

Far from Shangrila

by Aysha Chowdhry



"We ourselves must be the change we want to see in the world," Mahatma Gandhi.

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Acknowledgments

I'd like to thank the World Food Prize Foundation and the M.S. Swaminathan Research Foundation for bestowing such an incredible experience. Credit is also due to Professeur Swaminathan and Mr. David DenHartog for initiating a passion to expand my understanding of food security throughout the world.

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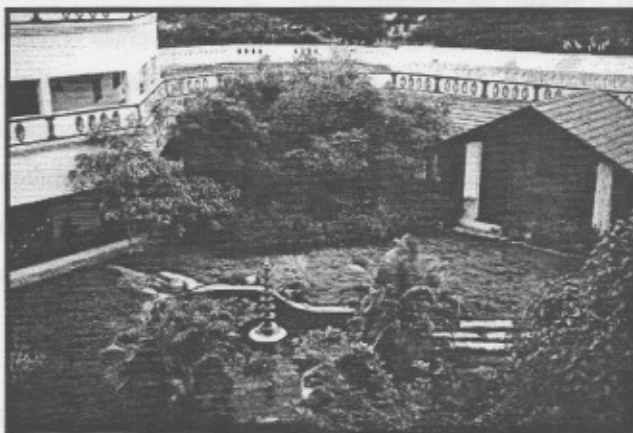
Mahatma Gandhi once said, "We ourselves must be the change we want to see in the world." I believe in this as a common goal, rule, life provision. My name is Aysha Chowdhry. I am from Independence, Iowa, a typical rural, midwestern town. During September of '98 my government teacher approached me with the idea of participating in the World Food Prize Youth Institute. He gave me a brief background on the task I had to complete. I will admit my reluctance to be involved. I wasn't sure if my urban background would hold up against the agricultural talk I would need to understand. I wrote a vague paper discussing global food security, what's been done, and my own immature solutions to the problem. The World Food Prize Foundation Youth Institute approached the students with newly developed pilot programs at international agricultural institutions. Anyone interested in spending two months in a foreign country researching food security, was welcome to apply for the position. I felt the only way for me to understand the obstacles badgering global food security would be to immerse myself in a country, culture, and environment completely unfamiliar to me. After writing another paper displaying my interest and attending an interview with the World Food Prize staff, I was told I would be spending my summer in Madras, India. I had no idea what to expect.

On June 7, I boarded a plane taking me away from everything familiar. As soon as I stepped off of flight 35 traveling from London to Madras, I stood in an immigration line for an hour, searched for my suitcases for another two hours, and after no luck finding my second bag, waited an hour to report the missing luggage. I'd arrived in Madras at 6:00 am. I didn't get out of the airport until 10:00. I was exhausted, dirty, and mad, but I still had to find my taxi driver. Outside the airport exit terminal, I was greeted by hundreds of blatant stares of interest. I was walking on unknown territory, a scary revelation. After struggling to find my taxi driver with no luck, I finally spotted two professionally dressed men and asked them where I could find a phone. I am forever grateful to them.

My voyage from the airport to the foundation took an eternity. I'd never experienced the driving first of all, and was completely astounded by the daily sight. City goers slithered between cars risking fatal collisions, women draped in saris carted full loads of dirt as they worked at construction sites, trash enveloped the streets.

As we drove up Taramani Road, deteriorating buildings stood on the right. Turning onto Third Cross Street, my expectations dropped. I was certain I'd be sleeping in a rat-infested palace the following evening. I was wrong. A gorgeous structure stood before me. I knew I'd come to a safe place

When I arrived at the foundation, the contrast between the surrounding buildings and the center could not be more striking. Two simple helix-shaped buildings are joined by an open courtyard in which the agro-economical zones described in a 2000 year-old Tamil poem, *Tolkappiyam*, are represented: forest, hills, river plains, coastal sea belts and desert land are symbolized in the landscape. Greenhouses purposed for conserving and proliferating traditional plants are on the sides, research laboratories are secluded quietly in back, office and conference rooms face front, while solar panels on the rooftops generate power.



The M.S Swaminathan Research Foundation offices, a center creating better livelihood for the rural poor of Madras.

When you hear about food security problems plaguing a country, the reality of its horror doesn't fully register until you meet it. Nearly one quarter of the world's population, approximately 1.2 billion people live in absolute poverty. At some point in your life you have the chance of meeting someone actively working to improve the lives of that quarter. I met him. His grandfatherly manner and soft-spoken tongue put my nerves to rest when I shook hands with him. Dr. Monkombu Sambasivan Swaminathan greeted me with such familiarity I felt at home right away.

