICCOA and wish them success.
The sixth edition of BioFach India together with India organic 2014 was held in Kochi, Kerala for the first time and proved to be a great success. It again provided a convergence ground for different stakeholders of organic farming. There were 179 exhibitors at the trade fair. Nearly 8000 visitors visited the trade fair each day. A two day international conference was on the theme

**Organic ++: Livelihood – Biovillages - Markets**

The conference had 39 speakers and 249 delegates participating from different regions. Presentations and discussions advocating crop diversity, integration of allied activities with agriculture, promotion of concept of biovillages, growth of organic markets at regional, national, and international level, community mobilization and leading through organic way were part of the conference. Consumer Connect programme and farmer’s workshops were also held in conjunction with the main event to create awareness among general public. An organic food court was set at the venue to serve healthy and delicious food and snacks.

I appreciate the hard work done by the Nuremberg Messe – Germany, the organizer of the event for developing this grand platform for organic producers, buyers and other stakeholders in the organic sector. I am also thankful to Department of Agriculture, Government of Kerala, International Federation of Organic Agriculture Movements (IFOAM), APEDA and NABARD for their support, which made it possible for ICCOA to organise this international conference successfully.
Contents

1. Growth of Markets in India and Asia............................................................... 1
   Mr. Ashish Gupta, Vice President IFOAM Asia, IFOAM Global Ambassador

2. Trends and Potential of Organic Product Exports from India.................... 6
   Dr. Saswati Bose, Deputy General Manager, APEDA, New Delhi

3. Potential of Indian Organic Products in the International Market........... 17
   Mr. Tapan Ray, MD & CEO – Nature Bio-Foods Ltd, India

4. Organic Farming and Marketing................................................................. 28
   Mr. Bablu Ganguly, Chairperson, Timbaktu Organic, Andhra Pradesh, India

5. Organic Movement - The Way Forward through Localization............... 38
   Mr. H. R. Jayaram, Organic Farmer, Founder, the Green Path, Bangalore, India

6. Farm Gate Markets: An Innovative Approach for Marketing Quality Fish at Premium Price................................................................. 45
   Mr. Vikas P.A, Krishi Vigyan Kendra of Central Marine Fisheries Research Institute, ICAR, Kochi, Kerala, India

7. The Export Potential of Indian Organic Products...................................... 53
   Ms. Karin Heinze, Editor, Organic – Market Info, Germany

8. My Neighbor My Market.............................................................................. 57
   Ms. Binita Shah, Program Manager, Uttarakhand Organic Commodity Board,
   Uttarakhand, India

9. Modified Atmosphere for Quality Exports & Storage of Organic Commodities................................................................. 64
   Mr. Avinash Ramchandra Wagh, Continent Manager – South Asia, GrainPro Philippines

10. Efficiency of Trichoderma Enriched Compost in Controlling Root Knot Nematodes in Gotukola (Centella asiatica L.)......................... 68
    Ms. Priyanga Dissanyake, Regional Agricultural Research and Development Centre,
    Srilanka

11. Integration of Different Inputs for Best Production in Organic Farming...... 75
    Dr. K Ushakumari, Professor & Project Co-ordinator (Organic Farming), Kerala
    Agricultural University, Vellayani, Thiruvananthapuram, Kerala, India

12. The Essentials of Organic Farming revis(it)ed...in the Context of Fast Shifting Paradigms in Indian Agriculture................................. 84
    Mr. Kishan Rao Parcha, Farmers Trainer, Sukshetram, Telangana, India
13. A Sustainable Model for Peri-Urban Farming in India
   Mr. Raj Singh, IFOAM Organic Leadership Course South Asia 2014

14. Analysis of Ecosystem Services, Biodiversity and Livelihood of Forest
    Garden Farmers in Three Different Agro Ecosystem Sri Lanka
    Ms. K.G.J.Pushpakumara, Green technology forum, No 200, Mata Road, Kamburupitiya,
    Sri Lanka

    Health Rejuvenation in Organic/Sustainable Agriculture
    Dr. Virender Dhingra, Director, C.E.O, Bio-Organics Solutions, New Delhi, India

16. State Organic Policy – Odisha, India
    Mr. Ekadashi Nandi, Former Technical Executive (organic Farming), Directorate of
    Horticulture, Odisha, India

17. Biomanagement of Grape Mealy Bugs, Maconellicoccus Hirsutus (Green)
    by Using Mealy Bug Destroyer, cryptolaemous montrouzieri in Koppal
    District, Karnataka
    Mr. Badari Prasad P.R., Subject Matter Specialist (Entomology), Krishi Vigyan Kendra,
    Koppal, Karnataka, India

18. Sustainable Livelihood Of Organic And Conventional Farmers:
    An Economic Perspective
    Md. Sikandar Azam, Doctoral Fellow, Department of International Business, School of
    Management, Pondicherry University, India

19. PGS as a Strategic Gateway for Quality Assurance and System Conversion
    to Organic Farming in Kerala
    Dr. A.K Sherief, Professor & Head, Kerala Agricultural University, Thiruvananthapuram,
    Kerala, India

20. Farm Enterprises through Private Community Partnership Program
    Mr. V.C.A. Jayachandran, Farmer, Pondicherry, India
A Brief Introduction

- **What:** Regional - Autonomous body of IFOAM Global in Asia
- **When:** Established June 28th, 2013
- **Where:** Secretariat is based in Seoul, Korea
- **Membership:** 110 organizations in 15 Asian countries including – Kyrgyzstan
- **Membership in India – At BIOFACH India 2015**
  - International center for competence in Organic Agriculture (ICCOA)
  - Organic Farming Association of India (OFAI)
  - PGS Organic Council (PGSOC)
  - Total 15 members from India

Main Work Areas for 2013~2015

- **Development & Implementation of Bio-villages, CSA, PGS**
- **Coop Model in Asian countries**
- **Building up alliances within Asia for the Development of Regional Networks and Organic farming**
- **Markets for organic and related products,**
- **Organic Rice Conference 2014**
- **Participation in Fairs like Organic fairs in Korea at COEX (Korea), BIOFACH (Nuremberg, India, China)**
- **Organic Leadership Course (OLC) Facilitation**
Prep-Meeting June 2012, Suwon Korea

• Formation meeting attended by representation of 15 Asian countries
• Collective requirement to form A Pan-Asian Identity under the IFOAM Umbrella

Interim Board and Organizational Formation – Manila, Philippines

• Vision and Mission of Organization Formed
• Working methods and Basic Constitution Created
• First Formal GA planned
• Nominations for the Board Received
Meet the Board Members – Pan Asian Presence

Manoj Menon (India), Rasdi Wangsa (Indonesia), Zejiang Zhou (Vice President, China), Dr. Suh (President, Korea), Dr. Shaikh Tanveer Hussein (Bangladesh), Patrick Bellasario (Philippines), Ashish Gupta (Vice President, India) – Co-Opted Board members – William Yao (China), Dr. A.K. Yadav (India) – Executive Director Jennifer Chang

First Board Meeting – Seoul, Korea

- Interaction with Hansalim and first order of business – establishing a formal secretariat in Seoul, Korea
- Establishing Projects on PGS, CSA, Bio-Villages
- Increasing Membership in other Asian countries
- Decision on Corporate Identity of IFOAM Asia – Logo Stationary
Second Board Meeting – BIOFACH India 2013

- One World Award Nomination for Timbaktu Collective and Hansalim Cooperative of Korea
- Concept Papers scheduled for CSA, PGS and Bio-villages Model across member countries in Asia
- Personnel and Expertise committed by Members for projects

Other Activities 2013-2014

- Participation on the Technology, Innovation Platform at IFOAM (TIPI) from IFOAM Asia – Research platform for scientists across the world on Organic Farming Systems
- Participation in FAO Asia Pacific Symposium in Bangkok – December 2013 – 3 papers from IFOAM Asia
- Organizing Organic Rice Conference 2014 – in Korea papers from Member countries in IFOAM Asia
- Creation of PGS Bangladesh with assistance of PGSOC In India
- Participation in IFOAM OWC in Istanbul
- Journal Paper submitted to FAO on PGSOC in India
- Participation in BIOFACH India 2014
Possible Future Activities 2015-2016

- 2015 Goesan International Organic Expo and Industry Fair
- Bio-Villages Project in Korea and India
- PGS Projects in Indonesia and Philippines
- Organic Rice Convention in other member countries
- OTUC Summit and Board Meeting in Chengdu China
- CSA Workshop participation in Fujian China
TRENDS AND POTENTIAL OF ORGANIC PRODUCT EXPORTS FROM INDIA
*Dr. Saswati Bose, Deputy General Manager, APEDA, New Delhi

**AREA UNDER ORGANIC CERTIFICATION**

2013-14 (Million Hectare)

- 4 mha, 85%
- 0.72 mha, 15%
- Total cultivable area
- Wild area

Area under organic Certification: 4.72 m ha

Source: Data Provide by the Accredited Certification Bodies under NPOP on Tracenet

**Organic Certified Production**

2013-14 (Million MT)

- Organic Certified Production: 1.24 million MT
- Cultivable Production: 1.23 m MT
  (ICS: 1.18 mMT; Individual: 0.046 mMT)
- Wild Collection: 0.01 m MT

Source: Data Provide by the Accredited Certification Bodies under NPOP on Tracenet
Organic Stakeholder’s under NPOP

- Certification Bodies: 26
- No. of Certified Operators: 4646
- No. of individual operators: 2109
  - Producers: 971
  - Processor: 682
  - Trader/Exporter: 693
- No. of Grower Groups: 2237
- Wild operators: 63

Percentage of Operators:
- Individual producers: 21%
- Grower groups (ICS): 48%
- Wild operators: 15%
- Exporters/Traders: 15%
- Processors: 1%

CERTIFIED OPERATORS & PRODUCTION

Number of Farmers involved in Organic Production:
- Grower group farmers: 591,000
- Wild collectors: 143,610
- Individual farmers: 971

Source: Data Provide by the Accredited Certification Bodies under NPOP on Tracenet
Consumer Demand for Organic products

- Issues of Adulteration in food.
- Growing Income for Middle Class.
- Evolution of Modern Retail Formats.
- Private Sector Initiatives in Agri Business.
- Technological innovations in Agri & Food.

Organic Product Range
EXPORT OF INDIA ORGANIC PRODUCTS
2013-14

Quantity Exported:
194087 MT
Food: 177765 MT
Textiles: 16322 MT

Agricultural products, 92%
Textiles, 8%

Food exports:
1328 Crore Rs

Textiles under GOTS certification

Export Value
2013-14
2428 Crore Rupees
Food exports:
1328 Crore Rs
Textiles:
1100 Crore Rs.

In USD
403 Million USD
Food Exports: 220.47 million USD
Textiles: 182.62 million USD

Export Value (Rs in Crores)
1100, 45%
1328, 55%

Export Value in Million USD
182.62
220.47

Source: Data Provide by the Accredited Certification Bodies under NPOP on Tracenet
EXPORT TREND FOR LAST THREE YEARS

Source: Data Provide by the Accredited Certification Bodies under NPOP on Tracenet

Major Products Exported

- Oil Crops (Soyabean, Sesame)
- Basmati Rice
- Sugar
- Tea
- Pulses & Lentils
- Dry Fruits
- Spices and Condiments
- Processed Food Products
- Medicinal & Herbal Plants
## Top Export Destinations 2013-14

<table>
<thead>
<tr>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUROPEAN UNION</td>
</tr>
<tr>
<td>U.S.A.</td>
</tr>
<tr>
<td>CANADA</td>
</tr>
<tr>
<td>SWITZERLAND</td>
</tr>
<tr>
<td>JAPAN</td>
</tr>
<tr>
<td>AUSTRALIA</td>
</tr>
<tr>
<td>U.A.E.</td>
</tr>
<tr>
<td>NEWZEALAND</td>
</tr>
<tr>
<td>ISRAEL</td>
</tr>
<tr>
<td>SRILANKA</td>
</tr>
</tbody>
</table>

*Source: Data Provide by the Accredited Certification Bodies under NPOP on Tracenet*

## Global Scenario

- **Present global food market**: 63.8 billion USD
- India’s total export of organic agricultural products (2013-14): 220.47 million USD
- **India’s share** in the global food market: 0.35%
Organic Certification

- Third party assurance from producer to the consumer
- For uniform label
- Assurance to the consumers that its concern for healthy food has been addressed.
- Effective marketing tool for Image, credibility, visibility/Transparency
Implementation of the National Programme for Organic Production (NPOP)

- To provide a focused and well directed development of organic agriculture and quality products, Ministry of Commerce and Industry, Government of India, launched the National Program on Organic Production (NPOP) in the year 2000, which was formally notified in October 2001 under the Foreign Trade & Development Act (FTDR Act).

- NPOP provides information on standards for organic production, systems, criteria, and procedures for accreditation of Inspection and Certification bodies, the national organic logo and the regulations governing its use.

- The standards and procedures have been formulated in harmony with international standards such as those of Codex and IFOAM.

- NPOP is implemented under AGMARK by Ministry of Agriculture for the domestic market (voluntary).

Recognition of NPOP Standards

- The NPOP standards for crop production have been recognized by European Commission* and Switzerland* as equivalent to their country standards.

- USDA has recognized NPOP conformity assessment procedures of accreditation as equivalent to that of US.

- With these recognitions, Indian organic products duly certified by the accredited certification bodies of India are accepted by the importing countries.

*Processed products are at present not covered under the equivalency agreement with EU and Switzerland
SCOPE OF CERTIFICATION

PRESENT CATEGORIES

• Cultivated Crops
• Wild Collection
• Processed food products (single/multi ingredients)
• Chain of custody (traders, storage, transport, export)

NEW CATEGORIES (standards are in the process for notification under NPOP)

• Aquaculture,
• Livestock
• Textiles

Traceability of organic products

An Indian Quality Initiative
TraceNet

TraceNet is a Software System for monitoring of Process Certification (Production, Processing and Trade) of organic products from India complying with the National Programme for Organic Production (NPOP) & National Organic Programme (NOP) standards.

TraceNet Quality Control

1. Only authorized registered stakeholders (Certification Bodies [CB] & Operators) can access to the Trace Net system.
2. All relevant certificates required (Scope Certificate & Transaction Certificate) are issued with unique Barcode.
3. Producers, Processors and Traders are registered. Scope certificates are annually issued.
4. The Producers may be individual farmers or group of small farmers (ICS)
5. Transactions are issued every time when there is a process of buying and selling among the stakeholders.
6. The entire activity is carried by the CB.
Stakeholders

Advantage of TraceNet

- Ensures Traceability of the product throughout the process up to the farm/Production unit
- Ensures authenticity of the certificates (Scope and Transaction)
- Ensures the compliance of the standards
- Enhances credibility of certification and ensures Organic genuineness of the product in the international market
There exists a massive demand for organic agricultural produce in the world today. A large section of the world’s population today is interested in holistic healthcare, and is willing to pay any amount of money for such organic products”.

“The government of India will help it in capturing the global market.”

Outline…

- Overview of the Industry
- Operations
- Standard & Controls
- Organic Export – Market Share Export Opportunity
- Our Strength
Overview of the Industry

- $63 billion – Worldwide
- Increasing health and environmental concerns
- Aggressive promotion - 4.72 million Hectare certified organic area in India.
- Supportive government policies
- Strong National Organic Standard – NPOP
- Globally recognized online traceability for Organic Products - Tracenet

Source: The Agricultural and Processed Food Products Export Development Authority (APEDA)

When we say Organic

……..it’s Organic

The Indus River Valley civilization, which built the city of Mohenjo Daro, arose about 4,500 years ago (2500 B.C.) Bulls & Cows were the part of their civilization

Source: © 1996-2012 National Geographic Society

Almost 100 years ago in British India. Cows & Bullocks were having same value in life

Source: en.wikipedia.org

In present India, Organic farms are still managed with the decade old cow based farming methods

Source: Nature Bio-Foods Ltd. Uttrakhand Organic Project
Operations: Agro-ecosystem

Agro-ecosystem of Indian Sub-continent

- Arid: 8%
- Coastal: 6%
- Hill & Mountain: 3%
- Irrigated: 23%
- Rainfed: 60%

% in total geographical area

Operations: Production System

Source: National Centre for Agricultural Economics and Policy Research (NCAP)
Standard & Controls

- Our own National Organic Production Standard (NPOP)
- Complete equivalency with USDA–NOP Standard
- Partial equivalency with EC 887/2009
- Equivalency recognition program with other Nation Standards are ongoing.
- Complete traceability control through on–line traceability tool – Tracenet.
- 26 – National & International Certification Body currently accredited.

