25 MSSRF
Harnessing Science for Sustainable Development

BIOVILLAGES

Transforming Lives and Livelihoods

BIOVILLAGES

Transforming Lives and Livelihoods

M S Swaminathan Research Foundation

Third Cross Street, Taramani Institutional Area, Chennai - 600 113

Tel.: +91 44 2254 2790 / 2254 1229 / 2254 1698

Fax: +91 44 2254 1319

E-mail: executivedirector@mssrf.res.in | Web: www.mssrf.org

Published by
M S Swaminathan Research Foundation
Third Cross Street, Taramani Institutional Area, Chennai - 600 113
Tel.: +91 44 2254 2790 / 2254 1229 / 2254 1698
Fax: +91 44 2254 1319
E-mail: executivedirector@mssrf.res.in | Web: www.mssrf.org

Developed and designed by
ADCS (Academic and Development Communication Services)
17/12, Venkittarathinam Nagar Extn
Second Street, Adyar, Chennai – 600 020
Web: www.adcs.in | E-mail: eashwar@adcs.in

Printed at
Jayabalu Printers
New No. 115, Old No. 47/2, Kodambakkam Road
Mettupalayam, Chennai – 600 033

CONTENTS

PREFACE

In order to get guidance on research priorities and strategies, MSSRF from its very inception started organising annually multi-disciplinary dialogues. These dialogues had the generic title, 'New Technologies: Reaching the Unreached'. An early dialogue organised in 1991 was in the field of biotechnology. This dialogue gave birth to the concept of Biovillage, which implies adoption of a human-centred development pathway involving a pro-nature, pro-poor, pro-women, and pro-livelihood orientation to technology development and dissemination. Thanks to an invitation from Dr Har Swarup Singh, the then Lt Governor of Puducherry, the Biovillage Programme was initiated in three villages of Puducherry in 1992. At the same time, the Biovillage model of human-centred development was replicated in the Peoples' Republic of China in association with the Chinese Academy of Sciences. The description of Qianxian Biovillage is given in the publication, *Biotechnology in Agriculture: A Dialogue* (1991), edited by M S Swaminathan, Macmillan India Limited, 367 pp.

The major aim of the Biovillage model of sustainable development is to ensure that every one in the village has an opportunity to earn his/her daily bread. Conservation and enhancement of common property resources such as land, water, and biodiversity, together with efforts to improve the productivity and profitability of small farms and the generation of new opportunities for market-driven non-farm livelihoods, are the pathways for achieving the principal goal of the biovillage, viz., a happy and healthy rural society. The programme is now 20-years old and it is community-managed and -driven. This publication brings out the progress made in spreading the message and methods of human-centred development. Biovillage leads to biohappiness when natural resources are converted into jobs and income in an environmentally sustainable and socially equitable basis. The criteria for designating a village as a biovillage are given at the end. An important

aim of this model of development has been the conversion of ordinary individuals into extraordinary human beings who have mastered the art and science of environmentally sustainable and socially inclusive development. Ultimately, we should strive for converting every village into a biovillage. I hope this publication will be of help in this process.

I would like record our gratitude to the late Dr K N Shyamasundaran Nair, Trustee of MSSRF, and to Dr R S Shanthakumar Hopper, Director, Ecotechnology, MSSRF, for their significant contributions to the development of the Biovillage model of rural prosperity.

Chennai
August 2013

Prof. M S Swaminathan
Founder Chairman
M S Swaminathan Research Foundation

ACKNOWLEDGEMENTS

The Biovillage Programme completed 20 years of its eventful journey. In the course of these two decades, the Programme has touched and transformed many lives for the better, especially the poor and the marginalised, in 50 villages of Puducherry.

The M S Swaminathan Research Foundation (MSSRF) firmly believes that it would not have been possible to effect this visible and tangible transformation without the wholehearted support of several organizations. The Foundation is deeply indebted and thankful to the following organisations in particular:

- Asia Initiatives, Tokyo, Singapore, Australia, and USA
- Asian Development Bank
- Government of Puducherry
- Government of Tamil Nadu
- Hunger Project of Japan and India
- Indian Council of Agriculture Research, NICRA Programme
- International Fund for Agricultural Development
- Jamsetji Tata Trust
- Lead Financial Institutions
- OCP Foundation, Morocco
- Pratiksha Trust
- United Nations Development Programme, New Delhi, India

The Foundation is also thankful to the members of the Biovillage Council and the communities for their active support and partnership.

As this publication marks an important milestone in the journey of the Biovillage Programme, the Foundation and the members of the Biovillage Council fondly remember and acknowledge the sincere and dedicated efforts of the past and present staff of MSSRF involved in this journey.

We are grateful to our Chairperson, Dr. Madhura Swaminathan for her constant guidance and encouragement and to Dr. Ajay Parida, Executive Director for his support and help in developing this document.

The journey of Biovillages certainly does not end here. The challenges of creating many more Biovillages and transforming many more lives push MSSRF to work even harder in the years to come. With all humility, the Foundation and its staff accept these challenges.

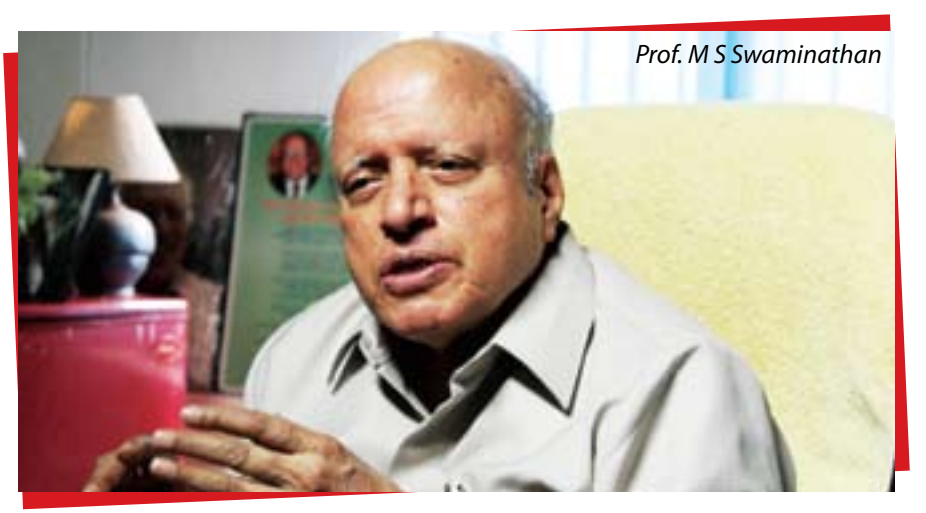
CHAPTER 1

Introduction

BIOVILLAGE: THE GENESIS

The story of transforming the lives of poor women in the villages around Puducherry can be traced back to the growing concern Prof. M. S. Swaminathan felt about the widening disparity between the *haves* and the *have-nots* in rural areas. While the resource-rich farmers were able to benefit from the Green Revolution and become richer, the small and marginal farmers and the landless labourers increasingly found themselves pushed to the deep end. The small and marginal farmers were unable to access and afford the technological advancements that were changing the face of farming. Landless labourers had short periods of farm work followed by long periods of joblessness when meeting the basic requirements of living itself was becoming a challenge.

On the other hand, biotechnology, ecotechnology, and information technology were growing by leaps and bounds. In 1991, Prof. Swaminathan expressed his concern about the growing chasm during an interdisciplinary dialogue, 'New Technologies: Reaching the Unreached', with focus on Biotechnology in Agriculture. His vision was to facilitate the transfer of knowledge to the poor, especially the women, in the rural areas by identifying, internalising, innovating, and implementing relevant technologies that would enhance their economic status.



Prof. M S Swaminathan

The poor have no assets, no education, and no skills. Just giving them money would be of no use. What is more important is asset building through value adding to their time, labour, knowledge, and skills so that they can make lasting changes in their lives, explains Prof. Swaminathan, recollecting the basis on which the Biovillage concept was founded.

BIOVILLAGE CONCEPT

Biovillage is a pro-nature, pro-poor, pro-women and pro-jobs development paradigm that seeks sustainable agricultural and rural development by concurrently attempting to mitigate the twin concerns of the present times, namely the creeping degradation of the resource base and the persistence of rural poverty, through technologies that are ecologically compatible, energy efficient, economically viable, socially equitable, and employment generating.

Biovillages aim to bring transformational technologies to villages for sustainable transformation of lives and livelihoods of the resource-poor communities, without endangering their long-term production potential.

The name 'Biovillage' denotes human-centred development, where the health and happiness of rural families is the goal of development. It involves partnerships between scientists and rural families in imparting a pro-nature, pro-poor, pro-woman, and pro-livelihood orientation to technology development and dissemination.

The resource-poor, landless labourers, and marginal and small farmers (particularly women) are the main partners of this project.

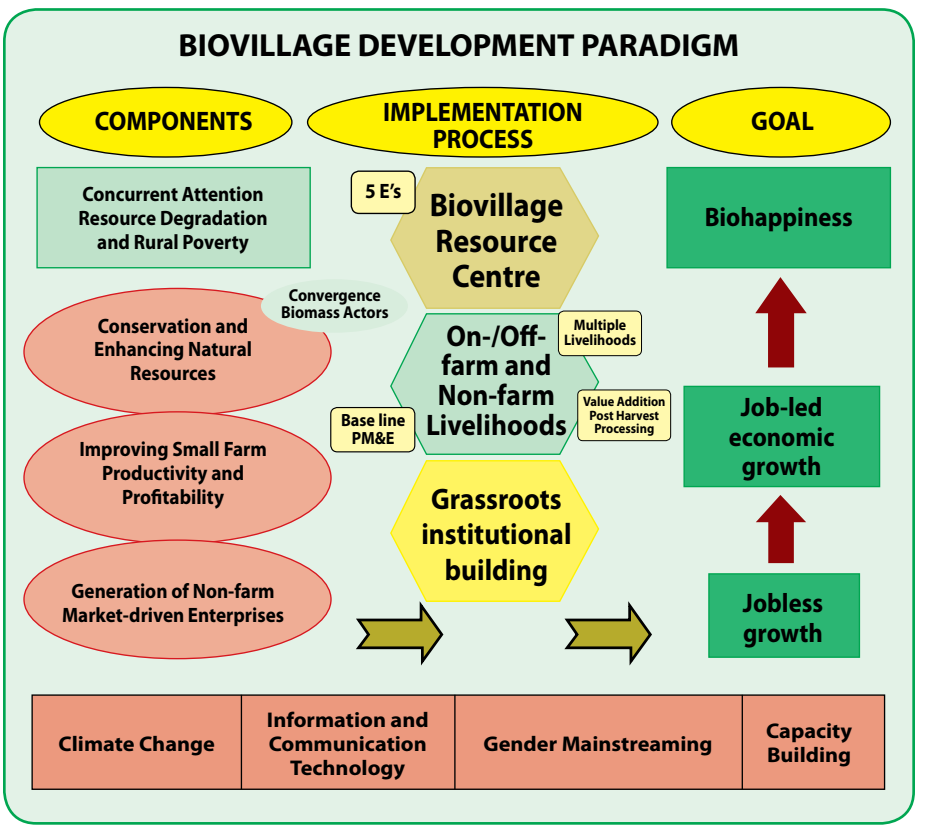
- **Pro-nature** orientation is reflected by ensuring the sustainability of productivity of bio-physical resource base and employing environmentally compatible interventions.
- **Pro-poor** orientation is achieved by employing interventions that improve the livelihood security of the resource-poor,

through empowering them with technology and skills, to enhance access to income and employment.

- **Pro-women** orientation is ensured through empowering women with skills and access to income and reducing the drudgery of work at home and outside. Reduction in the number of hours of work and adding economic value to each hour of work is the means to this end.

Prof. Swaminathan puts the thought process behind the Biovillage concept thus:

1. Every village has local, common property. Biovillage would mobilise the local people to not only protect but also enhance the ecological endowment of their village while creating enterprises and jobs around it.



2. Increase income of small farmers by introducing multi-crop farming and livestock, reducing risk associated with mono cropping.
3. Introduce new on-farm and non-farm skills to marginalised women, landless labourers so that they can create value-added, market-driven products based on opportunities in the area.

The vision was to graduate the villagers to **'Biohappiness'**, defining it as sustainable and equitable use of natural resources.

TAKING OFF

The vision presented by Prof. Swaminathan was immediately applauded and endorsed by some of the participants of the *Interdisciplinary Dialogue*. The then Lieutenant Governor of Puducherry, – invited MSSRF to begin the pilot project in Puducherry in 1991. The Chinese delegates who were present at the *Dialogue* welcomed the idea of starting Biovillages in China, and the pilot project began in these two places. The Asian Development Bank (ADB) offered to provide financial support for testing and feasibility study.

MSSRF selected three villages in Puducherry (Pillayarkuppam, Sivaranthagam, and Kizhur) for the pilot following a baseline survey.

Chinese delegates visiting Biovillages

1991: Prof. M S Swaminathan and colleagues at Gloria Farm, Pilliyarkuppam village

Each of these was selected to explore specific solutions that would benefit the village poor depending on the available resources.

The International Fund for Agricultural Development (IFAD) and Hunger Project, Japan and India, supported the testing of potential technologies simultaneously.

A special action programme was implemented during 1993–95 with support from IFAD.

A snapshot of the rural scene in Puducherry in the 1990s looks thus:

- Predominant paddy (three crops a year) and sugarcane cultivation, affecting the soil health as well as limiting revenue sources for the farmer.
- Unaware of new technologies, the farmers were practising cultivation through unsustainable, traditional agriculture practices. Examples of such practices include sowing almost 50 kg of paddy seeds per acre to improve yield; indiscriminate and excessive use of fertilisers and pesticides, leading to poor soil health and degradation; and over-exploitation of ground water, affecting profitability. All these made farming unattractive and economically unviable.

- Agricultural labourers had only seasonal employment as cropping was largely limited to one season. The rest of the year, especially during the monsoon period (about three months), they struggled to make ends meet. There was no 100 days employment scheme at the time.
- The women were unorganised, had low levels of participation in economic activities, were vulnerable to money lenders and suppressed. They were not able to voice their demands and had no linkages with banks and government agencies. They had no knowledge of their entitlements and rights.

