

MY TIME IN INDIA: HALF OF THE WORLD AWAY BUT FOREVER IN
MY MIND



ANDREW JAMES MCDOWELL

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India is half of a world away from my physical self, but only a step away in my mind. Daily, I find myself thinking of my visit to a temple dedicated to the monkey god Hanuman. Here my guide prostrated himself on the ground then bid me to sit cross-legged with him and eat kal kandu, a sweet rock candy. Daily, I think of the amazing sights and sounds of Chennai. The smell of jasmine as the scooter I am riding passes by a woman who depends on its scent for her living. Daily, I can remember the women doubled over in their fields transplanting paddy in a verdant paradise, which seemed to be lost. Daily, I thank God for what I have been given, for the hope that I have for life to improve, for the faith in my government here, and for the love that I felt in India.

I cannot even consider beginning my paper without thanking the people who made my life changing experience what it was. My sincere gratitude goes to the World Food Prize Internship Program for making my trip possible. My most humble indebtedness to Professor M. S. Swaminathan, the scholars, and staff of the M. S. Swaminathan Research Foundation for their help, hospitality, and friendship. To Professor Swaminathan and Dr. M. Velayutham, thank you for opening your foundation to me. Dr. Swarna Sadashiva Vepa, I must thank for her guidance and spending her valuable and overtaxed time to help me with my work. I must also credit Ms. R. V.



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I first saw Chennai at four in the morning, the orange hued lights did not reveal much as I flew over in the jet that I had been on for the last thirteen hours from London. I stepped out of the plane in the early morning darkness. With the sun beginning to light the ocean side of the city, I walk surreally on through the receiving area of the airport. It did not look like home, it did not smell like home, and it surely did not sound like home. I found myself walking with the group of people I hoped knew what they were doing, and wondering what I would come to next. There, just a few steps ahead were the immigration desks. My heart skipped a beat, “what if my visa was wrong, what if they tell me I have to go back home, what will I do, okay just be polite and smile I can do this,” I reassured myself. I stepped up to the raised platform in front of the man stamping passports. “Well you are quite tall, how tall are you,” he said.



“I am six feet and seven inches sir,” I stammered.

“Well, you must play sports, yes.”

“Yes sir, I like to run”

“Well, welcome to India,” and his large stamp slammed down on the page of my passport. I was in. The next few minutes I found myself walking outside to be greeted by more people than I had ever seen. Standing behind a brass rail were women in brightly colored saris with bindis on their forehead and men in what seemed to be like a sarong, which, I had never seen or heard of before. There I saw it, my name, on a sign held by an Indian man. I shook my head up and down, “yes that’s me.” I began to talk to him, but he only made hand gestures, he did not speak English and I did not even know what he was speaking. I walked to the right side of the car to get in, but was met by the steering wheel and the man only laughed. I climbed into the large white cab, which, looked like something that the Ford Company made in the 1940’s. We left the airport. It was only six in the morning and people were everywhere. Laborers were working on the road, women were tending stalls selling trinkets, and yes, there were cows wondering. I could not help but crane my neck when I saw the first one. Then as I turned back to look at the road, the driver was headed straight for on coming traffic. Just before I yelled he swerved back into his lane, “wow that was close,” I thought. Then he did it again and again. We were surrounded by motorbikes darting in and out of traffic with silk sari clad women riding sidesaddle holding their son in one hand with the other hand on their husband’s shoulder, their jasmine adorned hair flowing in the wind. This was India, the other side of the world. Banyan trees stretched tall with their aerial roots dangling over the road and small shacks beneath them serving as someone’s home. I had made it, I was in India.

A few months ago, it would have been impossible for me, a farm boy from a small place in north central Iowa, to imagine going with a friend to get her nose pierced in the dingy basement of a jewelry store or to eat anything off the leaf of a Banana Tree, but here I was. It started last summer with a broken arm. I had broken my arm in the second week of June and could not work for the rest of June, and half of July. To fill my

time I decided to write a paper to submit for the World Food Prize Youth Institute. I could not even think of a topic to write about, and then I read a National Geographic Magazine about the Untouchables of India. I had a topic and I ran with it. I learned about the caste systems' in and outs. I learned about the hunger most Indian's felt. I wrote and wrote, with each sentence I was more convinced that India was a place I wanted to go. I had to see the way the people lived. I needed to see the way the castes system operated. I wanted to learn about the scheduled tribes of rural India. All of these things I read and saw pictures of, but never really understood until now. I finished my paper and I was determined from that point to earn one of the international internships, not just any internship. I had my eye on the internship to India. A year after I broke my arm I was packing for India. Wondering what I would see, what I would do, if I would be able to



make friends with people from such a different culture, and trying to find insect spray to keep a mosquito the size of an elephant away. I had just graduated from Iowa Falls High School when I said good bye to my little town of four and a half thousand people to fly to Chennai with over nine hundred times as many inhabitants. I have always been interested in far away places and other cultures, and I feel that the best way to know ourselves is to know how other people

live. From my time in India, I have learned that this is very true. Each culture has a value and helps us see things that we need to improve in our own. It is hard for me to imagine how blessed I have been by this opportunity. I was able to work at an amazing place with amazing people who are dedicated to ending hunger in India and the world. Providence brought me to the M. S. Swaminathan Research Foundation.

The M. S. Swaminathan Research Foundation (MSSRF) is a non-profit, non-government agency based in Chennai, India. The foundation works to help the poor through sustainable livelihoods, female empowerment, and environmental consciousness. Prof. Swaminathan has said, "We are pro-nature, pro-poor, pro-women, and pro-livelihoods." His work on the Indian Green revolution garnered him the first World Food Prize in 1987.¹ With that prize and other winnings, he began MSSRF in 1989. He moved the foundation to Chennai, and MSSRF began to grow from there. With substantial grants from both national and international agencies, his foundation began to develop. From a few people housed in a suburb of Chennai, to more than 180 people in a state of the art facility in Taramani, an institutional area of Chennai.² His dream has become a reality, the 79-year-old Swaminathan and his research foundation are famous through out India for the enormous amount of good they have done. The foundation is currently working in

¹ Gita Gopalkrishnan M.S. Swaminathan One Man's Quest for a Hunger-Free World.(Chennai: Sri Venkatesa Printing House 2002), 56

² MSSRF. A Social Vision for Science: The History of M.S. Swaminathan Research Foundation, Chennai (1990-2000, (Chennai: Reliance Printers 2000) 3.

five Indian states and one Union Territory. The work done at MSSRF is not one that simply looks to improve life, but looks for ways to improve life in a sustainable manner. This remarkably place has brought computers to the rural poor, empowerment to Dalit women, improved plant varieties to the farmers, and reliable grain storage facility to tribal villagers.

I worked in the food security area of the foundation. This program has been assessing the agricultural and economic practices of India to determine places where food security has been attained and where energy must be focused. Under the guidance of Dr. Swarna Vepa, the program has published three atlases. These atlases deal with the food insecurity of rural India, urban India, and the food security of India as a whole.

My work involved both agriculture and food security. With the help of Dr. Vepa, I was able to learn first about the problems and solutions to the food security tribulations in India. I learned very quickly that there was not one simple problem or one simple answer, but many compound problems and many steps to a very complicated and illusive answer. It is easy to look at Indian society from the outside and believe it to be very similar in all parts of the country. India, like the US, is not homogeneous. Cultures, languages, beliefs, and modes of living change from state to state and district to district. There are the high Himalayan Mountains and crowded sand beaches of Chennai. Hindi is spoken in the north, and a whole host of languages in the south. There are stone houses with heavy walls in the north, and thatched roofed houses made of coconut palms in the south. There are tall and angular temples of the south compared to the rounded and portly temples of the north. So heterogeneous are India's food security problems. In Punjab, a

northern state, the environmental sustainability is tenuous. Yet in the Tamil Nadu, there are very few jobs, and access to money is needed. Still in the North East Indian, state of Bihar there is a problem of food actually being unavailable. The reasons for India's hunger are many and her problems are diverse, but the resolve of MSSRF is strong and its bulwarks are numerous. In my time in India, I was able to see many of the problems the nation faces. I was met by jobless beggars in the streets of Chennai. I saw the malnourished children in Balia village in Orissa, and I can still smell the open sewer of Jeypore. I had to use the precautionary candles at



my hotel in the Kolli Hills when the electricity went out. It was evident everywhere that jobs were few. Beggars were not afraid to touch people sitting on the beach in Pondicherry, or ask for money while darting in and out of a busy street's traffic. The food

security department at MSSRF has been lobbying for awareness about the need for sustainable livelihoods in South India. They have worked to identify the most pressing obstacles in the path to food security in each area.