Source: The Agricultural and Processed Food Products Export Development Authority (APEDA)

World Organic Market

- World’s Organic Market is US$ 63 Billion
- Growth Rate (CAGR) of 10.9% between 2006 and 2010
- Anticipated CAGR of 8.5% for the period 2010–2015 to reach US$ 88.6 billion;
- Fruits and Vegetables accounts for the largest share 33% of the total market value
World Organic Market

Major Organic Markets

- World’s largest market is in USA with US$ 31 Billion;
- Germany is the 2nd largest Organic market with 6.59 billion EURO (US$ 8.57 billion);
- 3rd largest organic market is the France with EURO 4 billion (US$ 5.20 billion);
- Other important markets are – Swiss Market about US$ 2 billion;
- Asia Pacific region market is about US$ 3.50 billion

Organic export opportunities

- Emerging demand of Organic Foods in USA which is higher than Traditional Organic Markets in the major EU countries such as Germany, France, Italy, Denmark, Sweden, Czech republic, The Netherlands;
- Exploring Asian Markets – China, Japan, Singapore, Malaysia, Hong Kong etc;
- Developing new products for the growing markets in Australia, New Zealand Eastern EU countries;
## Export of Organic Products from India

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Export Volume (MT)</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil crops (except sesame)</td>
<td>17966</td>
<td>25.73</td>
</tr>
<tr>
<td>Cotton &amp; Textile</td>
<td>17369</td>
<td>24.86</td>
</tr>
<tr>
<td>Basmati Rice</td>
<td>5243</td>
<td>7.51</td>
</tr>
<tr>
<td>Tea</td>
<td>2928</td>
<td>4.19</td>
</tr>
<tr>
<td>Sesame</td>
<td>2409</td>
<td>3.45</td>
</tr>
<tr>
<td>Honey</td>
<td>2409</td>
<td>3.45</td>
</tr>
<tr>
<td>Rice</td>
<td>1634</td>
<td>2.34</td>
</tr>
<tr>
<td>Dry Fruits</td>
<td>1472</td>
<td>2.11</td>
</tr>
<tr>
<td>Cereals</td>
<td>1348</td>
<td>1.68</td>
</tr>
<tr>
<td>Spices – Condiments</td>
<td>1174</td>
<td>1.68</td>
</tr>
<tr>
<td>Medicinal &amp; Herbal products</td>
<td>627</td>
<td>0.9</td>
</tr>
<tr>
<td>Coffee</td>
<td>320</td>
<td>0.46</td>
</tr>
<tr>
<td>Vegetables</td>
<td>167</td>
<td>0.24</td>
</tr>
<tr>
<td>Aromatic Oil</td>
<td>39</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Source: Yes Bank

### India Organic

**Exportable organic products**

- Sesame, Flaxseeds – No restriction
- Cashews, Walnuts; – No Restriction
- Dehydrated fruits, Mango Pulp – No Restriction

India has exported 70,000MT of Organic Products valued Rs 700 Crores in 2010–11
**India’s Organic Export**

<table>
<thead>
<tr>
<th>Market</th>
<th>Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUROPE</td>
<td>60</td>
</tr>
<tr>
<td>USA</td>
<td>20</td>
</tr>
<tr>
<td>Japan</td>
<td>5</td>
</tr>
<tr>
<td>Canada, Australia, NZ &amp; East Asian Countries</td>
<td>15</td>
</tr>
</tbody>
</table>

**Export Market Share**

**Organic export market share (%)**

**Domestic Market – Organic Segment**

<table>
<thead>
<tr>
<th>Product</th>
<th>Volume (MT)</th>
<th>Value (Cr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tea</td>
<td>1500</td>
<td>150.00</td>
</tr>
<tr>
<td>Coffee</td>
<td>750</td>
<td>45.00</td>
</tr>
<tr>
<td>Rice</td>
<td>5000</td>
<td>22.50</td>
</tr>
<tr>
<td>Jaggery, Sugar</td>
<td>6000</td>
<td>45.00</td>
</tr>
<tr>
<td>Wheat &amp; Flour</td>
<td>3000</td>
<td>12.00</td>
</tr>
<tr>
<td>Pulses</td>
<td>2500</td>
<td>21.25</td>
</tr>
<tr>
<td>Fruits &amp; Veg</td>
<td>5000</td>
<td>20.00</td>
</tr>
<tr>
<td>Millets Flour</td>
<td>2000</td>
<td>8.00</td>
</tr>
<tr>
<td>Oils &amp; Ghee</td>
<td>2000</td>
<td>50.00</td>
</tr>
<tr>
<td>Squashes &amp; Jams</td>
<td>500</td>
<td>5.00</td>
</tr>
<tr>
<td>Snacks</td>
<td>500</td>
<td>2.50</td>
</tr>
<tr>
<td>Honey</td>
<td>2000</td>
<td>25.00</td>
</tr>
<tr>
<td>Others</td>
<td>5000</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36250</strong></td>
<td><strong>548.75</strong></td>
</tr>
</tbody>
</table>

Source – Yes Bank
Zone Wise Sales – Organic Sector

<table>
<thead>
<tr>
<th>State/City</th>
<th>Value (Cr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mumbai</td>
<td>120</td>
</tr>
<tr>
<td>Chennai</td>
<td>55</td>
</tr>
<tr>
<td>Delhi/NCR</td>
<td>75</td>
</tr>
<tr>
<td>Bengaluru</td>
<td>45</td>
</tr>
<tr>
<td>Pune</td>
<td>15</td>
</tr>
<tr>
<td>Gurgaon</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>1000 (includes other cities as well as organic food service)</td>
</tr>
</tbody>
</table>

Source – Yes Bank

Rapid Growth of Organic Farming world wide

- As of 2001 the estimated market value of certified organic products was estimated to be $20 billion.
- By 2002 this was $23 Billions
- By 2007 More than $46 Billions
- By 2012 $63 Billions worldwide
- By 2015 to reach est. US$ 88.6 billion
India’s Potential in Food Grain Production

<table>
<thead>
<tr>
<th>Crops</th>
<th>Indian Share</th>
<th>India Rank</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>Production</td>
<td>Area</td>
</tr>
<tr>
<td>Wheat</td>
<td>11.2</td>
<td>11.4</td>
<td>2</td>
</tr>
<tr>
<td>Rice</td>
<td>28.5</td>
<td>21.4</td>
<td>1</td>
</tr>
<tr>
<td>Pulses</td>
<td>36.6</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>Groundnut</td>
<td>35.2</td>
<td>28.6</td>
<td>2</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>20</td>
<td>22.6</td>
<td>2</td>
</tr>
<tr>
<td>Cotton</td>
<td>20.7</td>
<td>14</td>
<td>1</td>
</tr>
</tbody>
</table>

Our Strengths

- Educated Resource people/businessman
- Knowledgeable hired help
- Production diversity
- Producing “Healthy product”
- Geographical Agro-climatic advantages
- Local seed verities
- Infrastructure & technological development for the value addition of agro commodities.
- Incentives to the farmers for organic production
GMO – A threat to the World
And advantage – INDIA.

Indian organic production
Opportunities

- Local Geographical varieties
- Diversity of crops
- Small Landholding
- GMO Free
- Rainfaid Areas
- Traditional Methods of Farming;
- Good history of Land
Govt Initiatives on Organic Farming

- The Government has launched Rastriya Krishi Vikas Yojana (RKVY) to promote use of organic farming and reduce dependence on chemical Inputs.

- Govt Initiatives on Soil Health Card Scheme, these cards will be issued to 3 crore farmers during current year and 5.5 crore cards each during next two years. Also 100 mobile soil testing laboratories will be made available during the current year, he added.

- Centre launches organic farming scheme in J&K

- Tamil Nadu to set up five model villages to promote organic farming
  The eco-friendly initiative would be set up at Rs 10 lakh each

Govt Initiatives on Organic Farming

- The **Budget** has **announced** several other initiatives for the North-East for ...
  100 crore for developing **organic** farming in North-East states to meet global demand ...

- **Indian Organic Trade Likely to touch Rs 6,000 crore($ 1 Billions) 2015**
Organic Farming and Marketing

*Mr. Bablu Ganguly, Chairperson, Timbaktu Organic, Andhra Pradesh*

---

**Background**

- Not – for – profit organisation initiated in 1990
- 170 villages in Anantapur District, Andhra Pradesh, India
  - Restoration of ecology & agriculture;
  - Empowerment of Women & alternative banking;
  - Child Rights & Alternative Education;
  - Empowerment & Inclusion of People with Disabilities;
  - Promotion of mutually aided cooperatives & producer owned business enterprises.

---

**Context**

Anantapur District in southern India is largely a semi-arid area with some parts of it gradually turning to desert.
Context

- Once rich in soils, forests, water, animals, agriculture and rubies
- Today - an arid region - second most drought prone in the country.

Context

- Just over four decades ago, Anantapur region was food secure with
  - diversified multi crop farming systems of millets, pulses, oilseeds & fruit trees
  - little or no use of chemicals
Small holder farmers constitute 93% of the population.

They have become dependent on external inputs such as seeds, fertilisers, pesticides, credit & marketing support.

7,000,000 small and marginal farmers cultivate 80% of the land under rain-fed conditions.
Possible Solutions

- Diversified crops with millets, pulses and oilseeds using organic methods;
- Increased tree cover, bio mass & floral diversity;
- Return of indigenous cattle & sheep into agriculture;
- Improved composting methods;
- Reduced external inputs & capital expenses;
- Collective storage, processing and value addition;
- Collective engagement with market.

Rainfed Ragi (Finger Millet)
Began experiments in soil health and agro-bio diversity in 1998/99

Started promoting Organic farming among 300 small holder farming families in 2005/06

By January 2008 around 840 farming families from 26 villages had signed up to join the Organic farming groups

By April 2008 the participating families decided to form into a Cooperative to procure, store, process and market their produce with support from the Collective
Dharani Farming and Marketing Cooperative Society Ltd is a producer owned cooperative & business enterprise promoted by the Timbaktu Collective

Currently 1,800 small holder farming families from 45 villages are share holding members with around 10,000 acres registered as organic
Promotes Agro biodiversity conservation

Supports low energy organic farming, composting, biological pest control for food crops

Uses Participatory Guarantee System for organic certification

Gives complete marketing support to its members

Procures from members at a 10-15% price premium over the local market

Stores, processes and markets the produce

Has built a strong local and urban market base
Dharani FaM Co-op Ltd

Business Objectives

△ Primary objective
△ To ensure a minimum net profit of 3% per annum;
△ To build a premium brand in organic food business

△ Secondary objectives
△ To pay premium procurement price to farmer members;
△ To provide incentives to farmer members on the basis of patronage;
△ To ensure farming practices are ecologically beneficial and sustainable;
△ To make available good quality, hygienic and un-adulterated products to the customers/consumers.

Dharani FaM Co-op Ltd

Business at a glance

Given below is a snapshot of the business operations as in the 9th year of operation in Indian Rupees

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenues</th>
<th>Direct Expenses</th>
<th>Gross Profits</th>
<th>Indirect Expenses</th>
<th>Net Profit/Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-11</td>
<td>12,852,684</td>
<td>10,419,056</td>
<td>2,433,628</td>
<td>2,643,368</td>
<td>(209,742)</td>
</tr>
<tr>
<td>2011-12</td>
<td>5,678,862</td>
<td>4,233,623</td>
<td>1,445,239</td>
<td>1,222,893</td>
<td>222,346</td>
</tr>
<tr>
<td>2012-13</td>
<td>10,200,549</td>
<td>8,117,352</td>
<td>2,083,196</td>
<td>1,792,303</td>
<td>290,893</td>
</tr>
<tr>
<td>2013-14</td>
<td>13,362,952</td>
<td>10,736,851</td>
<td>2,626,102</td>
<td>1,955,828</td>
<td>670,274</td>
</tr>
<tr>
<td>Projection</td>
<td>15,722,141</td>
<td>12,219,642</td>
<td>4,502,499</td>
<td>2,607,731</td>
<td>1,894,768</td>
</tr>
<tr>
<td>2014-15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dharani FaM Co-op Ltd

Value chain map

Rural and Urban people

Farmers Sanghas (Dharani Members)

Organic Food chains

Local retailers

Urban retailers

Dharani FaM Coop Ltd

Supporters

Timbaktu Collective & Investors & Donors

Consuming

Retailing

Packaging Marketing Wholesaling

Procuring Storing Processing

Producing

Organisational Structure

General Body – 1800 members
Dharani Farming & Marketing Mutually Aided Cooperative Society Ltd.

Elected Board of Directors – 12 members

CEO

Marketing Executive

Finance Executive

Supervisors (6)

Timbaktu Collective team for Organic farming & Business support services

Farming and Marketing Consultants

Dharani FaM Co-op Ltd

Organic

Food

chains

Urban

retailers

Urban retailers

Rural and Urban people
Members are able to sell organic produce for better returns - reduced dependence on local traders;

Members able to grow and sell millets for a premium price;

Increased availability of organic food grains, pulses, oilseeds at village;

Increased bargaining power for farmer members as they now participate in all aspects of the value chain.

Reduced dependence on external inputs for farming;

Revival of local natural resources - seeds, trees, bio mass, livestock & knowledge;

Business enterprise owned and managed by the producers - representing interests of ‘small holder farmers’.
ORGANIC MOVEMENT - THE WAY FORWARD THROUGH LOCALIZATION

*Mr. H R Jayaram, Organic Farmer, Founder, the Green Path, Bangalore

History of agriculture
As new ways of producing food and other necessities of life, Stone-Age humans shifted to
dependence on cultivated crops. Most of the ancient civilizations of the world have all thrived
around major river valleys.

In India, it is known that the people of Indus Valley Civilization cultivated and used wheat,
Barley and other cereals. The evidence traces it to 6000 BC.

World agriculture
With close to 40 % of the global workforce, agriculture is the world’s LARGEST provider of jobs
@ 1.5 billion. This represents 1 in 3 of all workers. Agriculture is the most oldest and
widespread profession. And there is NO WORLD WITHOUT AGRICULTURE.

Agriculture in India
Statistics show that only 54.6% of total workers in India are now part of the agriculture sector with a decline of 3.6% over 2001. As per India’s 2011 census, 263 million people are engaged in the agriculture sector and over half of them are now agricultural labourers, a trend observed for the FIRST TIME in the past 40 years. The contribution to GDP from Agriculture has come down from about 30% in 1990-91 to about 14% in 2012-13. About 55% of the population is contributing to only around 14% of GDP approximately.

The great agrarian crisis
Agriculture is NO MORE a remunerative, risk-free or sustainable profession; and this a GLOBAL PHENOMENON!

“Agriculture is the most un-predictable and riskiest business in India today.” Spare a thought for our humble farmer, who grows the food we eat & help lead our life.

Why? What is the prime reason for globalization?
Definition:
The world wide movement toward economic, financial, trade, and communications integration.

Globalization implies the opening of local and nationalistic perspectives to a broader outlook of an interconnected and interdependent world with free transfer of capital, goods, and services across national frontiers. Economic Liberalization of trade, investment & finance in 1992 facilitated the direct entry of MULTINATIONAL COMPANIES into India, covering every aspect of life & all key sectors.

Multinational Companies operating in India - Driven by greed, exploitation and consumerism

• Heightens disparity and deprivation
• An attack on the marginalized sections - The poor, the weakened. An attack on environment.
• Centralized Production / Distribution. Mega Advertisement campaigns
• Encourages growth of symbolic or Artificial Wealth of the World

An MNC company's influence on agriculture – Monsanto
Pesticides
• Seed
• GMO (BT Cotton in India)
• Fertilizers
These kind of MNC’s with worldwide presence, rule through their money and muscle power, so as to achieve monopoly over a period of time.
Money & muscle power of MNC’s
Large agribusinesses have rewritten the rules of the global agricultural economy, using “free trade” agreements to turn food into a monopolistic commodity for profit rather than a human right. Global corporatization of agriculture has had disastrous effects on farmers, food security & the environment.

WTO rules against India on US chicken ban

The World Trade Organization has ruled against India in its ban on US poultry imports, a move that has been commended by the USA Poultry & Egg Export Council (USAPEEC) and the National Chicken Council (NCC).

India placed a ban on US poultry products in 2007 under the guise of preventing low pathogenic avian influenza (LPAI), but produced no scientific evidence to support the ban’s validity. In response, the Office of the United States Trade Representative (USTR) initiated consultations in 2012, refuting India’s claims that LPAI will mutate into a highly pathogenic form of the virus.

"India’s ban was thinly veiled protectionism," said USAPEEC President James Sumner and National Chicken Council President Michael Brown. "This ruling)

Do we need MNC’s to rule us in an age old field we have run for generations and mastered it in our own way & style? Can’t we sustain in the field by allowing local Companies to compete with giant corporate?

An extract of what was quoted in a report in 2008:
“It’s essential for us to understand that the global industrial food system has become the largest and most destructive and least sustainable industry in the world. It burns about 23 percent of global oil and gas supplies, and contributes as much as 49 percent of total greenhouse gas emissions - and has been fouling our natural environment, destroying topsoils, depleting fresh water reserves, weakening our bodies and minds, decreasing human life expectancy, undermining our local economies and severing our relationship with the land and with all that is sacred in life.”

Localization - why do we need localization?
Because feeding people a bigger priority than generating profits.
• The way we grow our food and eat could be disastrous
• Agriculture is energy intensive
• Heavy dependence on Fossil Fuels
• Growing inequalities & Food Security
• Industrial Agriculture is producing unhealthy food
• We grow food by destroying nutritious Top Soil; Adding Toxins

It touches Humanity most, when we see Hunger / Starvation, Diseases elsewhere in this world. Could we be next?

• A very small percentage of the food we consume (current diet) is LOCAL... AND THIS SHOULD CHANGE
• The way we eat, we are destroying our connection with Mother Nature; with all the natural processes & cycles of earth & sky; with those who grow our food, and with the VERY ESSENCE OF LIFE.

“If you ate today, thank a farmer”,
– is the most common quote on Facebook these days.

How can we contribute to localization?
1. Grow our own food and support revitalizing of LOCAL AGRICULTURE. Focus on the concept of LOCAL FOOD PRODUCTION for LOCAL CONSUMPTION.
2. End to consuming NON LOCAL FOOD; Support only local farmers, local producers, Grocers, Processors. LOCAL cuisine / LOCAL Restaurants.
3. Get away and end dependence on fossil fuels, chemical fertilisers, pesticides, usage of mechanisations that use fossil fuel / add to pollution.
4. Work towards rebuilding our soil fertility and neutralising soil toxicity.
5. Improve local infrastructure in areas of processing, storage & distribution
6. Learn to eat seasonally.
8. Value our food. Anticipate & Prepare for shortages. Focus on children – they are our future inheritors; give them access to nutritious & affordable food. Improve awareness in every which way we can.

Remember. Economic Growth as the way we have known it so far is NO MORE SUSTAINABLE!

Brief comparison: Globalization v/s Localization
Globalization
- Food for global consumption
- Threatens Food Security
- Market Economy (induced)
- An economics of Price
- Allows MNC’s dictate & Prevail
- Intensification
- Large Scale Production
- Industrial & corporatized Models
- Encourages Naxalism / terrorism
- Monoculture

- Lengthy ‘Commodity chains’
- Relations across distance
- Big structure
- Technocratic rules
- Resource consumption & Degradation
- Commodities across space
- Corporate profits
- Technocratic rules
- Homogenisation of foods
- Growing more beyond limits

**Localization**

- Food for local consumption
- Aids Food Security
- Moral Economy
- A political economy of quality
- Allows Independent local farmers to discuss
- Slow Money. Slow Food.
- Extensification
- Small Scale Production
- “Natural” Models
- Abets Cooperation & Commune movement

- Biodiversity
- Shorter ‘Farmer to consumer’ chains
- Relations of Proximity
- Voluntary actors
- Democratic Participation
- Resource protection & regeneration
- Commodities in place
- Community economic development
- Democratic Participation
- Regional Palates
- Growing more with less land, pollution, labour etc.

