



INSTITUTE FOR AGRICULTURE AND TRADE POLICY

Women at the Center of Climate-friendly Approaches to Agriculture and Water Use

By Shiney Varghese

Institute for Agriculture and Trade Policy

February 2011

Women at the Center of Climate-friendly Approaches to Agriculture and Water Use

By Shiney Varghese
Institute for Agriculture and Trade Policy

Published February 2011
© 2011 IATP. All rights reserved.

The Institute for Agriculture and Trade Policy works locally and globally
at the intersection of policy and practice to ensure fair and sustainable food, farm and trade systems.

More at iatp.org

Introduction

Global warming has already affected the world's climate, and changed the type, timing, duration and intensity of water precipitation. There is either less or more snow and rain, affecting the amount of water that comes from snowmelts. There is increased frequency of extreme weather events across the world—cyclones, floods or droughts in populous regions. Some of these events affect millions, as was evident in South Asia recently.¹

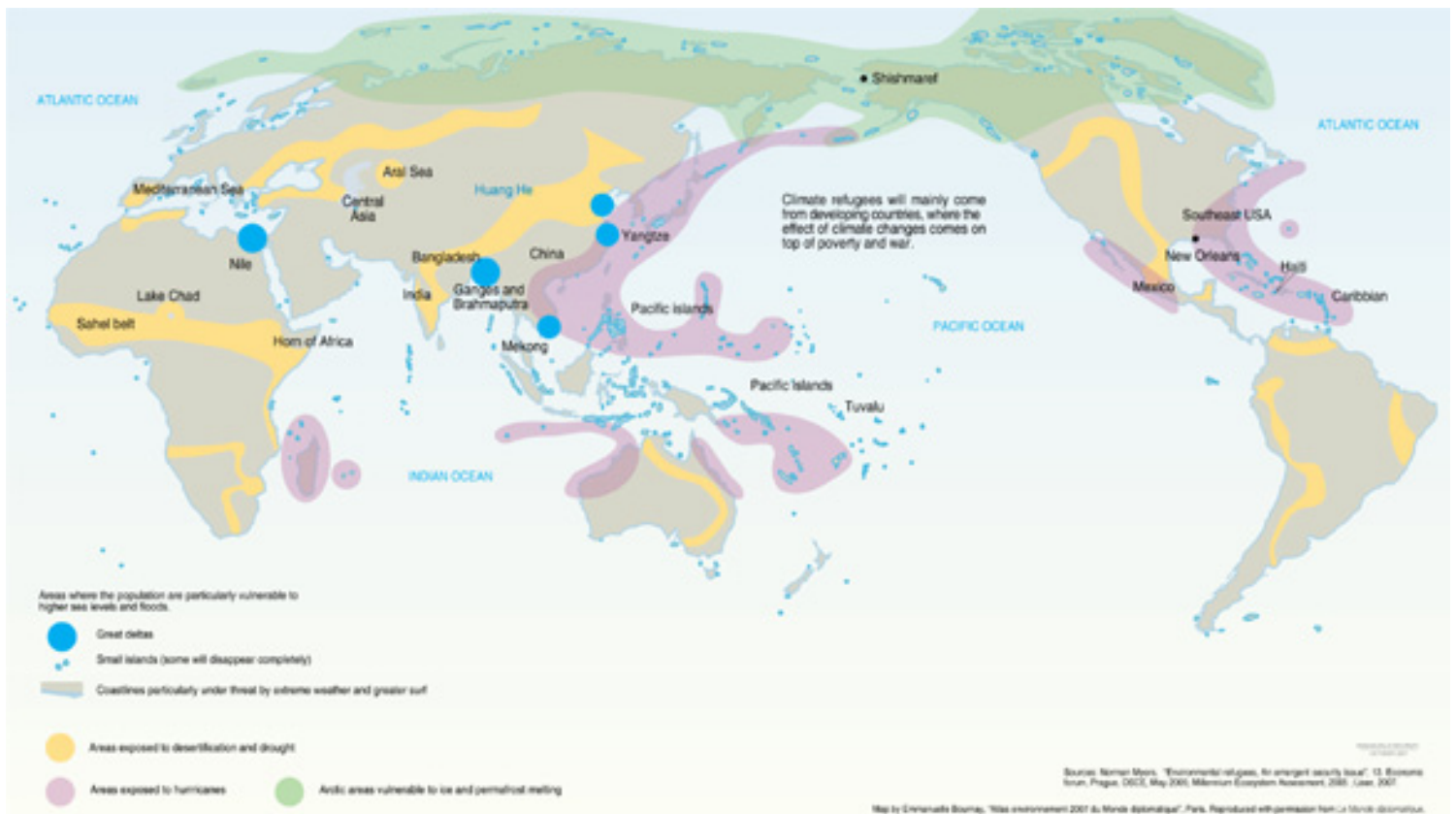
There are also smaller weather events such as delayed onset of monsoons or prolonged dry spells. These too have been playing havoc with the agriculture-dependent livelihoods and food security of about 75 percent of the world's poor who live in rural areas. This is particularly true for arid and semi-arid areas in the global south where the global water crisis is already a reality, poverty is rampant and agricultural systems are under siege. The U.N. has estimated that already in 2010, there are about 50 million climate refugees. By 2080 these numbers are likely to be much higher as agricultural productivity in arid and semiarid regions is expected to reduce by anywhere between 15 to 50 percent (see maps below).

Communities around the world have been exploring various ways to cope with the challenges they face in meeting their food and water security needs in this changed environment. The strategies adopted by vulnerable households in the face

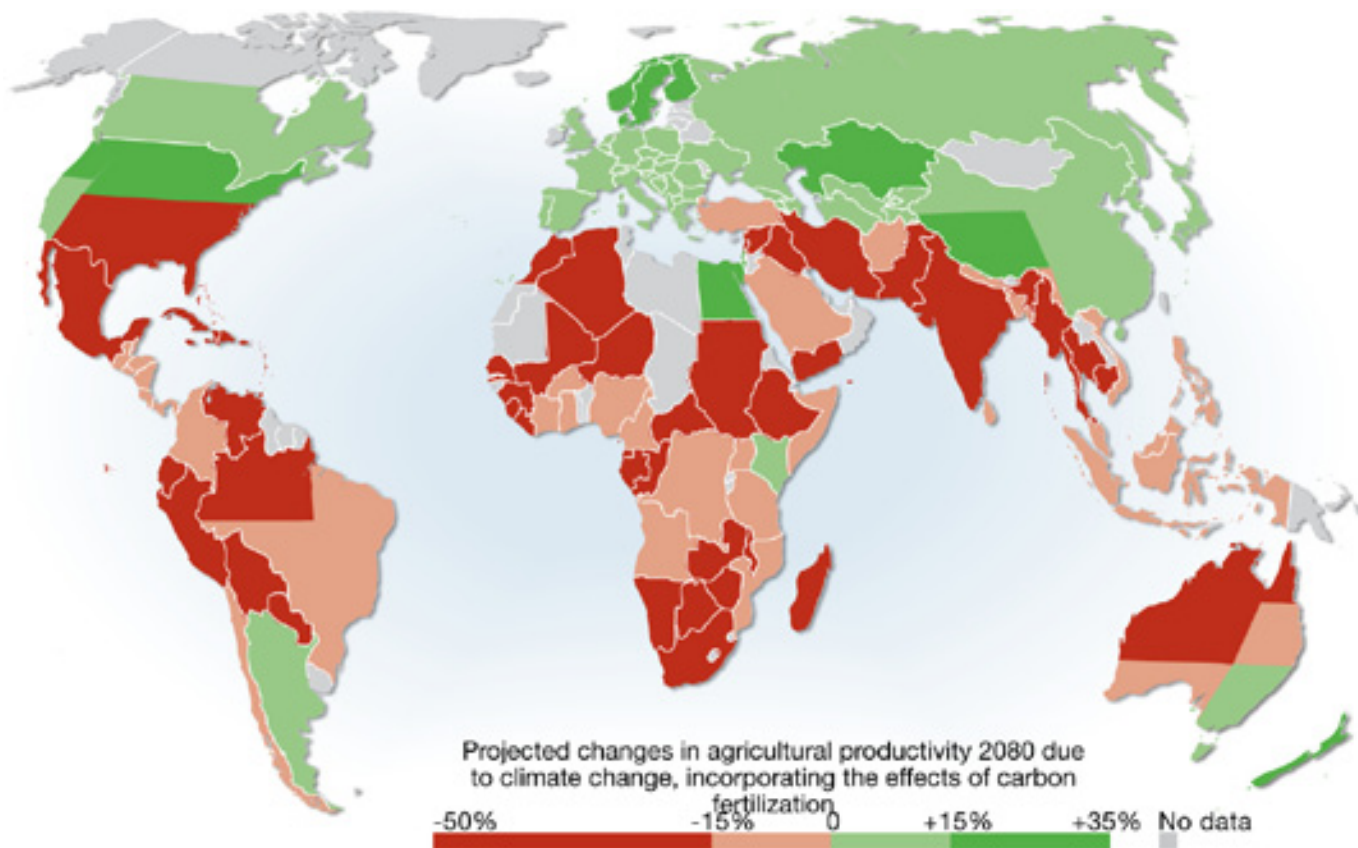
of these events are not only influenced by their traditional knowledge and immediate environment, but also by the political opportunities available to them.

Quite often, new policies on national development and food security undermine food and water security strategies adopted by individuals and households from marginal groups. It is necessary to create an environment that recognizes a wide diversity of strategies and strengthens gender-sensitive approaches. These approaches already address climate change, food and water security simultaneously. This is especially important in an overall policy context where agriculture is the sector most impacted by the vagaries of climate change, and the main sector through which both adaptation and mitigation can simultaneously be achieved to help solve food security issues, and the climate and water crises.