Dr. Vepa and I looked at all of the projects going on at MSSRF. We decided that it would be best for me to see as many of these as possible and mold a project around the work they were doing there. I was able to travel to the interior mountainous regions of Tamil Nadu and a northern state of Orissa. In Tamil Nadu, I visited the Kolli Malai or Kolli Hills and in Orissa, I observed in the Jepore Tract of the Koraput District. In each of these places, I was able to see how a tribal community lived. In the Kolli Hills, I interacted with the Malayali group, and in Orissa, I visited villages of the Khonda and Paroja tribes. I was able to see their homes and temples, as well as, a Malayali festival called Adi 18. I ate their foods and spoke with them about a myriad of topics. The most common topic was about their traditional crops of millet and paddy.

My work at MSSRF was based on these traditional crops. In both of these locations, there is a tremendous amount of biodiversity, which MSSRF has been working to preserve by promoting the use of the traditional crops. Each area has a long and intricate history with both of their traditional crops.

The Malayali people of the Kolli Hills are limited by their geography. To reach their homes in the Kolli Hills a traveler must scale the side of a mountain on a road with seventy hairpin bends. Seventy hairpin bends is a very large number and when one considers the grade of the road it is a very formidable obstacle. Before the creation of this road in the 1970's, the Kolli Hills Malayali people were completely cut off from the outside world. Occasionally a wondering merchant would find his way up the mountain, but only very seldom. For centuries since the mogul invasion, when they entered the hills, their culture had remained isolated from the rest of Tamil society. They developed their own vernacular, incomprehensible to a person even from the plains of India. They also worked very hard and developed their land. They terraced mountain sides and harnessed mountain streams for irrigation, where they were able to eke out enough food to live. Their land was not suitable for the paddy and sugar cane that is grown on the plains just below them, but they could cultivate millet.

Just fifteen years ago, millets were grown as the mono-crop of the Kolli Hills. The outside market for millet was small but people could grow enough to live. The major problem with millet at that time was its low market value. There was never much money left over. If an emergency were to arise, the Malayalis were at the mercy of the moneylenders. The moneylenders would charge astronomical interest rates and create a circle of debt that was almost



impossible to pay back. However, between ten and fifteen years ago, tapioca was introduced. Tapioca had a much higher profit per acre ratio and was more drought resistant. People now began to see their neighbors cultivate this crop, and have extra money to send their children to school. Soon tapioca replaced millet as the mono-crop of the Kolli Hills. Today millet is all but gone from the hillsides. Tapioca has taken over the terraced middle land and driven the nutrient rich millets to the rocky highlands. Part of my work was to find out improved strategies to promote the cultivation of millet varieties in the Kolli Hills.

Millets are a nutrient rich cereal grain. The Samai, Thinai, and Raggi¹ of the Kolli Hills have become specially adapted to its environment, creating a large amount of biological diversity. These biologically unique species or landraces are very valuable to agricultural science. They contain genes, which could be used to genetically modify other crops. The millets in the Kolli Hills have developed special drought resistant properties, abilities for some landraces to mature earlier, and increased height. The genes for these traits could be moved to another plant like paddy or sugarcane to improve that crop's production. The conservation of this biological diversity is imperative, but because of its low economic value is very difficult.

The most driving reason toward the production of tapioca is an economic reason. According to Mooligai Selvarai a farmer from Arapalenwar Koil village:

For one acre [of tapioca], we can get one hundred and fifty bags, one bag is seventy-five kilograms of tapioca. Our final profit will be 10,000 rupees (\$ 217.37) but with millet, it is not there. If we cultivate Samai on that acre, we will get five bags. Our profit will only be 1125 rupees (\$24.36).³⁴

With the profit being so much higher from the cultivation of tapioca, it is obvious why farmers will not choose millet as their crop of preference. The work being done by



MSSRF is to remedy this problem. Dr. Goppinath and his team have been able to create market linkages in a local city of Nammakkal, and in urban Food World stores in Chennai. In an effort to prevent corruption, the system of market linkages has become quite elaborate. A farmer is able to grow millet and sell it to a millet procurement self-help group for rupees six for a kilogram. Next, the procurement group takes the

³ Selvarai, Mooligai. Personal Interview. Arapalenwar Koil Village. 2 August 2004.

⁴ Rupees exchanged at the rate of Rps 46 equaling \$1

millet to a self-help group who buy large quantities and transports it to the milling group. They receive rupees seven and fifty paise⁵ for that kilogram they bring to the mill. The milling self-help group process the millet and then sells the remnants of the kilogram for rupees nine to the self-help group who takes the millet down the mountain. This group takes the processed millet down the hillside and into Nammakkal, where it will be packaged. The packaging group will buy the millet for rupees ten and fifty paise. After the millet is packaged or made into baked goods, it is sold in a market or sent to Chennai's Food World stores. In the end five hundred grams of millet will cost a consumer rupees twelve. It is important to note that removing the hull from the millet significantly affects the mass of the millet, reducing it on an average of forty percent.

There are major benefits and a few small drawbacks in this market linkage. The most obvious benefit is the actual creation of a millet market. Prior to the introduction of this system, there was no selling of millet outside the village level. Now millet can be sold to the outside for cash instead of labor or other grains. The profit on millets has improved from little to nothing just five years ago, to around rupees three per kilogram today. Secondly, sustainable ancillary livelihoods have been created by the market linkages. Each self-help group has an income that was not there before. Many of these same group members are farmers themselves and producers of millet. Most importantly there are no middlemen to manipulate the illiterate farmers and once MSSRF removes itself from the project, each group will be able to continue as their own entity. The small problem stems from the intricacy in the linkages. Because each link adds to the cost of the processed millet, the market rate for the farmer is lower. Each farmer is paid only six rupees for one kilogram but by the end of the of the market chain five hundred grams of the processed millet will cost twelve rupees. The market linkage definitely raises the market price of millets in the Kolli Hills.



After learning about the major problems, I went to the Kolli Hills and saw the hills and fields, the farmers, their homes and children, and observed the milling process. To gather the most information, I formulated a survey to facilitate a semi-formal interview. The survey was paying attention to the amount of land farmers used to grow minor millets and foxtail millet. I asked if they felt millets were healthy, if the Malayali

used agricultural laborers, and how much they pay them. The survey proved to be invaluable to my work. Its flexibility made it possible to change and grow as I continued

⁵ Paise are smaller denominations of the rupees Re 1 equals 100 paise

talking to people. My survey had some questions, which were answered by the first few people and were no longer needed; I was able to add new questions to find information on things noted by previous subjects. Some questions I added, “were do you use millet in any other ways, if you could find any ways to improve the millets, and where did you get your seeds.” See Appendix 1.

After formulating the survey, I traveled to the Kolli Hills in the Nammakkal District, of Tamil Nadu state. I boarded the sleeper train at eleven at night in Chennai. The train was three bunk beds tall and filled with men in dhotis getting ready to go to Salem or Erode for business. There were also women dresses in saris and makeup, with a child next to them. After sleeping for six hours, I awoke in the city of Salem. Salem is a medium to large city in central Tamil Nadu about two hours away from the Kolli Hills. At six in the morning in Salem, the streets were lined with flower vendors selling garlands for the temple or small ropes of jasmine for women’s hair. I hopped in the sport utility vehicle we were headed for the hills. The driver had a lighted shrine to Lord Shiva on his dashboard and a sweet lime hanging from his rear view mirror. After an hour of passing fields of sugar cane, sorghum, irrigated paddy fields, and plots of turmeric, I was in Nammakkal. Nammakkal is a medium sized town, with about 400,000 people, who live in anything from large houses to thatched huts. The city surrounds a large hill with a fort build before the British time. The fort seems to be growing out of sand colored stone. In Nammakkal, I went to the MSSRF field office, where I talked with Dr. Goppinath and his staff about what I was doing, and my goals as well as asking them about the millet market chain and other work done. After our conversation, we went to see some of the fields in the plains as they are called. The next morning my guide Shakti and I went up stairs. We traveled up the seventy hairpin turns past the monkeys and the bamboo forests,

past signs in both Tamil and English all about conservation, beyond Lantana hedges, past a lonely temple, and sari clad women clearing the brush from the side of road. Once up the hills I saw the villages. One of the first things I saw was a family of potbelly pigs rummaging through a heap of trash. The streets were muddy and men were walking around with shawls around their shoulders, even though it



was seventy-five degrees outside. I decided this was the India that most Americans saw in their mind’s eye when they thought of India. It was a small remote village in the middle of a forest with fields on one side. On closer inspection there were people who owned motorbikes, small shops selling tea and other necessities, a small village market, and people going about their daily tasks.

