

The Community Managed Bio-Industrial Watershed in Karasanur

**Empowerment through Water Security for Small &
Marginal Dalit Farmers**



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World Food Prize Foundation

2012 Borlaug-Ruan International Intern

MS Swaminathan Research Foundation (MSSRF)

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Lastly, thank you to my family and friends for their undying support, even from oceans away.

Introduction

Amidst the cacophony of horns and masses of people upon my arrival in Chennai, India, I was elated by the realization that I had finally made it. This dream had at last come into fruition. However, another realization left me even more stunned: I had just become the first person in my family ever to leave the continent of North America for something other than war. This made me utterly grateful for the progress previous generations have brought about. Meanwhile, it also reminded me that I belong to a new generation that is coming of age, which is poised to shrug off centuries-old grudges and cultural barriers for the sake of global progress.

Just two short years prior, I was introduced to the World Food Prize and its youth programs when I happened to speak with Jasmine Chen, a 2007 Borlaug-Ruan Intern. After hearing about my interests in international development and human rights, she said these were opportunities that I could not ignore. Now, I am forever grateful for our conspicuously destined conversation. Once I read about the Global Youth Institute (GYI), I was convinced that I had to attend. Furthermore, I was certain that I wanted to apply for a Borlaug-Ruan International Internship.

When I attended to the 2011 Global Youth Institute, I was a junior at Keokuk High School. For my research paper, I explored the ways in which conflicts over mineral resources exacerbated food insecurity in the Democratic Republic of the Congo. Since I was the first student from my school to participate in the GYI, my frequent communication with Lisa Fleming began early. She graciously guided me through the process of writing my essay and, ultimately, attending the Institute with my mother.

The international crowd that gathered in Des Moines during the Institute never ceased to amaze me. The passion of the speakers was infectious, and the lessons they shared were unforgettable. I remember being told by Josette Sheeran, the former Director of the UN's World Food Programme, that our generation would be the one to eradicate hunger. In order to do so, she instructed us to "be impatient, be unreasonable, be demanding, and get it done." I also remember DuPont CEO Ellen Kullman saying that "science is universal; solutions are local." She explained that broad concepts must be paired with local solutions in the fight against food insecurity.

A myriad of motifs in the story of hunger and various statistics shared during the Institute are forever ingrained in my mind. Five months later when I was assigned to do

an impromptu in speech class about the “greatest problem in the world,” I went over time by many minutes sharing a plethora of hunger statistics and their solutions.

When I received my insignia-clad letter from the World Food Prize which announced that I had been selected as a 2012 Borlaug-Ruan Intern, I thought it was not possible for me to feel any more excited. Though, I was soon thereafter proven wrong when I received an e-mail on my phone from Professor MS Swaminathan. This meant that I would be spending my summer in India at the MS Swaminathan Research Foundation (MSSRF)!

The Work of the MS Swaminathan Research Foundation

After receiving the first World Food Prize in 1987 for bringing the Green Revolution to India, Professor Swaminathan set out to help establish a foundation to carry his vision forward. Today, the MS Swaminathan Research Foundation uses science and technology as the means for achieving “pro-poor, pro-women, pro-sustainable, and pro-nature” development. Through knowledge dissemination and applications of ecotechnology and biotechnology, MSSRF works to foster on-farm, off-farm, and non-farm livelihoods.

On numerous occasions, MSSRF has received international recognition for its work. In 1996, MSSRF became the first institution in Asia to receive the Blue Planet Prize – the most eminent award recognizing achievements in environmental protection - for its research regarding mangrove conservation and coastal agriculture. State governments and the government of India have often looked toward MSSRF for guidance in the development of suitable policies pertaining to sustainability, food security, and nutritional security. In addition, Professor Swaminathan was recognized by *TIME Magazine* as one of the “Twenty Most Influential Asians of the Twentieth Century.”

About the Staff

Dr. R.S. Hopper, who served as my mentor during the time I spent in Chennai, is the Director of the JRD Tata Ecotechnology Centre of MSSRF. Therefore, he oversees the implementation of the Centre’s projects, which include five bio-industrial watershed sites, various “biovillages” across India, Fish for All Training Centers, and many more.

My other mentor in Chennai, **Dr. Manjula**, is the Centre’s Principal Scientist. As second in command for the Centre, she manages the execution of the projects aforementioned, especially as they pertain to gender mainstreaming and sustainability.