The Biovillage model of rural development was thus designed to address some of these issues at the micro level.

MSSRF came up with solutions for each of these problems that would empower the poor labourers and the farmers to improve their livelihoods and enhance and replenish the natural resources.

Participatory Disaggregated Matrix: Gender / Landholding

Interventions	Participants
On farm	
Participatory varietal selection trials	Big farmer/Small farmer
Seed production - paddy, pulses	Small farmer women / Marginal farmer women
SRI technologies - paddy	Small farmer / Marginal farmer women and men
Dryland horticulture	Small farmer / Marginal farmer women
Farm ponds	Small farmer / Marginal farmer
Tank rehabilitation	Small farmer / Marginal farmer / Landless women
Nutrition gardens / Flower production	Small farmer / Marginal farmer

Contd...

Contd...

Interventions	Participants
Off/Non-farm	
1 Mushroom production / Vermicomposting	Marginal farmer women / Landless women
2 Leaf plate-making	
3 Coir rope-making	
4 Terracotta making	
5 Dairy / Goat / Backyard poultry	
6 Tailoring	

The solutions broadly fell under the following categories:

1. Integrated resource management – to look at the local conditions and technologies to conserve and enhance natural resources
2. Multiple livelihood opportunities – for small farmers as well as landless labourers, spreading the risks
3. Support services – through the Biocentre that would facilitate information, knowledge, and technology transfer.

The Journey...

From the first three pilot villages in 1991, by the end of the decade, the MSSRF Biovillage concept had spread to 19 villages in Puducherry, and by 2012, to 50 villages. The interventions on the farm front included testing and demonstration of new technologies (LEISA [Low External Input Sustainable Agriculture] through integrated crop management practices) on horticulture, floriculture, and crop varieties. The knowledge management was through organising Farmers Field Schools (FFS) and Training of Trainers (ToTs) as well as through using various information and communication technology (ICT) tools.

Biovillage has also introduced several off-farm activities such as dairy farming. Integration of livestock and poultry into the farming system was done through dairy technologies and sheep and goat

rearing. With PONLAIT (Puducherry Cooperative Milk Producers' Union Ltd) needing milk in large quantities and setting up collection centres in all villages, the dairy industry got a major boost. This created a demand for fodder for the cross-breed cow, which cannot be allowed to graze indiscriminately. The MSSRF introduced hybrid grass and legume fodder varieties that have caught the imagination of the people of the village, with even the landless farmers growing fodder grass in whatever area available. This has become a business in its own right due to the high demand.

Along with various government departments working in the rural areas, Biovillage also introduced non-farm businesses in the villages. Primarily targeted at the landless labourers, especially the women, new skills were imparted to them to enhance their income generating capabilities.

Along with the growth in the Biovillage movement, women's self-help groups (SHGs) also became strengthened over the years. This characterised the growth phase of the Biovillage project in the first decade of the 21st century. During this time, the number of women members increased to 4500 under 350 SHGs.

As the reach of the project increased, so did the need for a centre that would be the hub and a facilitator. Although this was envisaged at the beginning of the Biovillage Programme, the Centre became a reality only in 1999. The Biocentre was set up in Pillayarkuppam on one hectare of land leased from the Government of Puducherry.

Biocentre: the Biovillage Resource Centre

The Biovillage Resource Centre (BVRC) or the Biocentre is the hub of the Biovillage Programme. Developed as a single-window centre, the BVRC addresses the specific needs and aspirations of the rural communities of these villages. The Biocentre has fulfilled that role by becoming the central office of the Biovillage movement and there

is a regular inflow of stakeholders to acquire technical know-how and the necessary inputs in the area of the Biovillage components.

The main components of the BVRC are listed below.

1. **Technology research, assessment, and pilot demonstrations:** Natural resources management and on-farm, off-farm, and non-farm technology-enhancing interventions are the key components. The BVRC is the focal point for development and demystification of technologies, testing and demonstration of new crop varieties and hybrids, integrated and intensive cropping and management systems and pilot-scale demonstration of viable micro enterprises.
2. **Training:** Trainings on micro-enterprises, micro-credit, and crop management are imparted to rural communities, NGOs and institutions.
3. **Knowledge management:** Through the Village Knowledge Centre on Sustainable Food Security, on-farm and off-farm technologies, market price intelligence, meteorological information and entitlements are disseminated to the resource-poor, through the use of ICT tools.
4. **Service centre:** Service facilities such as timely availability of quality seeds, custom hire of farm implements, input supply management, animal health-care centre, bio-control agents, and poultry feed production, spawn and mushroom production and processing are provided.

The BVRC is peopled by MSSRF employees who have a background in social work and rural development, and they work closely with the people. This has enabled a close bonding between the Biocentre and the Biovillage beneficiaries, resulting in truly transformational changes happening at multiple levels in the villages they are present. This has also enabled them to not only introduce training in skills relevant to the people but also work closely with them to encourage them to benefit from the various welfare schemes announced by the government.

Prof. M S Swaminathan; Ms Sathiyavathi, Chief Secretary, Government of Puducherry; Dr Madhura Swaminathan; Dr Ajay Parida; and HLPE international participants – November 2012

The BVRC, which suffered damages as a result of cyclone Thane in December 2011, has now been rehabilitated and has become fully operational. It hosted a stakeholders' consultative meeting with a high-level panel of experts (HLPE) chaired by Prof. M S Swaminathan on food security and nutrition in November 2012.

The next chapter takes a closer look at how the Biovillage has intervened and improved the lives of the people.

CHAPTER 2

Identifying, Internalising, Innovating, and Implementing Relevant Technologies

Kathanayagi from Sivaranthakam Village was a housewife, and content in that role. A landless labourer living below the poverty line, her family survived on the income her husband got from the mill he worked in. Then she was introduced to Biovillage in 1992 when along with 10 others she underwent training in oyster mushroom cultivation.

Kathanayagi

The reason for introducing oyster mushrooms was that they can be grown in easily controlled conditions and needs only paddy straw, which was available in abundance in Puducherry villages back then. The Biocentre produced the spawns, which were sold to the villagers to grow mushrooms. It was not a very popular form of mushroom in those days, but highly nutritious. So by growing oyster mushrooms, a family could ensure better nutrition as well as earn a little by selling it in the market.

In the traditional way of mushroom cultivation, i.e., the rack system, the production was not high. Moreover, rats ate away the spawn,

reducing Kathanayagi's income to less than Rs 1000/- a month. The mushroom growers went to local exhibitions and set up stalls to create awareness about the nutritional advantages of this mushroom. They showed the various dishes possible from this mushroom – the popular ones being mushroom 'bajjis' and soup.

Slowly the demand increased and by 2000, she saw as much as Rs 750/- in profit for an investment of Rs 1000/-. But over the years, Kathanayagi and her husband, who helped her in the cultivation, realised that the traditional rack system was not enough; they experimented and created a rope-based tier system (URI system). The rope-based tier system gave good yield and they have now transferred their experience and knowledge back to the Centre. Kathanayagi is also a master trainer for mushroom cultivation, training more than 200 poor women in mushroom production.

This is one of the telling examples of how the Biovillage and its members believe in identifying, internalising, innovating, and implementing technologies that have a market.

■ ■ ■

Example of demystification of Oyster mushroom technology in consultation and demonstrated by landless women

Technology modification process	Benefits
Spawn production - Replacing used saline glass bottles with sterilisable plastic covers	Contributed in cost efficiency, easy transportation and no breakages, bulk quantity transported and easy to handle. More spawn produced per cycle due to increased space in autoclave for sterilisation.
Replacing sorghum with paddy chaff	The substrate to grow spawn is sorghum grains and is expensive (Rs 25/kg). Paddy chaff is available freely or by paying a minimum cost of Rs 2/kg.

Contd...

Contd...

Technology modification process	Benefits
Low-cost construction of production units	Apportioning a part of their huts or pucca houses for mushroom production or constructing low-roof thatched huts with available resource materials.
Rack to 'URI system' of production	Internalisation/integration: The two-tier wooden rack system attracted rats, eating away the spawn and damaging the production units. Hence, only limited mushroom production bags can be arranged. The URI system doubles the quantity of mushroom production bags as well as the quantity produced and income.
Replacing rat cake with palmyra thorns (Traditional)	Rat cake to kill rats is costly, harmful to livestock and human beings. The landless women tried thorns of palmyra leaves and were successful as they were cost-effective and safe.
Maintaining required humidity: low-cost watering technology	Filling the floor of the hut with river sand and wetting it periodically, putting wet gunny bags around the huts and using low-cost water cans such as empty talcum powder cans and paint tins with holes.
Marketing: multichannel	Instead of marketing the produce with only one agency, local sales was encouraged and also different vendors were contracted. This move kept the demand high with good profits.
Part of small integrated system: mushroom waste converted to vermicompost and used for high-value crops; nutrition gardens; sales and income; and nutrition security	Risk diversification: Spreading the risk through multiple supplementary enterprises. Using the shed for other purposes during lean periods of production.

BIOVILLAGE: THE KEY INGREDIENTS

The mission of the Biovillage Programme is to improve the quality of human life within the carrying capacity of the ecosystem. The approach is designed to trigger a mass movement of

ecotechnologies. The term 'ecotechnology' symbolises the addition of sustainability concerns to technology development and dissemination, which would eventually achieve the triple goals of higher productivity, income, and employment with the participating rural families themselves becoming the engines of economic development.

The above is achieved through technological empowerment, which is an integrated process consisting of six steps, as listed below.

1. Identify local needs and resources through a baseline survey. (The non-negotiables are environment-friendly, economically viable, socially acceptable, and equitable energy-efficient, employment generation technologies and interventions.)
2. Adapt them not only to the biophysical conditions, but also to the specific socio-economic conditions, especially tailoring the scale of operation to resource access and management skills; internalisation through training and skill impartation.
3. Translate the technology into production and employment generation activities by providing access to micro credit.
4. Facilitate production through support services and access to infrastructure.
5. Foster group action to (a) bring about cost-effectiveness in the use of infrastructure and support services, (b) facilitate easy access to institutional credit, (c) ensure sustainable management and access to usufruct rights of the common property resources, and (d) promote the environment that facilitates total human development.
6. Provide access to the resource-poor a basket of income and employment opportunities and facilitate the choice consistent with resource availability, skill attainments, and management capabilities of the participants.

In the first few years, there was a strong focus on implementing the principles of Biovillage such as on-farm, off-farm, and non-farm

Number of members engaged in the various income generating activities

Sector	No. of members involved
On farm	
Agriculture	235
Fodder	420
Vermicompost	12
Vegetable cultivation	65
Floriculture	36
Off farm	
Dairy	984
Goatry	136
Poultry	18
Mushroom	2
Coir rope	48
Coconut leaf	12

Sector	No. of members involved
Non farm	
Tailoring	117
Terracotta	2
Grocery shop	23
Saree sales	36
Fancy and beauty	12
Home care	18
Idly shop	14
Arecanut plate	2
Sanitary napkin	4
Pottery	12
Laundry	32
Tuition	12
Electrical work and, Cable TV	16
Pvt. company	295
Housewife	282
Total	**3157**

activities, based on the available resources for the poor and the very poor. The Centre introduced new enterprises and provided training. In some cases, it even created the demand. Though the ventures may not have flourished under the Biovillage project itself, they have spread to other villages and started doing well.

On-farm activities

Rice production

One of the important interventions in the integrated natural resource management was Integrated Crop Management (ICM).

Paddy cultivation was demonstrated by using ICM package of practices. Presently, about 350 farmers are involved in the System of Rice Intensification (SRI). Farmers are taken for exposure visits to agriculture universities to enhance their knowledge.

Biovillage introduced crop rotation and multi-crop cultivation, thus naturally replenishing the soil nutrients. It encouraged soil testing among farmers (soil health card) so that only appropriate quantities of fertilisers would be used.

The Biovillage Programme also demonstrated new technologies such as for hybrid rice cultivation; using drum seeder for enhanced yields of rice; *Azolla* biofertiliser for reducing the application of chemical fertiliser; for weed control; for preventing evapo-transpiration; leaf colour chart for fertiliser recommendations; fuel-efficient stoves; paddy seed dryer; and hybrid vegetable cultivation. Paddy seed production was one of the major activities in collaboration with the Department of Agriculture, Puducherry.

Biovillage has its own research scientists and they worked closely with the Department of Agriculture and Krishi Vigyan Kendra, Puducherry, to bring in technologies and implement them at the ground level.

Tamizhmani from Pillayarkuppam, a village in Puducherry, is all smiles today. What comes across strongly are her confidence and joy at having lived her life to her liking. And for this, she is completely grateful to M S Swaminathan Research Foundation's (MSSRF's) Biovillage Programme. It came at a time when she was raring to make a change to their lifestyle and attitudes but did not know how to.

Tamizhmani, for instance, has benefitted from the implementation of these technologies. She has seen a remarkable improvement in the production in her farm: from 2000 kg of paddy in 1.25 acres to 4000 kg.

Belonging to a family of farmers, she did not cringe from hard work. Yet, it did not give her the financial freedom that would help her give her four children a comfortable life. Depending mainly on paddy, the seasonal nature of the produce and the heavy input costs made very little economic sense in continuing with rice cultivation. And then, Tamizhmani had other ambitions too. She wanted to educate her daughters well. But, she did not know how. She had herself studied till class 10 and her eldest daughter had also completed class 10 in a local school. As is the wont in the village, the eldest daughter had been married off. To study further, children had to be sent to far-away schools in the city. Without guidance, Tamizhmani was lost.

At such a time, in 1991, MSSRF was implementing its Biovillage Programme as pilot in three villages in Puducherry. The Programme had identified her farm along with others in the village to implement its concepts. Tamizhmani was introduced to vegetable and flower gardens, which she took to like fish to water. From here began a journey that would last for more than two decades. Tamizhmani and

Tamizhmani

her family's lives changed for the better, making her dreams come true one by one.

The vegetable garden enabled them to get ready cash on a daily basis – almost Rs 200 a day – improving the family's economic status and meeting daily expenses. She started breeding a cross-breed cow, and as fodder was not easily available, started fodder farming as well. 'Today, everybody in Pillayarkuppam started to grow hybrid fodder grass after seeing me', she says proudly.