**What is organic agriculture?**

The WHO/FAO/Codex Alimentarius Commission defines organic agriculture as a holistic production management system that promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity; that emphasizes management practices in preference to off-farm inputs, using, where possible, agronomic, biological and mechanical methods, as opposed to synthetic materials.

**Organic agriculture – potential**

The United Nations Food and Agricultural Organization (FAO) are favorably disposed towards organic agriculture. Its report ‘Organic Agriculture & Food Security’ explicitly states that organic agriculture can address local & global food security challenges. Organic farming is no longer to
be considered a niche market within developed countries, but a vibrant commercial agricultural system practiced in 120 countries, covering 31 million hectares (ha) of cultivated land plus 62 million ha of certified wild harvested areas. The organic market was worth US $40 billion in 2006, and expected to reach US$90 billion in 2014.

**Organic farming gives impetus to "localization"**

ORGANIC FARMING has the potential to provide benefits in terms of environmental protection, conservation of nonrenewable resources and improved food quality. India is bestowed with lot of potential to produce all varieties of organic products due to its diverse agro-climatic regions. In several parts of the country, the inherited tradition of organic farming is an added advantage.

"Localisation" makes life vibrant

Benefits the farmer as well as the consumer; Higher income and independence for farmers, more employment opportunities.

- Targets local food needs in local markets; Food travels less
- Best way to curb climate change
- Food is richer in body nutrients and antioxidants
- Cleaner, safer environment, greater biodiversity, more nutritious healthier foods; fresher food.
- Less processing, packaging, storing etc.
- Anaerobic digestion of farm and food wastes in zero-emission food and energy farms could boost total energy savings and greenhouse gas savings. Rely on natural nutrient-cycling processes
- Prevents extinction of species; Protects gene banks
- Boost to ‘Local Food’ conservation; Local Economy. Promotes Tourism
- Regenerate local economies, revitalize local, indigenous knowledge, and create social wealth
- Preserves rural life; promotes a local marketing system that lessens/eliminates middlemen
- Promotes networking of farmers as a community / cooperative; Farmers markets

**An example of localization**

Tiptur in Karnataka is an important coconut growing center. The place grows the best coconut - tender coconut, nut, kopra & coconut oil. The coir fibre, which is a by-product, has helped a flourishing industry in Tiptur. Top manufacturers of coir mattresses, oil, ropes etc have set up base in Tiptur and contribute to the LOCAL economic prosperity of this region. Transportation of raw material is MINIMISED TOTALLY or at best bullock carts are used to shift from farm to factories.
Farming can indeed be made viable through alternative technologies and cooperative federations and self-help groups and / or with Local Governments and also by Individual committed initiatives as Social Enterprises.

- Akshaya Kalpa - State of the art & world class Organic Milk Diary Farm
- World class Jaggery produced by Organic food club
- Jaivik Society at Lalbagh, Bengaluru
- The green path

The Green Path
An Eco-Social Enterprise involved in Multi faceted green activities like: Organic Farming ("SUKRUSHI") Organic Food Store, Eco Hotel Apartment, Eco Retreat, Responsible Tourism, Eco foundation
FARM GATE MARKETS: AN INNOVATIVE APPROACH FOR MARKETING QUALITY FISH AT PREMIUM PRICE

*Vikas P.A*, Shinoj Subramannian, John Bose, P.U. Zachariya, G Syda Rao and A. Gopalakrishnan
KrishiVigyan Kendra (Ernakulam) of Central Marine Fisheries Research Institute, (Indian Council of Agricultural Research), Narakkal, Kochi, Kerala - 682 505. E mail vikaspattath@gmail.com, Mobile: 00919447993980

Abstract
Marketing is one of the main challenges faced by fish farmers. Farmers are forced to sell produce at low price due to perishable nature of fish and need of costly facilities for storage and transportation. Middlemen who have these facilities always get maximum profit with minimum effort. Unavailability of good quality fish is the main concern for the consumers though they are ready to pay premium price for quality products. In this context a concept called Farm gate markets was field tested to avoid middlemen and ensuring maximum profit for farmers while ensuring quality produce for consumers. This model was demonstrated in Pokkali paddy fields located in coastal areas of Ernakulam district in Kerala during the fish harvesting season in April month of 2014. Pearl spot (Karimeen) and Mullet (Thirutha) fish grown in pokkali paddy fields are known for their taste and quality. Having received Geographical Indication (GI) of Government of India, pokkali fields are synonymous with organic farming. Wide announcements were given to attract public and arrangements were made in the farm for public to see the harvest and buy live caught fish. The brand name Pokkali attracted fish consumers from nearby district also. A total of 350 Kg fish were sold at the rate of INR 500/- from 1 Acre Pokkali field. The farmer got a net income of INR 1.75 lakhs and 35 per cent additional profit through the new mechanism. This is a replicable model for Pokkali farming system which can also be suitably applied in any fields.

Importance of Aquaculture

Global fish production continues to outpace world population growth, and aquaculture remains one of the fastest-growing food producing sectors in the

![](chart.png)

Source: FAO
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>China</td>
<td>Asia</td>
<td>12,212,188</td>
<td>13,536,409</td>
<td>13,869,604</td>
<td>13.6</td>
<td>2.4</td>
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<td>Indonesia</td>
<td>Asia</td>
<td>4,275,115</td>
<td>5,332,862</td>
<td>5,430,247</td>
<td>27.0</td>
<td>1.7</td>
</tr>
<tr>
<td>3</td>
<td>United States of America</td>
<td>Americas</td>
<td>4,912,627</td>
<td>5,131,087</td>
<td>5,017,559</td>
<td>4.0</td>
<td>-0.5</td>
</tr>
<tr>
<td>4</td>
<td>Peru</td>
<td>Americas</td>
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<td>8,211,716</td>
<td>4,867,323</td>
<td>-30.6</td>
<td>-43.5</td>
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<tr>
<td>5</td>
<td>Russian Federation</td>
<td>Asia/Europe</td>
<td>3,090,798</td>
<td>4,005,737</td>
<td>4,068,850</td>
<td>31.6</td>
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<td>India</td>
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<td>2,418,700</td>
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<td>4.8</td>
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<td>10</td>
<td>Myanmar</td>
<td>Asia</td>
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<td>2,169,820</td>
<td>2,332,790</td>
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<td>11</td>
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<td>Europe</td>
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<td>2,281,856</td>
<td>2,149,802</td>
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<td>-5.8</td>
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<tr>
<td>12</td>
<td>Philippines</td>
<td>Asia</td>
<td>2,033,325</td>
<td>2,171,327</td>
<td>2,127,046</td>
<td>4.6</td>
<td>-2.0</td>
</tr>
<tr>
<td>13</td>
<td>Republic of Korea</td>
<td>Asia</td>
<td>1,649,061</td>
<td>1,737,870</td>
<td>1,660,165</td>
<td>6.7</td>
<td>-4.5</td>
</tr>
<tr>
<td>14</td>
<td>Thailand</td>
<td>Asia</td>
<td>2,661,223</td>
<td>1,610,418</td>
<td>1,612,073</td>
<td>-10.2</td>
<td>0.1</td>
</tr>
<tr>
<td>15</td>
<td>Malaysia</td>
<td>Asia</td>
<td>1,283,256</td>
<td>1,373,105</td>
<td>1,472,339</td>
<td>14.7</td>
<td>7.2</td>
</tr>
<tr>
<td>16</td>
<td>Mexico</td>
<td>Americas</td>
<td>1,257,699</td>
<td>1,452,970</td>
<td>1,467,790</td>
<td>16.7</td>
<td>1.0</td>
</tr>
<tr>
<td>17</td>
<td>Iceland</td>
<td>Europe</td>
<td>1,986,214</td>
<td>1,138,274</td>
<td>1,449,452</td>
<td>-27.0</td>
<td>27.3</td>
</tr>
<tr>
<td>18</td>
<td>Morocco</td>
<td>Africa</td>
<td>916,988</td>
<td>949,881</td>
<td>1,130,474</td>
<td>26.3</td>
<td>22.0</td>
</tr>
<tr>
<td>Total 18 major countries</td>
<td></td>
<td></td>
<td>58,764,668</td>
<td>63,466,320</td>
<td>60,799,384</td>
<td>3.3</td>
<td>-4.3</td>
</tr>
<tr>
<td>World total</td>
<td></td>
<td></td>
<td>79,674,875</td>
<td>82,609,926</td>
<td>79,765,910</td>
<td>0.0</td>
<td>-3.5</td>
</tr>
<tr>
<td>Share 18 major countries (percentage)</td>
<td></td>
<td></td>
<td>73.8</td>
<td>76.8</td>
<td>76.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Inland waters capture: major producer countries

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>Asia</td>
<td>2,135,068</td>
<td>2,222,221</td>
<td>2,297,829</td>
<td>7.6</td>
<td>2.9</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>Asia</td>
<td>757,253</td>
<td>1,061,022</td>
<td>1,469,456</td>
<td>92.8</td>
<td>37.6</td>
</tr>
<tr>
<td>3</td>
<td>Myanmar</td>
<td>Asia</td>
<td>290,149</td>
<td>1,163,159</td>
<td>1,246,460</td>
<td>220.6</td>
<td>7.2</td>
</tr>
<tr>
<td>4</td>
<td>Bangladesh</td>
<td>Asia</td>
<td>709,333</td>
<td>1,094,585</td>
<td>957,095</td>
<td>34.9</td>
<td>-9.2</td>
</tr>
<tr>
<td>5</td>
<td>Cambodia</td>
<td>Asia</td>
<td>386,750</td>
<td>445,000</td>
<td>449,000</td>
<td>45.4</td>
<td>0.9</td>
</tr>
<tr>
<td>6</td>
<td>Uganda</td>
<td>Africa</td>
<td>241,810</td>
<td>437,415</td>
<td>407,638</td>
<td>68.6</td>
<td>-6.8</td>
</tr>
<tr>
<td>7</td>
<td>Indonesia</td>
<td>Asia</td>
<td>208,656</td>
<td>368,578</td>
<td>353,553</td>
<td>27.5</td>
<td>6.8</td>
</tr>
<tr>
<td>8</td>
<td>United Republic of Tanzania</td>
<td>Africa</td>
<td>201,855</td>
<td>290,962</td>
<td>314,945</td>
<td>4.3</td>
<td>8.2</td>
</tr>
<tr>
<td>9</td>
<td>Nigeria</td>
<td>Africa</td>
<td>174,688</td>
<td>301,281</td>
<td>312,009</td>
<td>78.3</td>
<td>3.6</td>
</tr>
<tr>
<td>10</td>
<td>Brazil</td>
<td>Americas</td>
<td>227,551</td>
<td>248,865</td>
<td>266,042</td>
<td>16.9</td>
<td>6.9</td>
</tr>
<tr>
<td>11</td>
<td>Russian Federation</td>
<td>Europe, Asia</td>
<td>190,712</td>
<td>249,140</td>
<td>262,548</td>
<td>37.7</td>
<td>5.4</td>
</tr>
<tr>
<td>12</td>
<td>Egypt</td>
<td>Africa</td>
<td>313,742</td>
<td>253,051</td>
<td>260,039</td>
<td>-23.5</td>
<td>-5.1</td>
</tr>
<tr>
<td>13</td>
<td>Thailand</td>
<td>Asia</td>
<td>190,447</td>
<td>224,768</td>
<td>222,500</td>
<td>12.1</td>
<td>-1.0</td>
</tr>
<tr>
<td>14</td>
<td>Democratic Republic of the Congo</td>
<td>Africa</td>
<td>230,385</td>
<td>217,000</td>
<td>214,000</td>
<td>-7.1</td>
<td>-1.4</td>
</tr>
<tr>
<td>15</td>
<td>Viet Nam</td>
<td>Asia</td>
<td>208,872</td>
<td>206,100</td>
<td>202,500</td>
<td>-2.6</td>
<td>-1.2</td>
</tr>
<tr>
<td><strong>Total 15 major countries</strong></td>
<td></td>
<td></td>
<td><strong>6,597,640</strong></td>
<td><strong>8,753,039</strong></td>
<td><strong>9,247,624</strong></td>
<td><strong>40.2</strong></td>
<td><strong>5.7</strong></td>
</tr>
<tr>
<td><strong>World total</strong></td>
<td></td>
<td></td>
<td><strong>8,611,860</strong></td>
<td><strong>11,134,401</strong></td>
<td><strong>11,630,920</strong></td>
<td><strong>35.1</strong></td>
<td><strong>4.5</strong></td>
</tr>
<tr>
<td><strong>Share 15 major countries (percentage)</strong></td>
<td></td>
<td></td>
<td><strong>76.6</strong></td>
<td><strong>78.7</strong></td>
<td><strong>79.5</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Farmed food fish production by top 15 producers and main groups of farmed species in 2012

<table>
<thead>
<tr>
<th>Producer</th>
<th>Fish</th>
<th>Molluscs</th>
<th>Other species</th>
<th>National total</th>
<th>Share in world total</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>23,341,143</td>
<td>3,592,588</td>
<td>12,341,169</td>
<td>803,015</td>
<td>61.7</td>
</tr>
<tr>
<td>India</td>
<td>3,812,420</td>
<td>84,164</td>
<td>299,292</td>
<td>12,905</td>
<td>4,209,415</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>2,091,200</td>
<td>51,000</td>
<td>513,100</td>
<td>400,000</td>
<td>30,200</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2,092,407</td>
<td>582,077</td>
<td>287,698</td>
<td>...</td>
<td>477</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,525,672</td>
<td>63,220</td>
<td>137,174</td>
<td>...</td>
<td>1,726,066</td>
</tr>
<tr>
<td>Norway</td>
<td>85</td>
<td>1,319,033</td>
<td>...</td>
<td>2,901</td>
<td>1,321,119</td>
</tr>
<tr>
<td>Thailand</td>
<td>380,986</td>
<td>19,954</td>
<td>623,660</td>
<td>205,152</td>
<td>4,045</td>
</tr>
<tr>
<td>Chile</td>
<td>59,527</td>
<td>758,567</td>
<td>...</td>
<td>253,307</td>
<td>...</td>
</tr>
<tr>
<td>Egypt</td>
<td>1,016,625</td>
<td>...</td>
<td>1,169</td>
<td>...</td>
<td>1,077,786</td>
</tr>
<tr>
<td>Myanmar</td>
<td>822,589</td>
<td>1,868</td>
<td>58,981</td>
<td>...</td>
<td>1,731</td>
</tr>
<tr>
<td>Philippines</td>
<td>310,042</td>
<td>361,722</td>
<td>72,822</td>
<td>45,308</td>
<td>...</td>
</tr>
<tr>
<td>Brazil</td>
<td>611,343</td>
<td>...</td>
<td>74,415</td>
<td>29,699</td>
<td>1,005</td>
</tr>
<tr>
<td>Japan</td>
<td>33,957</td>
<td>250,422</td>
<td>1,596</td>
<td>345,914</td>
<td>1,108</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>14,095</td>
<td>76,307</td>
<td>2,838</td>
<td>373,468</td>
<td>13,672</td>
</tr>
<tr>
<td>United States of America</td>
<td>185,595</td>
<td>21,169</td>
<td>44,928</td>
<td>168,329</td>
<td>...</td>
</tr>
<tr>
<td>Top 15 total</td>
<td>36,302,688</td>
<td>4,618,012</td>
<td>5,810,835</td>
<td>14,171,312</td>
<td>859,254</td>
</tr>
<tr>
<td>Rest of world</td>
<td>2,296,562</td>
<td>933,893</td>
<td>635,982</td>
<td>599,426</td>
<td>5,288</td>
</tr>
<tr>
<td>World</td>
<td>38,599,250</td>
<td>5,551,905</td>
<td>6,446,818</td>
<td>15,179,398</td>
<td>864,542</td>
</tr>
</tbody>
</table>

Note: The symbol "..." means the production data are not available or the production volume is regarded as negligibly low.
MARINE PRODUCTS EXPORTS

• Exports aggregated to 9,83,756 MT and Rs. 30,213.26 crores

Fish is the one of the most traded food commodities in the world.

Globalized fisheries and aquaculture chain includes:

- Production systems
- Processing facilities
- Transport and communication facilities
- Trade policies
- Efficient distribution and marketing cannels
- Recent Technological innovations
- Packaging and transportation facilities
- Geopolitics

Marketing is the one of the most difficult phase due to the limited and congested market infrastructure and facilities (FAO 2014). Marketing and transportation of live fish is challenging as they are often subject to stringent health regulations and quality standards. Marketing issues are common with many farmers having a minimal understanding of the market chain. Large discrepancies between prices paid at the farm gate and wholesale prices. Measures to resolve such issues include providing real-time information on fish prices in the destination markets, group marketing and shortening the market chain by reducing reliance on intermediaries or by establishing farm gate markets.
Constrains - Farmers View
- Marketing is one of the main challenges faced by fish farmers.
- Farmers are forced to sell produce at low price due to perishable nature of fish and need of costly facilities for storage and transportation.
- Middlemen who have these facilities always get maximum profit with minimum effort.

Concern - Customers View
It is also important to study the consumer side and determine how aquaculture can better contribute to the nutritional security of rural and urban poor consumers through improved trading and marketing systems (FAO 2014).
- Unavailability of good quality fish is the main concern for the consumers though they are ready to pay premium price for quality products

Opportunity
- In India, national average annual consumption of fish and fish products is 2.85 kg/capita.
- This accounts for 2.2 percent of total protein consumption.
- Annual consumption levels range from 22.7 kg/capita in the coastal province of Kerala to just 0.03 kg/capita in mountainous Northern Province of Himachal Pradesh.

Objective - To test the viability of Farm gate markets to avoid middlemen and ensuring maximum profit for farmers while ensuring quality produce for consumers.