After tea in the village, we were off to survey people. They were from small villages tucked inside the hillsides flanked by fields of tapioca and paddy: small square houses with pointed and thatched roofs, or for the wealthy terra cotta tiles. Stone grinders for cooking filled with the rainwater, lining the village paths that had come that morning. This village was called Padasollai. In it, I met a woman named Poonamma. She was a forty-one year old woman who acted as the speaker for her self-help group. Her family was considerably endowed by the standards of the Malayali. They owned four and a half acres of land and had a terra cotta roof on their house. She and her family grow two acres of pineapple, a half an acre of paddy, another half of an acre in millet, and an acre and a half of tapioca. She explained how each crop filled a part of their budget.

We grow paddy for our own consumption, but pineapple if for family expenditures like school for the children and clothes. We use half of our millet to eat and sell the other half to MSSRF for household needs. We sell our tapioca to get more profit to save if we have a need later.⁶

The most noticeable thing about Ponnamma was her self-confidence. Throughout the course of my time, I met Ponnamma on several occasions, and each time I met her I continued to think that she was an amazing woman. She traveled from the village to Nammakkal for a seminar about raising poultry. She took the six-hour train trip to Chennai to tell approximately a hundred members of NGO's about her self-help group, and carried a bag of malted millet on her head to the Adi 18 festival to sell where she stayed up all night. I was amazed by the accomplishments of an uneducated and illiterate



farmwoman who was a member of a scheduled tribe. See Appendixes 2 and 3.

I continued to interview men and women, members of self-help groups, individuals, millet farmers, and non-millet farmers. I traveled to villages where I had weak coffee with Kuppiya and walk high into the hills to speak with Dhanam in her rock filled millet fields. I spoke to Anna Malai as he

was walking to the market, and Conga Gounder as he pulled weeds from his field. I gathered crowds and stares as I went. Shakti thought it was important that I did a little of the surveying myself so he taught me to ask each subject their name, as the last question. My accent earned me a look of surprise as well as a smile because I had made an attempt

⁶ Ponnamma, Personal Interview. Padasollai Village. 13 July 2004.

at their language. Each interview was closed with *Nandri*, the Indian sign of greeting and parting, and a friendly Indian head bobble.⁷

My survey showed me important things. I learned about people's fears concerning growing millet and their need for money. As a farm boy, I was able to empathize with their fears about lack of water. A major benefit of both millet and tapioca is drought resistance. The scientists I spoke with agreed that millet varieties are drought resistant crops because of their germination and growth. Yet several farmers in the Kolli Hills felt that they were not drought resistant. The problem with millet is the need for water when the plants begin to produce grain. If water does not come at that time, the crop will fail. However, tapioca can go through three months of drought and not be adversely affected. Tapioca is seen as so reliable that moneylenders consider growers of tapioca as people who will have money to pay them back. Farmers felt that all they had to do to get loans was to grow tapioca. Kuppayi of Nariankkadu village told me about her fear about millet failure.

*I did not plant millet this year. The rains did not come last year, and I lost my crop. I am afraid that they will not come this year. I only have one acre of land and I need to grow something reliable on it.*⁸

Finding drought resistant millet is part of the work being done by MSSRF. The villages of the Kolli Hills have been working with scientists to choose the best and most drought resistant millet for the Kolli Hills. The farmers and scientists assembled by MSSRF had over two hundred landraces of minor millets to choose. After selection based



on the priorities of scientists and farmers the best were chosen. The farmers then grew each variety in the test fields near Padasollai village they isolated a few of the most suitable for the Kolli Hills' climate and growing conditions.⁹ After the research, the best types of millets were disseminated throughout the hills. After the research, the best variety was isolated for

drought resistance and it is much improved from the previous variety, but it still requires rain at the correct time. It is a hope of mine, that research to make millets maximally reliable will continue and succeed.

⁷ Indians have a particular way of shaking their heads to sign agreement and thankfulness.

⁸ Kuppayi. Personal Interview. Nariankkadu Village. 13 July, 2004

⁹ MSSRF. Enhancing the Contribution of Nutritious but Neglected Crops to Food Security and the Rural Poor. (Chennai: IFAD, IPIGRI, MSSRF, 2003) 44

Another important aspect of millet cultivation is the land used. Minor millet fields are usually the most marginal land a farmer has. It is very hilly and strewn with boulders. This is a direct result of the millets weaknesses and its strengths. The low price of millet drives it from the fertile land used for tapioca and its hardy nature makes it possible to grow in rocky areas. The fields were once forests, which have been cleared for the production of millets because farmers do not want to use up the good middle land. These fields are so rocky and pitched that they cannot be plowed with a bullock, but must be hand tilled with small hand tools that are simple pieces of metal attached to a handle, which is no more than fifteen centimeters long. These hoe-like tools are wielded by women to remove weeds and scratch the soil before the seeds are broadcast over the field. Like the old parable, some of the seeds land on the rocks and some on the land. This method considerably increases the amount of seeds needed for the cultivation of one acre, and limits the profit ratio because of the increased need for agricultural laborers to scratch the land.

MSSRF has actively been campaigning in the Kolli Hills to promote the growth of millets based on good nutrition. Millets are a very rich source of calcium, vitamins, and minerals. This important aspect of millets is becoming well known by the Malayali. Each person I surveyed felt that millet was good for health, even a man selling temple



offerings, which had little to do with agriculture, had a comment to make about the health aspects of millet. “Twenty years ago [when millets were commonly grown] the people cared about their health but now people only care about money. They know millets are healthy, but they grow tapioca for the money and then buy rice,” he observed. In fact millet is extremely rich in protein and iron, two of

the most important nutrients which many Indian diets are lacking, especially Indian women and children. When minor millets are nutritionally compared to rice there, benefits are astounding. They contain more protein, fifty-three percent more calcium, sixty percent more phosphorus, and seven times the amount of iron found in rice. When the comparison is made between rice and finger millet, the figures are even more staggering.¹⁰ Farmers know millets are much healthier for them and have seen the change in their daily life. It seems that the health benefits of millets are the most swaying

¹⁰ ICRISAT. “Minor Millets” The Neglected Crops of the Semi-Arid Tropics. 2002. 22 Sept 2003. <www.icrisat.org/>

reason for the production of millets. Many of the farmers who grow millet only sold a small amount and kept the majority for their family's personal consumption.

After all, of the surveying work was finished, I was able to get a good idea about the issues facing the growth of millets in the Kolli Hills. I was able to make some suggestions. Dr. Vepa explained that my job was to look at things from a different perspective, and my work was to be making suggestions because they as people who were very close to the project may not be able to see. In my final presentation, I outlined the improvements I could find to make in the program. They included increase ability to get loans by using collateral other than tapioca, finding ways to make millets economically more attractive compared to tapioca, increase awareness about millets' nutritional features among "elite" classes, and lobby government to use locally grown food crops as grain for the public distribution system. If farmers could get loans based on other collateral such as animals or savings there would be less need for tapioca to be grown as a source of collateral and repayment.

Farmers rely very heavily on the public distribution system because it nearly undercuts the profit on millets. The average profit for a kilogram of millet for the farmers I spoke to was rupees three and ten paise. Yet, one kilogram of rice from the public distribution system is rupees four and fifty paise. As a result of the low cost of rice and the high profit of tapioca, millet is no longer important to the farmers. The people of the Kolli Hills use their status as a scheduled tribe, to obtain Public Distribution System (PDS) rice from the government of India. They no longer need to grow millets for food and thus do not have the motivation to use the land which can make more profit in cash for the production of millet. If the locally grown crops could be bought by the

government and used in the area they are grown, there may be a new interest in the production of millet. Buying goods locally would be beneficial for the government as well as the people. All of the food stuffs used for the PDS must be trucked in from the plains considerably increasing the cost of these grains for the government. If the millets grown in the Kolli Hills were used there, no trucking cost would be



incurred, thus allowing the government to pay the farmers more for the crop. Because millets are more nutritious than rice, their health benefits would be an aid for the people of the Kolli Hills as well. The elite classes in Chennai and smaller cities like Nammakkal need to be made aware of the benefits of millets. Nearly half of all Indians are projected to be diabetic in the next fifty years and for this reason, it is important to let people know about the health aspects of both minor millets and finger millet. Marketing them as organic and diabetic friendly would be a major step to increase the marketability and

profitability of millets. Another small flaw remains in the Kolli Hills themselves. The seed banks used by MSSRF charge a one hundred percent interest rate on borrowed seeds. This is a tradition for the Malayali tribe, but because there are some fears about the crop failure several of the farmers do not use the seed banks, and continue to sell seeds within the village and have other sources of seeds. If the interest could be less these fears may be diminished. It is important to continue the traditions of the community, but some traditions are helping to keep them scheduled.