An innovation she introduced in her farm for paddy crops, with guidance from the Biovillage, was planting single seedling, in a methodology called SRI (System of Rice Intensification) for better

Contd...

growth and productivity. This brought down the seed requirement, thus reducing costs and improving farm produce and profitablity dramatically.

While profitability and better produce have been the direct by-products of the intervention by MSSRF, what she is proud of is that she was able to educate her daughters as much as her son.

Such a transformation in thinking has happened in one generation, within 10–15 years of being incepted.

Tamizhmani's transformation does not stop here. While their economic and social status has improved, she has also felt the effects of the transformation at a personal level. Gone are the days of hesitation and accepting without questioning. Being associated with the Biovillage has given her the courage to question wrongs and be a leader. She formed 22 self-help groups (SHGs) in the village. Why, she even contested and was elected to the cooperative society for dairy in 2001, and stood for village Panchayat election held in recent years though she lost there.

Tamizhmani's story is not an isolated instance in the Biovillage story. As we travel through the 50 villages that it covered in the last 20 years, one can see the impact it has created in about 3000 women who not only question wrongs, but also stand as beacons leading others by example.

■ ■ ■

As Mr Ramamurthy, Department of Agriculture, Puducherry, pointed out, 'The advantage of MSSRF is its comprehensive approach, looking at the needs of individual households where the needs are diverse and go beyond just farming. It also has the

scientists/social workers needed to work with the farmers at the ground level and take the programmes to the people through appropriate training.'

Introducing high-yielding hybrids also benefitted the farmers, who formed Farmer Field Schools (FFS). In FFS, the farmers are encourage to make decisions regarding their own farms. The FFS also facilitated peer group learnings, exchange of ideas, problem sharing, and training in new methodologies. Organic methods of cultivation and development of vermicompost were envisaged. While the villagers did most of the steps needed for organic farming, they sometimes ended up spraying chemicals towards harvest time as they believed it made the crop look green and fresh. Meaningful intervention and constant monitoring by the Centre over a period of time helped stopping farmers from the practice of using non-organic methods completely. As for vermicompost, it needed space and time, which many farmers did not have. However, the mushroom growers were able to demonstrate vermicomposting as an additional source of income.

Other developments in the decade of 2000 such as rapid urbanisation and selling or leasing of farmlands for non-agricultural purposes also saw a reduction in on-farm activities. However, the initial farmers continue to look up to the Biocentre for solutions to their problems. The turnaround for on-farm activities happened in 2010 when MSSRF and the Indian Council for Agriculture Research (ICAR) jointly took up a project to study the impact of climate change on farming, develop climate-smart agriculture, and devise adaptation strategies/solutions to respond better to these changes.

Fodder grass cultivation

Another significant development was the introduction of cultivation of fodder crop. Dairy was picking up in the state and with the introduction of cross-breed cows, giving appropriate fodder became important to get good milk yield. The PONLAIT has in every

Training on fodder grass

village established a milk collection centre and gives good price and other benefits like cattle feed to the members. The research by MSSRF revealed that Co-3 fodder grass variety was well-suited for the cross-breed variety of cows, increasing milk production.

This came like a fresh lease of life for even the landless labourers who grew fodder in their backyards to begin with. They got better results from the cows they owned, which enhanced their incomes. Soon, many were leasing land to grow Co-3 fodder grass and sell.

An instance worth noting here is the case of **Babu**, who was a driver at the MSSRF Biocentre. He lives in Tamil Nadu and owns an acre of farmland, which his father was tending. Unlike other drivers, he would join in the discussions at the FFS and experiment the ideas in his farm.

When he saw the growing demand for fodder, he decided to give it a try. He started in a small way, dedicating 10 cents of his land area for this purpose in 1997. Initially there was resistance locally to the new fodder since the farmers were not familiar with it. But Babu was convinced of its effectiveness and so, on the way to the market, he sold it in small quantities to the farmers. When

Babu

the cows that consumed this fodder started producing more milk, he used these case studies to create awareness among other farmers. From then on, fortune started smiling on Babu and in a year's time, he was seen growing fodder crops on 7 acres of leased land. He initially delivered fodder using his two-wheeler, then got an autorickshaw and today has a mini-truck to deliver fodder in the market. Recently, he has also leased three more acres as the demand is high but not enough supply. Today, he is full time into fodder cultivation, and bagged a contract to supply fodder to a 'goshala' in Chennai, sending a mini-truckload every alternate day covering 400 km (to Chennai and back). There are other large orders waiting in the pipeline, but he wants to stabilise production first before expanding his business.

Poonkothai is another example. She has been associated with several projects of Biovillage, including non-farm and on-farm activities. Recently she and her cousin took a loan from the Federation to start fodder cultivation on leased land. Today, it is reliably learned that in a short span of time she was able to buy a property in her name. What is noteworthy here is that her husband has named the house after her – a first of sorts in a patriarchal village!

Fodder cultivation has taken off in a major way in almost all villages of Puducherry associated with the Biovillage. It has given small and marginal farmers as well as landless labourers a ray of hope in not only improving dairy production but also cutting down on straw consumption and giving an additional source of income.

Integrated inland aquaculture in community ponds

Access, control, and usufruct rights of common property resources for the resource poor whether it is land, water or forests are major challenges. In the Biovillages, four village ponds were leased from the Block Development Office and rehabilitated with support from the District Rural Development Agency (DRDA). The landless families (SHGs) were partners as they inhabited around the pond and used the water for domestic purposes. Once the pond was desilted and filled with rain water, it created conflict of interests among the various sections of the community as this was a new concept of using common property. The pond that was an eye sore and in a miserable state became the centre of attraction. The community could see the vast potential and benefits of the pond. However, the conflicts were resolved amicably with the women SHGs able to convince the various sections of the village and agreed that one portion of the share would be given to the temple fund.

Integrated inland aquaculture

The participants were trained scientifically in fish rearing and feed management. The pond was developed as an integrated pond with fodder grass on the bunds to prevent soil erosion, floriculture and vegetable cultivation on the bunds for income and nutrition. Five different types of fishes inhabiting different layers of the pond were stocked with support from Fisheries department. This was a family enterprise where the husbands also helped in feeding, harvesting, and marketing of fish. The success of the enterprise was that the Government was interested in replicating this model in other villages.

Nutrition garden

Introducing the concept of nutrition garden to the farmers has been another beneficial activity promoted by the Centre. MSSRF gave the seeds and the training to its members to grow flowers and vegetables. This activity has enhanced the income sources for small and marginal farmers. The Government of Puducherry, through its 'Mini Kit Programme' of Backyard kitchen garden, also chipped in as it distributed about 500 kits to the Biovillage community, especially to small and marginal farmers, every year.

Nutrition garden

Floriculture

Tamizhmani proudly declares, 'Dr Swaminathan himself came and told me how to grow brinjal during the initial days of the Biocentre.' The flower garden where she grew 'Ambur Mullai' gave her as much as 5 kg of flowers everyday at a time when it was selling at Rs 40 per kg. This eased her cash inflow by about Rs 6000 every month.

Savithri, another farmer, also started growing flowers, vegetables, and fruits in 1993. From 150 plants, she got 10 kg of 'Ambur Jasmine' in a day.

Diversifying the sources of income has been one of the direct benefits of introducing such varieties of plants and crops. With shorter return times, they remove the risk on the farmer who depends on just one crop to deliver him from starvation.

Dr Harish Selvanathan, Director, Department of Horticulture, remembers the initial days of Biovillage in Puducherry. 'They gave a detailed blueprint for plant diversification. At that time, crop diversification was unheard of. It almost took a decade for the concept to pick up in Puducherry. In the initial stage, it did not take off on the scale the thinkers behind the project at Biovillage had planned due to the changing dynamics of the social environment. Today, however, as a result of direct intervention with some, and the subsequent ripple effect, many farmers are opting for multiple crops in Puducherry.

Off-farm activities

Dairy and goat herding

One of the early interventions of the Biovillage Programme that benefitted the small farmers and especially landless labourers was dairying and goat rearing.

Indira Sarojini from Uttaravahinipet village is one such beneficiary. Already an 'aware' individual who had savings in the post office and a tailoring business, she was convinced that an organisation like the MSSRF would be a good vehicle to uplift the condition of the women in her village. She formed 15 groups and many of them bought cows and goats through the loans they became eligible for. The Biocentre provided them with training on management and health care.

Today, Indira has at least 15–20 goats and kids but lacks space to expand more. She is also an animator representing her village and feels that women coming together have helped boost their morale as well as give them a means to add to the family income.

Many cow owners have also started fodder cultivation in the limited space they have. Ever since the Puducherry government set up

cooperatives to collect milk from all the villages, dairy has become a steady source of income. This has led to a dramatic increase in the family income and the confidence levels of these farmers.

Dairy is the most popular income generating activity among the members and fetches the second highest monthly average income amongst the various activities pursued.

Mushroom production training

Mushroom cultivation

As we saw in the story of Kathanayagi, mushroom cultivation is a profitable business, and 64 families were pursuing this till 2000. This number has come down to 2 because spawn production has been temporarily stopped as the Biovillage Programme underwent a shift in focus after 2000.

Now the Biocentre has resumed its spawn production and demo because given the demand, there is high scope for growth. A few women belonging to the associated groups have also begun mushroom cultivation on a medium scale having undertaken training from Kathanayagi.

What gives Prof. Swaminathan satisfaction is that be it oyster mushroom production or fodder cultivation or even vermicompost, while not many in the Biovillages are pursuing these businesses, some of these have become popular in the rest of Puducherry.

Production of asafoetida

Johnson in Puducherry is an active member attending SHG meetings. Both he and his wife started making asafoetida and are working hard to establish their 'Ammu' brand in the market. Being a small, but growing, venture and coming from a poor background,

Johnson and his wife with their Ammu brand of asafoetida

Johnson always needed working capital. He has always banked on the support of the Federation not only for his working capital needs but also to give his daughter good education. As for his business, Johnson says, 'For an investment of Rs 2000/- to make 20 kg of asafoetida, there is a potential to make up to Rs 1800/- as profit.'

In the 1990s, the self-help group (SHG) movement for women was picking up speed across the country. MSSRF too encouraged the women to form SHGs. The women who joined the SHGs were sincere and hardworking and the group dynamics really worked wonders for them. MSSRF trained these women in various activities through associated agencies. One of the important training programmes were related to development of skills to enable these women to establish their ventures and generate additional income.

Coir rope-making, mushroom cultivation, dairy, goat rearing, and poultry were some of the activities that dramatically changed the lives of many of the members. With industrial development picking up of late, Mr Kamal Badshah, Officer, Coir Board, noted that there are abundant opportunities for women in Puducherry to work in industries. As a consequence, many of these trainings did not result in enterprises in the Union Territory. But for those who put the training to good use, the transformation was dramatic.

Coir ropes

Lakshmi's case is one of adaptability to changing circumstances and what multiple skills can do to one's self esteem and income-generation potential. Lakshmi was part of the fisheries project in the beginning. The local pond was leased from the local panchayat and different varieties of fish were stocked. However, after three profitable harvests, the village took over the pond as per a new rule passed by the government.

Unable to continue with aquaculture, Lakshmi then got goats, moved on to mushroom cultivation and is now finally established in coir rope-making. Each of these ventures helped her improve her economic status. Apart from educating her children and securing their future, she has also managed to buy her own property in the village.

She also went to Delhi recently to receive an award from the President of India through the National Virtual Academy for her work done in her village. She is a master trainer today with the District Industries Centre, imparting training to other village women in coir rope weaving. The Coir Board is also actively promoting coir business by providing machinery at subsidised cost to the villagers.

Coir rope training

Confidence, openness, and readiness to lead, learn, take initiatives, that is how Lakshmi can be summed up. It is not just the changed financial conditions that give Lakshmi this assurance, but the fact that she has done it on her own and is also recognised for her contributions. This encourages her to do more, and today she is an active member in the *Innuyir Grama Sangam* – a body that has brought together all the SHGs operating under the Biovillage Programme.

Non-farm activities

The non-farm activities promoted by the Biovillage were primarily targeted at resource-poor landless women as well as small and marginal farmers who were below the poverty line and had very limited access to natural resources. The key challenge was the changing development scenario.

Terracotta products

Kamakshi, currently living in Tamil Nadu but originally from Puducherry, has made a name for herself in the business of terracotta products. In the initial days, the Federation helped her get loans to meet the capital expenses for her venture. Today, Kamakshi takes 40 days to ready an order and employs six people. As per her estimate, if she puts in a lakh of rupees as investment, she can see a turnover of up to Rs 10 lakh! She is in the process of expanding her operations in Puducherry also to enable this growth.

Terracotta production

One of the greatest impacts of being part of the Federation was her confidence to speak up and demand a price that she thinks she rightly deserves for her work. She knows that the quality of her terracotta ware is better than many other such products available in the market and she rightly demands a higher price. Without any hesitation, she says, 'I got this courage to demand my rightful price because of my association with the Biovillage.'

Production of sanitary napkins

Lakshmi also works with the primary health centres to create awareness about health, hygiene, and sanitation. She is an animator with the *Innuyir Grama Sangam* and acts as a via media between the villagers and the Centre.

The council members of the Sangam (called the Biovillage Council) are also regularly participating in the mother and child health programmes in the villages. Through their active participation in these programmes, they found that in many villages, women in the age group of 25–40 years have been facing gynaecological problems, particularly related with personal health and hygiene. The Biovillage conducted a survey among the rural women in the Biovillage, and realised that there is a demand for low-cost sanitary napkins.

Women SHG: Sanitary napkin production

The Sangam decided to start a sanitary napkin unit to make available hygienic and low-cost sanitary napkins in the villages. An exposure visit was arranged to a unit in Coimbatore district (west of Tamil Nadu) where the council members were exposed to low-cost machinery to produce these napkins. They were also trained to establish and manage a unit, and develop a business plan. Equipped with this knowledge, the *Innuyir Grama Sangam* under its *Thozhir Pirivu* established a low-cost sanitary napkin unit for the first time in Puducherry. The unit received 30% grant support from the micro-credit bank of the Friend of MSSRF. The product was being marketed under the brand name of 'Softex'. At this moment, maintenance issues have put a temporary spanner in the running of this unit but the Federation is getting it fixed to revive the unit soon.