Pokkali farming system
- Paddy in one season (June to October, 4 months).
- Shrimp in subsequent season (November 14 to April 15, 5 months)

Pokkali field
Fin fish farming in Pokkali fields: Challenges

- Only 5 months license period. (November 14 to April 15, 5 months)
- Variation in salinity.
  - During monsoon: 0 to 1
  - During summer: upto 28 (November to April)
- Turbidity during flood.

FARM GATE MARKET: A case study

- ENSURE PREMIUM PRICE FOR PRODUCE
- ENSURE QUALITY FISHERY PRODUCE TO CONSUMERS

Pokkali produce are currently being mixed up in the market with low quality fish from elsewhere. The brand name and farm gate market for the pokkaly fish is to ensure safe-to-eat product for the consumers at a reasonable price while enhancing the income from pokkaly farming towards its sustainability.

### Pokkali and climate change

- Saline tolerant paddy variety.
- Flood tolerant paddy variety.
- The farming system is wholly dependent on climate-monsoon and tidal fluctuations.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area initially existed</td>
<td>25,000 ha</td>
</tr>
<tr>
<td>Area 5 years back</td>
<td>5,000 ha</td>
</tr>
<tr>
<td>Present area</td>
<td>1,000 ha</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No machinery</th>
<th>WSSV disease</th>
<th>Labour scarcity</th>
</tr>
</thead>
</table>

Mullet  *Mugil cephalus*

Pearl spot  *Etrousus suratensis*
**Farming**

**Pearl spot**
- Seed collected produced by farmers
- Nursery rearing done in happa nets
- Farming done in cages and open Pokkali fields
- Harvesting done using cast net and scoop net
- Live fish caught

**Mullet**
- Seed collected from wild by fisherfolks
- Nursery rearing done in happa nets
- Farming done in open Pokkali fields
- Harvesting done using gill net
- Live fish caught

---

**Overview**
- A total of 350 Kg fish were sold at the rate of INR 500/- from 1 Acre Pokkali field.
- The farmer got a net income of INR 1.75 lakhs and 35 per cent additional profit through the new mechanism.

**Advantages**
- On demand catching and sale at farm gate
- Ensured premium price for farmers
- Safe to eat product for consumers
- No need of storage and transportation facilities
THE EXPORT POTENTIAL OF INDIAN ORGANIC PRODUCTS

*Ms. Karin Heinze, Editor, Organic – Market Info, Germany, contact: kh@bio-markt.info, www.organic-market.info*

Introduction

1 My name is Karin – here you can see my local organic super market in Germany, where I buy my organic food - and these are some customers that may be will buy your products in future

2 First, please let me give you a short overview of what our online publishing house offers: Organic-Market.Info is an international b2b online magazine with a German, English and French web portal. Our weekly newsletters reach around 25.000 stakeholders in the organic sector worldwide.

3 Without web portals we support the organic sector daily with current news and in-depth information, reports from shop concepts, companies, market development and market data. We inform our readers about relevant political issues and cover trade fairs and other important events. Most of our content is free; background info and articles and data are available on a subscription basis. I’ve been in the organic business since 1980.

4 Organic-Market.Info is read in around 200 countries worldwide. Here you can see where. Readers can find thousands of articles in our archives, where they can search for information relating to the organic sector in many countries around the world. A wealth of pictures, charts and videos give you a lively impression of what’s going on in the international organic scene.

5 My topic today is to give you some insight into western markets and to show you the potential for exporting products from India to Europe and the United States. I’ll give you some market data and introduce you to importers, distributors, retail outlets and consumers. But I’ll also talk about requirements (certifications, labelling), the expectations of traders and consumers (quality, transparency, reliability) and also the challenges (GMO, logistics, unfair competition, fraud) as well as the challenges to overcome easier like to find a buyer and develop a supply chain.

6 India has much fertile land and is an important sourcing country for organic commodities (raw materials) – your country is rich in tea, coffee, rice, basmati, spices, turmeric, ginger, all kinds of pulses, soya, cocoa, fruit, organic cotton, essential oils, etc. etc …Although in Europe more than 10 million hectares of land are farmed organically, there is still great demand in the European Union for certain commodities. Please note that it’s not only food that’s in high demand in the
western countries but also organic cotton and fabrics, natural personal care products and (Ayurvedic) supplements.

**Markets**

7 Let me now come to the development of the markets in Europe and in America. For many years, the organic markets in the western industrial countries have experienced high growth rates, and they’re continuing to grow by 5 to 10% and more, even though the economic crisis is still going on. The German market is the biggest organic market in Europe, with a volume of 7.55 billion Euros in 2013 (a rise of 7.2%) (Converted more than 580 billion Rupees). A similar growth rate is expected for 2014. For example, in Germany you find around 2,600 specialized shops, of which almost 800 are organic supermarkets with 200 to 1,000 square meters of retail area and 4,000 to 10,000 certified organic products, including food, organic cosmetics and supplements and cleaning products. Some outlets also offer organic textiles. The turnover of natural and organic cosmetics amounted to 920 million Euros in 2013 (that are more than 71 billion Rupees).

8 Second in the ranking of EU countries is France. 25,500 farmers cultivate more than 1.1 million ha of land and 12,400 manufacturers and traders work in the organic business. The national turnover in the organic sector grew to more than 4.56 billion euros in 2012 (converted 353 billion Rupees).

Italy, the “country of foodies”, has more than 52,000 agro companies, processors and traders in the organic sector. Last year the market volume was around 3 billion Euros (that are 232 billion Rupees). For the first time since the financial crisis in 2008, the organic sector in Great Britain registered slight growth in 2013. The market grew by 2.8% and turned over 2.16 billion euro last year (converted 167 billion Rupees). The Scandinavian countries are also doing very well and have recorded market volumes over 1 billion Euros (more than 77 billion Rupees). The Netherlands too recorded very respectable sales of 1.07 billion Euros in 2013 (converted almost 83 billion Rupees).

9 The giant in organics just over the pond (Atlantic) are the United States. Sales in the American organic sector rose from 31.5 billion to 35.1 billion US dollars in 2013 (growth of 11.5%). 32.3 billion US dollars of the sales revenues (converted 2.1 trillion Rupees) were achieved with organic food, and the rest with non-food articles.

10 Let me introduce the consumers in the western industrial countries to you, who will buy your products – that are students, young families with kids, singles, foodies, vegetarians, vegans. Recent Trends in the western countries are being vegetarian/vegan, Ayurveda,
practicing yoga, taking innovative supplements, Cooking and eating exotic food, enjoying the taste of a country, etc. And people go beyond food in their buying habits and look for organic textiles and organic cosmetics & body care.

11 In a lotof western states organic products are available in all sales channels. So in the big conventional supermarket chains like Rewe or Edeka, the discounter Aldi, in drugstore chains, for sure in specialized organic shops and health food stores like the German Reform has and naturally also in the American Whole Foods Market, in Food Co-ops, box schemes, Farmers’ markets, restaurants, canteens and for sure also by e-commerce... See where your products will be on the shelves

12 Traders and consumers expect quality, tasty products, transparency, reliability, taste and innovation from organic products and of course most also reasonable prices. Both groups often expect also a background story, fairness in trade, social responsibility on the part of the company.

Requirements
13 Let’s talk about requirements. Organic agriculture in many countries worldwide is regulated by law, as it has been in India since 2001. All organic products to be marketed in the EU states need to be labeled with the EU logo, or seal as it is sometimes called. In the US it’s the USDA seal. All imports must fulfill these legal requirements. India has equivalence status with the EU. Do you know that there have been new import regulations since last summer? (http://www.ble.de/SharedDocs/Downloads/02_Kontrolle/08_Oekolandbau/Flyer_Import_Drittländer_en.pdf;jsessionid=44776C512A0F12EFF63D4856199CAA9D.1_cid325?__blob=publicationFile)

14 There’s no trade without challenges! And the organic sector has to face a lot of challenges. But the challenge starts already at the level of the farmer: the worldwide problems of the increasing use of genetically modified seeds and pesticides (especially glyphosate) make organic farming a challenge – fighting the GMO companies and their lobby is an ongoing task. Unfair competition and fraud are also facts of life in the organic world, but happily not too often.

15 There are a lot of challenges that are easier to overcome –

First and foremost, finding a business partner – that’s why we’re here at BioFach! Second - developing a supply chain and appropriate logistics – you can do that with the help of organic associations and trade association’s like ICCOA or APEDA or your national government. Third - building trust and investing in a confident, long-term business relationship.
Fourth - providing good transparent quality and tasty, reliable but also innovative products (added value).

16 The topic that I’m standing here is ... Potential ...and guess what! The challenges I mentioned before are at the same time your business opportunities (capabilities). The question is: What makes your product unique and your business successful? It is absolutely necessary to meet the expectations and demands of the markets – as I’ve already said – you in fact need quality products, and you try to add value by processing them, by finding innovative trends. But on the other hand it’s also essential to have a good relationship with your business partners. With reference of our little delegation of buyers, let me show you how importing works: after you’ve found your business partner - a trader like Franziska from Ökotopia, Renate and Yvonne from Oasis, Stefan from Lotao, a broker like Elisabeth or Matthias or an importer like Ingmar from Naturkost Weber - then you can start your negotiations with them bearing in mind all the requirements I mentioned a moment ago. Your products will finally find their way to the western markets and onto the shelves of a whole variety of shops ....

17 And finally, please allow me to show you different kinds of potential. Please don’t forget your domestic market – two pillars are better than one. Please don’t forget your traditions - knowledge is one of the most important success factors.

18 Please don’t forget to raise the level of awareness – educate your farmers and your younger generation – they are the future! And really finally – let us not forget that organic is not only a business – it is responsibility for our planet!!
Organic Farming is the manifestation of the traditional environment stewardship of the people of Uttarakhand providing a meaningful expression in the form of economic growth.

Organic farmers are small farmers

- Rain fed Farmers
- Marginal and small land holders
- Subsistence Farmers

Forward linkages are fragmented and complex also dominated by small players at the farm and intermediary level.
Average national holding is 1.2 ha (Uttarakhand hill is 0.7 ha).

Forward linkages are fragmented and complex, also dominated by small players at the farm and intermediary level.

Dogg'd by issues of scale (poor production), storage, climate change, and low inspiration.

Profile of the farmer:

Link small farmers to markets:
- Supporting Agency takes charge
- Building social dynamics, networking with markets, quality & brand marks if any
- Hopping the dominant net of local players
- Aggregation & storage dynamics
- Supply chain, finances, damages and sales etc...

Policy supports Small farmers for Organic:
- Livelihood enhancement
- Adaptation in Climate Change
- For diversification
- For higher productivity
Knowing Organics in India

- Organic domestic market in India stands at 1 million $ (600 crores) (ICCOA)
- Domestic food markets stands at 258 billion $ (whooping 15,800 crores)
- Export markets stand at 752 million $ (4627 crores)
- Organic export stands at 403 million $ (2474 crores)

Food processing segments in India
Meat, fish, fruits, vegetables and oils accounts for 40.2 per cent in FY12.
**Strategy**
- Organic to be the umbilical chord of all livelihood programs
- Hill regions to be thrust areas
- Focus of rich agro-diversity
- Organic to be cross-cutting and over-arching
- Cluster approach for economies of scale
- Bio Tourism
- Sink with the overall Vision of the state for hills green, carbon footprint compliant and inclusive

**Extension & Development**
- Development of commodity wise Organic production clusters called Bio villages & Organic Blocks (3000 villages)
- Development of a battery of Grass root workers called Master Trainers as Messengers for Organics.
- Emphasis on In-situ (on farm) input production for organic production (Compost, ITK, bio pesticides)
- Partnering with voluntary organizations to build social capital.
Marketing Model

- Single window
- Marketing guidelines
- Markets: Export, domestic, raw, processed, food & fibers, MAP, Meats, eggs, etc
- Contact Farming
- Develop Producer Companies.
- Promote an Umbrella Brand for all farmers of Uttarakhand

Trade Partners

- Wholesalers and Retailors
- Commodity Specific Traders
- Processors for Domestic and Exports
- Direct Marketing by Federations
- Private Players (Independent Working)

My Neighbor my Market

- Exports
- Domestic (wholesale, retail)
- Neighborhood (retail, semi processed)
My neighborhood - Corporate and Mall less markets

- My self
- My family
- Offices
- Local restaurants
- ‘Kirana’ Stores
- Defunct cooperative stores
- Government buildings
- City Mela ’s
- Haats
- Bazaars
The Organic Kitchen of Uttarakhand
WHAT IS HERMETIC STORAGE?
Hermetic means Air Tight. Hermetic Storage techniques are age old & used to store dry food crops thousands of years ago. The wax seals found on ancient Greek and Roman jars known as “amphoras” tell us that hermetic storage has been used to preserve grains for more than 2,500 years.

WHY HERMETIC STORAGE?
- True IPM for A Greener Environment.
- Challenge of Organic Fumigation
- Very Less effective Options
- Methyle Bromide & Aluminium Phosphide
- Change is Inevitable

ORGANIC BAGGED STORAGE

1. GrainPro Cocoons

2. Organic Fumigation Co2 In Ghf Cocoon
3. 1 Mt On Farm Organic Storage

4. Super Grain Bags

5. SGB-HC & SGB-HC ISO
6. **Organic Exports In Transafe Liners**

7. **Onfarm and Solar Dryers**

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**ORGANIC CERTIFICATION**

GrainPro Storage and Transport Products have been certified for Organic Use. GrainPro, Inc. recently raised their standing in the world agricultural storage industry by obtaining an official International Organic Storage (IOS) Certification. This certification guarantees the certified products are compliant to international organic standards.

**Advantages**


II. Prevents development of molds, involving aflatoxins and mycotoxins.

III. No need for fumigants or pesticides harmful to food and feed.

IV. Totally impermeable to gases and water; UV resistant.
V. Mobile: units can be set up in minutes.

VI. Tested under all climatic conditions.

VII. Insects killed by lack of oxygen.

VIII. No infrastructure needed.

IX. Rodent resistant.

X. PVC of 0.83 mm thickness.

XI. Effective life of 10 yrs to 15 yrs.

GRAINPRO IN INDIA

I. PCI representing Grainpro in India

II. More than 150 Cocoons & more than 70,000 SGB’s

III. Sectors Catered – majority of dried agricultural commodities.

EFFICIENCY OF TRICHODERMA ENRICHED COMPOST IN CONTROLLING ROOT KNOT NEMATODES IN GOTUKOLA (Centella asiatica L.)

*Presenter: Priyanga Dissanyake, Sri Lanka D.M.P.S.Dissanayake ¹, D.C.Tennakone ², L.C.Wijethilake ¹ and A.G.B.Aruggoda ², ¹Regional Agricultural Research and Development Centre, Makandura, Gonawila, ²Department of Agricultural and Plantation Engineering, The Open University of Sri Lanka, Nawala

Abstract

Compost is an efficient and effective organic nutrient supplement and a soil amendment in sustainable agriculture systems. It improves chemical, physical and biological properties of the soil. By enhancing micro biological properties, antibiotic and pesticide effects of compost can be improved. This study was planned to assess the suitability of root knot nematode control ability, compared to chemical control agents using Trichoderma enriched compost. Due to high demand, farmers do intensive cultivation of leafy vegetables with the application of excessive doses of chemical fertilizers and other agrochemicals such as pesticides, fungicides and foliar liquid growth promoters. Gotukola (Centella asiatica L.) is a widely grown popular leafy vegetable in Sri Lanka. Infection of root knot nematode (Meloidogyne spp.) is a major problem causes heavy losses in commercial Gotukola cultivations in warm climates. Two bio control agents, Trichoderma harzianum and Trichoderma viridae enriched composts were evaluated with commonly using chemical pesticide, Carbofuran and normal compost on root knot nematodes while evaluating growth promotion of Gotukola. The results reviled that application of Carbofuran had significant reduction of nematode count in soil. But both Trichoderma spp. incorporated compost treatments showed lower disease incidents as 7.75% and 9.75% respectively. They were not significantly different with 5.75% of disease incidents of Carbofuran treatment. Trichoderma spp. showed better impact on yield and growth of Gotukola cultivation when compared to chemical treatment of Carbofuran. Recorded yields of both Trichoderma spp. incorporated compost treatments were 118 and 93 g/m² and it was two times greater than normal compost treatment (58 g/m²) while three times greater than chemical treatment (35 g/m²). Importantly Trichoderma spp. inoculated compost can be used as a safe biological agent to control root knot nematode attack in Gotukola cultivation and it also act as a substitute for Carbofuran by reducing health risk of people and harmful effects to the environment while increasing higher yields.

Key words: Biological control, Compost, Gotukola, Nematode, Pesticide, Trichoderma spp

Introduction

Gotukola (Centella asiatica L.) is an annual small creeper which belongs to family Umbeliferaceae (Apiaceae), found in India, Sri Lanka, Madagascar, South Africa, Australia, China and Japan (Kumar, 2010). According to Leung and Foster, 1995; Gotukola plant contains some
important components including volatile oils, flavonoids, tannins, phytosterols, amino acids and sugars. Mohandas has reported in 2006, that *C. asiatica* is used as a medicinal treatment for wide range of disease conditions and other neurodegenerative disorders. At present, Gotukola has an increasing demand in local and foreign market (Cultivation of leafy vegetables, 2014). Apart from minerals and vitamins, it has medicinal properties in Ayurvedic medicine especially for catarrh, Hemorrhoids, Blood mucosdiarrhea, worminal diseases and wounds. Continuous use of Gotukola is essential to get the beneficial effects in improving the mental faculties (Sooriyapperuma *et al.*, 2006). Cultivation of Gotukola has become a high profitable income source and intensive cultivation has been popularized in Gampaha and Puttlam regions. The yield could be varied up to 8600 – 12,350 kg/ha according to the management practices (Wahundeniya and Kurukulaarachchi, 2004).

Excessive use of chemical and organic fertilizers with other agro chemicals has become a severe threat to human health and also to the environment. In order to get more yields and to protect the crop from pest and diseases, farmers use these agro chemicals indiscriminately (Sooriyapperuma *et al.*, 2006). Therefore, high amounts of pesticide residuals and toxic trace metals could be contained in Gotukola available in the markets. Generally most of the people consume Gotukola with minimum preparation. Therefore, avoiding the use of toxic substances should be taken to the consideration especially for Gotukola like leafy vegetables.