I was not able to see if my findings will be of any use, due the limited time I spent in India, but they were well received by the staff of MSSRF. I hope my findings have had some fresh and new ideas that can be used to better the lives of the people there. In the end, I believe that tapioca will always be a “necessary evil” in the Kolli Hills. Hopefully there will be a land use reversal when it comes to millet and tapioca.

I did not spend all of my time in the state of Tamil Nadu as most past interns have done but I traveled to another of MSSRF’s field stations in the northern and more impoverished state of Orissa. To get to Orissa I took a domestic flight from Chennai to Visakhapatnam, in Andhra Pradesh. I then traveled six hours in a car to Jeypore. Along the way, I saw people herding water buffalo down the road to a village market, people using parasols made of coconut palms to keep the hot Indian sun off, and people carrying charcoal in bags yoked across their shoulders. We sped at a speedy pace of forty kilometers and hour.



Listening to Hindi and Oriya music, which I developed quite a taste for after a few weeks. When we got to Jeypore, it had rained a little and had been dark for two hours. The city seemed very confusing and full of twists and turns. In the morning, it rained and I met with Bibhu Prasad Mohanty in the office in Jeypore where he explained to me about the work being done with the people there and

the commonality of natural disasters found in Orissa. On the second day of my time in Orissa, I went to the villages in the rural Koraput district. In these villages, malnutrition was visible in the male children and lack of food in the female children. These tribal villagers have been growing paddy since “My grandfather’s time,” as one of my survey subjects showed. In these villages, I conducted another survey. They do not have millets as the traditional but neglected crop, in this place it is rice. In Jeypore, the neglected crops are the landraces of paddy that the tribal people have been breeding for centuries. There is an astounding amount of biodiversity in these hills. There are more than two

hundred unique landraces each with their own extraordinary trait¹¹. For example, Benia dhan is scented and has a red husk while Bastabhog dhan is drought resistant and has a black husk.¹² This enormous amount of biodiversity is in the hands of some of the most scheduled tribes in India. The Khondas have been known throughout history for vicious human sacrifice known as Meriah and the commonality of female infanticide in their group.¹³ However, they have not been known for their ability to isolate new types of paddy landraces and breed them to use in their fields. The women in the tribal communities of the Jeypore tract have been isolating unique seeds from the trashing floor and propagating them for centuries. Now there are many types of paddy landraces that need to be conserved in the area. They have been pushed from cultivation by the high yielding varieties (HYV) that were once promoted by the International Rice Research Institute, which was based in the area during the 1970's. After the promotion of the HYV's in the seventies and eighties the production of the lower yielding more coarse grained local varieties spiraled downward. The biological diversity was on the road to oblivion when MSSRF entered the area in 1997. They began to work with villages to increase the yield of the local landraces. Most tribal farmers wanted to grow the local landraces of paddy but could not get enough yield to feed themselves and make enough



money to live throughout the year. In my travels to villages I saw women bent in the fields transplanting paddy for the nursery to the fields. I saw a young boy plowing the fields behind an amiable water buffalo. Toured the home of Paroja woman and saw the two meager rooms in which she and her family lived. One room for was for sleeping and one room was used for cooking. I was not allowed to enter the room on the east

side of her home, because this was where the family gods were kept. I saw the traditional seed storage vessel and wondered at the ability for a self-help group's investment of a rice husker to save village women huge amounts of time. I walked through a muddy pasture to see a water bank that the community had built and I stopped over at a thatched roof restaurant. Prasanth and I talked to villagers about the amount of paddy they grew, and if they had ever stopped growing the traditional varieties. We asked if they understood the concept of profit and if they felt the local landraces were good for health.

¹¹ M.S. Swaminathan Research Foundation, 2002-2003 Thirteenth Annual Report. (Chennai: MSSRF, 2003) 78

¹² *Orissa: A Centre of Origin of Rice*, Sharma, D.S. et al. (MSSRF:MSSRF Cuttak OR) accessed August 29 2004 available at <http://www.mssrf.org/fris9809/orissa-rice-koraput-district.html#top>

¹³ Dandipani Behera. Tribals of Orissa the Changing Socio-Economic Profile, ed B.C. Ray. (New Delhi: Gain Publishing House, 1989), 67

I learned so many things from impoverished uneducated tribal people. They told me about their troubles getting to the market in Jeypore. They explained about their preference for the traditional varieties, but could not quite afford the lower yields. They also felt that it was extremely important that I understood that the yields had once been high, then dipped, and now were increasing again. The problems with the local landraces include the preference of social classes for the fine grained high yielding varieties, the improved yields in HYV's, the farmer's traditional view of the landraces as solely a food crop and HYV's as the cash crop, and the problems getting to the Jeypore market where the commodity values are higher. Appendixes 6, 7, and 8

There were so many interesting answers from the survey. Manima Dalei of Tola village in the Mohuly panchayat was especially interesting. She was approximately fifty years old and had been growing the local varieties of paddy all her life.

High yielding varieties have not affected the choice of crops because if I use the high yielding varieties I will need money in the lean season. I do not have money at that time of the year. That money is not needed in the local landraces. The improved varieties give more yields but I still do not grow it.¹⁴

Manima was referring to the need to buy chemical pesticides and fertilizers with the HYV's. Most tribal communities do not like to use chemicals on their fields and do not have the money to use for the chemicals. They have been able to use farmyard manure and vermicompost to produce an efficient fertilizer for the local varieties and they do not require pesticides because they have no local pests. The farmers are very in tune with their land and know that their soil is one of their most valuable assets. Because

of my limited time in Orissa and large amount of time it took to get to the villages, my work left some statistical niceties to be desired. I was able to observe many different types of villages and paddy fields but I was not able to survey with any statistical certainty. I was able to see many things all the same. I was able to find out about seed purification and the value of pure seeds in the production of seeds. I spoke with an old Brahmin man in



Patraput Village. His name was Sukumar Katia and he was fifty-two years of age. He was able to tell me about the time in the past when the high yielding varieties were not known in the area.

¹⁴ Manima Dalei. Personal Interview. Tola Village. 23 July 2004.

Since a long time in the very far past the yield was very good but in the middle time the yield went down. After MSSRF came and purified the seeds the yield has been improving. Now the market value is also increasing after MSSRF some prices are increasing in the market.¹⁵

The work to purify the seeds has been very helpful in increasing the yields and many of the farmers now know how to purify their seeds and keep their seeds pure. The yield is steadily improving and the seeds are becoming more pure. As the yield increases the security of the crops increase as well.

There are many benefits that these landraces have for sustainable agriculture. Many of the tribal communities believe that the traditional landraces of paddy are healthier for them. They base this knowledge purely on taste. They feel since they prefer the taste of the traditional varieties they are more healthy. They also assert that the traditional landraces are preferred by cattle as fodder. Not only is the straw preferred as fodder, but also is also preferred for the thatch of houses. The stems of the traditional landraces are longer and are preferred by the thatches because of their ability to cover the space that would take two of the shorter high yielding varieties. Not only are the local landraces beneficial for house construction but they help food availability as well.



In most areas of the Jeypore tract, there are three types of land, lowland, middle land, and uplands. These three areas each have different types paddy that is grown best there. The HYV's usually take the best lands, where irrigation is present and the land is fertile, these are the lowlands. In the middle land irrigation is most likely not available and seedlings are either transplanted or broadcast

over the fields. These areas are valuable because they have been used for both HYV's and local landraces for the last few years. Finally are the uplands. These lands have no irrigation and no high yielding varieties have been developed for this area. The upland varieties are a very important part of the agricultural system of the tribal people. The upland paddy is harvested before the lowland paddy, and provides food and income when the families need it most. By the time harvest is ready the stores of paddy from the previous year are running low and cash has also been depleted because of the need to pay agricultural laborers. The upland varieties keep the people fed during the months when

¹⁵ Sukumar Katia. Personal Interview. Patraput Village. 23 July, 2004

they are without an income. The farming practices are beneficial for the land and environment, the byproducts are preferred for building materials and the market values are beginning to increase. The outlook for the local landraces of paddy in Orissa is strong.