Village Development Programme: Post-cyclone Thane rehabilitation

Sellipettu, Pillaiyarkuppam, and Sorapet, the three badly affected villages by cyclone Thane in December 2011, were selected for NABARD's 3-year adoption programme on economic infrastructure and human development. The following activities were taken up under this programme: about 300 people were given training on mushroom production, organic manure production, fodder development, and vermicompositing. Three model units were established under each of the above themes. In addition, three health camps were conducted for cattle. An SHG member's fish pond in Pillaiyarkuppam was also renovated. These programmes received a lot of appreciation from the community.

In brief, the Biovillage Programme is identified with the following services:

- Promoting sustainable agriculture through access to microcredit and participatory technology development (PTD) process

- Facilitating to identify and internalise suitable market-driven livelihoods (on-farm, off-farm, and non-farm) and implement through group action for specific socio-economic conditions
- Transfer of technology, knowledge management, and facilitate market linkages
- Liaisoning with financial institutions – NABARD, nationalized and cooperative banks for credit linkage
- Technology and knowledge linkages with academic and research institutions like Tamil Nadu Agriculture University; Krishi Vigyan Kendra, Puducherry; universities; medical colleges; etc.
- Facilitating services through the line department – agriculture, animal husbandry, District Rural Development Agency, fisheries, forest, women's commission and market linkages through PONLAIT (Puducherry Cooperative Milk Producers' Union Ltd), sugar mills and other outside marketing agencies.

CHAPTER 3

Village Knowledge Centre

Empowering through Information, Education, and Communication

Chinnathambi, a small farmer with 2.5 acres of land in Embalam village under Nettapakkam Commune, cultivates paddy, fodder, and banana at present.

He also produces and distributes Amirthakaraisal, Panchakavya, vermicompost, and seeds with assistance from the Department of Agriculture, Government of Puducherry. He has a long lasting relationship with the Village Knowledge Centre (VKC) at Embalam and uses and shares information provided by the VKC.

In April 2011, his cow delivered a calf but the placenta did not come out. He called the government-appointed veterinary assistant, who promised to do the needful the next day as he had finished for the day. Chinnathampi was aware of the fact that if the placenta did not come out within four hours, the milk yield would be greatly reduced. Sensing the urgency of the situation, he uses the helpline mobile number (93442 27654) of the VKC for assistance and was given timely advice by the expert available.

Yasodha, a woman farmer from Kalietheerthalkuppam under Mannadipet commune, cultivates banana, gingelly, and sugarcane in her 2 acres of land. When her banana plantation was affected by wilt disease, she heard an audio message advising on control measures for this disease. This helped her save her crop, which is now healthy. Not only that, Yasodha also makes a note of all such useful information she gets from this medium for future use.

Yasodha, Chinnathambi, and thousands of other farmers in the Biovillages are signed up for the audio advisory that is disseminated by the Village Resource Centre run by MSSRF.

■ ■ ■

THE BEGINNING

Information and communication technology (ICT) has grown by leaps and bounds since the 1990s. Much ahead of its spread across the globe, Prof. M S Swaminathan had predicted the important role it would play in transforming human lives, and how rural India could benefit from this development.

Even as the Biovillage concept was spreading across the villages in Puducherry, very high frequency audio and voice-and-data communication were set up in five villages connected to the Hub centre in Villianur in the initial period of 1998. To increase the ownership in the technology and thereby improve its effective usage, rural women were trained to operate the equipment. This was used by the rural community to call experts and get solutions to their problems in agriculture and animal husbandry. Providing access to validated and appropriate content helped the villagers in their livelihoods.

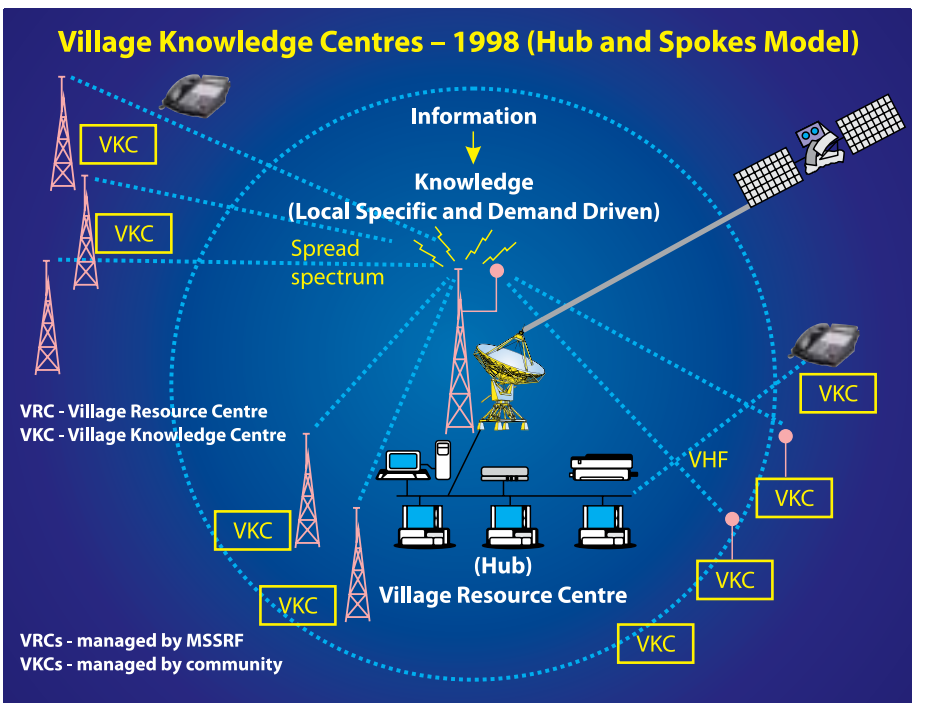
Other emerging ICTs were also tested for their relevance and usability in the delivery of information and knowledge. The Spread Spectrum Radio-frequency connected computers of the Hub centre

Mr R A Mashelkar, Director General CSIR, Prof. Bruce Alberts, H. E. Rajani Rai, Former Lt. Governor, Pondicherry, and Prof. M S Swaminathan, at Villianur VRC

in Villianur village to the computers in the VKCs (earlier known as Rural Knowledge Centres). MSSRF played a vital role in collecting relevant content from various sources including traditional practitioners and scientists. Content editing and preparing learning modules in the vernacular language to suit the needs and demands of the community were the major challenges. Some of the traditional methods of information dissemination such as Notice Boards in front of the VKCs and Public Address System for announcing the information to the villagers were also used. The utility value of this technology spread across Puducherry and other villages too started demanding the setting up of VKCs.

HUB AND SPOKE MODEL

Village Knowledge Centres (VKCs) came up as clusters around the Village Resource Centre (VRC) as Hub and Spokes model. The VRCs supported the VKCs in content repository, capacity building, and linkage services. The VKCs became important nodes in the villages for addressing any information needs of the village community.



The VKCs were operated by two knowledge workers, one male and one female. The VKCs were governed by the community-based institution called VKC Management Committee (VMC) consisting of representatives from village-based institutions such as Public Health Centre, represented by either a doctor or nurse, school teacher, women's SHGs, farmers' association, fisher folk association, philanthropic individuals, etc.

Spreading the word

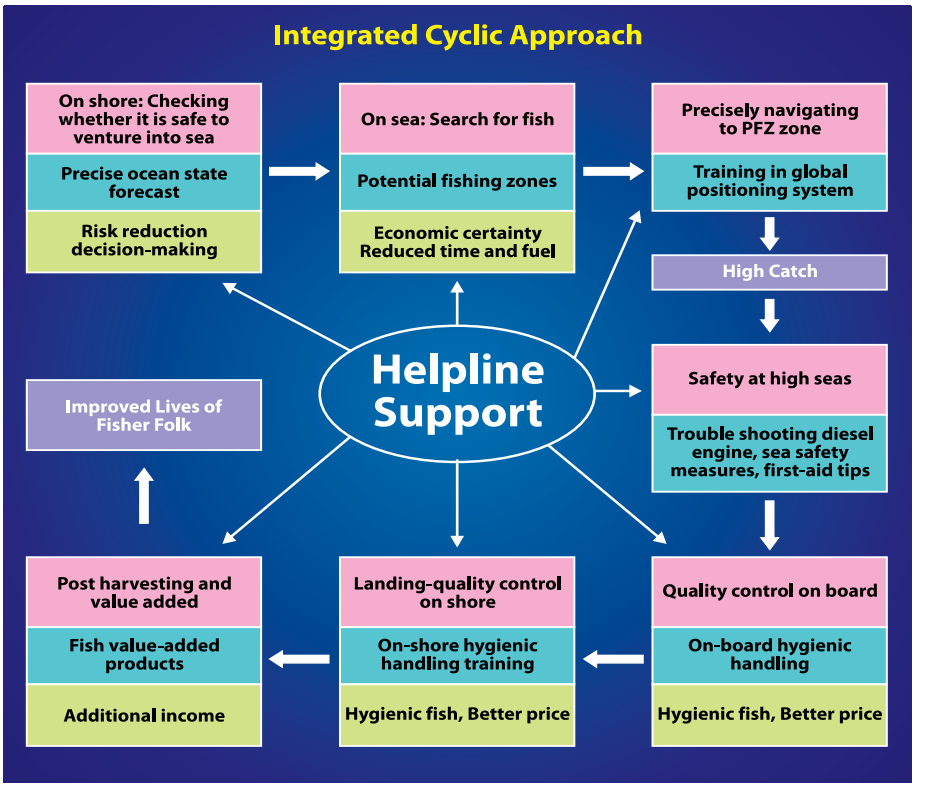
The VKC as a node for information and knowledge dissemination in the villages promoted by MSSRF caught the attention of many institutions, organisations, and government departments across the globe. Many resource organisations and research institutions in the development sector from Australia, Bangladesh, Japan, Latin America, Malaysia, Nepal, South Africa, Sri Lanka, United Kingdom, and United States of America visited the VKC villages and the Pillaiyarkuppam Hub Centre (prior to 2005, it was located in Villianur near Puducherry), learnt the 5 'Cs' – Connectivity, Content, Capacity building, Care and Management and Coordination – that are fundamental to the process of knowledge dissemination and replicated it in their respective regions. The years 2000–2008 saw a number of researchers, journalists of popular magazines, and writers from across the globe visiting these centres and publishing documents and books. The aftermath of VRC–VKC enabled MSSRF to win the Motorola Dispatch Solutions Award for Information Village Research Project in 2000 and the Stockholm Challenge Award in 2001. The *Scientific American* magazine has also covered the MSSRF's knowledge connectivity programme in the December 2004 issue.

Upgrading as needed

Modern ICT innovations and applications have been tested and adopted for information and knowledge dissemination as and when they were found to be relevant and expanded to the Biovillages. GSM-based public address system was implemented to disseminate information through mobile phone from anywhere, transmitting

short text and audio messages for fisher folk, farmers, and small and micro enterprises (SMEs). The fishermen have been receiving potential fishing zone information in their mobile phones as text message and in the Fisher Friend Mobile Application (FFMA) set as data retrieval mode. They also get Ocean State Forecast (OSF) such as wave height, wind speed and direction, and weather information. In addition, often they also get government announcements for fisher families, emergency telephone numbers, and news flash.

There is a cyclic approach to the knowledge and skill empowerment of fisher folk right from information on sea safety measures, potential fishing zone (PFZ) and OSF information, weather information, particularly the monsoon rains, to make informed decisions for sailing or not. While at sea, the fisher folk get PFZ and OSF information, cyclone warnings, and rescue operations by the Indian Coast Guard/Coastal Police.



Fisher-friend mobile application

Timely information

Women of the family are provided support to enhance their income-generation possibilities. Today, the excess fish, prawn, and crab are used for preparing pickle and other varieties that have a long shelf-life. MSSRF has collaborated with Marine Products Export Development Authority (MPEDA)–NetFish for creating awareness among fisher families on sustainable fishing practices, sanitation and cleanliness in the beaches and use of proper gears and nets for fishing. The Indian Coast Guard conducts awareness on sea safety measures and implications of crossing the international boundary lines.

Women and men farmers are provided information on timely care and management of crops such as paddy, coconut, banana, groundnut, and vegetables to reduce the risks and control the damages. The generic contents on all these crops and their cultivation practices from seeds selection to harvest and post-harvest managements are disseminated and reposited in the computers at the VKCs. The same is also disseminated through

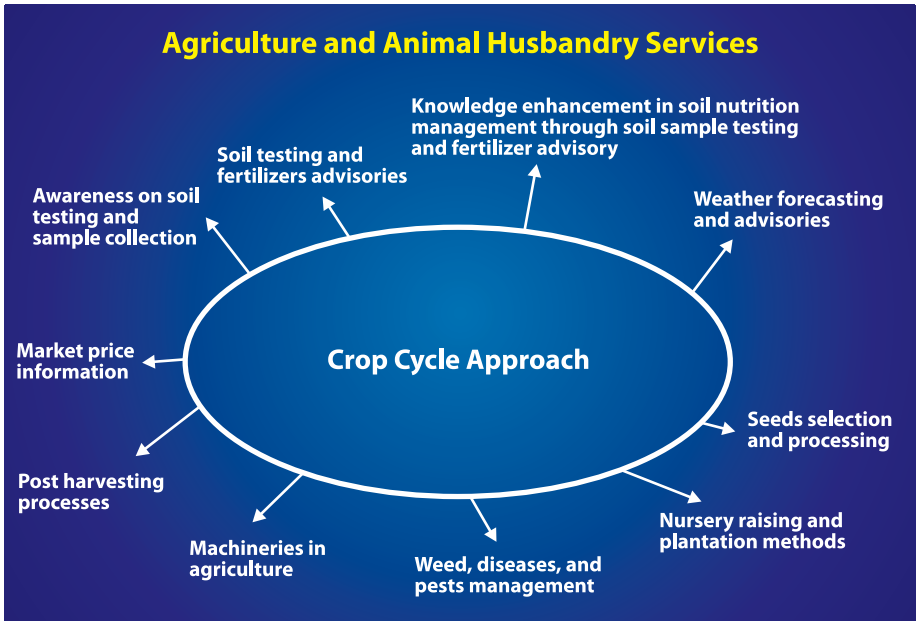
Ocean information system

notice boards on a daily basis in the VKCs and through the community newspaper '*Namma Ooru Seidi'* on a fortnightly basis to every household in the village.