As I carried out my research at the Bio-Industrial Watershed site in Karasanur, **Mr. Nandeesh** helped to guide me through my work. His job as the project coordinator for the BIWS program in Karasanur is to ensure its progress on a day-to-day basis.

In order to prepare for my field visits, I spent time at the office of the nearby biovillage, where I was aided by **Dr. Vidya**. As the Project Coordinator for the program, she plans the countless social and scientific interventions that take place, such as the federation of women's self-help groups (SHG's), capacity building, and various organic farming methods. The biovillage, therefore, serves as a model for the surrounding community members, who replicate the various interventions that take place in their own villages.

Mr. Sanjeev is a scientist for the BIWS program, who guides the beneficiaries through adapting MSSRF's agricultural interventions. In addition, he served as a translator during my interviews.

How I Chose My Research Topic

At the beginning of my internship, I had many nebulous notions of what my ideal project would consist of. First, I wanted my research topic to somehow involve Micro-Finance Institutions (MFI's) and Self Help Groups (SHG's). Through establishing a global awareness group in my community and serving as an intern for the Iowa United Nations Association to spread its mission of a "globally engaged Iowa," I had become fascinated with microfinance and its ability to empower the globe's most destitute. Given that I was in India, the land in which a Gandhian philosophy of self-reliance prevails, it seemed fitting that I witness first-hand the grassroots development that Community Based Organizations such as MFI's and SHG's can bring about. This research would also enable me to have much interaction with the beneficiaries of such programs, which I was eager to experience.

In addition, I hoped to explore the technical aspects of one of MSSRF's projects. That way, I could receive a more complete view of how MSSRF is able to initiate programs that empower the poor and promote gender equity, while also ensuring their sustainability and ecologically responsibility. Though, due to the many programs that take place within the Ecotechnology Centre, I was not sure precisely which one to research.

During my second day in India, Dr. Hopper invited me to join him for three days as he traveled to various project sites. With what he referred to as my "window seat view," I would be more inclined to decide which project I wished to be involved with. On this trip, we visited two Bio-Industrial Watershed (BIWS) project sites. The leaders of the Hindustan Petroleum Corporation Limited (HPCL), which supports MSSRF on water

augmentation through its corporate social responsibility funds, had come from Mumbai to see the progress of the BIWS projects. As Dr. Hopper and his colleagues explained the projects to their supporters from HPCL, I learned a tremendous amount about the program.

As I visited these project sites, I began to comprehend the holistic transformations that sufficient water access was beginning to bring about for the villages. Prior to the introduction of the BIWS in these communities, insufficient water access meant that much of their land lay fallow. Though, the increased water availability was enabling farmers to plant crops they would never have imagined possible before. The increased income promised by MSSRF's intervention, along with its capacity building and development of Community Based Organizations, promised meaningful empowerment for the villagers. With this understanding, I became certain that I wanted to study how the Bio-Industrial Watershed Program had begun to empower its beneficiaries, both socially and economically, through agricultural advancements and community management.

The Analytical Framework of the Project

After I explained my interest in researching the BIWS to my mentors, Dr. Manjula helped to put the project into context and to set forth a plan of action for my research. She explained that since these farmers were Dalits, or members of the former lowest caste, significant strides were left to be made in their social standing. Therefore, I researched the ways in which the Bio-Industrial Watershed had impacted the purchasing and bargaining powers of these farmers.

The Bio-Industrial Watershed that I researched was located in the panchayat of Karasanur, and more specifically the hamlet of Thiruvalluvar Nagar. This hamlet, which is directly adjacent to the BIWS project site, is inhabited by 110 Dalit families. Twelve of the members of this community were the direct beneficiaries of the Karasanur Community Managed Bio-Industrial Watershed program. Of the beneficiaries, seven were women and five were men.

I explored the ways in which the BIWS program impacted the lives of the beneficiaries through interviewing each of them. During the twelve interviews, I was able to gather quantitative data, such as improvements in water availability, income, crop intensification, and diversification that were experienced by each of the farmers. Furthermore, I was able to gain insights into the effects of the program through the personal stories and hope that they shared. After conducting the interviews, I held a focus group with the beneficiaries altogether to learn about the project's effects on their

bargaining powers and their ability to demand the fairness that they deserved in their economic activities. Then, I spent my last week in India at the Foundation in Chennai, writing this report by piecing together the data and anecdotes that I gathered to provide a full view of the empowerment that the Community Managed Bio-Industrial Watershed project in Karasanur had brought about.