I was able to find ways to increase motivation to grow the local landraces. The most important aspect, which requires improvement, is infrastructure. There is no reliable transportation between the villages and the Jeypore market. Many farmers know that there is a good market in Jeypore but they must use the local markets to sell their crop for a lower price because there is not transportation. The roads in rural Orissa leave a little to be desired. At one, point the driver of the jeep I was traveling in actually preferred to drive along the side of the road. Traveling on the winding one-lane roads of the rural areas and even the main arteries in and out of the state is tiring to say the least. If a self-help group, MSSRF, or the state government could manage to hire a truck to go from a central village to Jeypore once a month or twice a month in the harvest season the villagers would not be as seclude from the good market. Only one stall in the Jeypore market sells Kalajeera, a local landrace, grown by the tribal people I talked with. The price for one kilogram is considerably higher then other landraces. One merchant in the market told me that the coarser varieties such as those grown by the tribal villagers I spoke to are preferred over the finer grained HYV's in the Jeypore market. A farmer named Bhima Dalei expressed his concern about the lack of access to the village market is in Jeypore.

There is a good rate [of sale] in Jeypore but it is 20 kilometers away se we must depend on the local market where the rate is lower. I am not selling my paddy because I do not have little land and use all of my crop to eat.¹⁶

If Bhima was able to get to the bigger market, he may get a better rate of return and would be able to move from subsistence farming to vibrant agriculture. Most of the farmers are not knowledgeable of profit and marketability. In fact, the people seldom sell their paddy. My guide Prasanth explained about the selling habits of the tribal communities in Orissa.



The people only sell their local landraces when they need money for needs throughout the year. If a farmer needs something, he will only sell enough paddy to buy that object but not any more. They do not have a concept of profit.

¹⁶ Bhima Dalei. Personal Interview. Tola Village 23 July, 2004

The natural resistance to biotic and abiotic stresses is the single most selling factor for the tribal communities in the Jeypore Tract of Orissa. They do not require the use of any chemical pesticides or fertilizers. The biology behind their mutation is of immense value to science. It is important to realize that in today's age of gene mutation that there are genes all around waiting to be isolated and researched. It is much easier to use the genetic material that nature has produced than to engineer it in the laboratory. These genes are sure to work and conserving their producer's livelihoods and way of life is the best way to conserve them. If they can continue or resume growing the local landraces in a way that can sustain their needs and the environment the biodiversity of the Jeypore tract will be safe.

The scheduled tribes of India are usually some of the most disadvantaged peoples in the Indian population. They are scheduled economically, geographically, and socially. Yet they still hold tight to their culture and traditions. Their persistence is something that can inspire some of the most skeptical. Their hard working mentality and their ability to live life with so little is amazing. They are a metaphor for India, hard at work to improve their lives, maintain their rich culture, and finding hope in the world.

During my time in India, I was able to collect a small amount of data that may someday be used to find and improve ways to help the tribal people hold onto and regain their traditional crops. The work I did was modest in the scope of the foundation but it was colossal in the timeline of my life. It may sound overplayed and cliché from the internship papers by now but my time in India truly changed my life. I have a new appreciation for the gifts I have been given and for the world around me. I have returned home and fallen into the routine life of a university student but I know about life outside the compounds of my home. The time in India has changed my life's goals and the way I

think about the things I do. I am so much more grateful for water and the ability to move around freely. I realize what the benefit of friends is. I now know that when my mother told me to clean up my plate because people are starving she was telling me the truth. I have been changed by the time in India.

I cannot put into words the ways I have been affected. I have not seen the full extent

of the changes I have gone through, but they are many. I am more open, more knowledgeable, and surely more grateful of life and its blessings. I may not be completely able to explain how I have been changed by my time in India but I can say I would not trade the changes that have happened and the experience that made them for



anything in the entire world. Today, I know how thankful I should be of my multivitamins and the ability to choose from a vast array of foods any amount of times a day. I had never really seen the faces of hunger, but now they imprinted on my brain. I could not imagine a side alley where people lived in huts, along a sewer canal, with their children running around naked and laundry hanging over the canal, but now I can still see it.

In India, quotations from M. K. Gandhiji are copious so it is fitting that one of them has cemented itself in my minds. “Be the change you wish to see in the world,” he charged. I now know what the change I wish to create is and I will be it. I vow to make a difference in the lives of people in need, people on the edge of food security. I have left



India but I have not forgotten. I will always remember sitting on Elliot’s Beach talking about the future, I will never forget lounging in the grass at Chennai getting lessons on Indian religion, and I will always remember peaking through lattice of a cubicle to ask what a pucca house was. I cannot forget playing cricket, or catch with a tapioca tuber, or watching the gods being carried through the village at the Adi 18 festival. I will remember India for the rest of my life, but that is not enough.

I am not content to simply remember, or write letters every now and again. I will not forget because I will return. I will walk again among the Parojas of Orissa and celebrate once more with the Malayali people in the Kolli Hills. Now I am only a freshman in college but I am looking forward to the time when I will be back in India making India truly shine. I hope that I will be one of the many to bring hope to the land where hope and faith in government is almost lost. I wish to some day be one of the countless people who have worked to help the poor and scheduled. My work in India was small compared to the work I hope to do, the work I will do. Yet, I must hope that simply the changes that, it has made in my life’s plan, will be its manifest accomplishment. My life in India was not at all like my life in Iowa, but I think that is how the world has to work. The differences in cultural and biological diversity make the world, from Iowa to India so magical. It is the same *mathi* that shines over the University of Iowa and the M. S. Swaminathan Research Foundation, that moon shines on both, only at different times in its celestial journey. I will always be connected by the moon, the greater consciousness of the world, and by my memories. I cannot and will not forget my life in India. It may be half of a world away from my home, but India is still embedded into my mind where it will stay forever.

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Appendix 1
Under Utilized Crops and Food Security
Millets are good for sustainable agriculture

Production

How much millet do you produce?

What is your average yield per acre? Is yield important to you?

Do you grow any alternative crops? Why do you prefer those crops?

How much yield do you get from the [alternative] crops?

Access

How far is the market?

What is the average price per kilogram?

What was the profit?

What problems have you had with the market?

Has the Self-Help Group helped you in growing millets?

In what other ways?

Absorbtion

Do you eat what you grow?

What other sources do you get food from and what types?

Alternative Questions

Do you need any agricultural laborers?

How do you pay them?

How many kilograms of seed are needed per acre?

How has farming millet been effected by new and alternative crops?

How many acres of land do you use for millets?

Name

Village

Appendix 2
Millet Survey Participant Manifest
Kolli Hills Block, Nammakkal District, Tamil Nadu, India

Participant Name	Village	Age	Acreage of Millet
Ms. Thangammal	Aripalapatty	32	3.00 acres
Ms. Dhanam	Aripalapatty	32	2.00 acres
Ms. Ponnamma	Padasollai	41	0.50 acre
Mr. Palamiseamy	Navak Kadu	34	0.50 acre
Ms. Palaniammal	Navak Kadu	31	0.50 acre
Mr. Annamalai	Karaman Kadu	52	0.00 acres
Mr. Kuppusamy	Karaman Kadu	45	0.00 acres
Ms. Kuppayi	Narian Kadu	70's	0.25 acre biannually
Ms. Rajamal	Sembuthoovalavoo	45	1.00 acre
Mr. Conga Gounder	Sembuthoovalavoo	65	0.50 acre
Mr. Mooligai Selvarai	Arapalenwar Koil	39	1.00 acre

Appendix 3
Millet Survey

Mean Answers for Quantitative Data and Mode Answers for Qualitative Data
Under Utilized Crops and Food Security
Millets are good for sustainable agriculture

Production

How much millet do you produce?

An average of 0.91 acres of is land under production in millets.

What is your average yield per acre? Is yield important to you?

Average yield is 321 Kg per acre. Yes, yield is very important

Do you grow any alternative crops? Why do you prefer those crops?

All participants grew tapioca, most grew paddy some grew vegetables, one grew banana, mango, coffee, silver oak, another grew jackfruit, and the final grew pineapple.

How much yield do you get from the [alternative] crops?

Answers varied greatly between crop and producer.

Access

How far is the market?

Not all participants answered question. Data collected very unstable.

What is the average price per kilogram?

Rupees six for each kilogram profit when selling to MSSRF. Private sale between neighbors usually in trade.

What was the profit?

An Average of rupees 3.10 for each kilogram sold. Of participants, only half, sold millets and number could be skewed due to low rate of sale from those with identical cost ratio.

What problems have you had with the market?

None, most participants only sell to MSSRF or friends in the village.

Has the Self-Help Group helped you in growing millets?

Market linkages have been created with Food World. Many other ways such as loans, micro-enterprise and back yard poultry have been used to aid villagers.

In what other ways?

Question dropped mid-survey due to lack of response

Absorbtion

Do you eat what you grow?

Yes.

A Question was added. How often do you eat millets?

Average consumption was 1.67 times each week.

What other sources do you get food from and what types?

All participants obtained rice from the Public Distribution System.

Alternative Questions

Do you need any agricultural laborers?

