Sustainable in Senegal: Profiles in Senegalese Regenerative Agriculture

Diabou Balde, rice farmer, Manthiankaning, Kolda region

Intensive production pressure leaves little space for experiments, but improvements from increased spacing win respect for new method.

By Nathan C. McClintock

Diabou Balde (foreground) and Carrie Miner walk Diabou's rice paddies. She was one of six women in her village to agree to try Carrie's SRI experiements, spacing her rice transplants further apart. Results have been phenomenal so far.

Posted March 9, 2006: Diabou Balde stands ankle-deep in the grayish mud of her rice paddy and points to the soggy ridges lined with the bright green rice plants that will feed her family and provide her with income for the next year.

Like most of the women in Manthiankaning, a Pulaar-speaking village of a few hundred an hour or so east of the regional capital Kolda, Balde works hard in the rice paddies throughout the rainy season. “The women are out here every single day, from morning until evening,” says Carrie Miner, the Peace Corps volunteer who has been living and working with these women for the last two years.

Rice production is central to the livelihoods of farmers in Manthiankaning and elsewhere in the fertile Kolda region southeast of Dakar, Senegal’s capital. The region is the eastern part of the Casamance, the thin wedge of land that forms Senegal’s southern border. It is crammed between English-speaking Gambia to the north—a tiny country surrounded on three sides by Senegal due to colonial-era geopolitics—and French-speaking Guinea and Portuguese-speaking Guinea-Bissau to the south.

Dozens of ethnic groups—Jola, Pulaar, Mandinka, Manjak, Balant, and Wolof, to name a few—populate this unique region. High annual rainfall here—often more than 47 inches—makes the area a verdant paradise of lush forests, mangroves, and wetlands, as diverse in flora and fauna as in languages and ethnicities. While one of the country’s most fertile areas, its geographic isolation often led to neglect of the local population by the national government. Until recently, the region was the scene of a 20-year battle between separatist rebels and government forces, further isolating the region’s population and threatening food security.

Fewer plants spurs greater rooting

During her two years of service, Miner has promoted the System of Rice Intensification (SRI) in Manthiankaning in order to boost food production, working with Diabou and five other women in the village. This innovative approach was first pioneered in the rainfed, or upland rice fields of Madagascar and the Philippines. Contrary to what its name implies, SRI actually decreases the planting density in a given area by increasing the distance between rice plants to eight inches or more. This means less seeding and transplanting than usual in the Casamance, where farmers traditionally broadcast rice by hand, leading to random and inconsistent stands, or they transplant rice at a distance of four inches between plants.

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Doudou Diallo, urban market gardener, Saint-Louis
Strong customer demand for his high-quality vegetables propels this intensive urban gardener to pursue organics even without a premium price.

Madame Sall: bissap juice and syrup entrepreneur,

Dakar
Buying directly from farmers boosts the quality of her products and the consumer demand, but this home-scale beverage processor struggles to expand her place in the market.

Seydou Diémé: soil conservationist, Thiès
Water management is a key part of keeping farming viable for many communities in dryland areas of Senegal. With leadership and hard work a way forward is to build simple rock-lined ditches to slow runoff and restore viable farming areas.

Abderahmane Sow: agro-entrepreneur Belel, Matam region
Starting from scratch with curiosity and a knack for doing business, this new farmer wants to expand agricultural opportunity to help the next generation thrive on the fertile land along the inland Senegal River.

El-Hadji Hanne & Gora Ndiaye: regenerative ag extension & ornamental horticultural on the Petite Côte, Mbour
While university students in Dakar in the 80s, these two entrepreneurs became alarmed at the rate of pesticide use on the micro-farms. Today they work in a mix of endeavors to promote sustainable agriculture to interns from around the world.

Diabou Balde: An improved system of rice production, Manthiankaning, Kolda region
Intensive production pressure leaves little space for experiments, but improvements from increased spacing win respect for new method.

New interest in old crops, Tambacounda and Thies regions
Kekouta Camara of Touba Fall and Abdoulaye Niang of Keur Banda identify traditional crops that enhance biodiversity, reduce weather risk, extend crop rotations and attract high-value export buyers.

Fatou Kane, Ndeye Diop and Awa Mbaye: livestock fattening,Thiawène, Diourbel
Village women's group pioneers and teaches how "kept" sheep and goats can improve soil, boost yields and provide strong income in dry Diourbel region.