The Need for Water Conservation in India Today

Water, of course, is essential for growing the food that feeds our world. By fostering sufficient water access in areas that previously lacked an adequate water supply, water also serves as a catalyst for social growth. In fact, it has the potential to break the bonds that remain from the former Caste System.

In recent years, India has experienced noteworthy progress at the macroeconomic level with a burgeoning middle class, which has made the nation's future all the more hopeful. Even with the onset of the global financial meltdown, India has maintained one of the highest GDP growth rates among emerging markets and has accomplished meaningful progress toward achieving some of its Millennium Development Goals (MDG's) by 2015, such as reducing by the half the proportion of people who earn less than one dollar per day. While the nation struggles to reach its MDG's regarding Child Mortality and the spread of HIV/AIDS, it achieved the goal of improving the proportion of people without access to proper sanitation and clean drinking water by fifty percent by as early as 2008.¹ However, as the number of people below the poverty line today exceeds the number of people that made up India's original population in 1947, there is much more to be done in order to achieve a food secure and poverty-free India.



In addition, the progress that has taken place has not been shared equitably, especially for one group in particular: the poorest of the poor. Many of those who belong to this group are Dalits, or former "untouchables" during the Caste System. Although the Caste System is no longer legally in effect, Dalits remain highly outcast

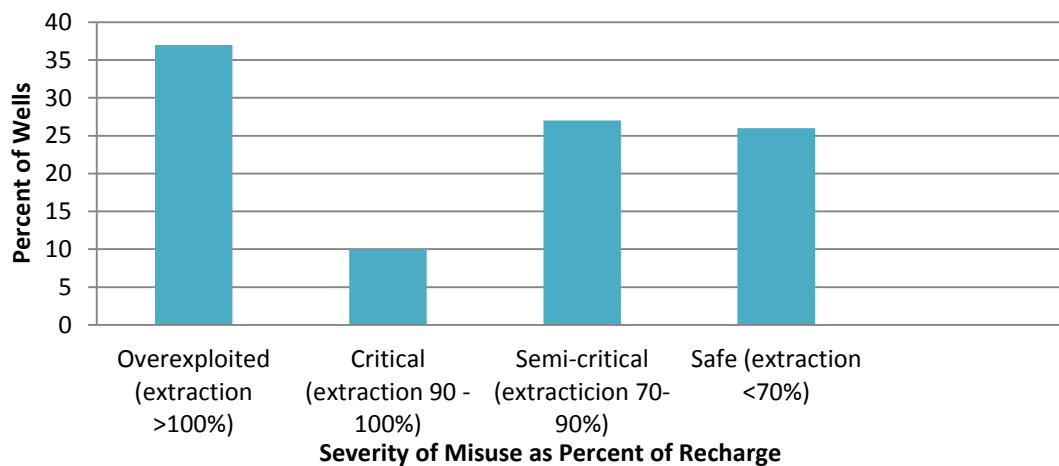
¹ Indian Ministry of Statistics and Programme Implementation, *Millennium Development Goals India Country Report 2011*. New Delhi, India, 2011, pg. 108

and marginalized in practice. Of India's 1.3 billion inhabitants, an estimated 167 million make up the Dalit community.² Members of this community continue to face unequal enforcement of laws and protections. Furthermore, they are victims of human trafficking more than any other group in the world, and Dalit women are said to face "double discrimination" due to backward attitudes toward gender and the frequent lack of retribution in the aftermath of sexual violence.

The variable that is most likely to decide India's future is water availability. As nearly two-thirds of the agricultural land in India is rain-fed, farmers remain at the mercy of the monsoons for their income security. These rains are becoming increasingly unreliable as the effects of climate change become more pronounced. Furthermore, given that most of India's annual rain comes within one hundred hours,³ the development of adept water harvesting structures is essential for achieving lasting water security.

The history of water harvesting structures in India parallels that of the subcontinent of India. As a legacy of colonization, these structures fell under misuse and neglect by the British. Though, even after independence in 1947, the Indian government continued to maintain them in negligence. As the government injudiciously managed the systems, the communities lost ownership and responsibility for their wells and tanks. It is this history that makes the future of water security in India so turbulent.