Dr. Swaminathan, born into a medical family in 1925, was expected to follow in his father's footsteps. He chose agriculture instead. A severe drought and ensuing famine in Bengal during 1942/1943, killed horrendous numbers of people and deeply motivated him in this decision. Through years of study in India, Europe, and America, he dedicated his time and energy towards a solution for his people's hunger. In an effort to cope with the reality of the world's dramatically increasing and declining food supply, scientists from all over the world joined together to pursue a solution to evade the inevitable. If something was not done immediately massive starvation would occur. Through the international co-operation of foundations and governments, research money became available to scientists to develop better genetic strains of plants, coupled with the use of chemical fertilizers, to produce harder stock with greater yield. The results were amazing. There was a 250 to 350 percent increase in the production of wheat, rice, maize, and potatoes. During the last twenty years alone, wheat production has increased 500 percent.

Dr. Norman E. Borlaug first isolated the genetic material to develop a strain of wheat, which produced so abundantly it became the foundation of the "green revolution" and for this he won the 1970 Nobel Peace Prize. Upon receiving the Nobel Peace Prize, Dr. Borlaug wrote, "The green revolution has been a team effort and much of the credit for its spectacular development must go to Indian officials, organizations, scientists, and farmers. However, to you Dr. Swaminathan, a great deal of the credit must go for first recognizing the potential value of the Mexican dwarfs. Had this not occurred, it is quite possible that there would not have been a green revolution in Asia."

Conversing with fellow scientists, acting as a mentor to promising young students, seeking funds for significant research, advising the Indian government in policy, educating farmers, dedicating his life not to one achievement, but to a number of follow-through work, Dr. Swaminathan has seen the implementation of policies and practices make India self-sufficient in wheat, potatoes and rice.

Since 1970, Dr. Swaminathan has received 35 honorary degrees from international universities, five honorary professorships, and recognition from scientific academies in eight nations. This includes international awards for everything from the Mendel Memorial Medal of the Czechoslovak Academy of Sciences for contributions to Plant Genetics (1965) to "outstanding contribution to activities which foster development for women as first recipient of the Award for the cause Women in Development (Washington D.C, 1985). Outside of the laboratory he's done everything from being vice-chair of the Protein-Calorie Advisory Group of the United Nations (1972-1977) to chairing the UN Advisory Committee on Science and Technology for Development (1980-83), chairing the UN Conference on Desertification, Nairobi (1977) and



Dr. Swaminathan and I after the presentation I made to the MSSRF staff.

heading the Hunger Free Project. All in the name of lobbying for a better world.

In 1987, the first World Food Prize recognized his devotion towards food security with a quarter of a million dollars. Instead of spending it on himself, Dr. Swaminathan established his own research foundation in July of 1988. The M.S. Swaminathan Research Foundation is a non-political trust committed to harnessing science and technology for environmentally sustainable and socially equitable development. MSSRF's research, training, communication, extension and networking programs in the fields of agriculture and rural development seek to link ecological security to livelihood security in a mutually reinforcing manner.

The organization began its activities in 1989 in a small, rented office space with a staff of three and a mandate to respond to the challenges of sustainable food security. Together Dr. Swaminathan, Dr. Rajeswari, and Mr. Parasu Raman created the base work for a completely successful and established foundation today.

Hunger comes in different faces. Whether its a healthy looking child in a rural village suffering from a micronutrient disease not yet detected, or a mother with her infant strapped to her chest begging for money in the urban slums, each episode poses a threat to life. With each problem, diverse solutions are created to alleve the most outstanding battle mankind will face. MSSRF considers each life lost and each saved with their projects. Using three concepts: food availability, access to food, and biological absorption, MSSRF projects implement these in the daily lives of the rural poor.

From the vision originally conceived by Dr. Swaminathan, MSSRF has blossomed over the past ten years in terms of personnel infrastructure and funding. Today the foundation's more than 150 full time scientific and support staff work to see technology reaches the unreached, those needing it the most. MSSRF has also developed the idea of a "foundation without walls." Many of the foundation's activities take place at a wide range of institutions as well as at the village level. Farmer's fields serve as experimental plots, so there is a genuine partnership between farmers and scientists in technology development and refinement.

During my time in Madras, I became acquainted with many of the projects and project heads. I chose three projects at the foundation in which I analyzed its progress in the ongoing struggle to ensure food security to India's population. The projects I chose are in different stages of development. The Hunger Project headed by Dr. Swaminathan is a mission working towards the eventual dismissal of hunger in India. The Ornamental Fish Project is a well-established program providing an income-generating scheme to rural and landless women in Chidambaram. The Bio-Village, situated in Pondicherry, brings MSSRF's



Some of the girls from the first village I visited.



When I first came to MSSRF, I spent most of my time studying the foundation's projects.

three main objectives; pro-poor, pro-women, and pro-nature to light. It denotes knowledge, skill information, and organizational empowerment of rural families to ensure their happiness.