Ask a question

After 2009, with the increase in mobile phone penetration in the villages, MSSRF introduced short text messages daily on weather forecasts and advisories and market prices of important crops. Similarly, these farmers started getting audio messages of less than one-minute duration on various cultivation practices and control measures. Following the success of these interventions and on demand, MSSRF established 'Helpline' services for the farmers. The farmers put their questions to a panel of experts through teleconference and the experts answer the farmers directly and instantly. As the popularity of the audio messages and helpline services increased, a weekly theme-based 'Phone-in' programme was introduced for the farmers to talk to the experts directly and get solutions instantly.

Agricultural services also extended information and knowledge on animal husbandry and livestock management aspects. Information



is provided on a range of topics starting from calf care and management, vaccination schedules to disease-control measures, feeds and fodder requirements, breed selection, breeding, insemination, and periodical measures to keep the livestock healthy. Audio messages and Phone-in programmes also include livestock topics.

Training and support

The animal husbandry expert in Puducherry VRC conducted six special training programmes in livestock care and management of cow, goat, sheep, and poultry to Biocouncil members during the year 2012.

Women SHGs were trained in some of the income generating activities like preparation of liquid soap, liquid blue, phenol, and fish value-added products. These groups were linked with financial institutions for funding support to continue the activities. The learning modules of the preparation of these products are available in the VKCs for anyone to see and learn.

Training programme on jute products training

Training programme on livestock rearing and management

A professor in an engineering college in Puducherry has motivated students to contribute to the social cause of the rural families. The amount collected was used for the purchase of four sewing machines. These machines are being used for training the women in tailoring. These machines are shifted to the VKCs on rotation basis for the benefit of women in all the villages. Further, the collected amount has also been used for supporting the education of the selected poor children by meeting the cost of tuition fee.

The National Virtual Academy for Rural Prosperity (NVARP) programme of the Information Education and Communication (IEC) Programme Area in the MSSRF recognises rural women and men who have expertise in livelihoods activities and have social commitment in extending knowledge support to the fellow villagers. These individuals are recognised as Fellows of the NVA. About 25 Biocouncil members are Fellows of the NVA who have expertise in agriculture, animal husbandry, micro-enterprises, social services, and strengthening of women groups.

For example, Sreenivasan, an entrepreneur from Muthirapalayam village, has been trained by the VRC in care and management of cattle and artificial insemination services using liquid ammonia flasks. Pargunan, a farmer from Pillaiyarkuppam village, is a Fellow of the NVA who has expertise in preparing vermicomposting manures.

Village Resource Centre – The Hub

Computer education

The VRC and VKCs conduct structured computer training courses for the rural community and particularly the children who get a certificate after completion of the course. Many of the children of Biocouncil members have completed the course and obtained certificates. Similarly, children aged between 8 and 12 have completed Computer Aided Learning Programme (CALP) in the VKCs. This has enabled rural children to access computers and learn its basic operations. As CALP is a curriculum-based computer game, children spend evenings at the Centre happily as it enables *learning while playing*.

Computer education for children

Counselling services

The VRC regularly conducts career counselling for higher secondary school students on the various courses offered by educational institutions and the prime courses that have more job opportunities. The health aspects of women, adolescent girls, and children are taken care of by conducting awareness programmes inviting specialists to interact with the rural people. Women reproductive health is one of the important topics of awareness in the VKC villages.

Knowledge movement

Some of the modern ICTs used are loud speakers connected to WLL CUG telephone for villagers to have audio-conferencing with experts in agriculture and animal husbandry. The video-conferencing from the VRC to the expert centre is also a structured intervention enabling rural people to interact with experts and find solutions for their problems.

Thus, the knowledge connectivity using various modern and traditional ICTs is one of the important areas of extension service in the Foundation. The Hub and Spokes model of VRC and VKCs has been universally adopted by the development sector for replication. The model is also being propagated by the Foundation through a national alliance of partners under the umbrella of *Grameen Gyan Abhiyan* (Rural Knowledge Movement).

Knowledge empowerment of rural community and timely dissemination of information have become important interventions reducing the gap between the *haves* and the *have-nots*. Its quick adoption by the villagers proves its relevance as well as the need, which the MSSRF's Biovillage Programme has been able to successfully identify and fulfil.

CHAPTER 4

Empowering Grassroots Institutions

Pakkirichi, a dalit from Sorapattu village, says that for the first time in her life she learnt the value of saving money when she formed an SHG in 1998 under the Biovillage programme. It is on account of her accumulated savings that she was able to buy land next to her house, where she has a kitchen garden. She also constructed a house in a plot adjacent to it, which she has given to a destitute friend of hers a place to live in. By selling two of her cows, her father-in-law was able to fund his second son's house construction.

Pakkirichi

Indira Sarojini of Uttaravahinipet was able to form 15 groups as the savings and the loan facility were a big lure to the women in her village. They started with a monthly subscription of Rs 50 but after two years, raised it to Rs 100, realising the benefits.

■ ■ ■

By 2005, about 350 groups and 4000 members were associated with the MSSRF Biovillage project. The main attractions for the women to join the project were

1. they get various skill-based trainings,
2. they get to save money, and
3. they can get loans for consumption and production purposes.

THE SHG MOVEMENT AND THE FEDERATION

Reaching out to maximum number of villages and its residents has been one of the primary objectives of the Biovillage Programme. One of the effective ways to do this was to motivate and mobilize the women together into informal institutions like SHGs and use the available funds effectively. The thinking behind this was when a woman benefits from the programme, the entire family benefits.

While on the one hand, Biovillages were focused on training women in skills that would help them set up environment-friendly ventures, on the other, they also encouraged them to form groups so that peer motivation would ensure sustainability. Each group selected its own name, based on the enterprise they worked in. There were no group ventures, but the groups were bound by common interests.

Keeping this mind, in the 1990s, women were encouraged to start self-help groups (SHGs). This move proved to be a great success over the years as many SHGs were formed by the stakeholders. They function effectively in supporting, encouraging and sharing resources. Not only that they repay on time, but also ensure that other women also pay promptly so that the members may continue to benefit from the loans.

Group leaders emerged and they were able to bring in more women into the fold. Trainers and master trainers emerged who took their skills to women in other villages besides their own, encouraging enterprise. This contributed to the spread effect.

An indirect impact of this SHG movement was that the women started saving money, which was unheard of until then. When one becomes an SHG member, they pay a monthly charge as a deposit. This practice gives them access to a bulk amount at the end of the year or in case of emergencies. They can take loans for personal reasons like education or health. Many women also have taken loans to expand their businesses.

One may say, going by the focus over the years on various activities, that between 2000 and 2010, savings and the SHG movement seem to have dominated the Biovillage stage. Also, as urbanisation became the rule of the day, the Biovillage shifted its focus to more non-farm activities and building the SHG movement.

When it achieved a critical mass of 4000 members, MSSRF encouraged the women to form a federation that would institutionalise the groups and give them an opportunity to not only function along the lines of a corporate, but also plan a secure future for its current members. This will give it an opportunity to grow further and touch even more lives in the rural and semi-urban areas of Puducherry. In 2005, the *Innuyir Grama Sangam* was established, first as a society, and later as a Trust.

Micro-credit facility

MSSRF had been focusing on linking micro-credit with micro enterprises through the SHGs. In February 2000, the National Network on Biovillages and Community Banking was launched in order to link micro-enterprises, both on-farm as well as off-farm activities, with micro-credit.

The support from the members of Asia Initiatives – Friends of MSSRF Tokyo and Fiends of Swaminathan, Australia – in establishing over 310 micro-credit banks (over Rs 10 million) has significantly contributed to building the livelihood capital assets of the rural communities, especially the Biovillage Federation members. It also strengthen the off-farm and non-farm activities to be scaled up.

To facilitate micro-credit, the *Innuyir Grama Sangam* Community Bank was established in January 2007. With contributions of Rs 500/- from each members of the 350 SHGs, all of them were brought under the community bank fold. This bank was formed

Dr Geeta Mehta, Asia Initiatives, *distributing microcredit*

to support the individuals and extend support to groups for establishing and promoting enterprise activities either individually or in a collective manner. As on July 2011, Rs 36.40 lakh had been given as loan to 280 entrepreneurs.

The financial auditing reports show that in 2005/06, the turnover was Rs 0.7 lakh; but in 2010/11, it was Rs 21.99 lakh, which increased to Rs 30.89 lakh in 2011/12. There was a matching grant of Rs 7.5 lakh from the Chennai headquarters of MSSRF. Besides, the interest gained by the Biovillage Community Bank has increased from Rs 24,188/- (in 2005/06) to Rs 1,07,777/- (in 2010/11), and Rs 1,66,095/- in 2011/12.

During 2012/13, the community bank provided loans to the tune of Rs 18.92 lakh to 126 members for scaling up and initiating income-generating activities (IGAs). Through nationalised banks (SBI and Indian Bank), 463 SHG members availed additional loans to the tune of Rs 127.32 lakh. The IGAs for 384 existing traditional livelihoods were enhanced with the addition of 142 new livelihoods. Special loans were given to 5 members, 34 members received educational loans, and 24 got loans for asset creation.

Janashree Bima Yojana, the Life Insurance Corporation's (LIC's) micro-insurance scheme, was initiated through the Federation and

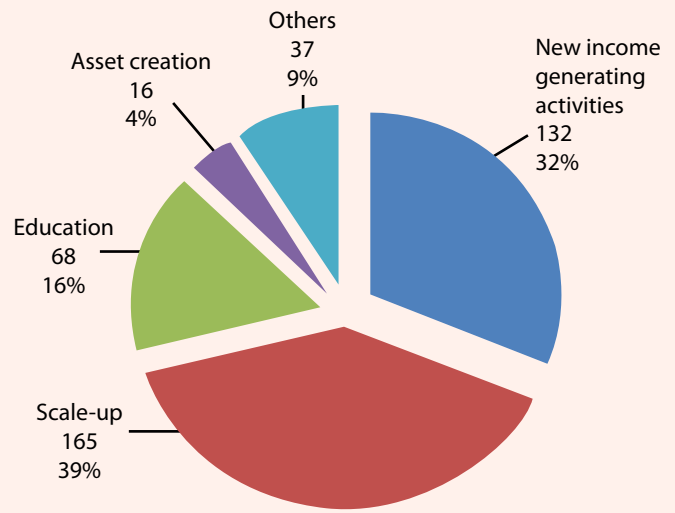
2300 members were enrolled in it. Sixty-five children of Federation members received LIC's education scholarship.

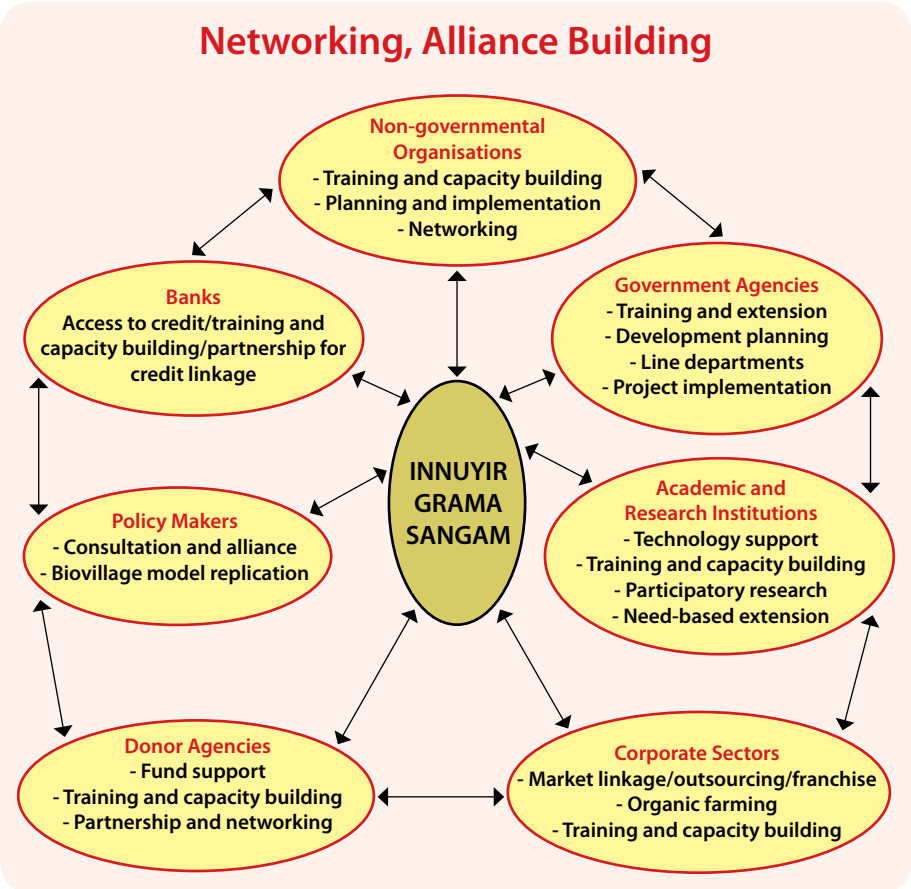
The pitfalls and corrective measures

The effectiveness of the SHGs stems from the fact that banks were willing to lend to the women who were prompt in repaying. At the same time, sensing a business opportunity, many micro-finance companies and NBFCs (non-banking financial institutions) also started entering the field. This led to a scenario where many women across the country started becoming members of multiple SHGs and soon were caught in the very debt trap that this system sought to avoid.

The SHGs in the Biovillage Programme also noticed that some of the SHGs were constantly defaulting. President of the Federation, Rajalakshmi of Pillayakuppam, says, 'The members would say they had repaid, while the SHG leader would deny it. We realised that there was no way of finding the culprit.' Alerted to the situation, in 2009, MSSRF and the Federation – which had become a Trust in

Usage of community bank loan





2008 – streamlined the existing 346 SHGs after internal auditing. It helped in removing groups with dual memberships and defaulters, whittling the overall number down to 210 sustainable SHGs.