Figure 1: Water Mismanagement in Tamil Nadu



Source: Briscoe and Malik, 2006

² Stephanie Barbour, Tiasha Palikovic and Jeena Shah. *Hidden Apartheid*. Human Rights Watch. New York, USA, February 2007, pg. 2

³ Narain, Sunita. "Building a Water Secure India." *Centre for Science and Technology*. Web. 15 July 2012.

Due to the disrepair of the water harvesting systems, small and marginal farmers are forced to develop their own mechanisms for accessing water. These wells are frequently mismanaged, inefficient, and flawed by design. As Figure 1 shows above, thirty-seven percent of the wells in Tamil Nadu are overexploited, as water is drawn from them in amounts that exceed their likely recharge.

The need for water conservation becomes especially urgent with the realization that the country's demand for water is likely to exceed its supply as soon as 2050.⁴ While the world's largest democracy grapples with industrialization, the rise of big business threatens to take water resources away from the farmers and ecosystems that need them most. As sixty-five percent of India's people are dependent upon agriculture for their income, this tumultuous water paradigm poses a significant threat to the nation's livelihood security, as well as its food security.⁵

Background of the Karasanur Community Managed Bio-Industrial Watershed (BIWS) Program

The dichotomous relationship that has developed between the industrial and agricultural sectors over water resources in India requires innovation that takes into account food and livelihood security, as well as environmental quality. This is precisely what the Community Managed Bio-Industrial Watershed (BIWS) program aims to do. By holistically approaching the issue of water scarcity, the BIWS program is poised to achieve systematic progress.

The term *bio-industrial* connotes two meanings. Firstly, *bio* highlights the human-centered development that the project promotes. Through agricultural inputs and social interventions, the watershed community remains at the center of the program. As their on-farm efficiency and profitability increase, their social standing is expected to do the same. Secondly, the word *industrial* points toward the enhancement of livelihoods and the development of a more diversified economy in the village. Beyond the promotion of on-farm livelihoods, MSSRF works to garner off-farm and non-farm livelihoods for the sake of enhancing income security. In Karasanur, animal rearing has been introduced as an off-farm livelihood. The tailoring of purses and garment bags is one of the micro-enterprises that have been introduced, which provide non-farm livelihoods.

⁴ The World Bank. Agriculture and Rural Development Unit. *India's Water Economy: Bracing for a Turbulent Future*. By John Briscoe and R.P.S. Malik. Oxford University Press, n.d. Web. 20 July 2012.

⁵Gies, Erica. "Access To Water May Limit India's Development." *Forbes*. *Forbes Magazine*, 26 Sept. 2011. Web. 01 Nov. 2012. <<http://www.forbes.com/sites/ericagies/2011/09/26/access-to-water-may-limit-indias-development/>>.

To gain insight from villagers and to discover potential interventions, MSSRF often uses the Participatory Rural Appraisal (PRA) approach. During one PRA, it was discovered that renovations to Perumalkulam Pond, which is located just outside of the village of Thiruvalluvar Nagar, would lead to an increase in water levels of the open wells that surround the pond. The renovations that were completed as a part of the first phase of the BIWS program in 2007, also increased the duration of the pond's retention of water from one month to six months.

Prior to the renovation, these water harvesting assets were not maximizing income for the farmers. They were burdened with siltation and some of their walls had fallen in. The farmers could not afford to renovate them, and struggled to rely on their faulty wells. Thus, in order to maximize the water supply for the farmers, twelve open wells were selected as beneficiaries in need of renovation. The Hindustan Petroleum Corporation came forward to finance the well renovation, which involved two stages. The first consisted of deepening and de-siltation. The second was the stein wall construction.

Beyond these water harvesting activities, MSSRF has introduced a series of scientific and social interventions aimed at promoting livelihood security for the farmers. As the Dalit farmers in Karasanur remain highly marginalized, these interventions must not only provide gains in income but also enhance their bargaining powers and social standing. The remainder of this report will provide an analysis of how effective these efforts have been at achieving lasting gains in the purchasing and bargaining power of the farmers and, ultimately, their social standing.

Study Findings

Hypothesis

Short term indicators of progress in the purchasing and bargaining powers for the beneficiaries of the Karasanur Bio-Industrial Watershed offer them the promise of increased long-term empowerment and equity.