One of a severe problem in Gotukola cultivation is the root knot nematode infestation. *Meloidogyne halpa, M. arenaria* and *M.incognita* have been identified as major causative agents of Root knot disease in Gotukola in Sri Lanka (Wijekone *et al.*, 2000-2001). They are sedentary endoparasites and infection starts with root penetration of second stage juveniles, hatched in soil from eggs stored in egg masses that have been laid by the females on the infected roots (Baker *et al.*, 1985). The disease is manifested by the formation of galls in the roots accompanied by stunted growth, chlorosis and loss of vigor of the plant (Babu *et al.*, 1999). The roots which are damaged cannot uptake water and nutrients effectively. Infections of young plants may be lethal and mature plants show poor growth, yellowing and decreased yield (Eisenback and Triantaphyllou, 1991). In Puttalam area which having sandy soils, farmers use frequent application of urea as foliar nitrogen supplement to promote leaf growth apart from application of carbofuran as soil treatment to kill nematodes. That kills insects, mites and nematodes on contact or after ingestion but frequent application of urea and other agro chemicals causes severe damage to the quality of ground water table is another threat created to the human health.

Hence controlling of root knot nematodes with biological agents is very important solution for this problem and it will reduce the harmful effects to the bio diversity, human health risk and
also the high production cost for pesticides and foliar fertilizers. Therefore the main objective of the study was to assess the suitability of using *Trichoderma* spp. incorporated compost as a treatment for root knot nematodes problem in Gotukola while considering the growth and yield performance comparing with chemical treatments.

**Materials and Methods**

A pot experiment was carried out at Regional Agricultural Research and Development Centre, Mankadura, Gonawila (Low Country Intermediate Zone of Sri Lanka) during 2011/2012 *Maha* season. The soil type was Red Yellow Podsolc Soils (RYPS) and the mean annual rainfall was less than 1020 mm.

**Collection of nematode infected samples**

About 10 soil samples together with root samples were collected from the rhyzosphere of Gotukola (*Centella asiatica* L.) plants, in root knot nematode infested farmer fields situated at Puttalam District, Chillaw, Manuwangama on the left bank of the Deduru Oya river. The area belonged to LCIZ of Sri Lanka and soil types were RYPS and LHGS. This area was very popular for commercial level leafy vegetable production including Gotukola and Mukunuwanna.

**Isolation of nematodes**

Collected soil and root samples were taken to the laboratory of National Plant Quarantine Service, Katunayake, Sri Lanka for the isolation of nematodes and identification process was carried out according to morphological and morph metrical characters (Eisenback, 1985). Bermann funnel method was used to isolate the nematodes under the stereomicroscope and parasitic nematodes were identified by observing the stylet. At the same time initial nematode count was taken using counting dish with stereomicroscope. According to the nematode count, a nematode containing soil extraction was prepared to inoculate the Gotukola growing pots.

**Mass culturing of *Trichoderma* sp. in compost**

Pure cultures of *T. herzianum* and *T. viridae* were introduced separately in to autoclaved culture media and after development of spores, two inoculums were introduced in to two mature compost heaps (1g of inoculums : 100 g of compost). Then inoculated compost was mixed thoroughly and heaped separately providing optimum conditions. One week after mixing, the inoculated composts were used to fill the pots. Normal compost was used to compost treatment and chemical treatment (Carbofuran). The ratio of potting mixture was top soil and compost as 1:1 and for the control treatment, only top soil was used.

The selected Gotukola variety was “Mirigama” and equal size nematodes free plants were transplanted in pots and aftercare operations of the crop were done according to the
recommendations of the Department of Agriculture. Nematodes were introduced in to all pots in one month after pot planting. Treatments were 1). *Trichoderma herzianum* inoculated compost, 2). *Trichoderma viridae* inoculated compost 3). Carbofuran as chemical treatment 4). Compost without inoculation 5). Control treatment only with soil. Yield, disease severity and number of root galls per plant were recorded. The experimental design was Completely Randomized Design with three replicates. Data were tabulated and analyzed by using Analysis of Variance (ANOVA) procedure of Statistical Analysis System (SAS). The data variance was compared with those of means using Duncan's New Multiple Range Test using SAS.

**Results and Discussions**

According to table 1, number of root galls in gotukola plants showed more or less similar in chemical treatment (T3) and two *Trichoderma* treatments (T1 and T2). The highest number of root galls was observed in control treatment. According to Harman, 2000, *Trichoderma spp* have an ability to control nematodes and reason is the parasitism ability of *Trichoderma spp* and their rapid colonization in rhizosphere.

Table 1. Number of galls appearing root %, disease incidents % of Gotukola

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of roots with galls (%)</th>
<th>Disease incidents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 T.harzianum + compost</td>
<td>7.75 dc</td>
<td>3.17 c</td>
</tr>
<tr>
<td>T2 T.viridae + compost</td>
<td>9.75 c</td>
<td>4.89 bc</td>
</tr>
<tr>
<td>T3 Carbofuran</td>
<td>5.75 d</td>
<td>6.65 b</td>
</tr>
<tr>
<td>T4 Compost</td>
<td>15.0 b</td>
<td>5.15 bc</td>
</tr>
<tr>
<td>T5 Control</td>
<td>27.0 a</td>
<td>16.48 a</td>
</tr>
</tbody>
</table>

Means appeared in a column with the same letters are not significantly different at P=0.05 according to DMRT.

According to Adegbite and Agbaje, (2007), chemical agents like Carbofuran are efficiently control nematodes due to the toxic effect. But the lowest disease incidents were recorded in *T. harzianum* compost treatment (T1) as 3.17%, which is significantly different only to control. According to Pascual *et al.* (2002), composts are known to protect plants against soil borne pathogens and *T. herzianum* and *T. viridae* showed good parasitism ability against nematodes by producing toxic metabolites.
Table 2. Total leaf count and average biomass dry weight in one harvest

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total leaf count No of leaves/m²</th>
<th>Biomass production - g/m² (Dry wt basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.harzianum + compost</td>
<td>2395.5 a</td>
<td>118.00 a</td>
</tr>
<tr>
<td>T.viridae + compost</td>
<td>1876.87 b</td>
<td>92.98 ab</td>
</tr>
<tr>
<td>Carbofuran</td>
<td>667.91 c</td>
<td>34.92 c</td>
</tr>
<tr>
<td>Compost</td>
<td>73.5 c</td>
<td>58.36 b</td>
</tr>
<tr>
<td>Control</td>
<td>64 c</td>
<td>10.89 d</td>
</tr>
<tr>
<td>CV %</td>
<td>22.65</td>
<td>22.59</td>
</tr>
</tbody>
</table>

Means appeared with the same letters are not significantly different at P=0.05 according to DMRT.

According to Harman, 2000 nematodes cannot penetrate to the roots due to colonization of fungi species in root zones and they act as a barrier for root penetration. Further the enzymes produced and released in colonized area by Trichoderma spp such as chitinases, glucanases and proteases seems to play an important role in parasitism (Haran et al., 1996). Treatment 4, with normal compost also recorded high nematode count since composts increase the water and nutrient holding capacity in soil. According to El Nadi et al., 1995 and Bernal et al., 1998, compost significantly increase organic matter content of most desert soils and improve soil structure and fertility. Moreover Baker et al., 1985 has identified that nematodes are highly active on high temperature and fine moisture content.

The dry matter yield of Gotukola has increased in compost treated pots and the values were significantly higher than chemical treatment. Apart from biological control of pathogens, compost can improve of soil physical, chemical and biological properties (El Nadi et al., 1995). Trichoderma spp can parasitize nematodes and inactivate pathogen enzymes as well as help in tolerance to stress conditions by enhanced root development. (Sivan and Chet, 1992 and Herman, 2000).

Conclusion
Trichoderma spp. incorporated compost can be used as a safe biological agent in controlling root knot nematodes in Gotukola. Furthermore compost enrichment with Trichoderma spp could be an effective and efficient soil amendment in intensive leafy vegetable production.

Acknowledgement
Authors wish to express their gratitude to Dr. Rajapaksha, Pathologist of the Horticultural Crop Research and Development Institute for providing pure cultures for the research purpose. Also Mrs. L.C.Hewage, Research Officer of the National Plant Quarantine Service of the Department...
of Agriculture is greatly appreciated and acknowledged for providing laboratory facilities and valuable support in this research work.

References


INTEGRATION OF DIFFERENT INPUTS FOR BEST PRODUCTION IN ORGANIC FARMING

*Dr. K Ushakumari Professor & Project Co-ordinator (Organic Farming), Kerala Agricultural University, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala, India*

Organic farming

System approach of crop production, observing the rules of nature, targeted to produce nutritive healthy and pollution free food, protecting the entire system of nature, maximizing the use of on-farm resources minimizing the use of off-farm inputs and avoiding the use of chemical fertilizers and pesticides.

Pure organic production refers to organically grown crops which are not exposed to any chemical right from the stage of seed treatment to the final post harvest handling and processing.

Objectives of organic farming

- Production of poison free food
- Maintenance of soil fertility and soil organic matter
- Recycling of nutrients and minimizing the use of external inputs
- Sustainability and soil health by using organic manures, biofertilizers, bio control agents and botanicals etc.

Benefits of Organic farming

- Conservation of Natural Resources
- Prevention of Damage to Environment
- Production of ‘CLEAN’ foods
- Reduction of entry to toxicants in the food chain
- Prospects of Export of Organically produced foods
- Self sustaining production system dependent largely on on-farm resources

Basic principles of Organic Farming

- Soil and water conservation
- Mixed farming and cropping
- Nitrogen harvest through legume growing
- Compost and biofertilizer use
- Recycling of crop residues
- Mulching
- Minimum tillage
- Use of bio-plant protection
- Nutrient siphoning
The key characterization of organic farming includes:

1. Protecting the long term fertility of the soil by maintaining organic matter levels, postering soil biological activity and careful mechanical intervention.
2. Providing crop nutrients indirectly by using relatively insoluble nutrient sources
3. N self sufficiency through the use of legumes and biological N fixation and recycling of organic materials
4. Weed, disease and pest control rely primarily on crop rotation, natural predators, diversity and resistant varieties.

Scope for Organic Agriculture in Kerala

- High level of literacy and awareness.
- Home to spices and medicinal plants.
- Rich natural resource base or biodiversity.
- Low rate of consumption of chemical inputs compared to other states in India.
- Many farmers and their associations already practicing organic farming.
- Increasing awareness for organic agricultural products among consumers

Components of organic farming

Organic manures, green manures, bio fertilizers, Non-chemical weed control measures, Biological pest management

Organic manures

- Solid
  - Farm yard manure
  - Poultry manure etc.
  - Oil cakes - Neem cake, Ground nut cake, Castor cake etc
  - Composts - Traditional Compost, Vermi compost, Coirpith compost, Enriched compost, EM compost, Mineral compost

- Liquid
  - Vermi wash
  - Biogas slurry
  - Panchagavya
  - Dashagavya
  - Cow urine
  - Fishamino acid
  - Jeevamritham

- GreenManures
  - Daincha-Sesbania aculeata
  - Manilla agathi-Sesbania rostrata
  - Kilukki-Crotalaria juncea
  - Azolla
Green Leaves Manure

Glyricidia

Leucaena

Pongamia

Cowpea green manure for basin management under coconut root-wilt garden

Azolla unit

Azolla
Bio-fertilizers for crop production

Biofertilizers are preparations containing live cells of beneficial microorganisms. They increase the availability of nutrients and produce growth promoting substances.

- Nitrogen bio fertilizer – *Rhizobium, Azospirillum, Azotobacter*
- Phosphorus bio fertilizer – AMF, P solubilizers
- NPK bio fertilizer - *PGPR Mix I*
- K bio fertilizer - *Frateuria*

*Rhizobium* - N₂ fixation in legumes
- Nitrogen contribution 30-50 kg /ha
- Meet 80 % of crop nitrogen requirement
- Nitrogen transfer –green manure
- Develop appropriate *Rhizobium* suitable for green manures

*Azospirillum*
- Nitrogen fixation
- Growth promotion in legumes
- Nitrogen contribution 20-25 kg/ha
- Yield increase is 5-15 %

Growth Promotion

A – Azospirillum Innoculated    C - Control
**Azobacter**
- Nitrogen fixation 20-25 kg/ha
- Auxins
- Vitamins
- Growth substances
- Anti-fungal antibiotics

**Application of Azospirillum and Azotobacter**
- Seed inoculation –500g-l ha
- Soil application – culture + FYM(1:25)6 months-1-2kg/ha, >6 months-2-4kg/ha
- Perennial crops-10-25g-first year, 25-50g subsequent years
- Dipping of seedling/cutting500g in 2.5 l water-dip for 20min

**Precautions**
- Dry treated seeds under shade
- Do not apply along with chemical fertilizers and plant protection chemicals
- Use recommended strains
- Use before expiry date
- Application of organic manure

**Biotic and abiotic components for enriched manure production**
- Microorganisms
- Azolla
- Green manure corps etc
- Rock dust
- Oil cakes
- Rock phosphate etc

**Potential organisms used for biological control**
- *Trichoderma*
- *Fluorescent pseudomonas*
- PGPR Mix 2
- *thuringiensis* etc.
- *Beauveria basian*
- *Verticillium lacani*
- *Bacillus*

**Botanical pesticides**
- Neem seed Kernal extract 5 %
- Neem oil - garlic 2% emulsion etc.
Organic crop production – General guidelines

1. Choice of crops and varieties - Seeds and planting materials from organic source adapted to soil and climatic conditions, resistant to pest and diseases. Genetically engineered seeds, pollen culture, transgenic plants are not allowed.

2. Conversion period - time between the start of organic management and certification - It depends on past use of land and ecological situations. Conversion period is 2 years for annual crops, 3 years for perennial crops and 1 year for pastures, meadows and their products.

3. Cropping pattern-Diversity in crop production - avoid mono cropping, follow crop rotation for annual crops, inter cropping for perennial crops, include legume in crop rotation, adopt organic method of production of all crops in the field, avoid crop belonging to the same family in the rotation

4. Mixed farming - Adopt mixed farming, maintain livestock organically, shifting cultivation is not allowed.

5. Manurial Policy - Soil fertility should be maintained or enhanced by raising green manure crops, leguminous crops, etc, incorporate crop residues, use biodegradable materials of microbial, plant or animal origin, encourage the use of on farm organic inputs and the use of synthetic or chemical fertilizers and synthetic growth regulators are not permitted.

Mineral based materials like rock phosphate, gypsum, lime etc in limited quantities, prevent the accumulation of heavy metals and other pollutants, minimize the nutrient loss by management practices, apply manures as per soil test result, maintain adequate pH levels, manures containing human excreta shall not be used.

6. Product for use in fertilizing and soil conditioning

- On farm resources are permitted like FYM, poultry manure, slurry, urine, crop residues and green manure, straw and other mulches.
- Off farm resources of restricted use like blood meal, meat meal, bone meal and feather meal without preservatives, compost made from any carbon based residues, farm yard manure, slurry, urine, fish and fish products without preservatives, biodegradable byproducts from food and textile industries without synthetic additives, sea weed and sea weed products, sewage sludge and urban compost, straw, vermicast, compost and spent mushroom and
vermiculate substances, compost from organic household reference, by products from oil palm coconut and cocoa, by products of industries, processing ingredients from organic agriculture.

- Permitted off farm products like Peat without synthetic additives (Prohibited for soil conditioning) – Permitted for manuring, saw dust and wood shavings from untreated wood, compost from plant residues. Minerals – permitted are calcified seaweed, Calcium chloride, limestone, gypsum, chalk and phosphate chalk, magnesium sulphate (Epsom salt), clay, Sodium chloride. Minerals – Restricted are basic slag, calcium and magnesium rock, mineral potassium with low chlorine content, natural phosphate (eg. Rock phosphate), pulverized rock, trace elements, wood ash from untreated wood.

7. Pest disease and weed management - Conditions for minimizing the loss due to pest, disease and weeds are balanced manuring programme, use of crops and varieties well adapted to the environment, fertile soil of high biological activity, adopt rotations, companion planting and green manures etc.

8. Pest and disease control - Prohibit the use of synthetic chemicals, use preventive cultural techniques, encourage and protect natural enemies, use products from local farm and biological origin prepared at the farm, prohibit the use of genetically engineered organisms and products and brand name products must always be evaluated.

9. Weed control - Thermic weed control, slash weeding, use mechanical weed control, weeded material as mulch, use clean equipments for organically managed areas, use of synthetic herbicides, synthetic growth regulators and synthetic dyes are prohibited.

10. Product for pest and disease control

- Permitted products - Chromatic traps, Clay, Gelatin, Mechanical traps, Light traps, Sticky traps, Plant based extracts (Azadirachta Neem oil and other neem preparations, Garlic, Pongamia etc), Pheromones – in traps and dispensers only, Homeopathic and Ayurvedic preparations, Herbal and biodynamic preparations, Plant based repellents, Soft soap, Casein, Sodium bicarbonate.

- Restricted products - Chloride of lime/Soda, Copper salt, Derris root, Diatomaceous earth, Light mineral oil, Propolis, Lecithin, Silicates, Permanganate of Potash, Plant and animal preparations, Pyrethrum cinerarifolium, Quassia amara, Quick lime, Parasite predators of insect pest, Sodium bicarbonate, Lime.
Sulphur, Sulphur, Viral, fungal and bacterial preparations, Sea weeds, Sea weed meal, Sea weed extract, Sea salt and salty water.

- Bio control agents permitted for pest and disease control - Viral Preparations, Fungal Preparations, Bacterial Preparations, Parasites, predators and sterilized insects
- Prohibited materials - Mineral powders (Stone meal, silicates), Ethyl alcohol

11. Contamination control - Measures should be taken to minimize contamination from outside and within the farm. Accumulation of heavy metals and other pollutants should be limited. Protected structures with polyethylene, polypropylene or other polycarbonates are allowed and these shall be removed from the soil after use and shall not be burned on the farmland. Prohibit polychloride based product. Relevant measures shall be taken to prevent salination of soil and water.