Now, the processes and procedures are in place and the Federation has established its credibility with banks and lending institutions. The Federation has paid its members dividends twice since then. This has enabled many women to improve their lifestyle, give their children good education, and expand their businesses.

As Mr Parameswaran, Chief Manager, Indian Bank, says, 'Sustainable maintenance of SHGs is important and in the case of MSSRF, the Federation is step two in the growth of women, ensuring their socio-

A snapshot of the current status of the community bank

No. of SHGs formed (2000–12)	:	346
No. of self-sustaining SHGs	:	252
No. of members involved in IGAs	:	1922
Credit provided to the SHG members		
- through nationalised banks (2000–12)	:	Rs 1209.67 lakh
- through BVC Community Bank (2007–12)	:	Rs 60.03 lakh
Percentage of credit repayment		
- 2000–08	:	95%
- in 2009–12	:	99.8%
No. of families benefitted through BVC Community Bank	:	418
Amount mobilized for BVC Community Bank		
- SHGs' contribution	:	Rs 6.82 lakh
- Credit support from MSSRF	:	Rs 7.50 lakh
Total no. of trainee days organised (2000–12)	:	50,282
No. of animators	:	13
No. of community accountants	:	1
No. of Federation assistants	:	1
No. of master trainers	:	32
No. of elected PRI members	:	12

economic empowerment. Besides, MSSRF's constant interaction and handholding have also enabled these women to venture out into several areas – be it enterprise or be socially and politically active. Also, though there are several beneficial schemes for the poor, they need intervention from NGOs like MSSRF to actually benefit from them.'

Governance

The Federation has been able to mobilize funds from its members and purchase a piece of land measuring about 2000 sq. ft. worth


Innuyir Grama Sangam: Executive Council members

Rs 3.55 lakh in November 2010, for the construction of the Administration–cum-Training Centre for the *Innuyir Grama Sangam*.

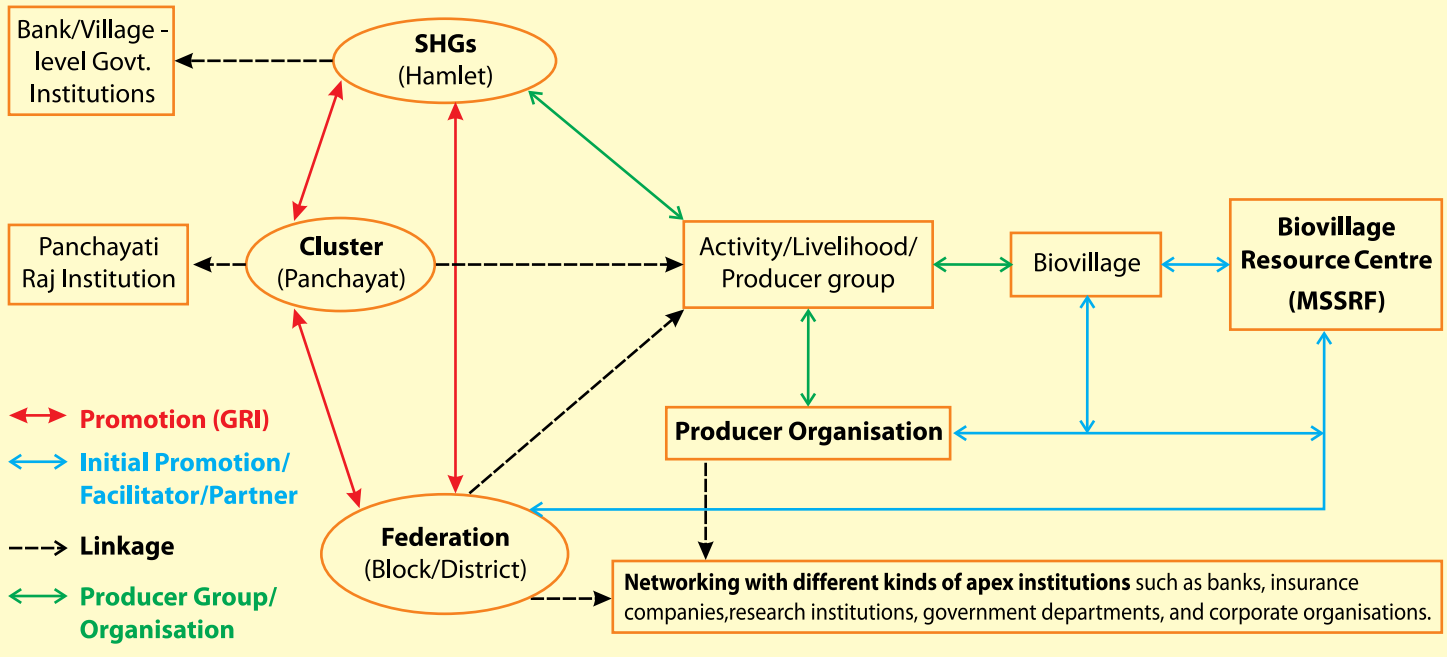
The Federation has elected its executive council (EC) members twice since its formation and the third election is to be held anytime soon. The 12-member EC consists of a president, vice president, secretary, joint secretary, treasurer and other members.

The Federation also lends to its members on easy interest terms and a part of the interest goes back to the Federation fund. Animators visit villages acting as via media between the non-executive members and the EC, sharing information and communicating new ideas and ventures.


NABARD Training programme

Training and capacity building have been the core focus of the Biovillage Programme. As Mr Sreepathy Kulkura, AGM - DD, NABARD, points out: 'The role of SHGs is to satisfy the needs of its members for personal consumption first; at the second level, they should facilitate enterprise building; and the third stage is when the members can help others. The Federation is aiming for the second level on a

ORGANOGRAM OF INNUYIR GRAMA SANGAM



- Characterising of clusters needs to be done based on local contexts like natural resources management, livelihoods, and development issues of members at the Panchayat level.
- PO will focus on particular livelihoods, value addition, and value chain interventions, and facilitation of forward and backward linkages (ITact).
- Federation will focus on civic activities (health, education, social security, livelihood, housing, and MF)

larger scale, as can be seen from the various training programmes it is conducting in association with several relevant organisations, including NABARD.

Twenty of MSSRF-associated SHG members such as Lakshmi, Pakkirichi, and Kathanayagi have also been recognised for their contributions to the society and went to Delhi to receive the award. This would have been unthinkable a few years ago as the rural women were used to being confined to their homes or travel only with an escort. But these women have been able to break the shackles of tradition and develop confidence because of their interaction with the Biovillage volunteers to be able to not only run their ventures but also be the guiding lights for other women and participate actively in social transformation of the villages they come from.

STRENGTHENING AND SUSTENANCE OF THE *INNUYIR GRAMA SANGAM*

During an evaluation by the Tata Trust in early 2008, two important aspects were pointed out by them for the Biovillage Programme at Puducherry:

1. Strengthening of the grassroots institution (*Innuyir Grama Sangam*)
2. Sustenance of the grassroots institution, including its financial sustenance.

As a follow-up of the above, an assessment of the Federation was undertaken on its independent functioning and management, as well as to plan for long-term sustainability. A three-day workshop was held in November 2012 to understand the present situation of the various activities of the Federation and to develop an action plan for self-sustainability for the next 5 years. Positive feedback was received from the leaders and staff of the Federation. This exercise has given them encouragement and commitment towards the future development of the Federation.

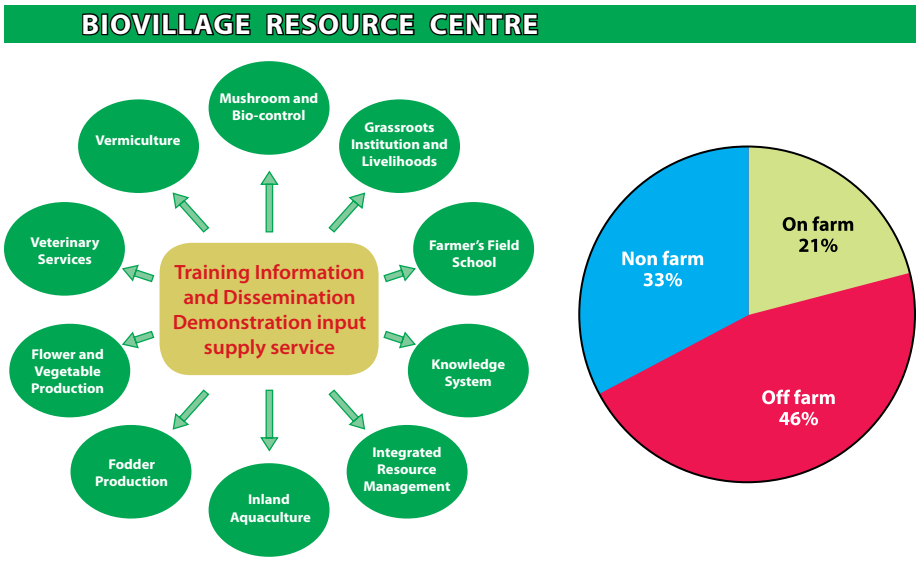
Mentoring and capacity building cell

The Biocentre at Pillayarkuppam emerged as the extension centre for training and capacity building and is the hub of the Biovillage programme. As per the third tripartite committee's (UNDP, Government of Puducherry, and MSSRF) recommendations, the role of Biocentre has been defined as a Centre imparting training to the SHGs facilitated by the Foundation, the government and other SHGs facilitated by other NGOs, farmers, students or any other stakeholder who needs training to replicate the Biovillage model.

The main objectives of the Mentoring and Capacity Building Cell are listed below.

- Work towards sustainable SHGs.
- Equip the SHGs, Federation/NVAs in social, managerial, enterprise skills and, health and gender-related aspects.
- Promote socially acceptable, eco-friendly, economically viable enterprises.
- Demystify appropriate technologies for livelihood.
- Help the SHGs for choosing need-based and location-specific enterprises, and prepare detailed business plans.
- Facilitate market linkages for the enterprise and entrepreneurs.

Dr Brenda Gael McSweeney inaugurating the Biocentre, 1999



As for the activities of the Mentoring Cell, it conducts training programmes in a participatory manner; documents these programmes; and prepare training guidelines and training manuals, and resource material for the training kit.

These activities are aimed at strengthening the capacities of SHGs, farmers, and other stakeholders of the Biovillages.

Training needs identification

During June and July 2007, a participatory-cum-brainstorming session was held for identifying the training needs of village-level SHGs leaders. The main objectives of this exercise were:

1. to identify the training needs of the SHGs relating to social, political and economic empowerment and
2. to motivate village-level group leaders to streamline the existing SHGs.

The outcome of this exercise led to identification of the training needs of the SHGs depending on what kind of individual or group

enterprise they want to start. Specific training needs were related to (a) developing the required EDP skills for identifying the right enterprise, (b) developing business plans, (c) starting and managing an enterprise, (d) enhancing leadership skills of the members of the participating SHGs, (e) improving their capacity in maintain SHG accounts and book-keeping, and (f) those related to soft skills such as motivation, team building, and interpersonal communication.

Trainings conducted

The training programmes offered by the Mentoring and Capacity Building Cell are wide and varied. Some of them are listed below.

- Entrepreneurial skill development in coir, mushroom, dairy, integrated dairy management, clean milk production, vermicompost, enterprise management, production of bio-control agents, backyard kitchen garden, biogas unit, fodder cultivation, azolla production, sanitary napkin production, pseudomonas fluoresces production, trichogramma production, biofertiliser production, and livelihood for the fishing community.
- Preparation of business plans
- SRI and maize cultivation

Training on vegetable cultivation

- Orientation on the Biovillage model to grassroots, NGOs, bank managers, national and international university students
- Day Awareness Training Programme (ODAP)
- Micro-enterprise development programmes (MEDPs), market linkages and tie up.

In addition, the Mentoring Cell also conducts training programmes on SHG formation, accounts and bookkeeping, group management and village-level group leaders training, cluster leaders training, PRA, conflict management and resolution, Panchayat Raj pre- and post-election, institutional management, and community banking.

The trainee days have increased from about 2500 in the year 2000 to about 6000 days in 2012/13.

The upward trend in the number of trainee days clearly indicates that the Biocentre has been building its niche as a unique training facility imparting various technical and non-technical training in farm and non-farm enterprise activities.

Out of the total trainee days, almost 75% percent of the training has been given to women, particularly in the promotion of enterprise activity for livelihood enhancement, leadership development, and conflicts management.

Farmer producers' organisation

Another initiative of the MSSRF is the formation of Farmer Producers' Organisation (FPO) to encourage savings and facilitate regular interactions between small and marginal farmers for mutual benefit. This group has been initiated under a project for climate-resilient agriculture, started with the support of ICAR, to provide resilient agriculture practices to the farmers in order to address changing climatic conditions and adverse effects in agriculture. The FPO and IGS complement each other in their activities.

Farmer Producer Company - Executive Committee meeting

At least five groups have been formed in each village so that the number of farmers adopting and following the same kind of climatic-resilient agriculture leads to a lasting impact on agriculture as well as in changing farmers' attitude.

The FPO provides inputs for cultivation including quality seeds, enables technology adaptation, capacity building for the members, linking with market and ensuring fair trade. The producer organization would continuously make efforts to solve ecological and economic factors for the betterment of its members.

An executive committee has been formed through a general body election and the FPO collects Rs 10 as membership fee. FPO members also have to buy at least one share in the organisation at Rs 100 per share.

There are 21 farmers' producer groups with 381 members. Of this, MSSRF has helped with a loan of Rs 5.4 lakh to 281 farmers to purchase inputs for SRI cultivation in 173 acres. The amount would


Farmers Field School – Rice cultivation

be collected after the harvest of paddy and that would be kept as common fund for PAFPO (PASUMAI Farmers Producer Organisation) for lending loans to its members. Paddy, pulses, vegetables, and sugarcane are the major portfolio crops of the FPO.

SOCIAL OUTCOME OF THE FEDERATION

No. of role models	:	36
Role models recognized by Government	:	12
NVA Fellows identified	:	18
Women Panchayat leaders elected	:	12

CHAPTER 5

Impact

Economic, Social, Political, and Individual

Whichever way one looks at the Biovillage story in Puducherry, one of the most noticeable outcomes is the transformation it has brought about in the people who are part of the movement. A closer look at the lives of these people reveals primarily four factors that have led to this transformation. These factors are related to (a) economic, (b) social, (c) political, and (d) individual, with the central theme 'empowerment' cutting across all. So the statement of impact can be redefined thus:

Biovillage, in its two decades of operation, has transformed the lives of people through economic empowerment, social empowerment, political empowerment, and individual empowerment.