Most current climate proposals on adaptation and mitigation largely focus on developing new technological interventions, without adequate attention to precautionary principles. Thus, there are increased investments towards solutions like developing new climate-ready seeds to deal with water scarcity and pests; and “soil carbon sequestration” through large-scale use of bio-char is proposed as a means for reducing the carbon levels and enhancing soil-quality. However, these approaches are based on still-unproven claims. For example according to Syngenta, “Agronomic traits, such as drought tolerance, and



UNEP/GRID-Arendal, Fifty million climate refugees by 2010, UNEP/GRID-Arendal Maps and Graphics Library, <http://maps.grida.no/go/graphic/fifty-million-climate-refugees-by-2010>.



UNEP/GRID-Arendal, Projected agriculture in 2080 due to climate change, UNEP/GRID-Arendal Maps and Graphics Library, <http://maps.grida.no/go/graphic/projected-agriculture-in-2080-due-to-climate-change>.

output traits such as yield or quality improvements have not yet emerged from the research phase [in the case of transgenic crops].² More over they do not fully consider their unintended impact on our natural world, which could worsen the overall crisis.

This case study on proven methods and practices by women in arid areas of India provides lessons for more immediate and sustainable alternatives.

The study is particularly relevant for highly populous and arid countries like India and China with emerging economies. India, along with other members of BRIC (Brazil, Russia, India, China) and South Africa, is a key political actor in climate negotiations. On the other hand, India is home to more than 40 percent of world's poor and has more people living in poverty than in Africa and the Americas combined. Accounting for 17 percent of world's population, but having access to only 4 percent of its water resources, India is a water scarce country with an average annual rainfall of 1,200 millimeters (mm). Tamilnadu, where this case study is located, experiences an annual rainfall of 930 mm, making it the second driest state in the country.

This paper identifies three principles and two sets of policy-level interventions necessary to enhance water and food security for marginal communities by drawing on the

experiences of the Tamilnadu Women's Collective (WC), a state-level federation of women's groups from 1,500 villages. With a membership of over 150,000, the WC is spread over 16 districts in Tamilnadu State, India.³

Three principles towards food and water security

Over the last 10 years, members of the WC have been engaged in joint and individual efforts (at local, state and national levels) for fair and sustainable food systems to ensure local food and water security as part of their broader mission.⁴ In developing this, the women have trusted their traditional knowledge, but have also built on it to enhance productivity and sustainability by selectively and carefully reintroducing both traditional and modern practices. From the perspective of climate change policy, their interventions are synergistic, bringing together an "adaptation strategy" and a "mitigation strategy," even as they try to ensure food security at individual and household levels. The WC's work on food and water security can be understood using a framework of three main principles: 1.) Empowerment of women as political actors in society and as co-decision makers at the household level; 2.) Participation of women in democratic local governance structures; and 3.) Promotion of multifunctional agriculture.

1.) Empowerment of women as political actors in society and as decision-makers at the household level

A.) WOMEN, FOOD SECURITY AND CLIMATE CHANGE:

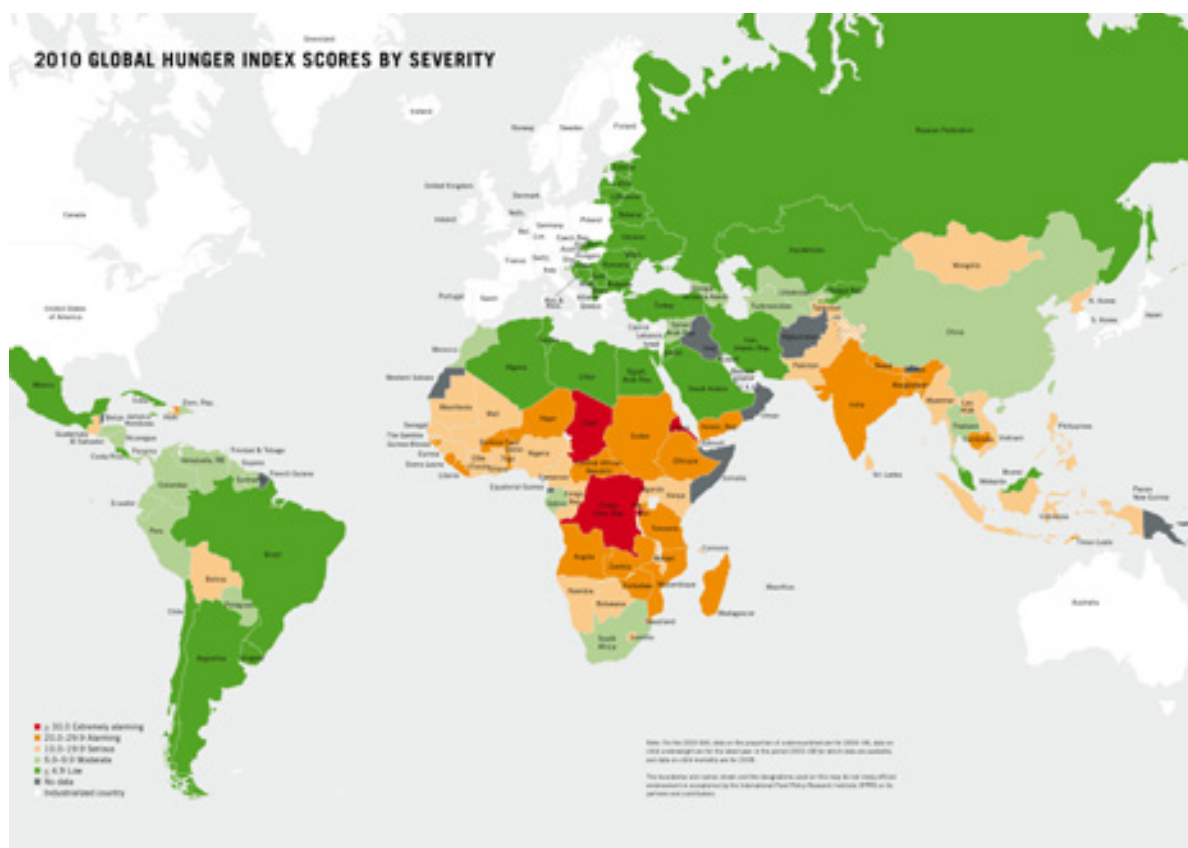
DISPROPORTIONATE IMPACT The majority of the Tamilnadu Women's Collective members belong to the Dalit community, which is the lowest in terms of socioeconomic and caste hierarchy. They tend to be either landless laborers or cultivators of small plots of land. Food insecurity was something they experienced for themselves and even for their families. In addition, Dalits were often made victims of violence when they attempted to ensure food security. This takes different forms for women and girls: for example, landless women who are dependent on landlords for agricultural employment are often sexually harassed. The challenges these women face are not unique. Women play a major role in food production, especially in developing-country agriculture. In regions like sub-Saharan Africa and South Asia, more than 60 percent of all female employment—globally more than a third of the female workforce—is engaged in agriculture.

But food security involves much more than food production, and this recognition is especially important from a gender perspective. According to the World Food Summit, “Food security exists when all people, at all times, have physical and

economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”⁵

Around the world, women play a major role in accessing food for their family members and in preparing food for household-level consumption. Women's access to safe water for domestic use is a necessary condition for ensuring household-level food security. However this direct link between the right to water and the right to food is often overlooked in deliberations on defining the right to water, and in defining obligations related to the right to water. For poor women, food preparation entails collecting firewood and water, an increasingly difficult task in degraded environments. Thus, realization of the right to water becomes a prerequisite for rural food security, especially in degraded environments.

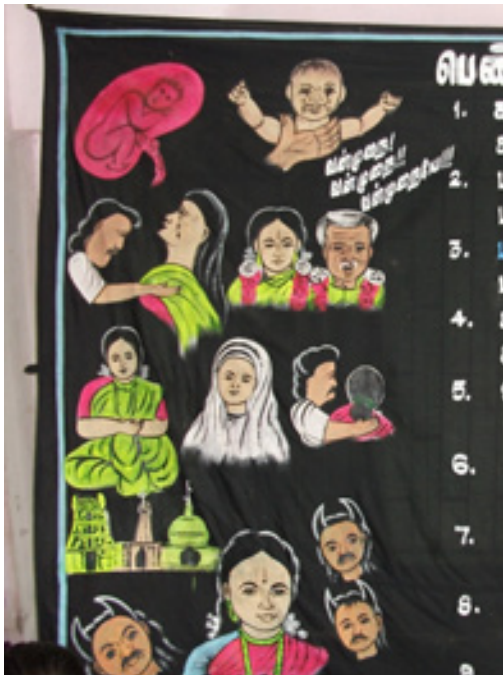
Despite women's role in ensuring food security at the household level, when it comes to consumption, they usually have the least access to food. Sociocultural-, gender- and age-based inequalities play a big role in each individual's ability to meet their food security needs, even when there is household-level food security. Women-headed households tend to be more food insecure compared to male-headed households.⁶ This has given rise to the phrase, “the feminization of food insecurity.”



Reproduced with permission from the International Food Policy Research Institute, www.ifpri.org. The report from which this map comes can be found online at <http://www.ifpri.org/publication/2010-global-hunger-index>.

According to the recently released 2010 Global Hunger Index (GHI) report, of the 29 countries in the world that have “extremely alarming” or “alarming,” levels of hunger almost all are in sub-Saharan Africa and South Asia.⁷ Amongst South Asian countries, India (GHI: 24.1) along with Bangladesh (GHI: 24.2) is placed in the “alarming” category. It is ranked much lower than neighboring Pakistan, Sri Lanka, Nepal, Myanmar and China. In South Asia, the low nutritional, educational and social status of women was cited as one of the major factors that contribute to this statistic.⁸

Several studies have shown “inadequate dietary intake, especially hidden hunger during pregnancy and lactation period among Indian women.”⁹ When household-level food security is impacted seasonally, or through catastrophic events such as those caused by climate change, women not only have to work harder to access food and water for their family, but their own access to food is further compromised. In order to redress this food insecurity that women face, it is necessary to empower them.



Violence against women is a central focus of the Tamilnadu Women’s Collective. Sheelu (right) is the president and facilitator of the Tamilnadu Women’s Collective.