12. Soil and water conservation - Measures should be taken to prevent erosion, salination of soil, improper use of water and pollution of ground and surface water. Restrict the burning of crop residues. Clearing of primary forest is prohibited. A buffer zone of minimum 25 meters is to be left all around the organic farm to isolate organic plot from conventional farm. Biofencing with green manure shrubs or neem and other plant protection agents.

Constraints
- Non-availability of sufficient biomass
- Organic sources are generally slow in releasing plant nutrients
- Use of soluble salts as fertilizers are avoided in organic farming
- Concept of organic farming is generally not well understood
- Lack of information on organic farming technology
- High cost of organic inputs
- Chance for yield reduction during conversion period
- Non-availability of credit facilities.

Suggestions for improvement
- Increase the awareness and technical knowhow through intensive training programmes & demonstrations
- Supply of quality organic inputs at subsided rates and in time
- Reintroduction of mixed farming system with livestock
- Credit facilities for organic farming through banks
- Simplified organic certification procedures, reduced certification cost and encourage group certification
Increased consumer awareness on the value of organic products
Crop insurance coverage for crop loss
Promote mechanization
Promote proper procurement and marketing facilities

Conclusion
Organic farming is not a single method, but a variety of techniques which are aimed at reducing cost, preserving the environment and protecting human health by eliminating the use of toxic farm chemicals. Let us hope that organic farming will lead all farmers, and their consumers, towards a more productive, prosperous, sustainable, and healthy future.
THE ESSENTIALS OF ORGANIC FARMING REVIS(IT)ED...IN THE CONTEXT OF FAST SHIFTING PARADIGMS IN INDIAN AGRICULTURE
*Kishan Rao Parcha, Farmers Trainer, Sukshestram, Telangana

Abstract
The Indian agriculture, from the remote ancient times to this present day, has undergone many changes, small and big, in terms of vision, direction and purpose. The quintessential Indian farmer has seen it all – from hunting animals to gathering roots & tubers to domesticating the bullock to plowing-sowing rain-fed farming to assured-irrigation to chemical farming - for his sustenance and for meeting his other non-food needs. Paradoxically, the Indian farmer, on a national scale, is now producing more (food crops, cash crops and other) than needed while, at the same time, killing himself in record numbers. Added to, and because of, this irony is the ‘arrival’ of Climate Change on the global scene, whose depth and range of debilitating effects on the earth’s ecosystem is beyond the comprehension of the most brilliant minds of our contemporary society. Since Climate Change is fait accompli, prudence demands that the thinking minds focus on exploring options to ‘remediate and mitigate’ Climate Change effects. This paper looks at the practical side of some of the solutions and measures that the Indian farmer can immediately put to practice. The author of this paper is confident that the Indian farmer is capable of springing back to centre stage to steer the society away from near fatality to a sustainable, invigorating and satisfying production systems, lively hoods and appropriate life styles.

The State of Agriculture Then and Now
• From being Hunter – Gatherer
• To transform into rain-fed farming
• To tank irrigation
• To canal irrigation
• Now...precision farming
• As to selection of crops...(Then) - The priorities were:
  ➢ Meeting the food needs of humans and cattle
  ➢ Growing soil & climate compatible crops
  ➢ Self sufficiency on a sustainable basis
  ➢ The extent of land for cultivation is limited by availability of labour within the Village
• From Closed Agri-Industry Cycle to Open-Ended Industrial-Agriculture – eg. Khandsari Sugar to chemically-treated factory sugar, from weaver friendly short-staple to spinning mill-friendly long staple,
• Heavy black Soils to black cotton soils
• Cash Crops at the cost of food security
• Green revolution at the cost of soil fertility
• High yields - Quantity Vs Quality
• From intensive industrial agriculture to farmer suicides
• Record Production of Food Grains
• High population growth.
• Increasing degradation of soils.
• Increasing mineral nutrient deficiencies.
• Prevalence of health disorders.
• Fossil fuel based industrial agriculture.
• Growing aversion towards rural (Agri)Culture.
• Finally, grappling with climate change ill effects.

Any Solutions in Sight?

The Quantity and Quality of any crop depends on, and is, directly proportional to its soil quality. Seed is secondary. Soil is supreme.

• Feed the soil with maximum possible bio-mass or manures of all kinds.
• Save Compost for the Seed Bed
• Grow only those crops that are suitable for the soil and climate
• Change dietary habits and so are the crops and cropping pattern to counter climate change effects - local production and local consumption” is the norm.
• Allocate lands for production of energy, cattle fodder and vegetables
• Save every drop of water through appropriate watershed design & technologies
• Grow quality crops and convert them into processed consumables and only then sell them directly to the consumer.
  ➢ Instead of Paddy, mill it and then sell semi-polished rice.
  ➢ Instead of Raw Pulses, de-husk and process them.
  ➢ Instead of Oil Seeds, extract oil, pack and sell.
  ➢ Instead of Raw Cotton, weave and stitch cloths and then sell.
  ➢ Instead of Sugar Cane, make khandsari sugar locally.
Abstract

Small scale Indian farmers close to urban centres face an ever increasing challenge to realise a financially and ecologically sustainable livelihood from agriculture. Faced with urbanisation of lifestyles, increasing living costs and lower land yields, they have insufficient capacity to sustain an agricultural livelihood. As a result many choose, or are forced, to quit agriculture and sell off their land.

At the same time many urban consumers are increasingly worried about freshness, safety and cost of their fruit and vegetables. They are seeking solutions to address these concerns but find that limited options are available with convenient access and reasonable price.

Given this scenario, there is a tremendous opportunity to develop a new small intensive peri-urban (SIP) farming model that delivers a sustainable livelihood to farmers and at the same time benefits urban consumers.

Key features of the small intensive peri-urban (SIP) farming model:
1) Small & Intensive - needs just 1 acre of land following intensive farming practices to provide a sustainable livelihood for one farmer household
2) Fresh produce - focus on fresh fruit and vegetables to take advantage of physical proximity of farm to fork, plus higher profit margins
3) Direct supply - single value-adding intermediary to facilitate direct symbiotic relationship between farmer and consumer
4) Organic - all produce is grown using organic farming methods, and PGS certified to give assurance to the consumer
5) Closed loop - urban consumer's food waste is recycled back to the farm for compost and green energy production
6) Nutrition driven - consumers receive a regular supply of nutritionally balanced fresh produce

Key benefits for farmers and consumers of the small intensive peri-urban (SIP) farming model:
1) Farmer - higher net income by supplying high margin produce direct to the consumer, eliminating non-value adding intermediaries. Better health of the farmer's household, animals and land through organic farming practices.
2) Consumers - better knowledge of where fresh food comes from, who grows it and how it is grown. Convenient access to regular supply of safe, nutritious and reasonably priced fresh food for the family.
Economic analysis supports quantification of two key output benefits of the small intensive peri-urban (SIP) farming model for farmer and consumer as:

1) Farmer - at least Rs 200,000 (USD 3,000) net income per year
2) Consumer - access to organic produce at prices similar to non-organic
ANALYSIS OF ECOSYSTEM SERVICES, BIODIVERSITY AND LIVELIHOOD OF FOREST GARDEN FARMERS IN THREE DIFFERENT AGRO ECOSYSTEM SRI LANKA
*K.G.J.Pushpakumara, Green technology forum, No 200, Mata Road, Kamburupitiya, Sri Lanka

Abstract

Forest garden farming is the one of main traditional home garden farming system in Sri Lanka and it is human-managed tree dominant agro ecosystem that analogous in structure and ecological functions to the native forest in surround area. Forest garden system is famous as Kandiyan home garden in scientific community. Analog forestry is the silvicultural method that develop base on forest garden farming system and it is practice by many countries and it is developing as another field of applied forestry as well as system science. Forest Garden Products (FGP) certificate is the accredited organic certification system and it has developed based on IFOAM organic standards as well as fair trade standards. FGP certification system respect biodiversity, ecosystem services and system maturity and it is unique with other organic certification system.

Ecosystem Service (ES) and livelihoods are the important components of human-ecological system. These two component show strong relationship and this study amide analyzed these component individually as well their relationship. Development of analog forestry based silvicultural treatment for enhance the ecosystem services and increase system productivity of forest garden systems also was the one of major objective. Participatory action research principles were applied to the study to create future payment mechanism.

Atanwala, Owill and Kadanbewa were three villages that conduct this study. Total ecosystem approach was followed in the study and quantification was based on experimental approach in contrast with earlier value transfer method.

Biodiversity quadrant and biodiversity transect were practiced for the biodiversity survey. Formal discussion and informal interviews were conducted for socio economic study. Implicit values also were used for some ecosystem service in the valuation process. Initial field survey was practiced for designing analog forestry and it was included formation physiognomic formula of sample forest gardens. Total economic value of Atanwala US $ 535886 ha$^{-1}$yr$^{-1}$, Owilla US $ 527267 ha$^{-1}$yr$^{-1}$ and Kadanbewa US $ 503835 ha$^{-1}$yr$^{-1}$. Physiognomic formulas of forest garden in
    Atanwala-V7pV6r,V5r,V4p,V3b;R3p,R2r;B6b;P6r,P5r;L_{1-6};G1r,
    Owilla- V8bV7p,V6p,V5p,V4r,V3r,V2r;G1p;L_{1-7};C4p;R5r,R4r
    Kadenbewa - V7r,V6p,V5p,V4r,V3r;G1p;L_{1-6};C4b;P5r;P67,P5r,p4r
Simpson index of floral biodiversity indices of Atanwala - 6.1908, Owilla- 3.0077 and Kadanbewa- 4.8952.

10 % farmers practice commercial farming in Atanwala area and 60% and 40% for Owilla and Kadanbewa respectively. Dependency ratio of house hold on forest garden livelihood in three site were,. 25- Atanwala , 0.8- Owilla and 0.5 Kadanbewa

This study indicate that forest garden livelihood is rich with biodiversity and ecosystem services values and there for forest garden frames have considerable potential initiate mechanism of payment for system service.

Key Words: Forest garden, analog forestry, ecosystem services, physiognomic formula, forest garden products certificate
QUALITY BIO-INPUTS: A POTENTIAL TOOL FOR ENHANCED PRODUCTIVITY & SOIL HEALTH REJUVENATION IN ORGANIC/SUSTAINABLE AGRICULTURE

*Dr. Virender Dhingra, Director, C.E.O, Bio-Organics Solutions, 101-102 Nitika Tower-I, Azadpur Commercial complex New Delhi-110033 (India). E-mail: bioorganicsnd@gmail.com; drvkd@hotmail.com Mobile: +91-9810100469, +91-9810900469

Abstract

Beneficial soil micro-organisms (Bio-Fertilizers & Bio-Pesticides) delivers longer-lasting protection against yield-robbing fungal/bacterial diseases by creating a “halo / nimbus of protection” around the seed and root system, which aids in the development of stronger, healthier root systems thereby lead to increased crop productivity and consistently better yields. Root Health can hold the key to the ‘Next Green Revolution’. Opportunities and challenges for Microbial seed inoculants in Organic Agriculture, in particular where conventional agricultural practice cannot be used, such as organic seed protection would be discussed. Seed Bio-priming a critical tool for enhanced productivity & Soil Health Rejuvenation in Organic/Sustainable Agriculture would also be high-lighted.

Key words: Bio-priming, Root Health, Organic Seed Protection
STATE ORGANIC POLICY – ODISHA, INDIA

*Ekadashi Nandi, Former Technical Executive (organic Farming), Directorate of Horticulture, Odisha, India, Email: nandie@rediffmail.com, Mob: +91 9437412411

Abstract

Food safety and sustainability in Agriculture is the call of the hour round the world. Human existence, human progress, human happiness and human’s secure future go hand in hand with agriculture. Indiscriminate use of artificial fertilizers and pesticides in conventional agriculture since 19 sixties (green revolution – born: 1960s, died: 1980s) though has sown increase in production of cereals and oilseeds, its side effects will have to be reaped for a long time and by many generations. Deforestation to give way to cultivate the fertilizer responsive food crops, spurt in agro-industries, overconsumption of petrol and diesel, spewing of nitrous oxide to the depletion of ozone in the stratosphere, poisoning of nature’s food web, eutrophication of water bodies, erosion of biodiversity, death of the soils, extinction of so many species, surge of cancer are a few examples of the dismal story of Green Revolution. High input costs compelled farmers to go for loans for arranging inputs for cultivation. Once in debt and low production coupled with imbalanced market facility, the farmers think of either abandoning agriculture or extreme situations like suicide.

Organic Farming is the only alternative left to fight such problems aiming at sustaining household food security for majority of farmers – small and marginal holding- and evade malnutrition and poverty, Place small-scale farming at the centre of agricultural, environmental and social policies and elevate the role of smallholder farmers as agents for alleviating rural poverty and ensuring food security for all; as stewards who manage and protect natural resources; and as drivers of sustainable development. Further there is scope for export of agricultural produce. Sustainability of organic farming is now not a question but reality.

Government of India has framed policy to support State Governments. Agriculture being state subjects, Central Government issues guidelines and provide funds. State Governments implement the schemes. States also have liberty to formulate their own schemes and avail funds from central Govt. Facilitating schemes – National Project on Organic Farming, National Horticulture Mission, Rashtriya Krishi Vikas Yojna (RKVY). In the mean time eleven states have formulated their own organic policies and are harvesting the benefit from the same. State Government of Odisha has also taken initiative for adoption of organic farming in the state and has included in the State Agriculture Policy- 2008 (redefined 2013). In our state out of 60 lakh ha about 35% of cultivated area is covered with fertilizers where there is irrigation facility and in remaining 65% of area which is mainly rain fed, negligible amount of fertilizers is being used, and there is possibility for conversion to organic. But coverage under organic agriculture under
certification fluctuates from 25,000ha to 95,000ha. There is no such rule to control effectiveness of Biofertilisers and bio-pesticides and many such issues.

Hence in this “International Year of Family Farming (IYFF)-2014” we need to formulate a strong Organic Policy for the State of ODISHA with a view to form a state organic commodity board, Research and documentation, capacity building, marketing facility, bringing organic inputs under regulatory framework (FCO), bringing more and more area under organic farming.

Key words: Organic Policy - Odisha, Sustainable agriculture.
BIOMANAGEMENT OF GRAPE MEALY BUGS, MACONELLICOCCUS HIRSUTUS (GREEN) BY USING MEALY BUG DESTROYER, CRYPTOLAEMOUS MONTROUZIERI IN KOPPAL DISTRICT, KARNATAKA

*Badari Prasad P.R¹ and Kantharaju V² and Gowdar S.B³

1. Subject Matter Specialist (Entomology), Krishi Vigyan Kendra, Koppal, Karnataka state. bads2001@rediffmail.com
2. Programme Coordinator, Krishi Vigyan Kendra, Koppal, Karnataka state
3. Assistant Professor (Plant Pathology), Agriculture Extension Education Centre, Lingasugur

Abstract

Mealybugs have become an increasing threat to grapes in peninsular India causing heavy loss in the field. Both nymphs and adults suck sap from all the parts of the plant and deters the growth of the vine apart from encouraging sooty mould growth. Sooty and sticky bunches harboring mealy bugs and their white cottony wax masses are unfit for marketing as table grapes and even raisins cannot be prepared from such infested bunches.

Farmers of Koppal district are suffering a lot from the menace of grape mealybugs. So, to create awareness among the farmers about the effectiveness of Integrated Pest Management Practices, Krishi Vigyan Kendra, Koppal under University of Agricultural Sciences, Raichur has taken Front Line Demonstration in the farmer’s field. Five farmers were selected in Somasagar villege of Gangavati taluk and were provided with all the critical inputs. Half acre block of grape were selected for each demonstration. Thompson seedless is the ruling variety of the grape which is popularly cultivated. Pre evaluation of the farmers were done to know the awareness of the farmers which clearly depicted that none of the farmers were aware of Biological control measures and were completely ignorant about field sanitation. After the demo farmers came to understand the principle Prevention is better than cure in grape mealy bug management and conventional insecticides alone cannot manage the pest. It is proved by less number of colonies per vine (12.4 against 29.5 in check plot), less number of individuals per colony (8.2 against 15.2 in check) and increased yield of 27.5 t/ha as against 22.5 t/ha in check plots. B:C ratio of 1:2.4 was achieved in demo plots as against 1:1.98.

Key Words: Grapes, Mealy bugs, Bio-control

Introduction:

Mealy bugs, *Maconellicoccus hirsutus* (Green) is considered to be the most serious pest of grapes in India. It has been reported to cause serious losses in all major grape growing regions of India (Manjunath, 1985; Mani *et al*, 1987). Grape is ravaged by nearly 85 species of insect pests in India (Butani, 1979), out of which as many as 26, were recorded on grapewine
in Northern Karnataka (Balikai and Kotikal, 2003). The grape mealy bug alone is able to cause 50-100 per cent yield losses in the field (Azam, 1983). The pest is seen throughout the year and is more serious from October to March (Balikai, 1999). To manage this pest, farmers are using many chemical insecticides indiscriminately but are ineffective in reducing the pest population besides high residual content in the fruit. Since mealy bugs are covered with a powdery wax that repels water-based insecticide solutions. They also often live deep inside cracks and crevices in trees, or inside fruit or fruit bunches where they are protected from contact with insecticides. So, in order to overcome this problem and to give an environment friendly solution to the farmers, Krishi Vigyan Kendra, Koppal initiated front line demonstrations on Biological management of grape mealy bugs.

**Methodology:**

The Demonstrations were taken at Somasagar village of Gangavati taluk, Koppal district. Five farmers were selected with 0.4 ha of grape yard each. Well established ten year old grape vineyard was selected the study was conducted on Thompson Seedless variety planted at a spacing of 3 x 1 m. The crop was pruned in April and October every year and all other recommended cultural practices were followed. The crop was kept free from insecticidal applications during the period of study. Ten vines infested with mealy bugs were selected and tagged. Number of live mealy bug colonies present on each vine was recorded. The average number of colonies per vine was worked out. The farmer’s were asked to adopt bio control practices in 0.2 ha and another 0.2 ha with their regular practices.