As can be seen from the earlier chapters, the economic empowerment was effected through augmenting and stabilizing livelihoods and incomes (through farming and strengthening off-farm and non-farm livelihoods). Breaking of caste and gender barriers reflects the social empowerment role of Biovillage. Exposure to information and knowledge and easy access to them empowered the people politically to question the 'wrongs'. The breaking of mental barriers and bringing in a 'can-do' attitude among the people, especially women and poor, mark the individual empowerment role.

While all these factors are closely interlinked as one cannot exist without the other, it is 'individual empowerment' that has made a lasting impact on the people and their families. Perhaps it is this change at the most fundamental level, i.e. themselves, that has made the various activities of Biovillage self-sustaining. The case studies that follow subtly bring out these elements of Biovillage.

Pakkirichi, a dalit from Sorapattu village, is like a firecracker. Bright, full of life and confidence, this lady was married soon after she completed her class X. As with village women, she was a housewife, content with running her household. Her husband was at the

Biocentre to drill a bore in 1998, when he was asked to bring his wife and introduce her to the Biovillage concept.

One of the most telling incidents in her life is that in the farmers' club, there was a temple in one of the VKCs, which was open to farmers for conducting meetings. But village social divides were so strong that dalits were not allowed inside the temple. In Pakkirichi's case, this social norm was broken for the first time as the members of the group did not allow the meeting to take place without Pakkirichi taking part in it. This incident speaks a lot about the social impact of the Biovillage programme.

A council member and an animator, Pakkirichi sits shoulder to shoulder with her other council sisters, contributing to the cause. With guidance from the Biocentre, Pakkirichi availed a loan in 2000 and got some goats. Later, she also bought cows and was trained on how to select and take care of the animals.

She had never stepped out of her village alone till she became a part of the Biovillage movement. Today not only does she travel to other villages in her capacity as an animator, but has also travelled to Delhi and Hyderabad. She went to Delhi to receive the NVA award. The veterinary college took her to Hyderabad for a training on how to care for cows and she was asked to speak in front of a large number of participants on what she had understood and demonstrate it on the cow, winning accolades for her understanding.

She contested the Panchayat election (political empowerment) in 2006 following an orientation at the Biocentre, and won. She is not scared to question wrongs and had once refused to sign a document highlighting the achievements of the Panchayat as it had not completed one of the tasks she had promised to her ward. In recent times, she managed to mobilise women of her village to get a nearby wine shop closed after someone was murdered there.

For Pakkirichi, Biovillage is her life-pulse. She drops everything to spread the movement and take it to other women in the state. She may be an exception where all aspects of individual, economic, social and political impact of being a part of the Biovillage movement can be seen. One of the overwhelming responses from the members is the information empowerment that Biovillage was able to do. With the power of information and knowledge, the members are able to stand up and fight for their rights and demands. Another aspect is about social mobility. Most of the women associated with the Biovillage movement are extremely confident of themselves and several of them even showed the courage to contest the Panchayat elections.

Prema of Sellippattu village speaks clearly though in a soft voice. A Biocouncil member, she is also active in the SHG movement in her village. She mentions two interventions through the SHG in the lives of their members that helped the people. One of the group members regularly faced the problem of being beaten up by her drunken husband. The rest of the women approached the drunkard to mend his ways. When the man did not mend his ways, they warned him sternly and threatened to report the matter to the authorities concerned. Yes, things did change after that; he has stopped drinking and does not beat up his wife any more! Today, Prema is grateful to the group members for bringing the smile back on her face.

In another incident, a member's husband was found guilty of a crime and was put behind bars by the authorities. Moved by her plight, the group members pooled in their resources to help the woman manage her family expenses till her husband can return and resume work.

That brings to the point on education. Ever since people became associated with the Biovillage movement, giving their daughters good education has been one of the direct impacts. Tamizhmani's first daughter is a nurse and the second is a teacher. She asserts with

conviction that it is only because of the Biovillage Programme the villagers understood the value of educating their daughters. The staff at Biocentre does provide help and guidance in this regard.

The table below gives an idea of the impact the Biovillage Programme through common indicators.

General indicators highlighting the value of the Biovillage Programme

Indicators	Before Biovillage Programme	During Biovillage Programme	Current Scenario
Literacy	Girl child education up to 8th standard	Higher education and technical level	Going in for professional courses
Social mobility / Organisation	No social mobility among women in the villages. No access to bank. No individual bank accounts. Unorganised and individualistic.	Social mobility encouraged. Access to bank and attending programmes outside village. Having individual and group accounts. Organised into SHGs and federated. Learning to work together. Awareness of social issues and taking action on those.	Recognized as community leaders: bold, confident and committed with a concern for others. Recognized as authorized signatories at the banks. Better decision makers. Grassroots organisation, the engines of development.

Table contd...

Table contd...

Indicators	Before Biovillage Programme	During Biovillage Programme	Current Scenario
Labour days and enterprise development* (in a year)	90 days for women 101 days for men	Labour days increased doubly due to the intervention of IGAs (such as dairy, goat rearing, kitchen gardening, backyard poultry, mushroom, vermicompost)	Activities scaled up by Dairy – 75% Goat rearing – 20% Kitchen gardening – 30% Backyard poultry – 15% Mushroom and Vermicompost – 20%
Access to credit	Money lenders, tandal, mortgage of small jewellery, ration cards and vessels	Access banks, financial institutions, government departments and government schemes revolving money from the SHGs and community banking	Banks have come forward to fund the IGS and there is 100% repayment. The community bank has become an independent banking organization.
Asset creation	Local chits	Cattle population increased Purchase of jewellery Household items Purchase of land	Income and food security ensured Purchase of land and registration of patta in women's name
Technical and managerial skills	Women had no technical knowledge and limited household managerial skills	Women developed technical skills and trained in better management	Transfer of knowledge and skills to other women.

Table contd...

Table contd...

Indicators	Before Biovillage Programme	During Biovillage Programme	Current Scenario
Leadership quality	Shy and did not participate in various activities. No opportunities to grow.	Emergence of SHG leaders, enterprise based leaders. Emergence of role models.	Emergence of PRI leaders (12). Recognized leaders as trainers by the Government of Puducherry for IGAs Recognized leaders as counsellors by the Women Development Commission
Agricultural activities**	Priority for mono cropping of paddy and sugar cane Excess use of chemical fertilizers/ pesticides Unsustainable withdrawal of ground water No idea of new technologies	Priority for vegetable and floriculture (using water conservation) Reduction in used of chemical fertilizer/pesticide application Introduction of bio-control measures, importance for soil management – issuing of soil health card Fodder development	Priority for vegetable and floriculture Practising Low External Input Sustainable Agriculture (LEISA) practices New opportunities for alternative crops to mono cropping of rice – pulses, maize, onion and millet

* Government support for dairy, fodder and vegetable – increase in labour days.

** Dwindling of agricultural land due to rapid urbanisation, conversion of agricultural lands into brick kilns reduced the agricultural activity.

As the Biovillage Programme in Puducherry completed 20 years, its achievements till date can be summarised as below.

- ★ Crop diversification in paddy, groundnut, tapioca, maize, vegetables, and floriculture with minimum water and input for more income covering 3075 households.
- ★ Increase in usage of bio-controls and organic manure.
- ★ Introduction of more region-specific enterprises based on the natural resource base – dairy, fodder, vegetable cultivation, floriculture, mushroom and backyard poultry covering 8560 households.
- ★ Credit linkages for SHGs – Rs 1270.20 lakh.
- ★ Emergence of frontline leaders - 12 elected leaders in panchayati raj institutions.
- ★ National Virtual Academy Fellows identified - 20 Biovillage council women.
- ★ Emergence of role models (36), resource persons for different enterprise activity recognized by the Government (12).
- ★ Trainings – a total of 61,384 trainee days (2000–2012) for farmers, SHG members, government sponsored SHGs, other NGOs, research institutions, students, bank officials, and policy makers for replicating the biovillage programme.
- ★ A National Workshop on Biovillages was held in November 1999 to share the knowledge and experinces gained from establishing Biovillages.

Having stated the achievements quantitatively, the empowerment of women stands out as the clean qualitative change. They have changed as people. Today, the women are confident, willing to explore and experiment, and most importantly to lead. From being mere shadows, their worlds limited to the four walls of their homes, they now take decisions, contribute to the family income and are part of a movement to touch many other lives. They are now even seen in the political scene as many have contested in the Panchayat with mixed results. They no longer think of themselves as helpless women subject to the man's vagaries. Because of the changes in their lives, their children enjoy a healthier lifestyle. These women also act as inspiration and examples for other women in the villages to emulate.

The *Innuyir Grama Sangam* – Sweet Life Movement, in other words – indeed is geared to spread sweetness and light not only to other rural women but also to the poor women in urban areas who are still bound by traditions and hesitations.

BIOVILLAGE: A SNAPSHOT

From 2700 women, the aim is to reach 10,000 rural women. In its third decade, Biovillage Programme is refocusing on the principles it began with as it targets newer geographic areas of coverage.

Biovillage Programme at Puducherry - Highlights
Milestones*: The Journey*

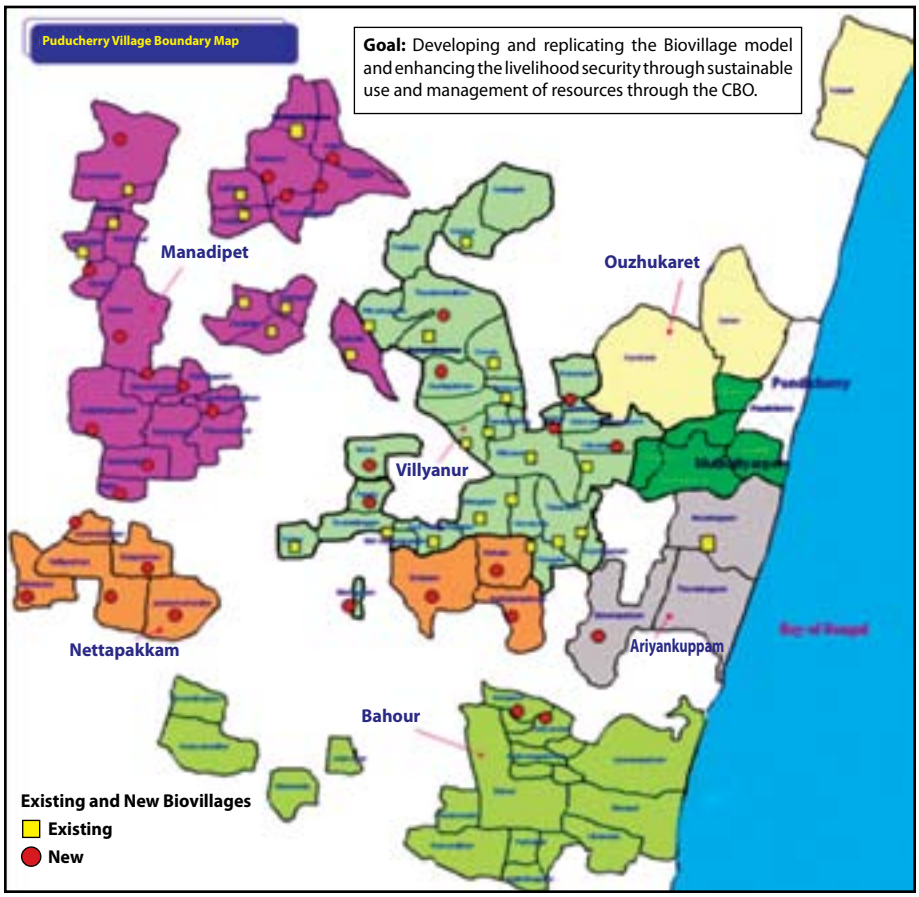
Year	Events
1991	• Dialogue on 'Biotechnology in Agriculture: reaching the unreached' held in Chennai, endorsed the concept of Biovillage.
1991–1995	• The Government of Puducherry invites MSSRF to establish Biovillages in as a pilot demonstration project. Similarly, Biovillages were also established in China by the Chinese Academy of Sciences. • The Biovillage Programme at Puducherry initiated in 3 villages by testing and demonstration of technologies with the support of Asian Development Bank and International Fund for Agriculture Development (IFAD). 14 enterprises: based SHGs were formed.

contd...

Year	Events
1995–2000	• The programme was expanded to cover 19 surrounding villages as a demonstration model with the support of United Nations Development Programme. The Government of Puducherry, Planning Commission (Government of India) and the Food and Agriculture Organisation provided the needed backstopping support. • A Biovillage stakeholder's consortium (Tripartite Meeting) was held to guide the programme. Developed national and international collaborations. • 98 SHGs and 5 Farmers' Clubs. In 1999, Biocentre was inaugurated. • To replicate the Biovillage model in all the villages of Puducherry interested men and women those were closely associated with Biovillage Programme were identified and they were honoured with the name Biovillage Corps in August 2000. • First grassroots institution meeting organised at Biocentre. • The experiences of the Biovillage project led in the development of the following important publications/documents: 1. A toolkit for developing Biovillages 2. Biovillage development plans for the entire Union Territory of Puducherry by a team of consultants and presented to the President of IFAD during his visit to Puducherry in 2000 3. Prime Movers and Doers – a document on the role models 4. A film on Biovillages, titled An Adventure in Partnerships, was produced.
2000–2004	• Replication of the Biovillage model in Kodathur, Puducherry supported by State Bank of India. 29 SHGs consisting of 19 women, 9 men and 1 mixed have been mobilized.
2005–2006	• Emergence of the *Innuyir Grama Sangam* – Federation registered under Society Act (Biovillage Council). • Replication of Biovillage Programme extended, increased to 56 villages covering 4238 families through 346 SHGs. • Participation of women in community activities and active participation of a few women in the local self governance (Panchayat Raj Institution).
2007–2008	• Established the *Innuyir Grama Sangam* Community Bank (micro-credit institution) on 12 January, 2007 with the members' total contribution of Rs 1, 45,000. Promoting livelihood options and supported for on-farm, off-farm and non-farm activities. • Women's Federation registered as a Trust on 23 January, 2008. • Started a collective eco-enterprise, a low-cost sanitary napkin unit, on 1 February, 2008 catering to the women and girls in the villages. • Bioindustrial watershed programme initiated in Karasanur village as Biovillage Programme.

contd...