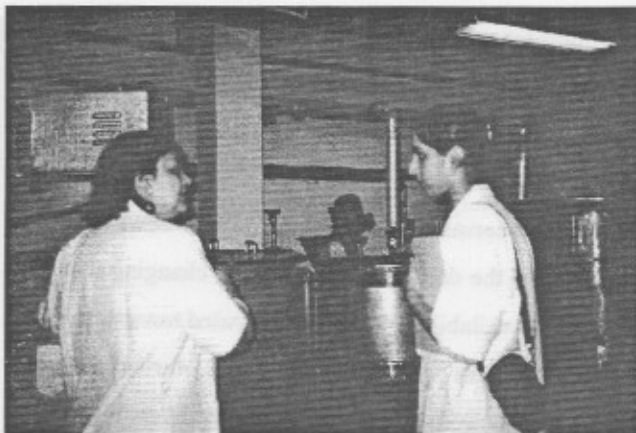
The Hunger Project India, established in 1989, focuses on strengthening the livelihood security of the economically and socially underprivileged sectors of the society. The Tamil Nadu Council assists the government of Tamil Nadu in developing a seven-point action plan for the total elimination of hunger from the state. Based on the multi-center studies undertaken by MSSRF a seven-point action plan has been prepared for combating hunger. The seven points include:

- 1. Identification of the ultra poor suffering from under and malnutrition by the respective gram sabhas based on criteria decided by local communities themselves.**
- 2. Information empowerment of ongoing Government programs disaggregated by age and gender and distribution of household Entitlement cards on the schemes to which the family members are entitled.**
- 3. Eliminating protein calorie under nutrition by ensuring that the targeted Public Distribution System reaches the unreached.**
- 4. Elimination of silent hunger caused by the deficiency of micronutrients like iron, iodine and Vitamin A.**
- 5. Improving the biological absorption and retention of food through the provision of safe drinking water and improved sanitation and environmental hygiene.**
- 6. Strengthening rural and urban livelihoods of families below the poverty line through market driven micro enterprises supported by microcredit.**
- 7. Ensuring that the special programs intended for women and children reach them.**

(Raman p.43)

Malnutrition is implicated in more than half of all child deaths worldwide, a proportion unmatched by any infectious disease since the Black Death, yet it is not an infectious disease. Its threat towards human health holds the higher hand because of its undetectable working state. Millions of survivors are left crippled, vulnerable to illness and intellectually disabled for a lifetime of heartache. It jeopardizes women, families, and ultimately the viability of whole societies. Malnutrition has long been viewed as a consequence of poverty, now it's increasingly viewed as the cause. Micronutrient malnutrition, particularly Vitamin A, iodine, and iron, is wide-spread in the state of Tamil Nadu affecting the health, welfare, and productivity of its population. Orissa and Assam also fall into the category of states where Vitamin A deficiency is prevalent. The task of eliminating this hidden hunger is an integral part of the seven-point action plan. I worked with Dr. S Rajagopalan, world-renowned nutrition scientist, and researched micronutrient deficiencies in India. During my time with him I developed a report explaining causes, consequences, and strategies to overcome hidden hunger. We also discussed the differences a developing country and developed country have in micronutrient deficiency. The contrasts are astounding.

In India alone, significant steps have been made in conquering iodine deficiency. A major factor noted in iodine deficiency research plans concerned questions about methods used to persuade people to incorporate iodine into their daily diets. That problem was solved when under the direction of Dr. Rajagopalan, a study was conducted to mastermind the production of salt fortified with iron and iodine. In collaboration with Mrs. Malavika Vinodkumar of Sundar Biotech, a salt producing company, a patent for double fortified salt was successfully developed. Sundar Biotech, of which she is the owner, was a pioneer in devel-



Mrs. Malavika Vinodkumar giving me a tour of her salt producing factory, Sundar Biotech.



Kolli Hills women pounding millet seeds into a fine powder to make nutritional foods.

oping and commercially marketing iron fortified salt in India. When approached with the challenge of synthesizing salt with both iron and iodine, several problems need to be combated. Normally iron compounds, which are used in fortification, tend to discolor the food item during cooking. After several years of research a suitable iron product was developed, failing to discolor any food item during cooking, remained stable in storage, and was bioavailable. Special biopromoters were involved which enhanced the bioabsorption of iron not only from the salt, but also from the food consumed. During the development of double fortified salt, the related problems involved the stability of iodine. Iodine is stable in an alkaline pH while iron requires an acidic pH. Years of intensive research lead to the development of a product where both iron and iodine are stable for more than a year. In 1992 Nutrisalt was released as the first double fortified salt available to India's population. Today Sundar Biotech is working on the production of a vitamin and mineral liquid supplement for animals. The supplement equips animals, especially farm animals, with the necessary vi-

tamins and minerals through daily feed intake.