All respondents used agricultural laborers

How do you pay them?

Laborers are paid with cash or grain. Men were paid rupees 57 per day on average and women were paid rupees 34 per day on average.

How many kilograms of seed are needed per acre?

An average is 7 kilograms of seed per acre but many participants measure plot size by how much seed was used.

How has farming millet been affected by new and alternative crops?

Less land is used for millets because it is needed for tapioca.

How many acres of land do you use for millet?

Very few farmers knew how much land they owned in total but could give quantities of seeds used and work could be done based on this information

Name

Village



Appendix 4
Sample Survey Abstracts
Sembuthoovalavoo Village

Rajamol is a forty-five year old member of Sembuthoovalavoo village where she is a self-help group animator and woman of the Malayali tribe. She plants anywhere from one-half an acre to two acres of millet each year. Her yield is considerably good at 300kg of Samai and Thinai per acre and 400 Kg of Raggi per acre. Her land is less rocky and she uses medium to good soil to cultivate millets. She also grows beans, tapioca, vegetables, and paddy. She sells her tapioca and expects to produce about six metric tones. Her beans, vegetables, and paddy are all used for home consumption.

She is selling her tapioca about fifty kilometers away as there is no market in the Kolli Malali. Fruit crops and other food crops are sold in Solakkadu about ten kilometers away. Rajamol will also sell about two thirds of her millet crop. For this, she will earn six Indian rupees for each kg and her profit will be about four rupees. She will use agricultural labor and will expect to pay women thirty-five rupees per day and men about sixty rupees per day.



Rajamol and her family eat one third of the millet they produce and buy paddy from the PDS as well. Rajamol had stopped farming millets but reintroduced them after the group initiatives. Millet has significantly changed for Rajamol. “Fifteen years ago the Malayali grew only millet in mixed crop farming, but have changed to tapioca for economic reasons, now they think millets are good for health and are riving it,” she said. She said that more people are eating millets because they are easier to prepare. With two dehusking mills for Samai and Thinai and one mini Raggi mill there is much less drudgery for women involved in production and preparation.

Conga Gounder is a sixty-five year old member of the Sembuthoovalavoo village. He is a farmer and not a member of a self-help group. Conga Gounder owns two acres of land, of that he devotes one-half an acre to the cultivation of finger millet mixed with mustard and red graham, while using the rest for tapioca. He uses his medium land for millet and expects 400Kg per acre. He grows tapioca for profit and says, “Many need money so they borrow from money lenders and now must grow tapioca to repay the debts.”

Conga Gounder will eat all of the millet he produces and buy rice from the PDS. He will also hire agricultural laborers for collecting weeds, sowing, harvesting, and threshing. For those laborers he must pay thirty-five rupees for women and sixty rupees for men each day. Because millet is only grown for food, it does not become economically viable. “Fifty years go cultivated millet and millet was very important, only ten years ago I began tapioca,” he narrated.



Survey Abstract
Aripalapatty Village

Dhanam and Thangamal are both members of Aripalapatty a small village high in the Kollu Hills. Dhanam is thirty-two and Thangamal is thirty years of age. They are members of the same extended family.

Thangamal

Thangamal grows two acres of millet crops. She also grows tapioca and paddy in the middle and low land. Of the millet she produces, she will sell one hundred kilograms and keep the rest to eat. She will prepare millets twice a week for her family.

She owns three milk cows and uses the straw of her millets to feed them as well. She also gets paddy from the PDS and needs agricultural laborers. She will pay her laborers the same amount as Dhanam. She will sell her millets for the same price to the procurement center in her village with her profit being rupees three. She has not grown as much millet as she can remember from when she was a child because of the introduction of tapioca. Both Dhanam and Thangamal grow millets on very rocky high lands, and their yields are considerably lower than those who grow millets in better land.

Dhanam remarked as follows. She and her family have about three acres of land sown to millets. That land is very steep and rocky but she expects to get between one hundred and one hundred and twenty kilograms of grain from each acre. In addition to minor millets, she grows ragi, tapioca, and paddy. She is expecting about two hundred and fifty bags of tapioca from her three acres and plans to sell it for family expenses. Aripalapatty is about seven kilometers from the nearest market where she will sell produce. However her village is a center for millet collection and here she will garner rupees six for each kilogram of millet. Her profit will be three rupees on each kilogram. She is a member of a self-help group and receives aid through the marketing of her produce. She also gets seeds from the community seed bank started by MSSRF. Dhanam feels that Samai and Thinai are reliable crops and if it had better market price she said, "I would grow millet continuously and only millets."

Dhanam and her family eat what millets they keep twice a week and she feels they are, "very good for health." Only after the family's needs for food are covered, they choose to sell their millets. She buys paddy from the public distribution system for a very low price, because she is a member of a scheduled tribe.

To produce millet Dhanam needs to hire agricultural laborers. She pays her workers in cash. She will pay rupees forty for the daily work of a woman and rupees sixty for the daily work of a man. Dhanam feels that the best way to improve millets is to improve the market. She concluded, "rupees six is a low price but if it was rupees ten, I would grown only millet."



Survey Abstract
Navak Kadu Village

Polaniseamy and Palaniammal are married, and aged thirty-four and thirty-one respectively. They grow one-half an acre of millets and expect to get two hundred kilograms of yield from their half an acre. In addition to millet, they grow tapioca, paddy, banana, mangos, coffee, and silver oak. Next year when their oak trees are large enough they will plant pepper at the base. They are expecting their tapioca to yield about seven and a half metric tones. They also hope to get one hundred bunches from their banana and a good crop from their five mango tree.

Polaniseamy and Palaniammal do not sell their millets but keep them all to eat in their home. They will eat millets two days a week and rice from the PDS the remainder of their meal. Ms. Palaniammal explained, “We did not feel as well when we ate only paddy and now we use millets and we feel they are good for our health.”

The couple needs to hire agricultural laborers to help with their fieldwork. They will pay female workers rupees thirty for each day worked and will pay men rupees fifty rupees for the same amount to time. Palaniammal requires about eight kilograms of seed to sow each acre and will get them from MSSRF’s seed banks. Before MSSRF’s seed banks, farmers traded seeds or used their own from the previous year’s crop. Polaniseamy felt that the economic problems were the major reason most people did not grow it. He said, “Millets are healthy but we need money for our homes and so we need tapioca. Millets are good for health but not for the economy.”

Survey Abstract
Karaman Kadu Village

Mr. Kuppusamy and Mr. Annamalai both felt that it would be best to speak for their village instead of as individuals. Where they come from people grow between one-half of an acre and one acre of millets. From the soil in that area, millets will yield between four hundred and five hundred kilograms of grain per acre in good soil or three hundred to four hundred in poorer soil. To get their millet seed they will use the seed banks set up by MSSRF or from other sources in the village. If they borrow seeds, they will pay back each borrowed kilogram with two kilograms. When it comes to selling their millet,



the amount sold usually depends on the size of the family. If the family is small, they will sell half of the crop to MSSRF. They will earn the standard rupees six and should profit three rupees per kilogram. The family keeps enough millet to eat once a week or twice monthly. Farmers in the area were particularly concerned about the drought resistance of tapioca. Annamalai said, “Tapioca is drought resistant so if it

does not rain the millets will fail but the tapioca will not. Tapioca is also higher in economic returns.”

In the Karaman Kadu agricultural laborers are need to help with the crops. Women are paid rupees thirty and men are paid rupees sixty for a days work. In Karaman Kadu tapioca, paddy, jackfruit, guava, mango, turmeric, and tomatoes are all grown as cash crops. Neither Kuppusamy nor Annamalai are currently farming millets.

Survey Abstract Narien Kadu Village

Kuppayi is a seventy-year-old member of Narien Kadu village in Chittur Nadu Panchayat of the Kolli Malai. She has been farming millets her whole life but only has a land holding of one acre. She rotates between cultivating millets and other crops. Every other year she will use about one quarter acre of her land to produce millets. From that quarter acre, she will expect about 100 Kg of millet making her yield per acre about 400 Kg, which is on the high side for millet yield in the Kolli Malai. Commonly she grows finger millet, tapioca, brinjal (eggplant), and lady’s fingers (okra). She will devote half of her land exclusively to tapioca and expects about fifty bags or three and a half tones when her crop is harvested.

Her village is three hours walk to the nearest market and she goes about once a week when her fruit crops are ready to sell. Currently, she is not selling millets in the market place but instead using them for home consumption. Her village is connected to MSSRF’s seed banks, but she has her own source of seed that she uses to procure germplasm

When Kuppayi grows, millet she eats most of what she grows because she believes that millets are very good for health. She feels that millets give added strength to villagers. She narrated, “Fifteen years ago we walked to the markets every day but now it is impossible to go because of ill health. We are not healthy because of only eating rice and not as strong as we used to be.” Studies have found that millets are high in calcium, which directly effects bone strength. Today her source of food is the Public Distribution System where she buys rice. There is a PDS center in her village.