B.) THE TAMILNADU WOMEN’S COLLECTIVE’S FOCUS ON VIOLENCE AGAINST WOMEN The organizational focus on empowerment of women is rooted not only in this understanding, but also in the history of the Tamilnadu Women’s Collective. The leaders of the original six groups that formed the WC in 1994 were part of a network called Voluntary Organization Women Staff Association (VOWSA), developed in response to gender- and hierarchy-based discrimination common among NGOs—even into late 1980s. Many of the VOWSA members had gone back to their villages and had started their own organizations. Since they were interested

in working with women, they decided to empower themselves and their staff as a first step. They agreed on a code of conduct based on their past experience, emphasizing principles such as integrity, transparency, equity, sustainability and equality. Since most of them had worked as staff, a 1: 2.5 salary ratio between the lowest and highest paid staff in the organization became the corner stone of the staff policy.¹⁰

Their second step was to identify violence against women as their focus. Violence against women occurs in a multiplicity of contexts: in the family, in the field, workplace, during caste, religious and communal conflicts, as well as by police and state officials. Violence against marginal groups is always informed by the sociocultural location of the victim, but for women, it is first and foremost mediated through her gender. Sexual violence is a norm to control women (intra-household, intra-community), or the community she belongs to (e.g., inter-caste or communal violence, or state sponsored violence) in the event of a conflict.

For example, in 1995–96, when there were land-based conflicts—between lower-caste pallars and upper-caste thevars in Kodiyankulam in Thiruvraveli district—the upper castes set fire to the standing and recently harvested crops, and poured kerosene in the drinking water well to pollute it. They also sexually abused lower caste women. In this case the experience of violence was both as lower castes and as women.¹¹ Similarly when conflict arose between lower caste parayars and upper caste vanyars in northern Tamilnadu, once again parayars and women of their community lost out. WC actively supported the lower-caste communities in both these struggles, as their members came from neighboring villages, and were stakeholders in the conflict.

Violence against women was a recurring theme. The Tamilnadu Women’s Collective trained themselves in counseling, and initially provided legal aid for women who were victims of domestic violence. Later on they expanded this work to support women by taking up cases of sexual harassment (and, once, murder) against upper castes and landlords. Single women (unmarried, deserted or widows) faced harassment from lower caste men as well. In 1997, a shelter was opened to house women who were fleeing abusive relationships, were victims of violence, or were destitute or single.

Many of their clients have become active members of the “sangams” (village-level women’s collectives), joined as staff or have emerged as leaders in the state-level organization.

In addressing the issue of domestic violence, members of the sangams were already confronting the issue of gender inequality at the household level. Though not overtly done, gender analysis is an integral part of addressing the issue of domestic violence or violence against women in general. This collective action, premised on “equality and equity,” is not only empowering but also influences their self-perception and identity.

More than anything else, the assurance that women have it in their power to act helps to secure their decision-making role within family and society. Studies have shown that women’s role in household-level decision-making influences their and their family members’ food and water security, irrespective of income levels.¹² WC members share similar experiences: Kaliasammal (Sangupuram village Sivagiri taluk), Pounuthai (Santhapatti village at Usilampatti taluk) and Sahayamary (Thottikalai village, Thiruvallur taluk) were amongst the women who explained how they have influenced crop choices (to retain part of their plots for consumption-oriented crops such as millets and vegetables) after they became active members of the WC.

2.) Participation in local democratic governance systems

The second organizing principle is women’s participation in governance systems. The experiences Dalit women had during the caste-based land conflict and other experiences convinced Tamilnadu Women’s Collective members that in order to ensure that their concerns were addressed in a just manner, they needed political representation in the local governance systems. Making use of a legal provision that stipulates 33 percent of the seats for women in local self-government institutions, WC members have been running for office since 1996. That year, 201 women belonging to the WC stood for Panchayat (local government bodies, which has several villages under its jurisdiction) elections; of these 102 were elected to various positions across the state.

Emboldened by success, they fielded more women in 2001. However, by then the policy of reservation for women was used by mainstream political parties to field women associated with male leaders, and the elections were more competitive. Yet, of the 400 women from the Tamilnadu Women’s Collective who stood for elections around 262 women were elected as representatives to local bodies. In 2006 elections, 912 members of the WC ran for office for various positions and 402 of them were elected. Of these, 78 women were elected as Panchayat presidents; these women are able to support the Tamilnadu Women’s Collective’s agenda on democratic local governance in the villages that come under their panchayats.

Because of their presence in local self-government, the Tamilnadu Women’s Collective has been able to effectively raise issues of concern on occasion. Their experience with sand mining is a case in point (see Annex 1: Sand mining, governance and right to water, page 19).

Traditionally, sand used to be mined from rivers to meet the minimal construction needs of local villages and government offices. But over the last two decades, with the construction boom, sand mining has become rampant across India. Wherever there are suitable rivers, sand mining has evolved into an income-generating activity. In Tamilnadu, a powerful network of politicians, miners, contractors, construction companies and government officials help ensure smooth functioning of illegal sand mining operations. Excessive sand extraction affects the groundwater



A dry riverbed lies downstream from the village of Sanganageri where sand mining is an issue.

recharge, since the river bedrock does not have water-retention capacity. Sand mining has lowered the water table in many riverine villages. Increased well failures have affected village-level water security: access to both water for domestic use and for food production has suffered in several villages where the Tamilnadu Women's Collective is active.

In mid-October 2010, shortly after this field study was conducted, it was reported in the national press that "a total of 133 protestors, including Vasudevanallur MLA [Member of the Legislative Assembly of the State], T. Sadan Thirumalaikumar and 87 women, were arrested at Sanganaperi on Wednesday when they prevented sand mining in the Nishabanadhi basin."³⁵ The arrested women belong to Sanganapari Village, and are part of the Vasudevanallur Women's Collective (VWC), one of the 38 member units of the Tamilnadu Women's Collective. These women have been waging a campaign against sand mining as it has affected their access to water for domestic use and irrigation.

In this campaign against sand mining, the women are led by the twice-elected Panchayat President of Sanganapari panchayat, Smt. Samthram, a long term member of the local "sangam." She is a recipient of the national award Nirmal Gram Puruskar, presented by the President of India, for realizing 100 percent sanitation coverage in her Panchayat.³⁴ One of the common challenges faced by state-run sanitation programs is that the toilets they build are left unused, as their use is not an easily accepted change in cultural practice. However in Samthram's Panchayat, the "sangams" were instrumental in ensuring that the community changed its sanitation practices

and started actually using the toilets constructed. This was indeed an achievement that was recognized by the block development officers as well, who since then have extended other developmental supports to the village.

Yet when the Panchayat President took up the issue of sand mining with local authorities, the response was not satisfactory (see Annex 1). Widespread allegations of corruption in the Tamilnadu state would seem to indicate that collusion with illegal operators has effectively resulted in people not being able to exercise their right to water. (The United Nations General Assembly Resolution of July 28 2010 and the United Nations Human Rights Commission Resolution of September, 2010, both uphold the state's responsibility in ensuring the right to water.)³⁵ Undaunted, the women continue to demand that the Tamilnadu government stop indiscriminate sand mining in river basins, and urge the government to take reparatory measures to help realize the right to water obligations that states have in these panchayats where sand has been overly quarried.

Even the support of state-level representatives has not led to effective enforcement of limits on sand mining. While many problems worldwide result from failures of local governance, ensuring fair, local solutions is much harder without effective, accountable and democratic governance systems at higher—regional, national and global—levels. Thus, even as members of the WC focus on participating in local governance structures, their campaigns to help address local issues also focus on transparent, accountable and responsive governance at the state, national and global levels.



Staff of the Vasudevanallur Womens collective (VWC). Seated rightmost is ponnuthai, state-level secretary of the collective.

3.) Promotion of multifunctional agriculture

The Tamilnadu Women's Collective recognizes that it is coping with an agro-ecological crisis of unprecedented dimensions, despite the region having a strong tradition of community-based water management. Historically, despite low rainfall, the semi-arid regions of Tamilnadu had well developed, traditional irrigation systems that helped farmers through crop-growing periods and provided stability to agricultural production. The backbone of these irrigation systems were tanks that were developed over several centuries. These were filled with rainwater runoff from the catchment areas or from rivers. These runoffs were fed through diversion weirs and feeder channels. The system of tanks

made South India a major paddy-growing region of India. Community-level water budgeting, allocation and irrigation system-management all evolved in the local historical, political and cultural context.¹⁶ These practices were integral to the successful maintenance of the irrigation system itself and its survival over centuries as a common property in the public realm.

In other parts of Tamilnadu, shallow wells were historically used as water sources for meeting domestic water needs, as well as for supplementing agricultural water needs. Animal power was the source of energy for drawing water out for supplemental irrigation of rain-fed crops. They cultivated several varieties of millets (such as Varagu, shown in picture), pulses (including 3–4 varieties of thattappayar a type of beans), oilseeds (such as gingili and groundnut) and vegetables (such as brinjal, onions and chilies) in monsoon season. In some areas, where the groundwater availability was plenty, they could extend the cropping season to plant small patches of sugarcane and rice paddy, or take crops over two or even three seasons.

This latter pattern was described as the most common traditional practice in most of the areas where members of the Tamilnadu Women's Collective live.

A.) THE CURRENT ECOLOGICAL AND AGRARIAN CRISIS The current agro-ecological crisis has some of its roots in the early 20th century, when British colonial officials introduced land tenure changes that brought these tanks under state ownership, and replaced village- and local-level management of the tank irrigation system with centralized water management. After independence, irrigation management became the responsibility of the state, and tanks came under the management of the public works department. Unfortunately, all these changes slowly led to the collapse of system itself. The collapse of the tank irrigation systems lead to a proliferation of private wells.

This more or less coincided with the introduction of tube-well technology in the area. Private tube wells were promoted through subsidies for the wells, and subsidized electricity. This has resulted in the spread of tube-well irrigation even to other areas, including most WC villages, where shallow wells were the norm.