Sustainability

MSSRF's projects are always designed with sustainability in mind. Furthermore, as the lack of community management is a principal cause of the disrepair of water harvesting structures, ensuring the project's sustainability and promoting the involvement of the beneficiaries is a cornerstone of the BIWS program. In this case, this

meant that the beneficiaries themselves had to bear the ultimate responsibility regarding their well renovation.

In order to be a part of the project, the farmers had to contribute twenty-five thousand Rupees toward their well renovation. The beneficiaries were notified six months in advance so that they could save money gradually. However, saving this small amount was difficult for some. Therefore, a few borrowed loans and one woman even pawned off all of her jewelry to pay for her contribution. In addition, MSSRF allotted one hundred thousand Rupees for each well. The money was entered into the Perumalkulam Well Group bank account, and funds were allocated by the well group itself. Meanwhile, MSSRF staff and the community monitored the project and provided supports along the way. This method of payment incentivized the participation of each beneficiary, ensuring the BIWS's long-term viability.

Well Depths

The farmers were financially incapable of building adequate open wells when they were first constructed. Therefore, the wells in Karasanur were initially flawed by design. As time passed, the quality of the wells continued to decline. However, this well renovation has provided the farmers in Karasanur with adequate wells for the long-term.

Not only are the water harvesting structures no longer crumbling, but the amount of water they supply is significantly greater. In fact, the renovation increased well depths by an average of six feet for the beneficiaries. Figure 2 shows the improvements in depth the renovation made for each of the twelve open wells.

Beneficiary	Before	After
Radakrishnan	33 ft.	39 ft.
Mangavaram	21 ft.	29 ft.
Kalyani	21 ft.	27 ft.
Chamundeswari	27 ft.	33 ft.
Vijayarangam	18 ft.	33 ft.
Renuka	27 ft.	27 ft.
Malar	21 ft.	30 ft.
Muthereaman	24 ft.	33.5 ft.
Kashthuri	21 ft.	27 ft.
Egavalli	27 ft.	33 ft.
Veeramal	34 ft.	36 ft.
Jayasankar	21 ft.	27 ft.

Land Cultivated

Through increased water access, the farmers are able to cultivate much more of their land. Prior to the renovation, the farmers were able to capitalize on less than sixty percent of their twenty-one acres. Much of the land, therefore, lay fallow due to the paucity of the water. Now, with sufficient availability of water, they are cultivating all of their land.

Figure 3: Land Cultivated (in Acres) Before & After the Renovation

Beneficiary	Malar	Muth.	Kash.	Ega.	Veer.	Jay.	Vija.	Kalyani	Chamun	Rada.	Manga.
Before:	0.75	0.25	1	1	1	1	1	1.5	1.25	2	1
After:	2	2	2	1	1.5	1.5	2	2	2	2	2

Crop Diversification

Not only has this increased water access enabled the farmers to cultivate more land, but it has also allowed them to grow crops that require more water, thereby improving crop diversity. For many of the farmers, these are crops that they never imagined that they would be able to grow. As illustrated below, most of the farmers planted paddy and ragi before the renovation. After, they have gone for vegetables, especially *Muttur* onion, known for its pungency and significant demand in the Arab world.

Figure 4: Crop Diversification

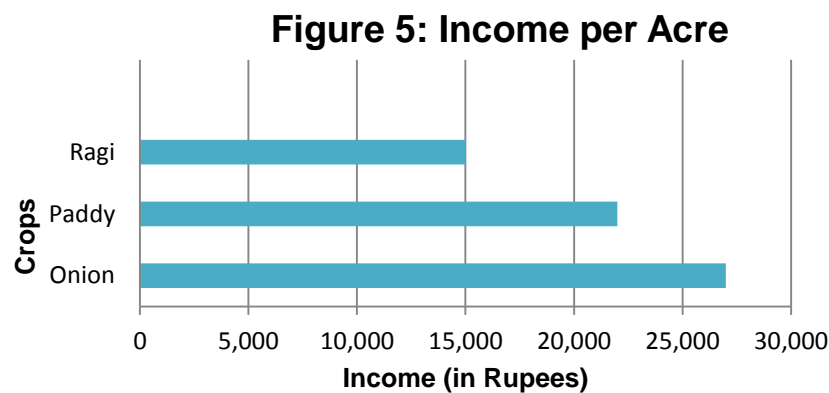
Beneficiary	Before	After
Radakrishnan	Paddy (one season)	Paddy (2 seasons), ragi, and onion
Mangavaram	Land laid fallow	Onion, ragi; plans for other vegetables
Kalyani	Ragi	Onion, ragi
Chamundeswari	Paddy, ragi, okra	Paddy, ragi
Vijayarangam	Paddy	Onion, ragi; plans for other vegetables
Renuka	Paddy	Onion, ragi
Malar	Paddy, onion	Onion
Muthereaman	Paddy, onion, chili	Onion, ragi; plans for other vegetables
Kashthuri	Paddy, ragi	Onion, paddy, ragi; plans for other vegetables
Egavalli	Paddy	Onion, paddy
Veeramal	Paddy	Paddy, onion, okra
Jayasankar	Paddy, okra and chilies in small amounts	Onion, ragi; plans for other vegetables