Milk and yogurt production, Ourossogui, Matam
Fulani women learn holistic cooperative development and enterprise skills to generate value-added revenue, and to inspire other small-scale farmers in the region – including their daughters -- with options for economic development.

Khadidja Niakh: thriving with peppers, seeds and leaves in Koumpentoum, Tambacounda region
Training in organic agriculture helps woman develop family enterprise that features

With a MS in soil science from the University of Florida, Miner was more than adequately prepared to test SRI in the field. However, conducting agronomic research in a Senegalese village's only rice fields was not as easy as it would have been at a land-grant university's research station. "This is all under cultivation," she says pointing to the wide expanse of green fields gilded with maturing seed heads. "There wasn't a lot of space for experimenting." Very few women were interested in giving up even a small portion of their field to try out a new method, much less a method that looks risky because it demands a lower planting density that would seem to promise a lower yield.

SRI seems counterintuitive, but the extra space between plants actually allows the rice to produce more tillers, resulting in higher yields.

It's true that increasing the distance between plants and reducing the overall plant density in a given area to improve yield seems counterintuitive. It works because the increased space per plant actually triggers more tillering, or the development of secondary shoots that produce grain. So while the number of plants may be fewer in SRI, the number of tillers is generally far higher, resulting in higher grain yields.

Most of the rice farmers in the village were skeptical of Miner's proposal, and only six agreed to participate. Now, however, most of those trying out SRI are happy with the results. According to Carrie, only one of the six women did not like the new system, while the others raved about it: "One of them even said, 'Wow, if I'd known the rice would look like this, I would have planted it all this way!'"

Tapping into tillering

Miner laid out an experimental demonstration plot of her own this year, in which she compared three varieties of rice (a local variety and two varieties developed by ISRA, the national agronomic research institute) either broadcast planted, transplanted in the traditional manner after 35 days at four-inch spacing, or using SRI, transplanting at eight- and 12-inch spacing. She also wanted to evaluate the effect of amending the plots with decomposed cow manure, applied at a rate of four metric tons/ha. While she has not yet calculated final yield, she has already noticed the superior tillering in the SRI plots. "We had one plant with up to 42 tillers, while a lot of the plants in the traditional broadcast plots only had two or three."

As elsewhere in the Casamance, rice farmers in Manthiankaning traditionally break up the soil with a short-handled hoe, a daba, and pile up the weed biomass prior to broadcasting their seeds. They then cover the seeds with a thin layer of soil. Because germination is low, they use an excessive amount of seed. Emergence is random. Some farmers transplant seedlings from crowded nursery beds into small ridges at a spacing of four inches. The ridges are made by flipping soil from one row to the next each year in order to smother the previous year's weeds. Tillering is low in both of these traditional planting methods due to crowding, late transplanting, or competition by weeds. "You're lucky if they get one weeding in," Miner explains.

enterprise that features income streams from integrated and biodiverse micro-agroforestry kitchen garden.

Tillering is low in the traditional planting method and means harder weeding, but transplanting for SRI means adding an extra tast to an already long list for Manthiankaning farmers. Final yield will determine whether or not the extra work is worth it.

When asked if she prefers SRI or the traditional methods, Diabou Balde doesn't mention the increased tillering, but notes that the wider spacing allows for easier management: "This way is better, quicker for weeding, "she says in Pulaar as Miner translates. "It's easier than the traditional method because you don't have to add a second layer of soil. It hurts my hands less."

Many farmers don't transplant simply because it adds an extra task to their already exhausting workload. Miner says, "In the end, it's a trade-off between labor and seed costs." Diabou recognizes this and is diplomatic in her final judgment. "Both ways have their advantages," she says. "We'll all wait to see our yields to see which is best."

The cautious and slow adoption of SRI by rice farmers in Manthiankaning is typical of agricultural innovation throughout Senegal and the developing world. With a family's survival so tied to the productivity of the land, adopting a new technique is risky. Nevertheless, some of the women of Manthiankaning are already convinced that it is a risk worth taking, that SRI is the way to increase their yields despite additional labor.

Further down the rice fields from Diabou plot, another farmer has expanded the number of rows in which she uses the new spacing. Next year, once her neighbors see the difference, they, too, will hopefully try out the new practice, little by little, one row at a time. NF

Nathan McClintock holds an M.S. in sustainable agriculture from North Carolina State University. He assisted a farmers' group Nepal in its transition to organic last summer before starting his PhD in agroecological geography at UC- Berkeley.