In the 1980s, the Tamilnadu government promoted the establishment of sugar mills that engaged in contract farming of sugarcane in many of these areas. It also promoted cotton as another major irrigated crop in the state. This shift was also influenced by the marketability of the crops. Also, cotton and sugar production now support the two largest agroprocessing industries in India.¹⁷ Along with the traditional irrigated crop of Tamilnadu, rice, this thirsty trio has contributed substantially to the water woes of Tamilnadu.



Varagu, one of the many millets commonly cultivated in the area.

The current cultivation practices of these crops are not only water intensive but also chemical intensive. Sugarcane, rice, cotton and wheat account for two-thirds of the fertilizer consumption in India. Cotton by itself accounts for about 45 percent of pesticide use in the country. Given that in 2009, Tamilnadu was the third largest contributor to sugarcane production, the seventh largest contributor to rice production and the ninth largest contributor to cotton production in India, the agro-ecological impacts of these crops are tremendous.¹⁸ Tamilnadu not only has depleting water levels; whatever water is available is highly polluted. In addition, lowering ground water levels in coastal areas led to salinity ingress in those areas. In many villages, women identified sugarcane cultivation as the harbinger of their water problem, which was further worsened by other developments in the area such as sand mining operations, and land and water pollution from untreated effluents from sugarcane processing and other industries.

All of these have contributed to an agrarian crisis, with those in the community who are unable to eke out a living turning to seasonal migration. By 2001-02, Tamilnadu had turned

from a rice-surplus region into a rice-deficit region of India.¹⁹ To ensure food security, the state has adopted a substantially subsidized universal food aid program through its public distribution system. The crisis is much larger than effective water management can address alone.

B.) NATIONAL AND INTERNATIONAL RESPONSE TO THE CRISIS This crisis has parallels nationally and internationally. National food security has been the centerpiece of state agricultural policies throughout the 20th century. Most countries in the Global South embraced high-yielding varieties (HYV) of wheat, corn and rice monocultures with gusto in an attempt to achieve national food security as part of the Green Revolution. The focus was on boosting the productivity and yield of just a few select crops. From a purely national and economic perspective, such chemical-intensive, mechanized agriculture often helped meet national food security goals. But despite generating large buffer stocks, India has one of the largest proportions of food insecure households and individuals in the world. This is symptomatic of the deeper failure of such agriculture.

This realization is increasingly shared by national and international agricultural policy establishment. For example, the latest national-level agricultural policy document from India, the National Policy for Farmers (2007), chaired by Dr. M.S. Swaminathan, calls for a new policy reorientation. It says, “there is a need to focus more on the economic well-being of the farmers, rather than just on production.”²⁰

There is now also an awareness of the environmental crisis caused by this form of agriculture. Ecologically, chemical-intensive and thirsty agricultural systems have contributed substantially to today’s water crisis both in terms deteriorating water quality in the downstream areas and decreased water availability for local use.²¹ In addition, globally, industrial agricultural practices contribute to severe biodiversity loss, and directly and indirectly account for about 31 percent of anthropogenic greenhouse gas (GHG) emissions.

But in India, as in other parts of the world, national policy responses continue to be from within the perspective of industrial agriculture. In India, when the Finance Minister presented the country’s 2010-11 budget, he underlined the importance of “concurrent attention to soil health, water conservation and preservation of biodiversity,” and laid out US\$43 million for a climate-resilient agriculture initiative.²² But the initiative effectively continues with industrial agriculture, with an additional \$86 million USD for extending the “green revolution to the eastern dry-lands of India.”

Agribusinesses also support this strategy in India and globally: “The challenge of embarking on a new Green Revolution is not just about increasing yield. It is about increasing yield while reducing the amount of water agriculture demands,” says Dr. Juan Gonzalez-Valero, Head of Public Policy and Partnerships at Syngenta International AG.²³

At the regional level too, the major agricultural initiatives in Tamilnadu have incorporated new elements such as water conservation technologies, and use of bio-based agri-inputs (which include biotech and a variety of other industrial products) in their pursuit of the Green Revolution. The Tamilnadu government also proposes to step up the area under cotton production. This is a crop that displaces areas under food crops. Its production is water intensive and highly polluting, and it has been instrumental in bringing large areas under genetically engineered Bt cotton seeds.²⁴

The new Green Revolution centered around genetic engineering (and at times water-use reduction) may increase national food production of a few crops and partially address water depletion issues. But it follows the industrial agricultural model, and does not address other aspects of the ecological or agrarian crisis.

Like its predecessor, the new Green Revolution fails to recognize the multifunctional nature of agriculture. Nor does it recognize multiple means for achieving food security by enhancing biodiversity. It continues to undermine an agricultural system that can provide local food security for marginal groups. Most importantly it ignores the potential of agro-ecological approaches built on traditional knowledge systems to respond to the needs of marginal groups, while sustaining viable rural communities through its multiple functions.

C.) THE TAMILNADU WOMEN’S COLLECTIVE’S FOCUS ON MULTIFUNCTIONAL AGRICULTURE Recognizing this, the Tamilnadu Women’s Collective has moved towards developing truly multifunctional agriculture. WC initiatives have especially stressed three elements. First, food security is not only about higher production and productivity, but about food security for the most marginal producers and others for whom agriculture is a means of livelihood. Second, such local food security can only be ensured by protecting agricultural and ecological biodiversity, since a richly biodiverse environment can sustain multiple means of achieving food security. Third, agro-ecologically appropriate, healthy and fair multifunctional farming systems are the foundation of rural viability now, and for future generations.

From their gendered analysis of the agro-ecological crisis, it was clear to the Tamilnadu Women’s Collective leadership from the outset that they needed to focus on working with

“women farmers” who were defined as women who have access to land and/or could take decisions about it. WC had a great resource to start with: they could harness the traditional knowledge of the community members about agro-ecological practices that were part of a multifunctional agricultural system. Through various exposures and networking events they have also built on using proven methods developed by practitioners elsewhere to enhance productivity and sustainability. This was done by selectively and carefully reintroducing into their agricultural practices elements of both traditional and modern practices associated with agro-ecological approaches. From the perspective of climate change policy, their interventions are synergistic as they try to ensure food security at individual and household levels, since these bring together both “adaptation” and “mitigation” strategies. Their experiences offer important lessons on the integration of climate, food and water policies.

SHEELU, PRESIDENT AND FACILITATOR OF THE TAMILNADU WOMEN'S COLLECTIVE

“Initially we were analyzing all the issues as violating the right of the women and addressing the issues; in the same line the issue of land rights was analysed as violating the economic and livelihood right of the women. As we got involved in land struggles where land was being taken away from people, we became more acutely aware of the broader issues related to access to food. State agricultural policies supported export-oriented agriculture, and incentivized cultivation of cash crops at the cost of traditional food crops such as various types of millets, pulses and rice varieties that were tastier, (and that have recently proven to be nutritionally better). At the same time we also realized that to eke out a living from small patches of land, without irrigation, we had to rebuild the land: both in terms of nutrients and water retention capacity of the land. As members of the Asia Pacific Network on Food Sovereignty,²⁵ we got involved in campaigns opposing free trade that harm small farmers; we participated in a study on Bt Cotton, as part of South action on GE campaign. These were also learning processes, and as a result of these and through interactions with proponents of natural agriculture²⁶ around 1999 or 2000 our members began consciously incorporating practices associated with nature-friendly organic agriculture.”

Policy interventions towards food and water security

Even as these three principles inform their work in the community, for the Tamilnadu Women's Collective, the agro-ecological crisis has been an opportunity to simultaneously advocate for policy initiatives that can help them (and other climate-challenged regions) move towards local and regional food security. Some of their key interventions can be grouped into two sets of policy interventions: strengthening local food systems and rebuilding the natural resource base.

1.) Strengthening local food systems

A.) FOCUS ON MILLETS AS A CULTURALLY, NUTRITIONALLY AND ENVIRONMENTALLY APPROPRIATE CROP In the areas where the WC members work, traditional varieties of millets and pulses are still cultivated in small patches for home consumption. In addition, they grow commonly consumed pulses such as green, black and red grams. The millets they grow include Kambu, Cholan, Kelvaragu (a.k.a., “Ragi”), Kuthiraivolly, Varagu, Tenai and Samai.²⁷ They prepare it in the form of thin or thick porridge, bread or in rice-like preparations. According to women farmers of WC, millets can grow with very little water and in very poor soils. Millets are beginning to be noticed as nutritionally far superior to “fine” grains (such as rice, wheat and maize), by health conscious urban consumers.²⁸ Finger millet, for example, has very high calcium content: 100 grams have more calcium than a cup of milk. However, millets still have an inferior status not only in wider society but even in the areas where it is produced and amongst its main consumers: the poor.²⁹

According to Millet Network of India, 42 percent of the millets produced globally are consumed by Indians. As per 2004 data, India is also the largest producer of millets, both in terms of area under these crops and total production.³⁰ This is despite the fact that area under millet cultivation has steadily been decreasing since the 1970s. Agricultural policies that were focused on increasing the production of rice and wheat (through the Green Revolution) provided an incentive to farmers for shifting their lands from millet cultivation to rice or wheat. In the first 20 years of popularizing the Green Revolution, from 1970 to 1990, area under coarse grains cultivation decreased by 20 percent.³¹ Over the last five decades (1966–2006), the area under millet cultivation in India has reduced by 44 percent.

With global temperatures rising, the production of heat-sensitive crops like wheat, upon which Indian national food security depends, will suffer. Surface air temperatures during the wheat-growing winter months are projected to rise at the very least by one degree in South Asia in the very near future.³² Millets, being heat tolerant, offer a climate-resilient alternative, especially for the climate-challenged semi arid tropical regions. Moreover, millets are also more cost effective to cultivate, since they grow better without synthetic fertilizers, especially under rain-fed conditions.