Prior to the well renovation, many of the farmers also relied on growing casuarina trees, which are often used for fire wood. These trees were appropriate for the farmers to grow, given that they require very little water. However, they take four to five years to

raise and to sell. Thus, earning an income from the trees proved difficult, if not impossible. With the new crops that have been introduced, the farmers are able to earn income every three to four months.

The farmers intend to grow even more vegetables, such as okra and brinjal. As they go for more vegetables, the farmers are able to use at least a small portion of the crop sown for personal use. As a result, the food security and nutritional security of the farmers and their families is enhanced.

This crop diversity also promises significant income growth for the farmers. Whereas the new crops require more water, they also provide greater income. As shown below, ragi earns a per acre income of 15,000 Rupees for the farmers while onions provide a per acre income of 27,000 Rupees.



Agricultural Inputs and Crop Intensification

Through the Farmers Field School (FFS), MSSRF provides capacity building for increasing crop yields. The farmers in Karasanur have gained a myriad of inputs from the FFS, such as knowledge on soil sampling to control soil borne pests, applications of bio-fertilizers and bio-pesticides, integrated pest management, and many more. The FFS has provided farmers with efficient and organic techniques, which serve to intensify crop production and widen the profit margin.

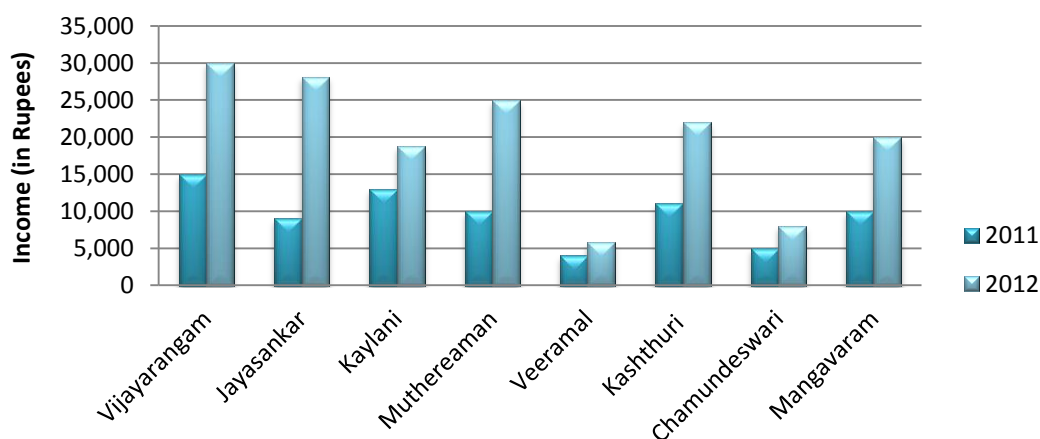
During my interviews, the most frequently referenced input by the beneficiaries was the System of Rice Intensification (SRI). This system defies the centuries-old myth that paddy has to be constantly flooded with water in order to grow best. Despite this traditional notion, rice cultivation is much more successful with "intermittent irrigation." In other words, water should be allowed to absorb into the soil, and only re-added once

hairline cracks appear in the soil. In Karasanur, SRI helped to increase paddy yields from 61.4 metric tons in 2010 to 81 metric tons in 2011.⁶

Estimated Income

As a full crop cycle has not passed since the completion of the well renovation, it is not yet possible to determine precisely how much income has been increased. Though, through the knowledge I gained about how much land was cultivated before and that which is currently being cultivated, as well as the income gained for the different crops, I was able to estimate the income for this year's second crop. As shown below, the expected income growth is very substantial for most of the farmers.