The technology adopted is as follows:

Management practices include the following steps after forward pruning (October–April):

- Collection and proper destruction of the pruned material from mealy bug infested grape garden.

- Removal and destruction of loose bark after pruning and swabbing of stem and arms with 2 ml of dichlorvos 76 EC + 2 g of fish oil resin soap in a liter of water to expose hiding population of mealy bugs and destroy them.

- Application of sticky oil bands on arms or on main stem before appearance of mealy bugs on canes or bunches to prevent crawlers of mealy bugs reaching the bunch and also to prevent movement of ants.

- Removal of weeds and alternate host plants like *Hibiscus*, okra, custard
apple, guava etc in and nearby vineyards.

● Locating of ant colonies and destroy them. This operation can be carried out round the year.

● Release of Australian ladybird beetle adult/grub, *C. montrouzieri* @ 5,000 beetles/ha, two times in a season especially during August–September and December–January.

● Foliar spray of *Verticilium lecanii* (2×10⁸ cfu/ml) @ 5 g/l of water after 90–105 days of pruning during high humid months to reduce the population of mealy bugs.

● Foliar spray of azadirachtin 1% @ 2 ml/l or 5% @ 1 ml/l of water after 120–135 days of pruning.

The farmer’s practice was April and October pruning and indiscriminate use of systemic insecticides. Farmer’s were completely ignorant on importance of field sanitation, bio control measures and about use of botanicals which was clearly depicted during the pre evaluation.

**Results:**

Results of the demonstration were very encouraging. Farmer’s learnt the principle of “Prevention is better than cure”. The farmer’s were surprised to see the activity of Mealy bug destroyer i.e., red headed beetle, *Cryptolaemous montouzueri*. Knowledge about clean sanitation by destroying the alternate hosts and weeds was learnt by the farmers.

The observations from the demo plots clearly recorded less number of mealy bug colonies 12.4 per vine as against 29.5 in check plot and even less number of individuals per colony (8.2 individuals/colony against 15.2 in check) showing the efficiency of lady beetles in reducing the population of mealy bugs (Table 1).

Highest yield of 30.0 and lowest yield of 25.0 t/ha was recorded in demo plots. Average yield of 27.5 t/ha was obtained in demo plot as against 22.5 t/ha in check plots. Overall 22.22 per cent increase in yield was recorded in demo plots (Table 2).

B:C ratio of 1:2.4 was achieved in demo plots as against 1:1.98 in check plots (Table 2).

**Discussion:**

Management of mealy bugs is a crucial and most difficult task. Plant protection products are of limited effectiveness against mealy bugs because of their habit of hiding in crevices and the presence of waxy covering of its body. So Biological control is considered the most effective long-term solution to the mealy bug infestation because the predators are self perpetuating, persist even when the mealybug is at low population densities, and they continue to attack the mealybugs, keeping populations below economic injury levels.
C. montrouzieri is an efficient predator of P. solenopsis, which corroborates the findings of Gautam et al. (1998), Kairo et al. (2000) and Moses et al. (2002), who reported that C. montrouzieri is the best biological control agent for hibiscus mealybug, M. hirsutus. Last larval instars and adult beetles of C. montrouzieri are the most voracious feeders of mealy bugs.

References:
SUSTAINABLE LIVELIHOOD OF ORGANIC AND CONVENTIONAL FARMERS: AN ECONOMIC PERSPECTIVE  
*Md Sikandar Azam, Doctoral Fellow, Department of International Business, School of Management, Pondicherry University*

Abstract
India’s 57 per cent populace still depends on agriculture and allied activities where more than 80 per cent farmers hold less than 2 acre land (FAO) and falls under marginal and small categories. Despite numerous benefits of organic farming like environment, ecological and social, economic empowerment is one of the key challenges for the farmers to convert their farming. The highest suicide number among farmers and willingness to give up farming is still a challenge for the India. Sustainable livelihoods of the marginal and small farmers can be merely improved by strengthening their economic condition. The fieldwork was carried in the district of Nalanda state of Bihar where recently farmers has set a new world record in potato production i.e., 108.8 tonnes compare to 45 tonnes per hectares by Netherland. The primary date has been collected through questionnaire and interview consisting total 400 farmers to analyze the Cost-benefit analysis along with their socio-economic conditions. The annual cost of cultivation for organic farming figured Rs. 92,118/acre whereas, conventional figured little high i.e., Rs. 94,276/acre. The annual “Net Profit” for the same combination of crops by computing each variable through “Cost-Benefit Analysis” figured Rs 17,757/acre higher than conventional farming.

Economic condition of organic farmers has been strengthened significantly which resulted in improving their livelihood condition. Training provided by the government to the farmers resulted more self-reliant and confident individuals. The study contributes to a growing understanding among small farmers, researchers and organization working in the arena of organic moment. The study intensely interrupts the myth of conventional farmers who set to believe that organic farming can be economically viable or survive only through “Price Premium”.

Introduction
Organic agriculture includes all agricultural systems that promote the environmentally, socially and economically sound production of food and fibers. A tremendous shift in demand of organic food especially from developed countries led numerous opportunities to many developing nation. Sustainable livelihood of marginal and small farmers has been challenge for most of the agriculture dominated countries. India’s 57 per cent populace still depends on agriculture and allied activities where more than 80 per cent farmers hold less than 2 acre
(FAO) and falls under marginal and small categories. Economic stability and sustainable livelihood of marginal and small farmers has been a challenge from long back in India.

Traditional agriculture in India was a kind of non-certified organic, and almost all practices and processes in these agro-ecosystems were compatible with organic agriculture, but it has not been certified as organic. Gradually, after Green Revolution use of chemical in farming became quite common practice in India. Despite bulk move from traditional to conventional farming; still many farmers especially in remote area belonging from rural part can be identify with organic manure practice where culture of certification was never in practice. Basically, practice of organic manure was a matter of ethical and traditional values which few of them still carry. In the last few decades, increase in consciousness among the consumers has provided a different recognition to the Organic Food and gradually numerous strict mechanism developed by the leading organic movement organization to provide and assure authenticity to the consumers. However, today certification procedure by the reputed organization made convenient for the consumers to differentiate between organic and conventional foods, and gradually commercialization of organic food started.

Green Revolution and Consequences
Green Revolution of India has changed the drastically food grain production which enabled to become self-sufficient as well as surplus status. Agriculture production has been more than double compare to post green revolution period with almost similar cultivated area which figured 95 million tonnes (mt) in 1967-68 to 256 million tonnes in 2012-13. After green revolution use of chemical in farming became more frequent practices among farmers even in rural area and it is set to believe that chemical farming can produced utmost production. Hence, farmers started using more and more chemical and gradually it reaches to a situation where high use of chemical directly affected not only agricultural land but also its ultimate consumers. Various studies have been conducted so far from the science perspective which reflects how chemical farming directly affects health condition of soil, human body as well as environment and ecosystem. It has been surveyed in some part of India which revealed that gradually soil becoming unproductive due to excessive use of chemical from long back.

Sustainable Livelihood and Economic Empowerment
Despite numerous benefits like environment, ecological and social, economic empowerment is one of the key challenges for the farmers to convert their farming system and numerous. It has been reported that everyday some farmers give up their farming and around 40 per cent farmers are willingness to quit farming in India (OWSA) specially marginal and small and looking for other means to earn for their sustainable livelihood. Further, in the past decade unfortunately India recorded highest suicide in the world history by any particular community i.e., farmers community in India and still continuing which is an outcome of financial distress.
among the marginal and small farmers. Sustainable livelihood of small and marginal farmers can be improved through economic empowerment therefore, study focus on measuring profitability and cost benefit analysis of their farming. However, there is a need for comprehensive study in different location on economic viability of organic and conventional farming which will directly influence farmers if organic is profitable to convert their farming method.

**Organic Farming in Bihar**

Agriculture is the backbone of Bihar's economy that provides 81 per cent of workforce which is much higher than national average and generating nearly 42 per cent of the State Domestic Product (Agi-Dept, GOB). The gross and net sown area in the State is estimated at 80.26 and 56.38 lakh hectares respectively and major crops are paddy, wheat, pulses, maize, potato, sugarcane, oil seeds, tobacco and jute. In the process of development of organic farming and food, government with the help of various organization started movement in Bihar and played a vital role in the development of organic farming by introducing numerous mechanisms. However, gradually it became a challenge for the government as well as farmers due to limited fund availability for agriculture especially for the promotion of organic farming. The state government unable to provide subsidies to all farmers and soon faced impede in motivating conventional farmers towards organic. In early 2011, The Bihar government has launched an "organic farming promotion programme" for the cultivation of organic crops in all the districts of the state. The government has decided to develop 38 "organic grams (organic villages)" for which a sum of Rs 255 crore has been sanctioned for five years.

The early effort of the state government to promote organic farming resulted significant improvement and in February 2013, farmers from Nalanda district of Bihar set a new World Record in terms of highest production of potato i.e., 108.8 tonnes and 72.9 tonnes per hectare which was 45 tonnes per hectares by Netherland similarly in onion and paddy too, ahead of China that too through organic method of cultivation.

However, government could not utilize properly this achievement as a mechanism to promote organic farming and still majority of the small and marginal farmer even consumers are unaware about the organic farming and food.

**Review of Literature**

Ramesh et al., (2010) found that organically managed farms recorded lower productivity and yield losses but there was an overall improvement in soil quality parameters, indicating better soil health. Further study suggests that organic farming economically feasible to practice when the farmers are able to get premium price for their produce. Singh & Grower (2011) carried out a comparative study on wheat cultivation in two district of Punjab i.e., Patiala and Faridkot...
summarized that organic wheat cultivation has been found much more profitable for the growers in the study area. The net returns over variable cost have been found higher for organic than inorganic wheat for organic growers. The lower crop yield in organic wheat was well compensated by the higher price it fetched in the market. Sudheer (2012) conducted a comparative study on three crops i.e., paddy, redgram and groundnut in the state of Andhra Pradesh with 500 farmers found that organic agriculture is more profitable for farmers, in terms of costs and returns, than chemical farming. Further, improved profitability of organic farmers in the present study is despite the fact that these farmers are not reaping a premium price for their produce and sold undifferentiated in the market at ‘normal’ prices. Demiryurek & Ceyhan (2008) studied on 64 farm house in Turkey and found that Organic producers had lower costs of production and had higher income. The organic producers do not use synthetic fertilizers and pesticides, so their costs of production are relatively lower than conventional producers. Charyulu & Biswas (2010) examined that the unit cost of production is lower in organic farming in the cases of cotton and sugarcane (compared to chemical farming), whereas it is higher for paddy and wheat. Raj et al. (2004) studied in Andhra Pradesh on cotton cultivation and export oriented organic cotton production programme. Study conclude that the profitability of organic cotton was significantly higher than chemical cotton, the major contributing factor being reduced expenditure on pest control management.

From the above discussion it can be conclude that Cost of Cultivation and Production of organic and conventional farming differs with the variation in many aspects like, Geographical location, Soil condition, Types of crops, Method of cultivation, year of practicing organic method, etc, moreover, there are other indirect causes like, Use of Quality Seeds, Use of Agri-technology, Types of climate and soil, Training and experiences etc, which impact on productivity and profitability too.

Need for the Study
Majority of the farmers set to believe that production in organic farming is lesser than conventional method of farming and moreover, it is also fact that conversion from conventional to organic decreases overall production but that is during the conversion period i.e., 3 years only. However, after conversion period (3years), gradually production increases with the improvement of soil fertility and nutrition. It has been advocate that due to “Price Premium” overall profitability not productivity is more compare to the conventional farming. Therefore, Economic viability of organic farming compare to conventional farming is still debatable issue weather organic farming is profitable compare to conventional farming or not with or without price premium.
Methodology and Sample Design
This study is based on primary data collected from farmer. The fieldwork for this study was carried out during January to May 2014 in the District of Nalanda state of Bihar. The data has been collected from organic as well as conventional farmers through questionnaire and interview method and total 400 farmers have been taken into consideration, 200 each for organic and conventional farmers. To understand the socioeconomic condition of organic and conventional farmers, demographic information has been paralleled. To compute the annual profitability of their farming cost benefit analysis has been incorporated. Most of the farmers rotate crop 3-4 times in a year and major crops cultivated by the both types of farmers were vegetable like Potato, Onion, Brinjal, Ladyfinger, Cauliflower etc.

Analysis of Data
Organic and conventional data were presented in percentage, average, graph and table and to calculate annual profitability Cost Benefit Analysis has been incorporated
'Marginal Farmer' defines a farmer cultivating (as owner or tenant or share cropper) agricultural land up to 1 hectare (2.5 acres).
'Small Farmer' defines a farmer cultivating (as owner or tenant or share cropper) agricultural land of more than 1 hectare and up to 2 hectares (5 acres).
1 acre = 0.404686 Hectare = 32 Katha.
To calculate Annual Cost Benefit and profitability per acre Organic and conventional farming following variable were considered:
X = Cost of Cultivation
X = Manure/Fertilizer Cost
X2 = Pesticides/Chemical Cost
X3 = Cost of Seeds Cost
X4 = Labor (Manual) Cost
X5 = Implementation/Equipment Cost
X6 = Electricity Charge
X7 = Diesel/ Fuel Expenses
X8 = Tax to Government
X9 = Transport/Warehousing Expenses
X10= Interest on Loan
X11= Rent for Leased land
Y = Annual Received from Crops
Z = Net Profit per annum
Major findings

A. Demographic Profile and Accessibilities

Educational Qualification - From the above table it can be inferred that conventional farmers are more illiterate (20.5%) compare to Organic farmers (13%). More than 50 per cent conventional farmers are either illiterate or having only primary education whereas, 63 per cent organic farmers are either high school or more than that.
Farm Experiences - Slightly difference has been figured where more number of High Experience farmers are involve in organic compare to conventional farming.

Number of Livestock - Organic farmers are having more number of livestock compare to conventional farmers which may be due to requirement of organic manure.

Use of Vehicle - Around 50 per cent conventional farmers still depend on cycle as a means of communication whereas a significant improvement has been found in organic farmers depending more motorbike, car etc.

Electronic Accessories - More than 75 per cent organic famers having either TV or Computer where as conventional farmers figure around 50 per cent only.

Mode of transport – More than 35 per cent conventional farmers uses Cycle as a means of transportation and Van (35%) whereas, organic farmers 14 per cent and 49 per cent respectively. There is no much difference in terms of “To whom you are selling product”. However, 21 per cent organic farmers doesn’t access newspaper as well as radio whereas conventional farmers figured double of that (42%)

Training and Agricultural loan - Around 75 per cent organic farmers are trained whereas only 40 per cent got training in case of conventional farmers. Around 47 per cent organic farmers access loan facility whereas; conventional farmers figured 37 per cent.
Therefore, from the above demographic profile it can be inferred that most of the conventional farmers are underprivileged and unable to access their basic requirement whereas organic farmers are substantial better in many cases like education, use of vehicles, mode of transportation, Training, Agriculture loan etc.

<table>
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<tr>
<th>Particulars</th>
<th>Organic Farmers</th>
<th>Conventional Farmers</th>
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<tbody>
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<td></td>
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</tr>
<tr>
<td>Average Experience (10-20 yrs)</td>
<td>62</td>
<td>31.0</td>
</tr>
<tr>
<td>High Experience (More than 20 yrs)</td>
<td>84</td>
<td>42.0</td>
</tr>
<tr>
<td><strong>Number of Livestock</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - Livestock</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td>1 - Livestock</td>
<td>95</td>
<td>47.5</td>
</tr>
<tr>
<td>2 - Livestock</td>
<td>80</td>
<td>40.0</td>
</tr>
<tr>
<td>3 - Livestock</td>
<td>17</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Vehicle (Best one)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle</td>
<td>52</td>
<td>26.0</td>
</tr>
<tr>
<td>Motorbike</td>
<td>89</td>
<td>44.5</td>
</tr>
<tr>
<td>Tractor</td>
<td>37</td>
<td>18.5</td>
</tr>
<tr>
<td>Car</td>
<td>16</td>
<td>8.0</td>
</tr>
<tr>
<td>Truck</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Electronic Accessories (Best one)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Mobile</td>
<td>44</td>
<td>22.0</td>
</tr>
<tr>
<td>TV</td>
<td>88</td>
<td>44.0</td>
</tr>
<tr>
<td>Computer</td>
<td>50</td>
<td>25.0</td>
</tr>
<tr>
<td>Laptop</td>
<td>16</td>
<td>8.0</td>
</tr>
</tbody>
</table>
DESCRIPTIVE OF DEMOGRAPHIC: ORGANIC VS CONVENTIONAL FARMERS

**B. Cost Benefit Analysis and Profitability**

The Study found that around 90 per cent farmers converted their farming into organic in 2009 and gradually their socio-economic condition has changed. Organic farming creates atmosphere where concept of community farming has been grown. Community farming played a very significant role in helping out with various challenges faced by the marginal and small farmers and today farmers are very less dependent on “Manson”, and together they manage tubewell for the irrigation purpose which ultimately reduces cost of irrigation. The Government has been playing pivotal role in motivating farmers and bringing together with a concept of “Community Farming” which benefited much especially in certification (Ecocert) and irrigation (Tubewell). The Study revealed that Organic farming is more economically viable and annual profit per acre from organic farming is higher than conventional farming.

The overall annual cost of cultivation for organic farming Rs. 92,118/acre whereas, conventional farming figured little more i.e., Rs. 94276/acre. The cost of seeds and labourexpenses is slightly high in case of organic farming whereas, cost of manure and pesticide is much higher in conventional farming. Crops production of organic farming is significantly higher than conventional and organic farmers received by selling their crops per annual Rs. 14585/acre higher than conventional. Hence, annual profit for the same combination of crops by calculating each and variable through “Cost-Benefit Analysis” figured Rs 17,757/acre higher than conventional.