National and international policymakers, too, have identified the potential of millets as a climate-resilient crop and have been investing in developing high-yielding varieties of select millets. According to WC women interviewed in September 2010, these HYV millet crops do not have the same qualities that they find in traditional varieties. Moreover, they

require higher input cost (seeds, agro-chemicals and irrigation). According to the WC women, instead of developing high-yielding varieties that are dependent on chemical-input agriculture, investing in selective breeding of traditional varieties that are less resource intensive and suitable to poor, dry soils would go a long way in supporting the food security of marginal households as climate-induced weather events become more frequent.

As part of the Millet Network of India, the Tamilnadu Women's Collective promotes cultivation and consumption of millets as alternative crops. The members of the women farmer's collective began this work by identifying the traditional varieties of different types of millets and saving the seeds of those varieties for the next season. They have also set up a mechanism for exchanging them during post-harvest festivals.

B.) REFORMING FOOD DISTRIBUTION SYSTEMS TO SUPPORT LOCAL AGRICULTURE According to the Tamilnadu Women's Collective, the state-level public food distribution system also plays a role in undermining the value of millets.

Currently, the Food Corporation of India (FCI), the central agency for food procurement and distribution, maintains a buffer stock of some staple crops. The buffer stock is intended both to protect against supply shortfalls and to control prices (by releasing grain if prices rise too high, and

purchasing more supply if the prices are low). Grain is stored in several godowns (warehouses) under a centralized storage system maintained by the FCI and State Warehousing Corporations, and is transported to the end point when it is ready to be disbursed. The state then supplies subsidized food through Public Distribution System (PDS), a consumer-oriented institution. The farmers are paid a minimum support price (MSP) against the procurement of a few select crops. This system of public procurement and the subsidies for the PDS system are limited to just a few crops, including rice, wheat, sugar and, in some cases, a few pulses and oilseeds.³³

Tamilnadu is one of the two Indian states where the PDS is considered a success. The success is ascribed to the system's universal coverage, with the very poor entitled to a higher ration.³⁴ From September 2008, the price of PDS rice was reduced by half in Tamilnadu: from the previous price (in Rupees) Rs. 2/kg to Rs. 1/kg (by contrast, the cheapest rice retails at about Rs. 20/kg in regular markets).³⁵ This low price has led to a complex situation, especially in the rural areas.

The availability of cheap rice (Rs. 1/kg) in the rural areas has meant that there is less demand for millets that sell for about Rs. 16/per kg. The availability of rice at such easily affordable price has had an impact on millet cultivation in particular; small and marginal farming families find it more economical to abandon farming, and men tend to migrate or engage in some other work, while their rain-fed lands lie fallow. The perception of millet as the poor person's food has also resulted in diminishing popularity of millet consumption among the younger generation within the household, even when they



Above left: A member of the WC carefully carries the seedlings (that were uprooted without disturbing the root-soil) as a head load for planting in a demonstration farm. Above right: At a conventional farm in the same willage, the seedlings are uprooted and bunched together, and held in hand directly for transporting it for planting

continue to cultivate it. For these communities, access to cheaper, but less nutritious grains also implies a move away from healthier coarse grains.

As the commodities in Tamilnadu PDS system are priced significantly below the price fixed by the Central Government, the Tamilnadu Government has been incurring substantial expenditures by way of food subsidies, the single largest component in the state's 2009-10 budget.³⁶ In designing this system, the Tamilnadu government has also ignored the important role played by rural communities as producers of food. By viewing them as mere consumers, the state ends up robbing rural people of their means of livelihood and destroying the economic viability of rural communities.

The Tamilnadu Women's Collective wants to change this situation. They are demanding that the state "develop minimum support price for all the crops including traditional millets. In addition it should support local procurement, to ensure that traditional millets can become part of a nutritious basket of foods offered through public distribution system."³⁷ If grains can be sourced locally it will also help address the issue of food-miles in a climate challenged world. The WC is also exploring the establishment of grain reserves that stock locally produced grains, and is managed by the local Panchayat Institutions.

They demand that traditional crops, like millets, be subsidized at a price comparable or below that of rice and wheat, so as to encourage their consumption. The price at which it is sold should not be far below the procurement price, so as to ensure the viability of farming as a means of livelihood in rural communities. To ensure child nutrition, mid-day meals and other state run child nutrition programs should source locally grown nutritious foods, including grains.

These strategies are replicable elsewhere. There should be more awareness building around the superior nutritional value of millets, and around how, through the consumption of crops produced locally through natural methods, consumers can reduce their contribution to global warming, as well as their water footprint.

2.) Rebuilding the natural resource base

A.) TRANSITIONING TO "NATURAL FARMING" METHODS

Historically, cultivators in these areas would harvest two seasonal crops: Kharif (monsoon) and Rabi (winter) crops of grains, pulses, oilseeds and vegetables. Well-based irrigation would supplement the natural moisture available in the soil, if the farmer had access. The agronomical practices associated with traditional millet cultivation in the area were very

SHANTA FROM VELLANIKOTTAM VILLAGE

Shanta is a single mother. When her husband deserted her a few years ago she approached WC for help. With the intervention of the court, they ensured that she got part of the family land. She has two acres of land where she grows rice for home consumption, and vegetables and pulses both for home consumption and for generating some cash income.

For several years she has been practicing natural farming. When she started natural farming practices, initially the production went down, but from the second year onwards it has been increasing; now the yields are very good. Initially she did not have enough farmyard manure for all the land, and couldn't convert all lands to natural farming, but a few years ago, with a loan from the WC, she has bought a "malamadi" (or mountain cow, an indigenous breed) to help with her natural farming practices. Now she practices natural farming on all two acres. She feels that combining agriculture with animal husbandry (keeping goats, cows and fowl) makes it more viable than just practicing agriculture.

Once she started natural farming, she decided to cultivate a traditional variety of extremely tasty rice, which her parents used to receive from her maternal grandparents family. According to her, this variety, "chandikali," is large-grained, short-duration rice that can better withstand drought. The seed is now shared with other members of the WC. She has also been experimenting with some of the agronomic practices in her natal (parent's) village, such as use of fermented rice-water and butter milk as a pesticide, and such knowledge is shared by women when they have networking events amongst various "sangams."

different from those associated with chemical-input agriculture. For example, traditionally, prior to planting in summer time, they would have "attukidai," (in exchange for payment in the form of grain, or less commonly, cash, village herders would take their cows or goats to the field for the night. Animal droppings were later ploughed into the field.) Use of farmyard manure and inter-cultivation of different types of millets with different types of pulses had been a common practice, making it a multi-crop system. Some of these practices still continue in isolated farms, particularly in the case of crops grown for domestic consumption.

From a gendered analysis on food and nutritional security it was clear to the WC leadership that they needed to build on this foundation to improve food and water security in the face of both the current agro-ecological crisis and the looming change in precipitation patterns.

Through Participatory Resource Appraisals (PRA), as well as various workshops and networking events, WC members educated themselves and enhanced practices that were part of a multifunctional agricultural system. Around 1998-1999, they were exposed to natural farming techniques developed through decade-long experiments by Subhash Palekar, an agricultural science graduate turned practitioner of multifunctional agricultural systems.

The concept of natural farming is based on the idea that farm inputs should enable “processes of self-replenishment found in nature.” Palekar also calls it “zero-budget farming” as all inputs can be derived from the farm itself. For him, this makes it distinct from large-scale, organic farming, which does not insist on a principle of minimizing the use of commercially available inputs.

In natural farming, the most important farm inputs are cow dung and urine derived from indigenous breeds of cows. Other important inputs include leaves with different qualities that are indigenous to different sub-agro-climatic regions. Some of these are used (in specific proportions) to make solutions in which seeds are dipped for better sprouting (Beejamrutham); others are used as fertilizers (Jeevamrutham, Ghanajeevamrutham) or pesticides (Puchi).

The other practices of natural farming which they have introduced include mulching (to help develop the micro-organisms in a conducive, micro-climate), multi-cropping (that enhances the use of the soil and its nutrients through the complementarity between the crops that need varied nutrients, with differing maturity and differing heights), and making borders or buffer strips of pest-repellent plants.

Natural farming is practiced by Tamilnadu Women’s Collective both under rain-fed and irrigated conditions. They have access to two demonstration farms: one in the Cauvery delta where irrigated agriculture is practiced; the other is in the semi-arid northeastern Tamilnadu, with limited access to irrigation.³⁸ Both of these function as a training field where new members of the women farmer’s collectives come for trainings.

According to the WC women farmers, natural farming practices have shown exceptional results especially under rain-fed conditions. According to Shanta, from Vellanikkottam village in Thurunelveli, even without supplemental irrigation her crops, were able to weather out a low rainfall season and give her better yields compared to earlier years. Natural farming increases water retention in the soil, and helps rain-fed crops that tend to be vulnerable to dry weather conditions if soil moisture is also low. Another farmer, Sahaymary of Thottikalai village, Thiruvallur, described how she got an excellent crop of brinjal (eggplant), while several of her neighbors (who were not members) lost the crop to pests. They commented on the better taste of vegetables and crops grown under natural farming practices conditions. Ponnuthai, the state-level secretary of WC, and a farmer herself, said: “Even flowers smell better when grown under natural farming practices.”

There is growing recognition of the advantages of agro-ecological approaches and multifunctional agricultural systems in international and national policy dialogues. Most notable among them is the report signed by over 54 countries on agricultural knowledge systems, released in 2008, called International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD).³⁹ Initiatives such as natural farming exemplify what may be involved in such knowledge systems. These may be appropriate elsewhere as an alternative to the new Green Revolution.

However, most of the international agricultural investments made over the last two years are directed to practices that are called sustainable, but are not sustainable at all. Some examples include practices such as no-till agriculture and conservation agriculture as well as use of “climate ready,” genetically engineered seeds, even when these are part of agro-chemical intensive production systems. In fact recent reports suggest that there may be reason to be cautious about promoting some of these technologies.⁴⁰ In countries such as India there is fierce civil society opposition to genetic engineering, especially regarding introducing it in the food chain. Groups, such as WC, questioned the need for introducing a genetically engineered variety of brinjal (eggplant) when there are other options available to farmers. In February 2010, the Ministry of Environment put an indefinite moratorium on Bt Brinjal, its first genetically modified food, until tests prove it safe.