(Rajagopalan p.1)

MSSRF is also taking another route in incorporating necessary vitamins and minerals into diets. The conservation and utilization of minor millets project headed by Dr. K. Balasubramanian integrates millets into common food eaten by many of the tribes and villagers in the area known as Kolli Hills. Minor millets are part of a diverse cereal species growing in an equally broad range of environments. Although the total global production of minor millets is less than that of the three major cereals, wheat, rice, and maize,



A woman sifts through the millet flour checking for any irregularities.

minor millets are used as a major food staple in many tribal and rural areas. Minor millets have a better micro-nutrient potential containing higher quantities of calcium and iron when compared to other cereals such as rice and wheat. (Annual Report p.125) The production and consumption of minor millets however is decreasing due to the decline in biodiversity, changing diet patterns and non-availability. MSSRF is focused toward the revitalization of on-farm conservation traditions of tribal and rural families. A strategy hoping to conserve biodiversity through the cultivation of minor millets and increasing the demand for minor millets is through integrating them with regular diets at



The MSSRF and I sell millet products at the Adi Festival.

commercial, semi-commercial, and household levels. One of the project's aims is to re-introduce minor millets into the diets of tribals by developing a sustainable way to improve nutritional security. One of the many approaches toward achieving



MSSRF staff discussing millet seeds with area villagers.

the above goal was to prepare traditional preparations made out of minor millets and market the products to the inhabitants of Kolli Hills and its surrounding areas. The above activities took place during the 3rd and 4th of August, the time of the *Adi* festival, an annual temple festival of Arapali Eswarar where people from various parts of Kolli Hills and surrounding areas were present. Traditional Tamil skits and informative pamphlets regarding the nutritional aspects of millets were used to attract attention of the people in order to sell the millet products. I experienced this traditional approach to marketing and how the populace reacted to this

strategy. My role during this time was to help pack the millet products and participate in the selling of these items during the actual festival. The *Adi* Festival lasted two days and at the concluding day, all the items were sold out proving the acceptance rate of the millet products and the readiness of the people to experiment with incorporating millets into their daily diet.

Through my discussions with Dr. Rajagopalan, my own research, and visiting Sundar Biotech, I created a report documenting India's efforts towards decreasing micronutrient deficiency. The report is now used as a reference in the M. S. Swaminathan research foundation library.

My first excursion outside the foundation came towards the end of June. Ms. Jayshree Vencatesan, project coordinator of the BV Rao Centre, accompanied me to Pondicherry, the site of the Bio-Villages. The biovillage concept is a relatively new idea born in the nineties. This past decade has been a time for detailed re-examination of the impact of con-



MSSRF staff and villagers from the Kolli Hills region.



Ms. Jayshree Vencatesan persuading village women to join in becoming one mushroom cultivation enterprise.

temporary development pathways on human well being and long term survival. Such examinations are needed at national and international levels. The major problems needing solutions in India are:

- Increasing rich-poor division resulting in the co-existence of unsustainable life styles and abject poverty and deprivation.
- Increasing feminization of poverty.
- Increasing damage to the basic life support systems of land, water, bio-diversity, forests, oceans, and the atmosphere.

- Expanding jobless economic growth.
- Expanding urbanization and the rapid growth of urban slums caused by the influx of environmental and economic refugees, who have no livelihood opportunities in their native villages.
- Prevalence of malnutrition and under nutrition among over 200 million children, women and men and the prevalence of silent hunger caused by micronutrient deficiencies in over 300 million persons. (Annual Report p.125)

The Biovillage model of rural development is designed to address some of these issues at the micro level. The name Biovillage denotes human centered development, where health and happiness of rural families is the goal of development. Its objectives require a pro-nature, pro-poor and pro-woman orientation to a job-led economic growth strategy. The methods used to achieve the objectives are knowledge, skill, information and organizational empowerment of rural families with priority being accorded to Ecotechnologies. These goals are based on a blend of traditional wisdom and frontier technologies such as bio-information, space, renewable energy and communication technologies. The Biovillage community will thus become ecological entrepreneurs or eco-preneurs.

As an avid subscriber to *National Geographic* magazine, I've seen indigent families and malnourished children pictured throughout the pages. During my visit to Pondicherry, I visited some of the villages the foundation aids. Walking on the dirt roads I noticed the appalling sanitary conditions. Animal feces cover the road allowing infections to spread. Barefoot children play cricket, unaware of the germs climbing their naked legs after stepping in decomposing garbage. Dogs stagger with ribs protruding over lifeless skin, eyes sunken to a hollow skeleton. Most of the houses, or huts, are made of thatch roofing and dirt walls. You can distinguish between the financial status of a family just by looking at their home. Homes with shingle roofing hold a higher financial status than others in the village.