Year	Events
2009–2010	• Internal review by Dr Uma Lele. • The project continues to work in coordination with the local line departments of the state government and other NGOs working in the same area. While doing so, the multi-stakeholders approach has been adopted for effective implementation of the programme through participatory planning, where the main implementers are the members of the *Innuyir Grama Sangam*. • New executive council members, office bearers and trustees for *Innuyir Grama Sangam* were elected. Role change identification and appointment of animators for *Innuyir Grama Sangam*. • Strengthening process of the grassroots institution started with vision-building exercise. Strategic planning and series of capacity building trainings planned and implemented. • Financial auditing of the Federation (external audit for the years 2007/08 and 2008/09) and individual SHGs (internal audit 2009/10) done and systems put in place. • Management Information System has been streamlined through the Self-Help Enabler (SHE) software package, creating database relating to the basic information of the SHG members and financial details. • SHGs/Federation operational guidelines were developed and a perspective plan for the Federation is being evolved.
2011–2013	• *Innuyir Grama Sangam* Future Search Exercise was done for ensuring the development and sustainability of the members, SHGs and the Federation. The various services of the grassroots institution and its scope for income generation were analysed and a comprehensive plan has been developed. • Major project from Indian Council of Agricultural Research (ICAR) on climate change adaptation integrated into the Biovillage project. • Informal Farmers Producer Organization formed consisting of more than 400 farmers practising participatory technology development process through conservation agriculture practices. • Initiated social security scheme (JBY) micro insurance services to its members. • Biocentre and adjoining Biovillages badly damaged by Thane cyclone in December 2011 and was redesigned and rehabilitated. • Criteria developed for certifying a village as a Biovillage. • 20 years Journey of the Biovillage documented by a team of consultants.



OUTREACH

Around 2700 women from 230 SHGs in 50 villages. Livelihood Activities - 1922 women

EXPECTED TO REACH

10,000 rural women, where majority of them are involved in livelihood activities

Notable Visitors to the Biocentre

NATIONAL

- Dr Rajani Rai, Former Lt. Governor
- Dr R Chidambaram, Principal Scientific Advisor to Government of India

- Dr S Samara, ICAR
- Mr Rabi Narayan Nanda, Minister of Science and Technology, Government of Odisha
- Mr V Vaithilangam, Former Minister for Agriculture, Government of Puducherry
- Mr V L Chopra, Former Director General, ICAR, India
- Mr D Swaminathan, Member, Planning Commission, Coimbatore, India
- Mr Gajendra Singh, Deputy Director General (Engineering), ICAR, India
- Mr G Godrej, Chairman, Godrej Group of Companies, Bombay

INTERNATIONAL

- Mr H C Von Sponeck, Resident Representative, UNDP, India
- Dr Norman Upaff, World Wide Coordinator for SRI
- Dr Speciosa Wandira, Vice President, Republic of Uganda
- Dr Steven, Vice President, Agriculture, Ohio State University, USA
- Mr Filip Dhobey, UN Hunger Task Force
- Mr Pedro Sandu, UN Hunger Task Force
- Mr Abdul Sedhan Harsan, Minister of Youth Development and Sports, Maldives
- Mr Geraldine Kouadio, SIDA, Switzerland
- Mr Maria De Lourdes Acosta Cruz, Foundation Chasquinet, South America
- Mr Tisa Vitarana, Ministry of Science and Technology, Sri Lanka
- Students from Temple University, Japan
- Mr Veronique LUCAS, Journalist, France
- Mr Julian Swwidell, Royal Agriculture College, UK
- Dr Gabriele Stuvm, Fed. Office, Building and Regional Planning, Germany
- Mr E Heideureids Athens, University of Aegean
- Dr Dipl-Ing. Hannes Wimmer, Austrian Institute for Spatial Planning, Austria
- Ms Sara Lombardi, Juniata College, Pennsylvania, USA
- Dr A T Ariyarathnae, Sri Lanka

- Ms Maha Chakri, Princess, Thailand
- High-level Panel of Expertise from Food and Agriculture Organisation, United Nations
- Mr James Gustave Speth, Administrator, UNDP, New York, USA
- Mr Erling Dessau, Resident Representative, UNDP, USA
- Ms Wakako Hironaka, Member, House of Councillors, Japan
- Ms Estina A Kabia, Deputy Director and Chief, DAMR-UNDP, New York, USA
- Mr Peter Rosenegger, FAO Representative, India and Bhutan
- Mr Michel Griffon, Director, CIRAD – GERDAT, Paris, France
- Mr Henri Carsalade, Asst. Director General, FAO, Rome, Italy
- Mr Francis Vibert De Souga, Minister, Government of Guyana, South America
- Mr I Serageldin, Chairman, CGIAR, and Vice President, World Bank, USA
- Mr Bruce Alberts, President, National Academy of Sciences, New York, USA
- Mr Maurice F Strong, UN Secretary General, USA
- Ms Brenda Gael McSweeney, Resident Representative UNDP, India
- Mr Satoshi Arikawa, Director, Hunger Project, Japan
- Mr Guy Sorman, France

CHAPTER 6

The Road Ahead

BIOVILLAGE: FINDING NEW CONTEXTS

The challenges and the way forward

The Biovillage Programme has been a huge learning ground not only for the staff of M S Swaminathan Research Foundation but also for the villagers and officials of the Government of Puducherry. Everybody involved in the Biovillage was learning from each other! And the only thing that perhaps remained constant for all the stakeholders during its 20-year-long journey was the element of 'learning, unlearning, and relearning.' In fact, this element was key to many of the innovations that happened in this Programme. As for impact, the unique interventions empowered the poor economically, socially, politically, and individually too.

Having established and attained sustainability in most of its activities to some extent, the thinkers behind the Biovillage Programme today are confronted with many new challenges, both external and internal. These challenges, in a way, also define the way forward for the Biovillage Programme.

External challenges

As Biovillages are not immune to the external environment, these challenges do affect Biovillages. Some of these are listed below.

1. **Urbanisation:** Puducherry has witnessed rapid urbanisation during the past one decade. It still continues and puts tremendous pressures on its natural resources such as land and water. The land area for agriculture has come down by almost half in the past two decades, though agricultural productivity has remained the same. However, that is not the case with 'water'. Provision of good-quality water has become a new challenge today. Retaining the youth population in agriculture is another challenge, thanks to urbanisation.

2. **Climate-smart agriculture:** Puducherry is prone to the fury of monsoons and frequent cyclones. With every cyclone and

monsoon-related flood, agriculture gets badly affected, leaving thousands homeless and hungry. MSSRF and Biovillage face the R&D challenge of providing climate-smart agricultural practices. This also calls for a strong DRR (Disaster Risk Reduction) programme as well.

3. **Mono-cropping:** While the issue of rampant mono-cropping was addressed to some extent in Biovillages, it is still rampant. The associated issues with mono-cropping are unsustainable use of groundwater, high input cost, and high incidence of pest and diseases.

4. **Malnutrition:** Malnutrition is an issue among women and children in the villages of Puducherry.

5. **Government scheme:** At present, the Government of India is implementing the MNREGA (the Mahatma Gandhi National Rural Employment Guarantee Act) through the state governments. The significant aspect of MNREGA is that it assures 100 days of employment to the rural poor. Today, during the peak agricultural season, there is acute shortage of labourers for doing Biovillage-related jobs as they get busy with the MNREGA work. This has also in a way pushed up the wages of labourers making things a little difficult for the Biovillage Programme.

6. **Refocus on off-farm and non-farm sectors:** The above-mentioned challenges directly or indirectly affect the off-farm and non-farm sectors. Keeping this mind, there is an urgent need to re-strategise the Biovillage Programme, especially in the off-farm and non-farm sectors.

Internal challenges

Some of the internal challenges that should drive the Biovillage Programme in the coming years are listed below.

1. ***Innuyir Grama Sangam* (the Federation):** The establishment of the Federation is one of the major highlights of the Biovillage Programme. With many central and state government schemes coming up for the rural sector, the Federation needs to do some serious thinking as the future of its members is directly linked to the new steps that it takes. As Kathanayaki points out, the Federation needs to reach out to more women, especially in the semi-urban areas.

2. **Pasumai Farmers Producers Organisation:** This is the first farmer producer organisation establised in Puducherry. Action plans are being developed for its scaling up and linking up with various stakeholders. The key challenges are judicious use of ground water and effecting a change in the cropping system from mono-cropping to multiple cropping. This being a cyclone-prone area experiencing frequent heavy rainfall, the farmers and the landless poor need to adapt to climate variability and insure themselves with appropriate measures.

3. **Biocentric interventions**

(a) As mentioned earlier, the rapid urbanisation of the villages has put pressures on agricultural land. This is a challenge for the Biovillage Programme's biocentric approach. According to an estimate given by Dr Ramamurthy, Deputy Director, Department of Agriculture, Government of Puducherry, the total area of farming has come down from 30,000 hectares to 20,000 hectares in two decades. However, interestingly, the productivity has sustained at the same level, despite plots and brick kilns coming up all across the Union Territory. Also, because of the easy availability of water, seeds, electricity, machines and training, farmers themselves are not motivated to move up to the next level and implement new ideas. Therefore, keeping the momentum going with new and better ideas and that capture the imagination of the villagers is a challenge for Biovillage.

(b) Biovillage needs to continue its research on demystification of technologies with value addition, primary process, and storage.

(c) There are about 160 villages around Puducherry itself. There are many small and marginal farmers and landless labourers in all these villages who can benefit from Biovillage interventions. Reaching out to the unreached is a challenge for the Biocentre.

(d) As Dr Harish of the Department of Horticulture points out, the government agencies announce various research results. But agencies like the MSSRF are required to convert the lab tests to land, and facilitate land–land transfer of knowledge as well. He says that many farmers try to copy but do not understand how to apply the technology correctly. For instance, a farmer brought in drip irrigation seeing the results in a neighbouring farm, but also flooded his field with water using the traditional method. Ironically, he was growing groundnut, which will spoil with flooding. The relevance of an organisation like MSSRF is in its understanding of farming and the language of the farmers.

(e) Judicious use of water is integral to sustainable development. As part of the Biovillage Programme, initiatives on watershed development programmes are on. Its ICAR project on studying the impact of climate change on farming in Puducherry is another entry point to revive its farming-related interventions.

4. Managing the spread effect

The spread of the Biovillage framework of development to other programmes of MSSRF in different Indian states has benefitted about 15,000 households, covering 20,000 ha of agricultural land spread over 250 villages. The spread of the Biovillage framework at the Ecotechnology Centre is captured in the table below.

Agroecological region	State/Districts/ Commune	Entry point activities	Projects currently being implemented
Coastal Biovillages	Puducherry	ICT – VKCs	Biovillage project in 5 villages
Biovillages (Inland)	Puducherry	Microcredit Microenterprises	Biovillage project in 54 villages
Rainfed Biovillages	Tamil Nadu – Villupuram, Pudukottai, and Dindigul districts	Soil and water conservation	Bioindustrial watershed project in Villupuram (10 villages), Pudukottai (48 villages), and Dindigul (150 villages)
Hilly region Biovillages	Odisha, Koraput district	Soil and water conservation	Bioindustrial watershed project in 18 villages

5. Every village a Biovillage: pathway to *Gram Swaraj*

'Bios' means living and 'biovillage' denotes Holistic and human-centered development, where the health and happiness of rural families is the goal of development.

The process of converting every village into a Biovillage at the National and International level as visioned by Prof. M S Swaminathan has been initiated in all the project sites where MSSRF works as explained above. Below are some of the criteria that can be used to assess whether a village has qualified itself for being referred to as a Biovillage. Biovillage is the pathway to achieving Gandhiji's concept of *Gram Swaraj*.

(a) Conservation and enhancement of life support systems with reference to soil, water, biodiversity and climate change adaptation and mitigation.

(b) Protection and sustainable management of common property resources on an equitable basis - such as community grazing ground and fallow lands, water harvesting tanks, threshing floor, etc.

(c) Food safety and safe storage of agriculture produce.

(d) Adoption of cropping / farming systems which can enhance the productivity, profitability and sustainability of small holdings with improves post harvest management.

(e) Creation of opportunities for non-farm employment and income through market-driven micro-enterprises, supported by microcredit.

(f) Group cooperation and commitment in the adoption of Ecotechnologies like scientific water harvesting and management, integrated pest management and improved post-harvest technology.

(g) Achievement of nutrition security through concurrent attention to the needed macro and micro nutrients, clean drinking water, sanitation, environmental hygiene and primary health care.

(h) Establishment of community managed village knowledge centres and weather stations.

(i) Leveraging entitlements especially for small and marginal farmers, landless agriculture labours and establishing linkages with various stakeholders like Government agencies, Research institutes, Universities and Financial institutions.

(j) Commitment to gender and social equity and to environmentally sustainable and socially equitable growth.

'Biohappiness'

The Biovillage Programme has demonstrated that knowledge, skill, and technological and managerial empowerment hold the key to poverty eradication on a self-replicating and self-sustaining basis. Delivering on the promise of a 'Production by Masses' strategy will be the single-point agenda for the Biovillage community. This would serve as the engine of development to ignite every household through an 'inclusion' process. Such an engine would certainly usher in a 'Biovillage Transformational Movement' towards 'Biohappiness', i.e. living in harmony with the nature and each other.

BIOVILLAGES: Transforming lives and livelihoods is a document that highlights the 20 years journey of the Biovillage programme conceptualized, developed and implemented by the M.S. Swaminathan Research Foundation.

M S Swaminathan Research Foundation
Third Cross Street, Taramani Institutional Area
Chennai - 600 113
Tel.: +91 44 2254 2790/2254 1229/2254 1698
Fax: +91 44 2254 1319 | www.mssrf.org
E-mail: executivedirector@mssrf.res.in