Yet, India has been very much a part of the story of the global expansion of GMOs acreage. From 2002 to 2008, the cultivation of genetically modified Bt Cotton has spread to about 81 percent (7.6 million hectares in 2008-09) of the total cotton acreage, making it fourth largest in the world after the U.S., Brazil and Argentina.⁴¹

This trend is primarily driven by corporate interests that would benefit from the adoption of GMOs and continuation of industrial food production systems. But it is also received favorably due to widespread skepticism that traditional agriculture, even informed by modern science, can feed the world’s populations. Proponents of modernization of agriculture argue that traditional farming practices condemn farmers to hunger. Yet the experiences of the Tamilnadu Women’s Collective show that innovative approaches such as natural farming, which are grounded on traditional farming systems, may offer satisfactory solutions.

“Even flowers smell better when grown under natural farming practices.”

State-level Women’s Collective Secretary Ponnuthai

B.) FOCUS ON WATER CONSERVATION: WATER HARVESTING, SYSTEM OF RICE INTENSIFICATION

Individual members of the WCs tend to complement natural farming with water harvesting practices. Over the last two decades, rainwater harvesting has been popularized in India through national- and state-level initiatives. In their 2002 annual meeting, the Tamilnadu Women's Collective resolved that, as an organization, they would facilitate this activity by helping members access interest free loans made available by the WC on the basis of their own savings. About 10,000 members took advantage of these loans to undertake ground-water recharge-related activities that increased the water availability in their wells.

Using natural farming, Tamilnadu Women's Collective members have shown it is possible to increase the water-retention capacity of the soil, allowing more water to seep into the soil and groundwater reserves. This reduces water runoff from the land as well. The system includes multiple cropping systems, and if the farmers have access to irrigation, this cropping system usually includes a patch of land for growing paddy rice to complement the other grains they grow, such as millet.

Tamilnadu is the seventh biggest producer of rice in India, though it is second poorest in terms of water availability. Even though the Cauvery river delta region of the Tanjavur district is known as the Rice Bowl of South India, the farmers there can no longer rely on a regular supply of irrigation water. This has led the state to look for alternatives.



Farm yard manure (FYM) is commonly used as a fertilizer in natural farming methods advocated by the Tamilnadu Women's Collective.

Thus Tamilnadu has been one of the states in the forefront of adopting System of Rice Intensification (SRI), a system of agronomic practices by which water use in paddy cultivation can be reduced by 30 to 40 percent (see Annex 2: The System of Rice Intensification, page 19). SRI involves a series of practices—including fewer plants per acre, and alternatively keeping the land barely moist and wet—that help increase root growth. Tamilnadu promotes SRI as an alternative to conventional paddy cultivation where plants are submerged to several inches in standing waters. SRI proponents say it is appropriate not only in a water-stressed economy, but also in water rich areas as a methodology for reducing water use and reducing the methane emissions associated with rice paddies, even as it increases yield.

The increase in yield combined with reduced water use is something that appeals to the imagination of farmers, and the adoption rate is high. They even experiment with similar techniques in their sugarcane fields. However most of them continue to use fertilizers and pesticides that are required to be used when cultivating high-yielding varieties. When the method was developed initially it had called for use of farm-yard manure to be used as fertilizer. But this emphasis on the use of organic manure seems to have been left behind even by the advocates of SRI. Today SRI is simply used by most of its proponents as a water-saving method to continue with the chemical-intensive paddy cultivation practices associated with Green Revolution agriculture.

Tamilnadu Women's Collective promotes SRI with a difference. They combine it with natural farming practices (thus bringing it closer to the original spirit of SRI when it was started in Madagascar—see Annex 2). Through their experiments they have found that natural farming practices further enhance the benefits of SRI.

WC staff and women farmer's collective members, many of whom were already involved in natural farming practices, were exposed to SRI practices about five or six years ago. The demonstration farm in the Cauvery delta was initially partially converted from a conventional rice paddy to SRI, later on increasing the land under SRI. Over the years they have compared the resource requirements and outputs from three different systems: SRI using HYV with chemical inputs, SRI using HYV with natural methods and SRI using traditional paddy with natural methods.



Map of Tamilnadu, with black dots denoting the locations of 38 member units of the Womens' Collective.

Their preliminary results suggest that output from their SRI cultivation with natural farming practices is higher than that in paddy cultivation using conventional planting methods. While in the first year the output from the SRI method using agrochemicals was higher than that from the SRI method using natural methods, the latter was more profitable once costs associated with chemical inputs were accounted for. This difference kept steadily increasing in the second and third years as the output from the SRI system using natural methods kept increasing. Output from SRI using traditional paddy varieties with natural methods—rather than high-yielding varieties normally included in SRI—resulted in net profits almost four times greater than traditional paddy cultivation using conventional irrigation. The net profit from SRI using traditional paddy varieties was almost twice that of HYV seeds.

This improved productivity is also due to increased root growth associated with SRI. This enables rice plants to withstand the force of minor floods on the one hand and deal with minor water stresses on the other. Other benefits of

combining SRI with natural farming include improvements in local water quality, as well as increased water availability for other uses.

C.) FOCUS ON WATER QUALITY: PROTECTION FROM AGRO-CHEMICAL POLLUTION Water pollution is one of the major reasons for water insecurity in many parts of the world. This is either due to the discharge of untreated industrial effluents or anthropogenic wastes into water systems, or non-point source pollutants such as agricultural runoff that pollute both ground water and surface water.

Concentrated animal feeding operations (CAFO) in feedlots, or application of more fertilizer than a crop can absorb, also cause runoff rich in nitrogen and phosphorus that can find their way into rivers and estuaries. On a global scale, agricultural runoff is the most important source of eutrophication (caused by high levels of nitrogen and phosphorous in surface water, promoting excessive growth of plants, small and large) which can lead to hypoxia (depleted oxygen levels), and impact the water ecosystem.

In India, pesticide contamination has affected groundwater in many farming regions, undermining the quality of the drinking water. Traces of pesticides have been discovered in breast milk and dairy milk. Indiscriminate use of fertilizers, especially urea, has been a problem in many parts of India, damaging soil and contaminating water, which in turn damages human health. A main contributing factor is excessive state subsidies for a particular fertilizer, irrespective of its nutrient content and combination. As a result, farmers end up using mostly urea, which is heavily subsidized. The recent reform in the national fertilizer policy seeks to address this problem by providing a nutrient-based subsidy (NBS) to fertilizer companies.⁴² The fertilizer companies are allowed to fix the farmgate price for their products, in return for them making all fertilizers available at uniform rates, thus allowing the farmer to choose what is best for his land. In part this is an attempt to “decontrol,” or deregulate, the fertilizer sector. The fertilizer prices are likely to rise, leaving many small farmers without access to fertilizer.

The Tamilnadu Women's Collective and other proponents of natural farming argue that these policy changes are soil-centered rather than farmer-centered. They argue that the fertilizer industry should not get subsidies in the name of farmers, food security and agriculture. The WC argues that a level playing field for ecologically appropriate agriculture would mean ending subsidies for fertilizer and pesticide companies, and providing a direct payment to farmers to let them practice their choice of agricultural methods and technology. With these changes in policy, the current crisis could become an opportunity for small farmers to embrace an agro-ecological

approach to farming that will go a long way in ensuring that rural communities and their animals have access to safe water for domestic use, as well as enough food to eat.

Conclusion

The climate adaptation strategies being pursued in national and international policymaking circles in relation to food and water security tend to look at each of these issues in isolation, and often continue with the same policies that have led to the current crisis in food and water security, as well as in rural livelihoods. Adaptation strategies to address food security focus almost exclusively on increasing agricultural production while ignoring health and cultural aspects of the food being produced, and the role of agriculture as a means for rural viability.

Similarly, mitigation is primarily seen as an accounting issue that can be resolved through market mechanisms such as carbon trading, or at best a technological problem that needs to be fixed. Some of these tech-fix solutions, such as industrial-scale production of biofuels, have tremendous negative implications not only for food security and livelihoods of poor communities but also for the global water crisis. Similarly the other activities currently being considered at the U.N. climate talks towards mitigation efforts such as re-vegetation, forest management, cropland management, grazing land management, wetland management, soil carbon management in agriculture, etc., have direct impacts on rural livelihoods.⁴³

While some of these activities may have the potential to reduce greenhouse gas emissions, it is necessary to have an environmental impact assessment with special attention to water quantity and quality (as a proxy for environmental protection) to help ensure that proposed adaptation and mitigation projects are not false solutions that end up passing the buck to future generations.

Most importantly climate policies should create space for development of national policies that pay attention to synergistic efforts such as that promoted by Tamilnadu Women's Collective. By selectively and carefully building on firm foundations of their traditional knowledge, and yet seeking ways to enhance ecological integrity while attempting to meet their food and water security needs, these women show that it is possible to develop effective, just and people-centered solutions to the food and water crises, without resorting to unproven technologies.