The Biovillage project aspires to ease the financial load of the villagers by suggesting methods of income generation, new farming techniques, and providing technical guidance to the village population. I came into contact with



One of several meetings held at the MSSRF office in Pondicherry.

two types of income generating projects during my stay: mushroom production by rural women, and floriculture. The mushroom production done by rural women was extended to the Uruvaiyar village where eleven participants are involved. The women produce oyster mushrooms by a system of using three hanging tiers. The project is successful with a yearly production of 537 kg and a generated income of 21,480 rupees. I attended a meeting where Ms. Vencatesan and other MSSRF employees were trying to convince the village women to join together and become one registered enterprise. Currently the women had been working with small-scale mushroom production making the profit minimum. The foundation felt if the women became one enterprise more profit would be brought in. After discussing the possible advantages and disadvantages of the proposal the women agreed to the suggestion. MSSRF agreed to provide the women with equipment at the biocentre to help ease the vigorous work accompanying mushroom production.



A farmer working in a rice field.

Most of the villages I went to marketed flowers as an income source for their family. The foundation gave jasmine plants to families who groom and sell the flowers for profit. The marketing of flowers bring 10-30 rupees in for some families, a healthy dose to their daily income.

I also visited the Biocentre, a tool envisioned as a facilitation institution for the testing and adapting of new technologies. The Biocentre stands as an educational tool used by the village farmers. It was developed by the MSSRF foundation to teach farmers advances in technology and farming techniques. Experience of both externally and nationally funded rural development projects show projects collapse when the external funding is withdrawn. Therefore, in all MSSRF projects, a



Ms. B. VijayaLakshmi measuring the content of nitrogen in the paddy field.

withdrawal strategy is based on efforts to build the capacity of rural families to manage the enterprises on their own. This involves building new voices and new leaders with the society. The Biovillage projects encourage the setting up of a Biovillage society constituted by the principal stakeholders. The Biocentre performs the following functions:

- Enables efficient decentralized production through the provision of key centralized services.
- Provides the necessary production and market information
- Confers on small-scale producers the power of scale in marketing.
- Provides the infrastructure essential for training, networking and capacity building.
- Provides necessary facilities for the effective functioning of the Biovillage Society.
- Serves as a meeting place for the exchange of experiences and ideas.

(Annual Report p. 125)



Women from the Keekamankudi village explain how they care for the ornamental fish.

These functions give the stakeholders a feeling of ownership thus creating a social and economic stake in its sustainability and effective functioning. The biocentre also abides by four components used to guide their work.

Components of Biocentre

- **Demonstration:** Biocentre will be the focal point of technology generation, testing, and demonstration of new crop varieties and hybrids, and micro enterprises.
- **Training:** on various microenterprises, microcredit and crop management for the villagers will be imparted. On demand, other NGO's and institutions would also be trained.
- **Information and dissemination:** through the Knowledge Center on Sustainable Food Security, on farm and off farm technologies, market price intelligence, meteorological aspects and entitlements for the resource poor.
- **Service center:** Various service facilities such as Animal health care center, Biocontrol agents, poultry feed production, mushroom processing and spawn production and processing. (See Reference #18)

The Biocentre is a true example of the foundation's work. Many people benefit from the exposure to advanced technologies shown by the MSSRF staff. A few more years of reinforced teaching will definitely bring about an economical change in the rural poor of Pondicherry. The success is accredited to the MSSRF staff and the farmers taking an interest in their own economical status.

The foundation plays a catalytic role in promoting a job-led economic growth ecologically sustainable in rural areas and particularly in agricultural sectors. It strives to develop, demonstrate and disseminate rural technologies by virtue of its pro-nature, pro-poor and pro-woman approach towards sustainable livelihood. Sustainable development of economic activity can not be possible unless women are involved in planning, decision making, and controlling the resources. The rural poor have two assets; time and labor. Adding value to the two assets will hopefully lead to livelihood security.

One of the methods researched by the foundation is aquaculture. Aquaculture contains vast potential in providing livelihood security as well as fulfilling the nutritional requirements of the rapidly growing population. Like many other production ventures, however, aquaculture also faces ecological, economic and social challenges while aiming at sustainable development. In view of the growing awareness of both the economic potential as well as the ecological issues with reference to the aquaculture activities, the foundation envisioned a program called 'eco-aquaculture' whose major concern is to develop a sustainable operation model in aquaculture. One of the main focal themes of the project is to address the issues of feminization of poverty by strengthening the role of women in various facets of aquaculture activities. On this premise the pro-



Shaleesha visits Chidambaram at least once a month to discuss progress and problems with the villagers.

gram makes effort to maximize productivity, but within the realm of ecological sustainability. The major issues addressed through the program are:

- Utilization of local resources.
- Reduction of resource dependency, particularly on the ground water resources.
- Integration of aquaculture components among other agricultural activities and develop an appropriate production model based on ecological principles.
- Precisioning of natural resource utilization including energy.
- Skill empowerment of rural poor women.



Posing in front of a few ornamental fish tanks.

A survey in the program found that women play a major role in the collection of wild seed, pond construction and post harvest activities. Their role is limited in the activities such as stocking, feeding and seed preparation. The program tries to fill the gap by providing technological skill and training to rural women.