Kuppayi has several production concerns when it comes to millet. Some of these concerns are directly related to her small land holdings. “Last year I grew millets but not this year because we did not get enough rain and I am worried that there will not be enough rain this year too,” she said. She went on to say that, millets need rain at the right time and without it, they are not very productive, but tapioca is drought resistant for months. Her main reason not to grow millets was economical; tapioca gives high economic returns and is a reliable crop. First, there was no tapioca and if the rains would fail there would be no crops, but now the land that was once used for millets, pulses, turmeric, and beans is used for tapioca because it will not fail.

She does hire agricultural laborers and pays men fifty rupees each day and women only thirty.

Survey Abstract Arapalewar Koil Village

Mooligai Selavarai is a middle-aged member of Arapalewar Koil village. His village contains the largest temple in the Kolli Hills. He was very knowledgeable about millets. He narrated that in the past millet farming was very common because it was the best crop for the area. He felt that at that time people were very healthy. At that time, there were many people in the Kolli Hills and there was much demand for millets as the primary food crop. Also, at that time there were many people who needed to work in the fields now there are not so many because people are leaving the hills to go to the plains. Millets require a lot of labor to grow and process and this was present in the past but now has diminished. He added that processing tapioca is very simple and it makes farmers more money. He felt that millets did not earn as much profit and took much more time [labor hours] to grow.

He felt that tapioca had changed the way the people interacted with moneylenders. He said, "If they cultivate tapioca, when tapioca is cultivated they can get loans because the return is safe. The output for millets is not as sure so they cannot get loans so if they need loans we can just say 'I am growing tapioca' and then money lender will give the money."

He felt that even people who wanted to grow millet did not because of the economic reasons. If they really wanted to grow millets, he felt they would still only use a small portion of their land and use the rest for other crops. He did foresee one possible way for the people to begin growing millets on a large scale again. He told me, "More millet will only be grown if the tapioca goes down. If there is a loss for the tapioca then they return to millets but not until then. Farmers need subsidies from the government and then there would be a chance."

I asked Mooligai if he felt that life had been improved by the production of tapioca and he felt it had been improved a lot. "When it comes to life it has improved much because of more money. Earlier children did not go to school but now they go. Now even some are going to private schools, but health has been negatively affected," he believed.

He continued to give an example, "For one acre [of tapioca] we can get one hundred and fifty bags, one bag is seventy-five kilograms of tapioca. Our final profit will be 10,000 rupees (\$ 217.37) but with millet, it is not there. If we cultivate Samai on that acre, we will get five bags. Our profit will only be 1125 rupees (\$24.36)."

Mooligai is thirty-nine years of age and owns three acres of land. He cultivated one acre of millet and tapioca on the other acre. The third he does not cultivate but grows trees like mango, jackfruit, guava, papaya, and silver oak.

Survey Abstract
Padasollai Village

Ponnamma is a forty-one year old woman from Padasollai village in the Kolli Hills. She and her family own four and a half acres of land. It varies from lowland to rocky upland. In her half acre of wet lowland, she grows paddy. In her middle high quality land, she grows one and a half acre of tapioca and grows millet in a half acre of this land as well. On the rocky high lands, she will produce organic pineapples. She will spend the money she earns from the pineapples for family expenditures to send her children to school and buy needed supplies. The money she gets from the growth of tapioca she will use to save if there is a need in the future. Of her paddy, she and her family will consume the whole, but she will sell half of her millets to MSSRF. Her yields are fairly high for the Kolli Hills. She plans to get 500 fruits or 20 *sumia*. *Sumia* are bunches of twenty-five pineapple in a large gunnysack. From her millet, she will yield about four hundred kilograms each acre.

Ponnamma has had no problems with the market for her crop. She sells the excess to MSSRF or sells small amounts to neighbors within the village. The amount she sells within the village is usually used for seed. Ponnamma has been farming since she was a small girl. She has been growing pineapple for thirty years, and tapioca for fifteen. In the last six years, she has begun farming millets again. "Tapioca gives more money at one time and helps to reduce out debts as well as family expenditures," she reasoned. Ponnamma still follows the tradition of paying agricultural laborers in their choice of grain or cash. She will pay women six kilograms of grain a day and men will earn eight kilograms for a days work. She will pay those who prefer cash forty and sixty rupees respectively. MSSRF has been active in her village. They have set up participant variety selection and yield enrichment trials in her village as well as trading germplasm and backyard poultry farming.

Appendix 5
Under Utilized Crops and Food Security
 Local landraces of rice are good for food security

Name	Age	
Village	Male	Female
Panchayat	SHG	Non-SHG

How much land do you use to grow paddy? How much of that is of the local varieties?

How much land do you have in total?

What is the yield for your local varieties of rice?

Where do you get seed for local landraces?

How far is the market?

What is the average price per Kg of the local landraces of rice?

What is your profit?

Do you have any problems with the market? Have you in the past?

How have the self-helps group helped you in producing and selling local landraces of rice?

What has changed about the market for local varieties of rice since MSSRF has come to your village?

Do you think that the local landraces are reliable crops?

Do you eat what you grow?

How often do you eat what you grow?

Other than for food, do you use any products from rice?

Have you used the local landraces for their healing properties?

Do you feel that the local rice landraces are good for health?

Do you use agricultural laborers? How much do you pay them per day?

How long have you grown the local landraces?

What changes have you seen over time?

How do you think growing local varieties of rice could be improved?

Have you noticed a change in yield over the years?

What about changes in aroma?

Have you always grown local landraces?

Why did you stop? When?

Why did you restart? When?

What has changed since you decided to stop growing traditional landraces?

What crops did you grow instead?

How have improved varieties of rice affected you crop choices and farming methods?

Appendix 6
Local Landraces of Paddy
Mean Answers for Quantitative Data and Mode Answers for Qualitative Data
Under Utilized Crops and Food Security

Local landraces of rice are good for food security
Name Age average 41

Village Male (3) Female (1)

Panchayat SHG (3) Non-SHG (1)

How much land do you use to grow paddy? How much of that is of the local varieties?
Paddy average land use was 4.40 acres.
Local landraces of paddy average land use 2.30 acres.

How much land do you have in total?
Average land holding was 5.20 acres.

What is the yield for your local varieties of rice?
Average yield was 14.60 bags per acre of 1168.00 kg per acre.

Where do you get seed for local landraces?
Three used some of their own seeds and three used the community seed banks.
These categories are not mutually exclusive

How far is the market?
All subjects used the village market in their native village but wished to use the Jeypore market.

What is the average price per Kg of the local landraces of rice?
Average for coarse paddy was Rupees 4.11 and the average for Kalajeera was rupees nine.

What is your profit?
The farmers had no concept of profit.

Do you have any problems with the market? Have you in the past?
The Jeypore market is too far away and there is no transportation.

How have the self-helps group helped you in producing and selling local landraces of rice?
This question received a wide variety of answers from teaching improved farming techniques to seed purification and loans.

What has changed about the market for local varieties of rice since MSSRF has come to your village?
The prices for local landraces are better.

Do you think that the local landraces are reliable crops?
Yes, they are pest resistant and do not require chemical fertilizers and pesticides.

Do you eat what you grow?
Yes

How often do you eat what you grow?
Exclusively or until supplies are exhausted

Other than for food, do you use any products from rice?
Thatch, fodder, and podged paddy are made from paddy by-products.

Have you used the local landraces for their healing properties?

No

Do you feel that the local rice landraces are good for health?

Yes, they taste good and no chemicals are used on them.

Do you use agricultural laborers? How much do you pay them per day?

Yes. They are paid in kind through labor exchange or women are paid an average of 16.66 rupees per day and men are paid rupees thirty per day.

How long have you grown the local landraces?

Personally, they had grown local landraces as long as they had been farming.

Ancestrally production has occurred since the “time of my grandfathers.”

What changes have you seen over time?

The yield has changed over time.

How do you think growing local varieties of rice could be improved?

They could be improved with the use of more farmyard manure, better farming techniques, and increased seed purification.

Have you noticed a change in yield over the years?

Yield was once high but over time it decreased because of poor seeds and farming practices. Today it is increasing again due to seed purification and increased knowledge.

What about changes in aroma?

No

Have you always grown local landraces?

All yes

Why did you stop? When?

Not Applicable

Why did you restart? When?

Not Applicable

What has changed since you decided to stop growing traditional landraces?