References

1. The floods in the summer of 2010 in Pakistan affected about 17 million, killing 2000 people. It destroyed standing crops in over 9 million acres, killed over a million livestock and displaced over 6 million people. On a much smaller scale, floods of May/ June 2009 in eastern India and Bangladesh displaced over a million people.
2. Syngenta Foundation for Sustainable Agriculture (SFSA), "Transgenics," SFSA, <http://www.syngentafoundation.org/index.cfm?pageID=653>, (Accessed Nov 28, 2010).
3. This paper is based on field work conducted during a visit to the Tamilnadu Women's Collective in September and October of 2010; interviews and focus group discussions were held with women/women farmer collectives from 23 villages in this period.
4. For the vision and mission of Women's Collective, visit http://www.womenscollective.net/vision_mission.php.
5. World Food Summit Plan of Action, (1996) Action point 1. <http://www.fao.org/docrep/003/w3613e/w3613e00.HTM> (Accessed November 2010).
6. Female-headed households are those households where either no adult males are present, owing to divorce, separation, migration, non-marriage or widowhood, or where men, although present, do not contribute to the household income.
7. The Global Hunger Index (GHI) is a multidimensional approach to tracking and measuring hunger. The three equally weighted components included in the GHI 2010 are: The proportion of undernourished as a percentage of the population; The prevalence of underweight in children under the age of five; and The mortality rate of children under the age of five.
8. K. von Grebmer et al., 2010. Global hunger index: The challenge of hunger: Focus on the crisis of child undernutrition. Bonn, Germany; Washington, D.C.; Dublin, Ireland: Deutsche Welthungerhilfe; International Food Policy Research Institute; Concern Worldwide.
9. Mallikharjuna Rao K. et al., "Diet and Nutritional Status of Women in India," *Journal of Human Ecology* 29 (2010): 165–70.
10. Not everyone agrees to the principles of transparency and collective management of finances. For example, of the initial eight groups, two left the collective in the first year. Registered as Tamilnadu Women's Collective in 2001, WC now has 38 members, working in 1500 villages of 16 districts of Tamilnadu. Each unit has a coordinator, and an average of about 5–6 staff members, each responsible for 3–5 "sangams" or village-level women's collectives, each "sangam" having various sub associations affiliated with it, such as children's panchayats, women farmers collectives, self help groups, elders groups, workers unions, fishers groups and sometimes men's self help groups as well. The village level women farmer's collectives have a state level apex body, Kalnjium Farmers Association.
11. The district administration and police force belonged to the thevar community, and played a partisan role, even though thevars were the aggressors in the conflict. The conflict lasted for a long time and in the fight two people belonging to the pallar community were killed. This partisan behavior led to the conviction that political power was key to control over resources.
12. Osmani S. Rahman, Report on Report on Food Security, Poverty and Women: Lessons from Rural Asia, Summary and Conclusions, International Fund for Agricultural Development, http://www.ifad.org/hfs/thematic/rural/rural_7.htm (accessed on October 16, 2010).
13. Staff Reporter, "MLA arrested, released Tirunelveli," *The Hindu*, October 14, 2010. Available at <http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/article829529.ece> (accessed October 16, 2010).
14. Government of India, Nirmal Gram Puruskar Informations System, http://164.100.194.23:8080/NGP2010/Rep_AwardedPriYearWise1.jsp?stateinfo=29gp07 (accessed November 28, 2010).
15. UNGA resolution at http://www.unesco.org/water/wwap/news/archives/UNDecWaterHR_EN.pdf and UNHRC Resolution at <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G10/166/33/PDF/G1016633.pdf?OpenElement> (Both accessed October 2010).
16. D. Mosse, "Colonial and Contemporary Ideologies of 'Community Management': The Case of Tank Irrigation Development in South India," *Modern Asian Studies* 33 (2), (May 1999): 303–38. Available at <http://eprints.soas.ac.uk/281/1/ColonialAndContemporaryIdeologies.pdf> (accessed November 2010).
17. International Center for Agricultural Research in the Semi-Arid Tropics (ICRISAT) and World Wildlife Fund (WWF), Sustainable Sugarcane Initiative Training Manual, by ICRISAT-WWF Project, India, March 2009. Available at http://assets.panda.org/downloads/ssi_manual.pdf (accessed October 2010).
18. Govt. of India, Department of Agriculture, Directorate of Economics and Statistics, at Agricultural Statistics At a Glance 2010 Accessed October 20, 2010

19. Jyoti Parikh and Singh Chandrashekhar, "Extension of MSP: Fiscal and Welfare Implications," (A Study for the Planning Commission [of India] by Integrated Action and Research for Development, October 2007, http://planningcommission.nic.in/reports/sereport/ser/ser_msp.doc (accessed October 2010)).
20. Dr. M.S. Swaminathan, who has been called the father of Indian Green Revolution, defines a farmer thus: 'a person actively engaged in the economic and/or livelihood activity of growing crops and producing other primary agricultural commodities and will include all agricultural operational holders, cultivators, agricultural labourers, sharecroppers, tenants, poultry and livestock rearers, fishers, beekeepers, gardeners, pastoralists, non-corporate planters and planting labourers, as well as persons engaged in various farming-related occupations such as sericulture, vermiculture, and agro-forestry. The term will also include tribal families / persons engaged in shifting cultivation and in the collection, use and sale of minor and non-timber forest produce. Govt. of India, Ministry of Agriculture, Department of Agriculture and Cooperation, National Commission on Farmers: National Policy for Farmers 2007, <http://agricoop.nic.in/NPF/npf2007.pdf> Accessed October 20, 2010.
21. Shiny Varghese, "Integrated Solutions to the Water, Agriculture and Climate Crises," IATP, March 2009, available at <http://www.tradeobservatory.org/library.cfm?refid=105477> (accessed November 30 2010).
22. T.V. Padma, "India to take green revolution to eastern drylands," Science and Development Network, February 26, 2010, <http://www.scidev.net/en/news/india-to-take-green-revolution-to-eastern-drylands.html>.
23. Juan Gonzalez-Valero, "Peak Water: The mounting water crisis and how agriculture can help provide the solution," The European Financial Review, October 2010, <http://www.europeanfinancialreview.com/?p=1800> (accessed October 2010).
24. Govt. of Tamilnadu, Dept. of Agriculture, Policy Note, (Demand no.5 Agriculture 2010-2011), 2010 <http://www.tn.gov.in/policynotes/agriculture/agriculture.pdf> (accessed October 2010).
25. The Asia Pacific Network on Food Sovereignty is a regional network of over 20 farmers' organizations, women's federations, social movements and NGOs in 10 South and Southeast Asian countries.
26. These include Nammalvar and Subhash Pallekar, among others.
27. Same order as in text: Pennisetum glaucum (Pearl millet), Sorghum bicolor (Sorghum), Eleusine coracana (Ragi), Echinochloa crus-galli (Barnyard millet), Paspalum scrobiculatum (Kodo millet), Setaria italica (Foxtail millet) and Panicum sumatrense (Little millet)
28. Debarshi Dasgupta, "Jab We Millet: The humble grain soars as it enters the red book of healthy diets," Outlook India, Bombay, March 15, 2010, <http://www.outlookindia.com/article.aspx?264511> (accessed October 2010). See the FAO document on Nutrient composition of rice, wheat, maize, sorghum, and various other millets
29. B. Aravind Kumar, "Study throws light on koozh as street food," The Hindu, June 17, 2010, <http://beta.thehindu.com/news/cities/Chennai/article462145.ece> (accessed October 2010).
30. CGIAR, "Research & Impact: Areas of Research: Millet," Consultative Group on International Agricultural Research (CGIAR), <http://www.cgiar.org/impact/research/millet.html> (accessed October 2010).
31. James Heitzman and Robert L. Worden, eds., "India: A Country Study," Washington: GPO for the Library of Congress, 1995, <http://countrystudies.us/india/103.htm> (accessed October 2010).
32. The temperature change is particularly acute for wheat growing in the winter (from December to February) months. IPCC report, Table: Projected changes in surface air temperature for sub-region of South Asia under SRES A1FI (highest future emission trajectory) and B1 (lowest future emission trajectory) pathways for three time slices, namely 2010-2039, 2040-2069 and 2070-2099. R.V. Cruz et al., "Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," 2007. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 469-506. Page 480, chapter 10, Asia at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter10.pdf>.
33. Govt. of India, Ministry of Consumer Affairs, Food & Public Distribution: Declining trend in food commodity prices, Press Information Bureau of India, March 5, 2010, <http://pibmumbai.gov.in/scripts/detail.asp?releaseld=E2010FR15> (accessed October 2010).
34. Tamilnadu is the only state in India to have universal PDS.
35. S. Vydhanathan and R. K. Radhakrishnan, "Behind the success story of universal PDS in Tamil Nadu," The Hindu, August 10, 2010, <http://www.thehindu.com/opinion/op-ed/article562922.ece> (accessed October 2010).
36. K. Gnanadesikan, Principal Secretary (Finance, Govt. of Tamilnadu): "Fiscal deficit not a cause for worry," The Hindu, March 20, 2010, <http://beta.thehindu.com/news/states/tamil-nadu/article258663.ece> (accessed October 2010).
37. Women's Collective: Resolution numbers eight and nine, 16th Annual Conference, July 31, 2010, Ranipet, Vellore, India.
38. These farms were established in 1999-2000 by the facilitating organization, Tamilnadu Resource Team (TNRT). TNRT is an effort for institutionalization of participation at the level of individual activists; groups in activism and organizations implementing rights based programs. Sheelu who has functioned as a facilitator for Tamilnadu Women's Collective since its inception in 1995, and as its president since 2001, is part of TNRT.
39. International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), Global report, (Washington, DC: Island Press, 2009), <http://www.agassessment.org/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads...Global%20Report%20%28English%29.pdf> (accessed November 28, 2010).
40. Round up is a broad-spectrum weed killer with the generic name glyphosate that was made by Monsanto, the bio-tech giant. Ever since Monsanto started marketing Roundup Ready crops that were genetically engineered to be herbicide resistant in late 1990, Roundup use is said to have tripled. For over 10 years farmers have been practicing no-till agriculture (considered environmentally friendly as it eliminates plowing to curb erosion and the harmful runoff of fertilizers and pesticides), in combination with Roundup ready soybeans, corn or cotton. Roundup Ready crops account for about 90 percent of the soybeans and 70 percent of the corn and cotton grown in the United States. However according to recent reports, such extensive use of the chemical has led to rapid growth of super weeds across American farm lands, just as the indiscriminate use of antibiotics has led to the rise of drug-resistant super-germs such as MRSA. This could dampen American agriculture's enthusiasm for some genetically modified crops. William Neuman and Andrew Pollack: Farmers Cope With Roundup-Resistant Weeds, The New York Times, May 3, 2010, <http://www.nytimes.com/2010/05/04/business/energy-environment/04weed.html> (Accessed October 2010).
41. J.L. Karihaloo and P.A. Kumar, "Bt cotton in India – A status report (Second Edition), Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)," New Delhi, India, 2009, 56. Available at <http://www.apaari.org/wp-content/uploads/2009/10/bt-cotton-2nd-edition.pdf> (accessed November 2010).
42. SME Times News Bureau, "Cabinet approves new fertilizer policy, gives reforms a push," SME Times, Feb 19, 2010, <http://smetimes.tradeindia.com/smetimes/news/indian-economy-news/2010/Feb/19/cabinet-approves-new-fertilizer-policy-gives-reforms-a-push60874.html> (accessed October 2010).
43. UNFCCC, Land use, land-use change and forestry (Documentation to facilitate negotiations among Parties), Ad Hoc Working Group on Further Commitments for Annex, Parties Under The Kyoto Protocol Twelfth session, Bonn, June 1-11, 2010, <http://unfccc.int/resource/docs/2010/awg12/eng/06a02.pdf> (accessed November 2010).