Shaleesha and I conversing with some village women.

Under the direction of Ms. Shaleesha Asir, I learned about and visited the site of backyard ornamental fish culture in Chidambaram. Shaleesha, 26, has been working at the foundation for 5 years. Three and a half of those years were spent toward her backyard ornamental fish project. Her main goal in developing this project is to provide an income-generating plan that would not add to the drudgery of the women's daily workload. Before the project could be actively pursued Shaleesha and co-workers extensively surveyed the village they'd be working in. That alone took six months.

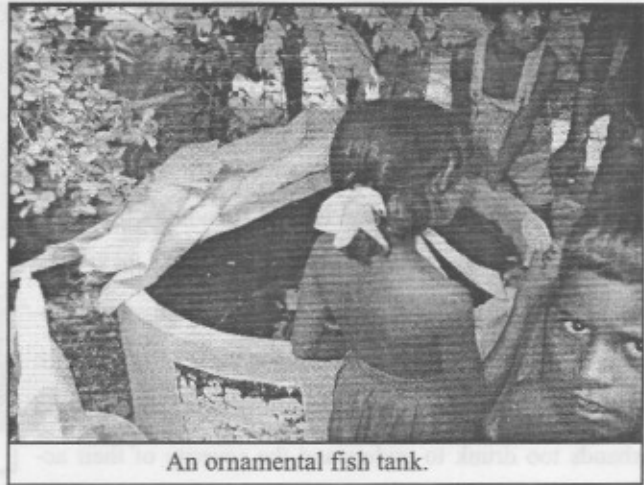
Villagers were reluctant to embrace the program fearing they would be swindled or have their land taken away. They were also not used to the idea of gaining money over a longer period of time for most workers were paid daily. After months of positive communication between the villagers and MSSRF staff a training program developed. During the first training session 60% of the village showed up. MSSRF staff needed to be selective of the households they were going to choose for success of the project depended heavily on the responsibility of the women caring for the ornamental fish. Two more training sessions were held. The second training session



Talking to the children in Chidambaram.

brought in 45% of the village population and the third brought in 30%, approximately the number of households wanted for the project.

Choosing the households became just one part of the educational journey for the villagers. Shaleesha lived in Chidambaram for 1 year to reinforce the manner in which the ornamental fish be raised and marketed. The MSSRF foundation gave three cement tanks as a capital and initial investment to each household. These were given on an agreement that the women would repay the cost from the profit of the fish to be sold. Thirty of the households embarked on the



An ornamental fish tank.

project making the total number of tanks in the village 90. The women are provided with live bearers of fish such as Guppy, Platy, Molly, and Swordtail. They were trained to address management issues related to the breeding of ornamental fish. The MSSRF staff regularly checks the fishes and make sure they are stocked according to minimum standards, avoiding any biological competition which would otherwise lead to cannibalism. The women earn an average of 300-500 rupees as an additional supplementary to the monthly income. After only a year the villagers, fully confident in their task, began breeding and marketing ornamental fish independently. The project has now been running successfully for the past two and a half years. They are independent of the MSSRF staff and approach them only during urgent problems. A local women fish-grower's self-help group formed to manage the feed and marketing issues in order to attain the scale advantages. The



Shaleesha showing me the fresh water prawn ponds.

group has also been advised to support more women in breeding ornamental fish through credit facilities. The ornamental fish project not only brings income to rural women, but also places them in a higher family position. More of these women play a major role in family decision making, a role missing before. Annual surveys done by the MSSRF staff discovered a 40% increase in financial status after participating in the ornamental fish project.

When I visited the colonies of Ambedkar and Periyar in the Keelamankudi Village I noticed the respectful, yet familiar fashion in which the village population greeted

Shaleesha. Carrying a single package of biscuits, children flocked to her sides shyly, but knowingly, waiting for a chance to indulge the cookie, a gift not given often. To them Shaleesha improved their living and food standards, an obstacle most never have tried. Although one out of the three tanks were empty, they usually are from May through August because of lack of rain, the women openly explained to me their daily fish care methods and how they separate the baby fish from parents. After years of breeding the ornamental fish the women are now experts.

During a question and answer session between the village women and me, I asked their first reaction when Shaleesha came to their village and suggested the idea. All of the women said they were hesitant initially, but now the market has improved, the village receives social recognition when buyers come, and children started going to school. The profits are all

put into a bank account, the first time any of the village residents have been exposed to one. Every month 10 percent of the profits go to an account making a lump sum of money over time. With the remaining money families are able to buy more food, entertain themselves by attending a few movies, and basically live a happier life than before.

A disturbing issue came up during one of our discussions. Domestic abuse is a common sight in any village household. Many of the women endure years of ill-tempered husbands too drunk to understand the severity of their actions. Many of the men are alcoholics, working themselves

into drunken rages after a day's work of farming and construction shifts. The women have now become one of the main income generating parties in the family thus forcing men to ask them for money at times. Authority gives the women an advantage over the men, forcing respectable behavior and nothing else.