Figure 6: Estimated Income from 2012 Second Crop



NOTE: Four of the beneficiaries' incomes from the 2012 second crop were not predictable due to the sporadic nature of which their crops were planted.

Although this income growth is significant, it will become futile unless the farmers' bargaining powers are also enhanced. Otherwise, they will remain predisposed to the same unfair treatment from various entities due to the systemic injustice that is left over from the former Caste System. Therefore, MSSRF has introduced Community Based Organizations (CBO's) aimed at fostering sociopolitical empowerment for the farmers.

⁶ Jonge, Alice De, and S. Pushpalatha. *Trainers Manual: Farmers Field School on System of Rice Intensification*. N.p.: Ekoventure, 2007. Print.

Farmers Producer Groups

Foremost among the CBO's for enhancing the farmers' bargaining powers are the Farmers Producer Groups (FPG's). Prior to their formation, the incomes of the farmers in Karasanur remained entirely at the mercy of "middle men," who became notorious for blatantly unfair practices. Often times, the middle man would give small advances for crop and then refuse to pay for the rest because of rain, which they alleged had spoiled the crop. Also, they are known to have used unfair scales, and thus taking more than they paid for. Most often, the middle men simply paid too little for the crops, and then sold them to the market for much more. Thus, it was the middle men receiving the money that the farmers rightfully deserved. However, the farmers had no other choice but to sell to the middle men, and had to acquiesce to receiving unjust pay for their work.

However, after MSSRF helped to establish the FPG's in Karasanur, the middle men have been eliminated. Therefore, the farmers are able to trade directly with the market. Thus, the farmers are receiving the income that they rightfully deserve. Whereas the middle men would often pay around 750 Rupees per bag of onion, selling directly to the Chennai Market enables the farmers to receive more than 1,200 Rupees per bag.

Figure 7: Prices per 80 kg Bag of Onion



The FPG's have also brought about attitudinal behavior changes (ABC) among the farmers. These ABC changes have prompted a sense of collective action that enables the villagers to independently solve the problems that arise as a community. During the focus group discussion, Kalyani, a beneficiary of the BIWS Programme, explained: "Before we worked as individuals, but now we go to work together."

Currently, MSSRF is working to scale up these activities to promote aggregation in the market among eight panchayats, or the Indian equivalent of a county. Through a

democratically elected and managed Farmers Producers Organization (FPO), the example of increased bargaining power in Karasanur will be replicated elsewhere. Thus, the middle men will be removed and ABC changes will be achieved for others, as well. Furthermore, with a larger bargaining organization, the farmers' ability to ensure accountability and demand fair practices from the entities they come in contact with will likely increase.

Livelihood Security & the Decline of Seasonal Migration

Until now, the farmers in Karasanur have been incapable of relying solely on their crops for income. Instead, they have depended on secondary income from insecure livelihoods. Some of the beneficiaries, like Mangavaram and her family, worked as day-to-day laborers wherever they could to earn income. Many others worked in the nearby quarry where they crushed rock. The beneficiaries have also earned income through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which provides payment for one hundred days of work annually with equal wages for both men and women.

In addition, the people of Karasanur often migrate to urban centers, namely Chennai and Pondicherry, during the off seasons of their crops to find industrial work. However, this paradigm is beginning to shift drastically. For the first time for these farmers, they are finding that wealth and the opportunity are in the fields that they own rather than in the drudgeries of distant industrial labor. Within due time, the beneficiaries all believed that seasonal urban migration would cease, as will their reliance on the insecure livelihoods formerly described.

MSSRF has fostered the development of on-farm, off-farm, and non-farm livelihoods in Karasanur. The on-farm development, such as crop diversification and intensification, has already been discussed. Goat-rearing and dairy farming have been introduced as off-farm livelihoods. Meanwhile, the tailoring of eco-friendly purses and garment bags has been developed into a non-farm microenterprise for economic diversification in the community. This greater variation in the economic activities of Karasanur has, of course, provided more income for the community.

Beyond income augmentation, livelihood diversification also provides income security for the farmers. In the off season of certain crops or in the event that one segment of the village's economy is struggling, the people of Karasanur will then be able to then focus on another sector. As they are less reliant on a particular source of income, they have begun to experience considerably greater income security. Simultaneously, the local village remains at the center of the farmers' economic dependence. Thus, in the near future, the need for seasonal migration will be erased altogether.