Annex 1: Sand mining, governance and right to water

Vasudevanallur Women's Collective (VMC) is in Tirunelveli District, which falls in the rain shadow region of Western Ghats. The only perennial river in the region is the Tamirabarani, which flows eastwards. In fact, if it was not for the several seasonal rivers that bring monsoon waters from Western Ghats to the region, Tirunelveli would have been a much more water-poor region. Although smaller, as these rivers flow eastwards, their waters seep down the sandy riverbeds, recharging the aquifers. In a traditional system it is a cyclical process, whereby rivers replenish the limited amount of water drawn out by farmers to supplement rain-fed cultivation.

The women farmers of Sanganapari Village say that until about 25 years ago, water was available at 20 to 50 feet depth. However, the water table has been going down after the introduction of motorized pumps and tube wells in the district. Now the bore wells (with side bores) go 10 times deeper, between 300 to 500 feet.

In the upper reaches of the river, sand mining operations started about ten years ago. Sand mining, in the riverbeds (and on the banks of natural waterways), a lucrative enterprise, has become one of the biggest threats to riverine ecosystems of India, especially in the last decade. While it has been going on illegally for years, a few years ago the Tamilnadu Government legalized the activity, approving certain sand quarries from where sand could be removed subject to certain rules and regulations. However, lax enforcement of these regulations means that sand is still being removed from non-stipulated locations and far above the limits suggested.

The Environmental and Social Assessment Report (Draft, E1 341 vol. 2) of the River Basins in Tamilnadu by Environment Protection Training and Research Institute (EPTRI) in 2006 reported that sand mining is causing ground water depletion in most of the river basins studied, including Tamirabarani river, and that it can lead to salt water intrusion in coastal areas. It recommended that sand mining be controlled and regulated.¹

In many areas along the river the entire sand in the river bed had been removed and the hard bed, through which water can no longer seep in, is exposed. In other areas the free flow of water is interrupted, and water no longer reaches the end of the river. Sand mining has resulted in lowering the water

table further, and as a result the villagers no longer have access to an assured water supply for drinking or for agricultural needs. Total sanitation is no longer a reality, despite the presence of physical structures in the village.

Earlier this year, the women were driven to desperation and decided to oppose sand mining by camping on the river bed for a week. This brought a temporary respite to sand mining.² To ensure that they got the support of the administration, the Panchayat president, a leader in the village level "sangam," took up the issue of sand mining with the District Collector. She was surprised at the response from the top administrative officer in the district, who perceived sand mining as a necessary activity, meeting a "demand of modernization." From a recent press report (Hindu, Oct. 14, 2010), it appears that the WC members from this village continue their quest for water security.



In SRI, plants are carefully planted well-spaced from their neighbors and minimal water is used.

Annex 2: The System of Rice Intensification (SRI)

"The monsoon is meager in Tamilnadu, where civilization itself matured amidst irrigated paddy fields," begins a 1979 book by a historian of Tamilnadu.³

Recent climate-induced variations in the duration and intensity of precipitation creates further uncertainties in water availability. In addition, factors such as population growth, urbanization, changing lifestyles and improvement in living standard are putting further stress on rural water resources. It is in this context, with a long history of irrigated agriculture rooted in its culture, that SRI is being adopted in Tamilnadu.

History of SRI

SRI was developed nearly three decades ago by Father Henri de Laulanié, a Jesuit priest, “who came to Madagascar from France in 1961 and spent the next (and last) 34 years of his life working with Malagasy farmers.”⁴ Conventional paddy rice cultivation requires flooding of the field, where the plants are partially submerged in water for most of the season. Reportedly, however, during a 1983 drought, de Laulanié noticed that the rice plants showed unusually vigorous growth where farmers were unable to flood their paddy fields. From this and other observations, de Laulanié developed the SRI practice: rice seedlings are transplanted earlier than in conventional systems, care is taken not to disturb the root system, transplanting of one plant per spot rather than the conventional way of 4–5 plants per spot and it is ensured that each plant is well spaced from its neighbor. Most importantly, paddy fields are not flooded! It is kept to the consistency of wet clay on which one can draw a line. Father Henri de Laulanié, in his practice of SRI, emphasized using organic compost over chemical fertilizers.

In 1990, together with a number of Malagasy colleagues, Fr. Laulanié established an indigenous non-governmental organization (NGO), named “Tefy Saina” meaning “to improve the mind,” to work with farmers, and agricultural professionals to improve rural livelihoods in Madagascar.

Norman Uphoff⁵ of Cornell University came across this organization and the SRI method in 1993. Initially skeptical of their claims of having doubled the rice productivity he was convinced once farmers in the rainforest regions started using SRI, and began getting almost four times the conventional yield. In 1997, Uphoff began promoting SRI throughout Asia, though it is not clear whether he advocated the use of organic compost over chemical fertilizers.

SRI today

Most agriculture extension organizations were not interested in promoting the innovation initially. Yet over the last decade it has spread to many rice producing areas especially in Asia. In the last few years, international financial institutions (IFIs) such as the World Bank have taken an interest in promoting it as a method to save water.⁶ In Tamilnadu, for example it is being promoted through IAMWARM project, coordinated through the Water Resource Department.⁷

Initially, there were no corporate interests promoting this method. It was remarked a decade ago that since SRI is not a “new technology,” there were initially no “saleable inputs” associated with SRI.

Syngenta, a biotech giant, seems to have found a solution to this “problem.” According to the International Rice Research Institute (IRRI), Syngenta is helping them promote “The

alternate wetting and drying (AWD) method,” apparently “an IRRI water-saving technology” amongst Bangladeshi rice cultivators.⁸ Syngenta field staff interact with farmers in their field and demonstrate the use of a tool called a “panipipe,” literally meaning water pipe, to help farmers assess the quantity of water in the fields in Bangladesh.

It is noteworthy that the lacuna created by the collapse of agricultural extension services has given rise to a vacuum that is thus being filled by multinational agribusinesses, which may have their own reasons to be in the field. With their experience in promoting IRRI’s alternate wetting and drying (AWD) method and Syngenta’s “panipipes” this field machinery will, if necessary, be ready to promote “climate ready” seeds⁹ and accompanying agrochemical intensive agricultural systems when needed, creating a captive market for Syngenta’s products.

Currently a net rice importer, this system may nudge Bangladesh closer to national food security, but will worsen the water quality problems Bangladesh is already facing.

Annex Resources

1. Environment Protection Training and Research Institute (EPTRI), Environmental and Social Assessment for River Basins in Tamil Nadu - IAMWARM Project (Draft Final Report) Submitted to The Chief Engineer (Plan Formulation), Water Resource Organisation, Public Works Department, Chennai, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/10/06/000011823_20061006110758/Rendered/INDEX/E13410vol.02.txt (accessed October 2010).
2. Personal Interviews with members of Sanganapari Women’s Collective, September 29, 2010.
3. D. Ludden, “Patronage and irrigation in Tamil Nadu: a long-term view,” *The Economic and Social History Review* 16, no. 3, July 1979, 347–65.
4. SRI International Network and Resources Center (SRI-Rice), “System of Rice Intensification,” SRI-Rice, <http://ciifad.cornell.edu/sri/> (accessed October 2010).
5. Uphoff was part of a team trying to find alternatives to the damaging types of slash and burn agriculture that was destroying Madagascar’s rainforest. It was clear to Uphoff that if rice yields in the area could be increased from about 2 tonnes per hectare, as it was then, a lot of forest could be saved. Uphoff was looking for a yield of 4 tonnes per hectare, and when he heard them say they could get 5 or more, he did not believe them. CIIFAD, “System of Rice Intensification (SRI),” SRI-Rice, <http://ciifad.cornell.edu/sri/> (accessed October 2010).
6. World Bank, Video: “Applying SRI,” 2008, http://info.worldbank.org/etools/docs/library/245848/files/flash/SRI_applying/index.html.
7. I thank Mr. Vibhu Nayar, IAS, project director of IAMWARM project, Chennai and Mr. Shankar Narayanan, senior social development specialist, World Bank, New Delhi for enabling my visit to two villages in IAMWARM project areas.
8. Trina Leah Mendoza, “Public-private partnerships push for AWD in Bangladesh,” *Irrigated Rice Research Consortium (IRRC) News*, August 06, 2010 <http://irri.org/our-partners/networks/irrigated-rice-research-consortium/irrc-news/public-private-partnerships-push-for-awd-in-bangladesh> (accessed October 2010).
9. Rice was the first crop to have its genome sequenced; by determining the complete genetic code of rice in early 2001, Syngenta became a leading organization in genetic modification and/or marker-assisted selection of genes of rice. More on their work at <http://www.syngentafoundation.org/index.cfm?pageID=142>. See also, Devinder Sharma, “For Rice Is Now Oryza Syngenta!” Available at http://www.inmotionmagazine.com/global/devsh_rice.html. In addition, they have been developing private-public partnerships; see Syngenta/IRRI, “Syngenta and IRRI collaborate to benefit Asia’s rice,” September 7, 2009, <http://beta.irri.org/news/index.php/press-releases/syngenta-and-irri-collaborate-to-benefit-asias-rice-farmers.html> (accessed October 2010).