Today the ornamental fish project is considered a success. It is a well-established idea now aimed at replicating its success in other villages in India. MSSRF staff is hoping to provide the ornamental fish propagators with higher bred fish to ensure the steady income of sales. "Any project which is done by MSSRF should help the rural people, especially rural women. They should have access to books, technology, and build the business on their own. They need to become independent," says Shaleesha of the rural women she worked with. The ornamental fish project is an example of the foundation's work to provide innovative science and technology to the rural poor. A simple idea and dedication by the project-staff brings a higher degree of financial security to families in Keelamanakudi. More income allows the villagers to buy more food pushing India closer to a hunger free country.

The philosophy of the foundation is clear in stressing the thinking of Dr. Swaminathan. He believes: "The world is in search of methods of giving practical shape to the concept of sustainable and equitable development. To achieve this, several forms of tensions need to be resolved: between individual gain and common good; between short-term opportunities and long-term stability; between job-less economic growth and the livelihood security of the poor; between resource extraction and ecological sustainability; between market economy and "marketization" of society, between greed and need. Only that kind of development which can help to resolve such tensions will be sustainable in the long run."

The Hunger Free Project, Biovillage project, and the ornamental fish project seek in keeping this dream alive. The Hunger Free Project does this by assessing India's food security problems and then searching for solutions. Micronutrient deficiency threatened the lives of millions years ago. Today, through scientific research, government funding, and education to the rural poor the percent of micronutrient deficiency victims fall every year. In a few years micronutri-



Children from Chidambaram



Shaleesha talking to the main person involved with the ornamental fish project.



Something I never would have done, but did.

ent deficiency will be eliminated.

By consorting to the food security pillars backing MSSRF Tamil Nadu's rural poor are improving their food intake. The projects I analyzed are minimal compared to the broad spectrum of plans in action at MSSRF. All of the projects fall into one of three categories developed to maximize MSSRF's work. Food availability is the primary concern in any family. As long as the presence of food exists in markets, severe malnutrition does not pose such a great threat unless there is absolutely no income available. MSSRF's Ecotechnology department concentrates on providing the rural poor with the knowledge and skills

needed to ensure a healthy production of harvest. Projects such as the Integrated Intensive Farming System (IIFS) maximize the productivity of crops while analyzing the economic efficiency, ecological viability and social feasibility of the model. Other projects developed by the Ecotechnology department implement the same goals.

While food availability is present, access to food provides another obstacle. Many rural families struggle to purchase food thus projects suggesting a means to generate income was developed for rural women while adding little drudgery to their daily workload. Mushroom production, floriculture, and the ornamental fish project are three of the methods MSSRF developed. The projects provide an environmentally friendly way to produce with natural resources. All three provide simple tending to the product and profits made benefit the worker.

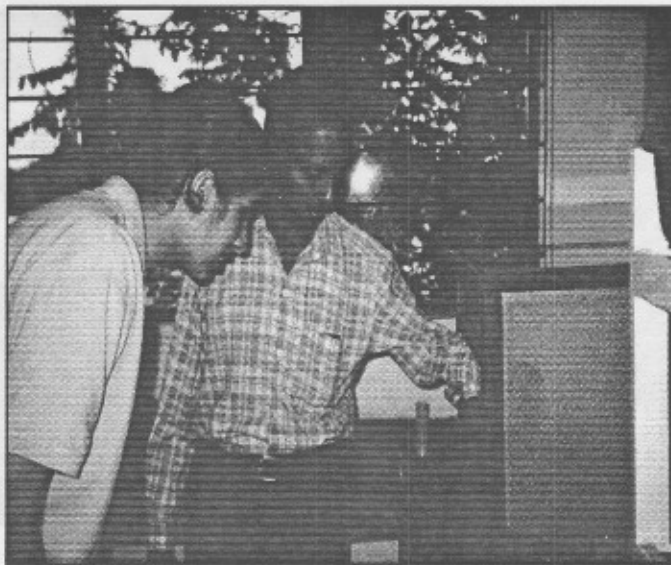
With food availability and access to food undertaken, malnutrition poses a threat more than ever. Studies confirm water borne diseases, worm infestation and diarrheal disease are common in rural areas. Stipulations regarding safe drinking water, sanitation facilities and proper water disposal will go a long way in reducing the incidence of morbidity and increasing the biological utilization of nutrients consumed.