Not Applicable

What crops did you grow instead?

Not Applicable

How have improved varieties of rice affected you crop choices and farming methods?

Two respondents were not affected by the High Yielding Varieties. Two said they had stopped growing the local landraces in lowlands but continued in uplands.

Notes

Appendix 7
Local Paddy Landrace Participant Manifest
Jeypore Tract, Koraput District, Orissa, India

Name	Village	Panchayat	Age	Acres of Landraces
Mr. Sukuman Katia	Patraput	Dangarchhinchi	52	1.50 acres
Mr. Bhima Dalei	Tola	Mohuly	35	2.20 acres
Ms. Manima Dalei	Tola	Mohuly	55	4.00 acres
Mr. Kilas Sukri	Pajariput	Digapur	28	1.5 acres



Appendix 8 Survey Abstracts

Survey Abstract Patraput Village

Sukuman Katia is a fifty two year old member of the Patraput village in Dangarchhinchi panchayat. Sukuman uses three acres of land to grow paddy and half of that land is used for the local landraces. In total, he owns three and half acres of land. He gets between seventeen and eighteen bags as yield for his local landraces. Each bag is equal to eighty kilograms so between 1360 and 1440 kilograms are yielded from one acre of Sukuman's land. He gets his seeds from his previous years crops.

The market for local landraces is found right in his village but the Jeypore market is twelve miles away. When Sukuman sells his coarse local landraces, he can expect to sell it for between six and seven rupees. Sukuman's village market has lower prices, so he wants to go to Jeypore where return is higher, but because of insufficient transportation, he is unable. The market value has increased for some varieties of paddy.

Mr. Katia thinks that the local landraces are reliable crops. He felt, "In these varieties there is no disease attack so now we are preferring the local variety." He prefers to eat the local landraces because he feels the high yielding varieties do not taste as well as traditional varieties. He eats his local landraces until he has none of them left and feels they are healthier than HYV's because they have no pesticides and chemicals used on them.

To grow paddy Sukuman needs to hire agricultural laborers. He compensates his female workers with twenty rupees each day and pays his male workers forty rupees each day. Mr. Katia has been growing the local landraces all of his life. He said, "We have grown the local land races since my grandfather's time." Over time, there have been many changes in the yield of the local landraces. He explained, "A long time past there was very good yield but in the middle period the yield became bad. After MSSRF came and purified the seeds the yield increased." He felt that if the seeds could be purified then the local landraces could be improved. Sukuman has not stopped growing the local landraces, so he was unable to answer the rest of the questions. He helped to illustrate the current situation by saying, "when improved varieties came it was preferred because of the yield and then we stopped growing the local varieties but since the last two years they have reduced the high yielding varieties and increasing the local varieties."

Survey Abstract Tola Village

Bhima Dalei is a thirty-five year old member of Tola village in the Mohuly panchayat. Bhima Dalei and his family own two acres and another third of an acre. He uses all of his land for the production of the local landrace. He grows two acres of upland paddy in his upland and he grows Kalajeera in his two tenths of an acre of his lowland. In addition, he grows one tenth of an acre of maize. He expects a yield of 1600 kilograms for his Kalajeera. He is growing three varieties of the local landraces. He gets two types of seeds from MSSRF's seed banks and one variety from his own source.

Bhima sells his paddy in a local market three kilometers away from his village. In that market, he will sell his Kalajeera as seed for 10 rupees per kilogram and his coarse varieties for between four rupees fifty paise and five rupees. If he were selling fine paddy he could expect an added rupee in price. Even though there is a market near him, he chooses not to sell his crop. He explained, "I am not selling paddy because I have little land and I must eat it. I have sold Kalajeera seeds because it has a good price, and with that money I could buy other types." Bhima would prefer to use the Jeypore market



where there is a higher rate but it is twenty kilometers away from his village.

Growing the local landraces has changed in the past few years since MSSRF has come to the Tola village. Bhima has gotten better prices for Kalajeera and other selected varieties. He feels that after seed purification and the improved farming techniques MSSRF have brought have made farming the local landraces better.

He has begun to add farmyard manure and to learn to purify seeds. He has learned that, "Better farming practices help to increase the yield because in old ways the plant population is too high so now the plants grow better."

His village has grown the local landraces since a long time ago and he still grows it today. He has seen changes over time in relation to yield. He observed, "Over time I am seeing changes in the varieties I am growing continuously. Over years, they give fewer yields so now I change every few years but I still use the high yielding varieties. There are no HYV's that can be grown in his upland." He also chooses not to grow the HYV's because the expenses will go up because they need to use chemical fertilizer and pesticides.

Manima Dalei is a roughly fifty-year-old member of the Tola village. Her family owns a total of five acres. She grows four acres of paddy and one acre of finger millet. Of the paddy land, she grows one acre of upland, two acres of medium land, and a final acre of low land. Manima grows Kalajeera in her low land and expects to get twelve bags or 960 kilograms of yield on her one acre. In her medium land, she will grow Muktavali and Supuri varieties. From these two types, she expects between twelve and thirteen bags or between 960 and 1040 kilograms of paddy from each acre. In her upland, she expects to grow much less. She is in the same village as Bhima so many of her logistical responses were the same. She has been effected MSSRF's initiatives for group lending. She needs the loans to pay for agricultural laborers for transplanting, weeding, and harvesting her crops. Agricultural laborers are less expensive in Tola village. Men are paid twenty rupees each day and women are paid fifteen rupees each day. Manima illustrated the reason for such low wages, "We as a village have decided not to increase labor costs because we each use our neighbors as agricultural laborers. We raised it three years ago, but before that, it was at ten and fifteen. Laborers can take their pay in cash or grain according their need, sometimes we pay in grain when people need it in the lean times" Manima's village usually hires others from the village so they pay less money to hire the laborers and will be paid less for their work for others.

Ms. Dalei prefers the traditional varieties because they taste better to her. She prefers to eat it because the local coarser types they taste better and are more filling. She explained, "I like coarse paddy because it will give more food and the other will feed less. The elite people prefer the fine grained paddy, but I prefer the coarse paddy." These local landraces play an important role in Manima's life. She told me about the



religious uses for the local varieties. Each year the villagers take the first bundle of paddy and worship as the form of the goddess Lakshmi. They worship it along with the other family gods and goddesses for a certain amount of time. She talked about the past practices of growing paddy. "Before [MSSRF's] intervention we used seeds in random from the food grains, now we have learned to keep pure seeds separate and use other food because these will give better yields," she clarified. The improved varieties do not affect her choice of varieties because if she uses the HYV's she will need money for that season and she does not have the money at that time. That money is not needed in the local landraces, the higher yielding varieties give more yields, but still I do not use it.

Survey Abstract Pujariput Village

Kilas Sukri is a twenty-eight year old member of the Pujariput village in the Digapur panchayat in Jeypore. Kilas owns twelve and a half acres of land of which he grows ten acres of paddy and an acre and a half of millet. He uses eight and a half acres of land for the high yielding varieties and one and a half of an acre for the landraces. He has been growing the High Yielding Varieties for ten years and until that time, he grew only the local varieties. He gets seeds for Kalajeera from MSSRF and the seeds for his upland. The nearest market is four kilometers away in a local village. At that village, the local landraces of upland paddy can be bought for between four and four and a half rupees for each kilogram. Kilas wants to go to the Jeypore market but it is very far away and he cannot get there because of transport problems.

Kilas had adapted to the HYV's because of the higher yield. Kilas continues, "Side by side expenses are more in comparison with local landraces. We are still keeping the local landraces for our consumption but we sell the HYV's to sell for other expenses." Mr. Sukri uses the local landraces for more then food. "We use the straw for thatching and fodder. The local landrace straw is better for fodder because cattle eat that straw and like it because it tastes better then the HYV's for them," he asserted. He explained why his village prefers the local landraces for thatch, "For thatching it is good because it I very tall and the HYV's are small so for roofing it is good."



MSSRF has been able to help the people get a higher price for their crops and to purify seeds. Once again, Kilas explained about the changes that have happened to the yield over the years, "Earlier it was giving good yield but continuous cultivation reduced the yield. So we left those varieties for HYV's but now they are adapting the local landraces because purification of seeds and increasing yield so now we are preferring them to some extent."

He also explained about the benefits of upland landraces, "Some upland varieties are best in the field because it will serve as a middle time food because it is harvested early. All farmers have kept some of the local landraces to at least a small extent."

Mr. Sukri plants many types of paddy on his land. He is growing Para dhan, Dungar dhan this season but has grown Mati dhan, Bodikaburi, and Gathia. He changes every year to keep the seeds pure and the yields high.