The Well Owners Group

The Thiruvalluvar Nagar Well Owners Group, which is led by the beneficiaries themselves, is what brings into fruition the community management of the bio-industrial watershed program in Karasanur. The group was initially formed to allocate funds and to ensure the responsibility of the farmers during the well renovations. In addition, it continues to oversee the water harvesting activities of the community.

Furthermore, the group provides significant gains in the purchasing and bargaining powers of the farmers. Foremost, it provides them with the opportunity to save money and has instituted access to credit. Now that the farmers have begun to earn enough income to become capable of saving, the group is able to provide small loans and emergency money to its members. Alongside this heightened interdependence has come an enhanced sense of financial security among the beneficiaries.

As another benefit of the collective action of the group, its members are able to access loans of up to 50,000 Rupees from banks. Prior to MSSRF's intervention, even this was not possible. Therefore, the development of CBO's that has been brought about has led to significant gains in the farmers' access to credit.

The Role of Women

The BIWS program in Karasanur has offered significant progress in achieving equitable gender roles. As a part of its gender mainstreaming objectives, MSSRF guarantees that women hold leadership roles in each of its projects. Nonetheless, the extent to which women possess a legitimate voice in the dealings of their communities remains indeterminate. Though, the



community that has benefitted from the BIWS program in Karasanur is fortunate to be led by a very outspoken and confident woman leader named Kalyani. As the leader of the Well Owners Group, she played a pivotal role in the allocation of funds for the program, and continues to help oversee its implementation.

Nonetheless, ensuring that the women farmers possessed a more equitable voice in their community was not easy. Instead, as the women wielded more power through leadership roles within their various CBO's, they faced heightened opposition to their authority. As the political paradigm within the community shifted to include the opinions of women, the new female leaders began to face ostracization from their newfound influence. This was due to the fact that the traditional leaders – namely men – perceived the women's authority as a threat to their own ability to wield political power.

Beyond this enhanced political authority, the women have begun to possess greater purchasing and bargaining power through the livelihood diversification that has taken place in Karasanur. This economic variation has brought about new ways for women to earn income, thereby improving their livelihood security and economic involvement. For example, the tailoring of purses and garment bags has been developed into a women-led microenterprise. Furthermore, women have played pivotal roles in the introduction of a milk producers group into the community as an off-farm livelihood. The heightened economic involvement and output of women, therefore, has begun to alter gender roles. Most notably, women's involvement in essential economic activities has started to eliminate the perception that women were not credit-worthy.



The renovations to the twelve open wells and Perumalkulam Pond have helped to make the beneficiaries, especially the women, more productive. Prior to the renovations, for example, it took two days to recharge the wells. After the renovation was completed, it took only one day. Furthermore, the transplantation of onion seedlings for one nursery previously took four days, whereas it now only requires one. As these tasks are

largely the responsibilities of the women beneficiaries, their increased efficiency has enabled the women to contribute even more to the community.

Conclusion

The Community Managed Bio-Industrial Watershed program in Karasanur has yielded truly transformational effects for its beneficiaries. The holistic approach of the program has helped to address poor yields, along with the marginalization that the beneficiaries continued to face as Dalit farmers. Therefore, while it has intensified and diversified their crops, it has also empowered the beneficiaries through Community Based Organizations so that they are now able to solve problems on their own. Furthermore, through sufficient water access, all of their land is being cultivated. This, along with the diversification of livelihoods, has equated to significant gains in income.

However, it is not the heightened purchasing power that is most important. Rather, it is how they will use it. When I asked the beneficiaries what they planned to do with their increased income, they responded with various answers. One said she planned to build a new home, while another mentioned investing in further agricultural innovations. Though, for each beneficiary, one investment was deemed most important: investing in their children's education.



Nothing epitomizes this more than my experiences with Renug, a woman farmer in Karasanur. When I first met her, she refused to stand and seemed rather calloused as I asked her my questions for her interview. However, weeks later when I saw her again, her eyes lit up with joy as she held her granddaughter. To me, she was expressing the great pride she felt that she had been able to help provide her granddaughter with a brighter future, as she would have the opportunity and the voice that Renug never could have imagined.

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