Two months ago I stepped off a plane unaware of what the future held in sight for me. As I mentioned in my introduction, my views about food security were truly immature. After researching the three aspects of food security: food availability, access to food, and biological absorption, I understand the interdependency of each category. While food availability is present, income has to be present. Children must obtain the necessary nutrients essential in the early stages of development. The challenge comes when having to recognize such a deficiency, even that is impossible at times. Before I came to India, food security issues didn't concern me. The closest I'd come to visualizing hunger came in magazines displaying children with fleshless legs failing to hold up the frail structure of a malnourished



Ms. Jayshree Vencatesan spent alot of time explaining the nature of the Biovillage project to me.

body evident in ballooned bellies. I was ignorant to the consistent hunger troubling an extreme number of people globally. Dr. Swaminathan, MSSRF employees, and the countless number of poverty-stricken faces I encountered on this trip altered my views. After reading numerous numbers of reports, discussing food security challenges and visiting sites where projects are implemented I've seen progress. My endeavors during the past two months transformed past complaints into honest spouts of gratitude. The people I've met all inspire me in more ways than words allow.



Mr. Malarvannan explaining the usage of biopesticides.

I'd like to thank first and foremost Dr. Swaminathan and Mrs. Swaminathan for providing this opportunity for today's youth. I'll never be able to express the magnitudes of change I've undergone since coming to India. I hope you continue to provide such opportunities for future World Food Prize scholars. I'd like to thank Professor P.C. Kesavan and Ms. Sudha Umopathy for their genuine show of interest in my activities, Dr. S. Rajagopalan and Ms. Malavika Vinodkumar for centralizing my report on micronutrient deficiencies, Ms. Jayshree Vencatesan and Dr. R. S. Hopper for arranging my visits to the biovillages, and Ms. Shalesha Asir for sharing her work on the ornamental fish project. I'd also like to thank the entire MSSRF staff for making my stay in India unforgettable. All of the little things people did for me will always be remembered. A special thanks to Ms. Shilpa Patel, the prime motivator behind all my reports and field visits and to Ms. Anita Vasanth and Ms. Hemalatha Rathnam for befriending me the first few days I was here. This summer has been the most memorable and educational journey of my life.



References

1. Hetzel, B.S.; Pandav, C.S.: S.O.S for a Billion-The Conquest of Iodine Deficiency Disorders, Oxford University Press, 1996, pp.4, 14, 223, 279, 433, 436.
2. Laguna, Rosalinda T; Claudio, Virginia S.: Nutrition and Diet Therapy Reference Dictionary; CBS Publishers and Distributors; 1996; pp. 188-189.
3. United States Department of Agriculture; Nutrition-Eating for Good Health; pp. 145-149.
4. World Health Organization Geneva; The 1998 World Health Report – Life in the 21st Century, a vision for all; pp. 133.
5. Vijayaraghavan, Dr.K; Hanumantha Rao, Dr. D; Mallikharjuna Rao, Mr. K: Diet and Nutrition in India: National Institute of Nutrition, Indian Council of Medical Research, Hyderabad: 1998; pp.21-23, 25-26, 33, 36, 37.
6. Food and Agriculture Organization of the United Nations (FAO) and International Life Sciences Institute; Preventing Micronutrient Malnutrition: A Guide to Food-based Approaches; ILSI Press; 1997; pp.9-10.
7. UNICEF Fact Sheet; Micronutrients (Iodine, Vitamin A, Iron); 1998, pp.1-4.
8. UNICEF Fact Sheet; Malnutrition: Causes, consequences and solutions; 1998; pp. 1-16.
9. UNICEF Fact Sheet; Summing up malnutrition's shame; 1998; pp. 1-2.
10. Raman, Dr.K.V.; Rajagopalan Dr.S; Sunderajan, Meera; Vencatesan, Jayshree; Kappoor, Smita; Ravi Kumar, M.V.; Saravanan, S.; Ramya, K; Kumar, M.K. Sathish: Hunger Project India-Towards a Hunger Free India-The Final Milestone: 1999; pp. 43-47.
11. UNICEF; Reducing Malnutrition – A Call for Urgent Action; 1995.
12. Rajagopalan, Dr.S; Kumar, Malavika Vinod: Elimination of micronutrient deficiencies by providing iron and iodine through the medium of salt- Development and field trials to assess the efficacy of NUTRISALT-Double Fortified Salt; pp. 1-4.
13. Raman, Dr. K.V.; Rajagopalan Dr. S.; Ramanathan; Kapoor, Smita; Kumar, Satish: Manual for the Development of Hunger Free Area Programme; 1999.
14. Background Papers for Global Hunger Project; Consultation on Towards a Hunger-Free India- The Final Milestone; 1999.
15. Gopalan, C; Micronutrient Malnutrition in SAARC- The Need for a Food-based Approach; NFI Bulletin (Bulletin of the Nutrition Foundation of India); July 1998; pp.1-4.
16. Website: <http://www.idrc.ca/mi/idddocs/whotoll.htm>
17. Website: <http://www.kiwanis.org/wsp/iddsolv.htm>
18. M.S. Swaminathan Research Foundation Annual Report 1997-98;Chennai.