<table>
<thead>
<tr>
<th>Main Mode of Transport</th>
<th>Cycle</th>
<th>28</th>
<th>14.0</th>
<th>72</th>
<th>36.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rickshaw</td>
<td>40</td>
<td>20.0</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Tractor</td>
<td>34</td>
<td>17.0</td>
<td>45</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>Van</td>
<td>98</td>
<td>49.0</td>
<td>73</td>
<td>36.5</td>
</tr>
<tr>
<td>To whom selling products</td>
<td>Direct to customers</td>
<td>2</td>
<td>1.0</td>
<td>19</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Village Traders</td>
<td>64</td>
<td>32.0</td>
<td>49</td>
<td>24.5</td>
</tr>
<tr>
<td></td>
<td>City/Town Traders</td>
<td>134</td>
<td>67.0</td>
<td>132</td>
<td>66.0</td>
</tr>
<tr>
<td>Access Newspaper/Radio</td>
<td>None</td>
<td>42</td>
<td>21.0</td>
<td>82</td>
<td>41.0</td>
</tr>
<tr>
<td></td>
<td>Radio</td>
<td>12</td>
<td>6.0</td>
<td>20</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Newspaper</td>
<td>146</td>
<td>73.0</td>
<td>98</td>
<td>49.0</td>
</tr>
<tr>
<td>Agriculture Training</td>
<td>No</td>
<td>52</td>
<td>26.0</td>
<td>123</td>
<td>61.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>148</td>
<td>74.0</td>
<td>77</td>
<td>38.5</td>
</tr>
<tr>
<td>Agriculture Credit/Loan</td>
<td>No</td>
<td>107</td>
<td>53.5</td>
<td>126</td>
<td>63.0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>93</td>
<td>46.5</td>
<td>74</td>
<td>37.0</td>
</tr>
</tbody>
</table>
Farmers those who are accessing “Loan” facility have not been found much difference in their annual profit. There were 48 organic and 59 conventional farmers, who were involved in farming activities by taking “Land on Lease” and the difference in average of profit between organic and conventional figured Rs. 9140/acre due to Rs. 8617/acre more rent for “Lease Land” of organic farming. Further, 33 organic and 32 conventional farmers reported their accessibility of “Loan” as well as “Leased Land” where annual net profit figured Rs. 9294/acre more for organic than conventional farming.

<table>
<thead>
<tr>
<th>Annual Net Profit per acre</th>
<th>Number of Farmers</th>
<th>Net Profit (Amount in Rs)</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organic</td>
<td>Conventional</td>
<td>Organic</td>
</tr>
<tr>
<td>Farmers without Loan and Leased</td>
<td>63</td>
<td>67</td>
<td>146340</td>
</tr>
<tr>
<td>Farmers with Loan only</td>
<td>56</td>
<td>42</td>
<td>144534</td>
</tr>
<tr>
<td>Farmers with Leased land only</td>
<td>48</td>
<td>59</td>
<td>107940</td>
</tr>
<tr>
<td>Farmers with Loan and Leased land</td>
<td>33</td>
<td>32</td>
<td>106290</td>
</tr>
<tr>
<td><strong>Total Average Net Profit</strong></td>
<td>200</td>
<td>200</td>
<td>126276</td>
</tr>
</tbody>
</table>
COST BENEFIT ANALYSIS OF ORGANIC AND CONVENTIONAL FARMING
Annual Calculation per acre – Amount in Rupees

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Organic Farming 200 Farmers</th>
<th>Conventional Farming 200 Farmers</th>
<th>Change (OF-CF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Cost of Cultivation per Acre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manures/ Fertilizers</td>
<td>6905</td>
<td>12590</td>
<td>-5685</td>
</tr>
<tr>
<td>Pesticides/Chemicals</td>
<td>7076</td>
<td>10925</td>
<td>-3849</td>
</tr>
<tr>
<td>Cost of Seeds</td>
<td>39867</td>
<td>34395</td>
<td>5472</td>
</tr>
<tr>
<td>Labor Expenses</td>
<td>22275</td>
<td>20050</td>
<td>2225</td>
</tr>
<tr>
<td>Implements/Equipment</td>
<td>14555</td>
<td>12508</td>
<td>2047</td>
</tr>
<tr>
<td>Electricity Charge</td>
<td>500</td>
<td>371</td>
<td>129</td>
</tr>
<tr>
<td>Diesel/Fuel Expenses</td>
<td>940</td>
<td>3437</td>
<td>-2497</td>
</tr>
<tr>
<td><strong>A. Cost of Cultivation (Sum)</strong></td>
<td>92118</td>
<td>94276</td>
<td>-2158</td>
</tr>
<tr>
<td>Annual Expenses from Crops per Acre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of Cultivation (Sum of A)</td>
<td>92118</td>
<td>94276</td>
<td>-2158.5</td>
</tr>
<tr>
<td>Tax to Government</td>
<td>500</td>
<td>349</td>
<td>151</td>
</tr>
<tr>
<td>Transport/Warehousing Expenses</td>
<td>903</td>
<td>2068</td>
<td>-1164.5</td>
</tr>
<tr>
<td><strong>B. Total Expenses per Acre (Sum)</strong></td>
<td>93521</td>
<td>96693</td>
<td>-3172</td>
</tr>
<tr>
<td>C. Total Annual Received from crops</td>
<td>239860</td>
<td>225275</td>
<td>14585</td>
</tr>
<tr>
<td><strong>D. Profit before Interest &amp; Rent (C-B)</strong></td>
<td>146340</td>
<td>128583</td>
<td>17757</td>
</tr>
<tr>
<td>Less : Interest on Loan (only)*</td>
<td>1806</td>
<td>1516</td>
<td>290</td>
</tr>
<tr>
<td><strong>I. Profit after Interest (D- Interest)</strong></td>
<td>144534</td>
<td>127067</td>
<td>17467</td>
</tr>
<tr>
<td>Less : Rent for Leased Land (only)**</td>
<td>38400</td>
<td>29783</td>
<td>8617</td>
</tr>
<tr>
<td><strong>II. Profit after Rent (D- Rent)</strong></td>
<td>107940</td>
<td>98800</td>
<td>9140</td>
</tr>
<tr>
<td>Less : Interest and Rent (both)***</td>
<td>40050</td>
<td>31587</td>
<td>8463</td>
</tr>
<tr>
<td><strong>II. Profit after Interest &amp; Rent (D- Interest &amp; Rent)</strong></td>
<td>106290</td>
<td>96996</td>
<td>9294</td>
</tr>
<tr>
<td>Market Value of One Acre Land #</td>
<td>22065000</td>
<td>20040000</td>
<td>2025000</td>
</tr>
</tbody>
</table>

*Interest on Loan (only) : Organic - 56 Farmers - Rs. 259200/143.5 acre = Rs. 1806
Conventional - 42 Farmers - 211500/139.5 acre = Rs. 1516

**Rent for Leased Land (only): Organic - 48 Farmers - Rs. 1200 x 32 Katha = 38400 per acre (Fixed Rate)
Conventional - 59 Farmers - Rs. 2472000/83 acre = 29783

***Interest & Rent: Organic – Interest - 33 Farmers – Rs. 147870/89.6 acre = 1650 per acre + Rent for 33 Farmers fixed rate Rs. 1200 x 32 Katha = 38400 per acre (Total - Interest Rs. 1650 + Rent Rs. 38400 = Rs. 40050)
Conventional— Interest - 32 Farmers - Rs. 135000/102 acre = \textbf{1330} per acre + Rent for 32 Farmers - Rs. 1119500/37 acre = Rs. \textbf{30257} per acre (Total - Interest Rs. 1330 + Rent Rs. 30257 = Rs. \textbf{31587})


Discussion and Conclusion
From the study it has found that there is a significant difference in organic and conventional farming where organic method of cultivation is more profitable. During the conversion period i.e., 3 years production of organic crops decline heavily however, gradually with the improvement of soil fertility, production also increases, and the practice of crop rotation is another mechanism through which soil fertility and production can be increased in the long run. Organic farmer’s economic condition has been strengthened which resulted in improving their livelihood condition by accessing day to day requirement. Training provided by the government to the farmers resulted more self-reliant and confident individuals, to stand up for their democratic rights in the midst of the formidable power of globalized corporate agriculture. The study contributes to a growing understanding among small farmers, researchers and organization working in the arena of organic moment. The study intensely interrupt the myth of conventional farmers who set to believe that organic farming is economically viable or can survive only through “Price Premium”. Changing mindset of conventional farmers by in-depth research in various locations towards overall profitability of organic farming without price premium will certainly motivate them to convert their method of farming.

Government can play critical role in motivating the farmers towards organic farming by assuring their losses especially during the conversion period in the form of conversion compensation or subsidies. Further, government should provide advisory/expert services to deal with the crops disease, proper use of organic manure, certification issues and establish group of farmers to uplift the concept of “community farming” which reduces overall cost of cultivation too.

References


PGS AS A STRATEGIC GATEWAY FOR QUALITY ASSURANCE AND SYSTEM CONVERSION TO ORGANIC FARMING IN KERALA

*Dr. A.K Sherief, Professor & Head, Kerala Agricultural University, Training Service Scheme, College of Agriculture, Vellayani (PO), Pin 695 522, Thiruvananthapuram, Kerala
Email: aksherief@gmail.com, Mob 91 94474 29615

Abstract

Agricultural sector of Kerala is facing serious challenges because of its ever-increasing population, limited land and water availability and degradation of natural resources. The excessive use of agro-chemicals over past decades has deteriorated soil health leading to declines of crop yields and produce quality. Organic farming has emerged as a potential alternative for meeting food demand, maintaining soil fertility and increasing soil carbon pool. It can also help poor farmers to improve their income and livelihood through sustainable farming practices.

Organic producers around the world have been developing methods to guarantee the organic integrity of their products for the past two decades. Today, what are generally referred to as Third-Party Certification systems have become the dominant means of Organic Guarantee for world trade. In many countries it is seen that the number of acres under third-party organic certification is increasing quickly, while the number of certified organic farmers is hardly growing. Also it appears as small farmers are less interested in joining the organic movement than large agribusiness farms. Barriers to entry for third-party certification, including direct costs and paper work means that many of the smallest and poorest farmers (the majority to gain by joining a system of committed organic production) cannot participate, and this encumber the growth of the organic movement as a whole in India and in particular, in Kerala too.

Why PGS?
The Participatory Guarantee Scheme is recognized and promoted as the alternative method of organic farm certification by both, the Food & Agriculture Organization (FAO) of the United Nations and International Federation of Organic Farming Movements (IFOAM). It is supported by the Government of India through the National Centre of Organic Farming or NCOF. The recognized farms are permitted to use the PGS organic label and logo for their produce. Participatory Guarantee System (PGS), as a complementary method to third-party certification, is essential to the continued growth of the organic movement, especially if we want to include poorer and small farmers who have the most to benefit from organic farming. PGSs provide a credible, relevant and cost effective mechanism through which producers can
provide an organic guarantee to consumers. In short Participatory Guarantee System is a quality assurance initiative that is locally relevant, emphasize the participation of stakeholders, including producers and consumers and operate outside the frame of third party certification. This system is more appropriate to Kerala conditions. This is because majority of farming community in Kerala falls under small and marginal categories and some farms are organic by default. There are a number of farmers groups (varying from 10 to 50 in each block) engaged in group farming activities. Hence there is a great potential for a system conversion to PGS in Kerala

**What advantage it have?**
Under the PGS, organic farmers region control over the certification process and are able to produce a far more credible & effective system of quality assurance compared to third party certification systems several of which are known to be cursory, superficial, incompetent and at times corrupt.

The main advantages of PGS are

1. Simple procedure: The procedures are simple. The documents are basic. All the documents are in the language of the farmers concerned.
2. Anyone can be the inspector: One among the farmer group can become the farm inspector for that PGS group. He can be literate or illiterate person. PGS offers the option of conducting the inspection on video or oral recording of responses which can be copied on a CD for further verification.
3. Group inspection: the farm visits can conduct by the people (consumers, Inspector and farmers) who have a day – to – day knowledge or acquaintance of the farm. Since it is within the village and the farm inspectors reside in the same area.
4. PGS suits to homestead farming. The PGS is ideally suited for homesteads of small and marginal farmers who are otherwise out of the certification process.
5. Control of the Farm certification process: Farm certification is typically a participatory nature and is in the hands of the farmers themselves and not in the hands of certifiers (mostly non farmers). Therefore the low cost of certification help farmers to get benefit of the price advantage of safe food production.
6. The PGS is based on personal trust and knowledge. Hence paper work which is required when the certifier does not have personal knowledge of the farm family or farm is greatly reduced in PGS.

**How it work?**
PGS follows a very flexible but systematic method of organic certification process. It should be followed by each member in a group and first target for local markets. Subsequently the PGS
networks of farmer could be formed for further expansion of markets. In order to implement
the following steps to be taken

1. Kerala Agricultural University will establish a Regional council and affiliate to PGS council
   India. Regional council to be formed under the Directorate of Extension, KAU with a
   Nodal officer

2. Department of Agriculture (under ATMA programme), Dept of Animal Husbandry, Dept
   of Dairy Development, VFPCK, SHM-Kerala, Horticorp, KVKs, Kerala State Biodiversity
   Board and selected NGO will partner in developing a PGS for Kerala condition.

3. Training of officers on PGS in the State level, district level & block level

4. Training of group leaders/inspectors on PGS.

5. Training of groups in each panchayat/block

Kerala Agricultural University shall initiate this programme. The Quality testing of produce will
be undertaken by the Pesticide residue testing laboratory of the Kerala Agricultural University.
Training and other logistics for implementation will be initiated through the Directorate of
Extension, KAU for a period of three years. The project is to be support through ATMA
programme.
FARM – ENTERPRISES THROUGH PRIVATE – COMMUNITY PARTNERSHIP PROGRAM

*V.C.A. Jayachandran, Farmer, Pondicherry

Abstract
This paper presents a novel business concept aimed for promoting archetypal farm enterprises featuring multiunit farm-cum-residential complex. The business will be conveyed by Professional Farm Land Developers who will play a role as “Turnkey Service Providers.

The farm complex will be owned and operated by a body of federally united stakeholders. Entitlements on the proposed farm complex will be based on a unique type of structured ownership termed as "Private - Community Partnership (PCP) Title Scheme". The scheme permits individual and community ownership to co-exist on a same platform extending a synergistic support to each other. Similar type of title instrument is found in condominium housing projects/gated communities.

The farm complex is essentially a product of five key components combined by design strategy and process. The components are:

# PCP titles scheme essentially involves two elements:
   * A portion of farm land which will be exclusively owned by the stake holder
   * Community land which will be owned by all scheme members as undivided shares

# Land architecture involves plan and design of the proposed parcel of land which will be bifurcated into private and community land. Private land will comprise multiple independent units of farm land. Community land will carry basic farm infrastructure such as road access, fencing, wind breaks, internal water sourcing system, power, threshing/drying grounds, warehouse, farm machinery/equipments logistics and etc. The role of the landscape designer is to create a nexus of art, science and technology in conformance with ecological design principles.

# Community corporate is an associational body of stake holders, a legal entity that owns and controls the common property including farm infrastructure. By and large it will serve as a supporting agent for the functioning of the scheme.

# Consortium agreement is a mutual agreement made by the scheme members for conducting their operations in a defined manner/code of practice such as
   * creating a living soil
   * preserving environment
* maintaining crop biodiversity
* living in harmony with all life forms

# Developers are committed to deliver a customized business solution for each farm complex by creating a conductive environment, based on the potentiality of the proposed farm land, interests and needs of the concerned stakeholders and the market access of the farm produce.

The concept enables farming to be practiced on a more organized and controlled environment. It will also provide the farming community with an integrated support system thereby enhancing the lifestyle and promoting economic prosperity of the acting stakeholders, and at the same time keeping in line with organic farming principles.
With best compliments from:
NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT
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Promotion of sustainable and equitable agriculture and rural development through effective credit support, related services, institution development and other innovative initiatives.

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Credit Functions: Refinance for production credit (Short Term) and investment credit (Medium and Long Term) to eligible Banks and financing institutions
Development Functions: To reinforce the credit functions and make credit more productive, development activities are being undertaken through
- Research and Development Fund (R&D Fund)
- Micro Finance Development and Equity Fund (MFDEF)
- Financial Inclusion Fund (FIF)
- Financial Inclusion Technology Fund (FITF)
- Farm Innovation and Promotion Fund (FIPF)
- Farmers’ Technology Transfer Fund (FTTF)
- Watershed Development Fund (WDF)
- Rural Infrastructure Development Fund (RIDF)/Warehousing Infrastructure Fund (WIF)
- Tribal Development Fund (TFD)
- Umbrella Programme for Natural Resource Management (UPNRM)
- Cooperative Development Fund (CDF)
- Producers Organisations Development Fund (PODF)
- Non Farm Sector Promotional Fund

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International Competence Centre for Organic Agriculture

ICCOA is a knowledge and Learning centre for all facets of Organic Agriculture. An excellent provider of information services, advice and market linkages to everyone involved in organic agriculture.

Currently ICCOA is managing Organic Farming cluster projects in twelve states namely Karnataka, Tamil Nadu, Meghalaya, Chhattisgarh, Kerala, Nagaland, Assam, Arunachal Pradesh, Sikkim, Himachal Pradesh, Haryana and Jammu & Kashmir

BOUQUET OF SERVICES

PROJECTS AND CONSULTANCY
- Organic Adoption & Certification Projects in 8 Indian states
- Developing Market Linkages for the Organic Produce
- Certificate course module on Organic Agriculture
- Developing best practices in Organic Agriculture
- Capacity building programs
- Database management
- Market research

EVENTS AND TRADE FAIRS
- BioFach India
- Organic Food Festivals
- International Exposure Programs
- International Seminars/Conferences

MISSION of ICCOA
To help build the competence of individuals and organizations of the South Asian region in organic agriculture and thereby contribute to building ecologically, economically and socially sustainable agriculture and organic business.

VISION of ICCOA
ICCOA aims at becoming a Knowledge and Learning Centre for all facets of organic agriculture. An excellent provider of information services, advice and market linkages to everyone involved in organic agriculture.

International Competence Centre For Organic Agriculture
58/3,39/A Cross,11th Main,4th T block, Jayanagar,Bangalore-560041
Tel-080-26641152,53, Fax-080-26641154
Email: info@iccoa.org, Web: www.iccoa.org