

NEWS & FEATURES

Dr. Salum Diwani Discusses Transforming Tanzanian Agriculture Through Advanced Soil Management and Mango Cultivation

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In December 2024 and January 2025, the Agribusiness East Africa Room convened key agricultural stakeholders to discuss the future of mango farming in Tanzania. The series of debates was organized in collaboration with AMAGRO, COPRA, TOSCI, SAGCOT, TAHA, and Diligent Consulting Ltd., along with Holly Green Ltd. and Afriflux Ltd. Mango farming is one of Tanzania's most promising wealth-generating agricultural ventures. The discussions explored its potential, challenges, and innovative solutions to boost productivity, market access, and sustainability.

Following the debates, the SAGCOT Centre had an in-depth conversation with Dr. Salum Diwan, a renowned agronomist and visionary farmer who is revolutionizing mango cultivation at Koga Farm, a 200-acre plantation in Mkuranga. Dr. Diwan's work reshapes Tanzania's agricultural landscape by integrating advanced soil testing, modern irrigation techniques, and global best practices. Inspired by Israel's agricultural advancements, he champions the adoption of tailored, internationally proven strategies to enhance productivity and economic growth. For Dr. Diwan, innovation in agriculture is not an option but a necessity. By embracing cutting-edge techniques, Tanzania can unlock its full potential, empower farmers, and drive national prosperity. Here is the full interview where he shares his insights, experiences, and vision for the future of mango farming in Tanzania.

Q: Can you introduce yourself and explain what initially drew you to agriculture and what continues to motivate you in this field?

A: My name is Dr. Salum Diwani. I love agriculture because it makes me happy and alive. Some people enjoy fishing, mining, or other activities, but for me, agriculture is what I enjoy most. It's something that appeals to me personally. Sometimes, there's no specific reason—it could be a historical background. For example, many of us were taken to farms by our parents, which developed our interest in farming. That's likely why I'm so passionate about agriculture.

Q: Thank you. So, how did your education and early experience shape your career in this sector?

A: Yes, it did. When I started, I studied science while doing Forms 5 and 6 and then went to SUA, an agricultural university in Morogoro, where I developed an immense interest in agriculture. There after went for Msc studies at the University of Aberdeen in which my studies where upgrade to PhD studies in Plant Pathology. After my return I with the Silviculture station in Lushoto, and then went to teach in Kenya, at Moi University. While there, I later joined

Bayer East Africa, Nairobi Kenya, an agricultural company, as a Regional Technical Manager looking after Kenya, Uganda, Tanzania, Somalia, Rwanda and Burundi and that is when I got exposed to the farming communities of these countries' farmers.

At one time, I visited a mango farmer in Kenya and was shocked to see that the fruits we were taking for granted in our country, Tanzania, were grown significantly and was an export crop. This is when I developed an interest in mango growing.

Then I decided to come back to Tanzania, sometime in 1989. At that time, I looked for a farm and started farming mangoes, but nobody understood my concept. Then I had to take my farm manager to Kenya to visit that farm so that he could understand what I was talking about. I then started working and researching various issues of agriculture. Because of my love for mangoes, I collected many varieties worldwide, trying to see how they could perform in our country.

Q: How many varieties did you collect and what have you discovered about growing these varieties?

A: We have between 30 and 40 varieties, primarily international ones from various countries. It's pretty interesting to experiment with these varieties. We can then compare the performance of different types and adjust our cultivation strategies accordingly. Fortunately, this led to the hybridization of the varieties among themselves.

There are two types of seeds in mangoes. For example, if you plant a seed from a 'Dodo' mango, the resulting plant will be a 'Dodo'. However, with another type of mango, such as 'Tommy Atkins', planting its seed might not yield a 'Tommy Atkins' mango; it could develop into any variety. This phenomenon is also observed with avocados, where the seed planted doesn't necessarily produce the same type of avocado.

Q: Can you explain the grafting process and your success with new varieties on your farm?

A: This is why grafting is necessary to develop a specific variety. You take cuttings from a specific tree and graft them onto the seed. This method ensures the continuation of the desired variety. These types of seeds that can produce any type of mango are fascinating because we discovered several new varieties on our farm that developed from these seeds. Some of them were outstanding. We narrowed it down to about three new types we are developing further. One of them is among the best in the world.

We named it 'Koga' after our farm, so the origin of this particular variety is recognized. We are now propagating many of these seedlings for planting on our farm, aiming to resume exports. We had stopped exporting due to issues with fruit flies, but now that it's under control, we can begin exporting again. That's reassuring, isn't it?

Q: What potential do you see in Tanzania's mango value chain?

A: The potential for mangoes in Tanzania is immense. Unlike coffee, which can only be grown in specific areas, mangoes can thrive throughout the country, even in arid regions like Singida and Dodoma. Mango trees are one of the few that remain evergreen in such dry areas. This adaptability makes mangoes a versatile crop that can significantly impact local economies.

Q: How can local farmers enhance mango production to boost their income and nutritional intake?

A: Local farmers can greatly enhance mango production by adopting methods used in countries like the Philippines, where I've seen smallholders significantly contribute 70% to national exports. In the Philippines, small farms ranging from one to a few acres can collectively generate substantial revenue from mango exports, totaling about \$200 million annually. This model can be emulated in Tanzania, involving smallholders and larger farmers, stimulating various sectors within the mango value chain.

For instance, companies like The Bakhresa Group in Tabora buy large quantities of mangoes for processing. Every time I visit my farm and drive through The Bakhresa Group's factory during the mango season, I see lorries packed with about 400 tons of mangoes. This not only boosts the local economy through direct sales but also impacts transportation, agricultural inputs, packing materials, and local vending.

Mangoes can be processed into various products, such as jams, juices, dried mango leather, chutney, and more. This diversity in processing options can lead to substantial employment opportunities and entrepreneurial ventures. For example, South Africa uses about 20,000 tons of mangoes annually to make Achari, a popular condiment. Moreover, I learned from our chairman's [AMAGRO] visit to India that even small enterprises can thrive by exporting mango products like Achari to the U.S., shipping two containers monthly. This kind of initiative could be replicated to harness the full potential of mangoes in Tanzania.

Q: Can you discuss the new opportunities emerging in the mango value chain with technological advancements?

A: Certainly! Technological advancements are opening up innovative uses for mango byproducts, such as turning mango skin into leather for shoes. This is similar to other sustainable practices like using banana and pineapple leaves to make various products.

Q: What global market advantages does the southern hemisphere have in mango production?

A: Interestingly, if you divide the world in terms of the Equator, the southern hemisphere, including countries like Australia, East Africa, and parts of South America like Brazil, produces about 15% of the world's mangoes, with the northern hemisphere countries like India, Bangladesh, Pakistan, and the Philippines producing 85%. However, our production period in November to January coincides with the off-season in these northern countries, creating a global market scarcity that elevates mango prices.

Australians have recognized this and have been increasing their mango cultivation areas, doubling them every 10 years, focusing only on crops that benefit from this seasonal advantage, such as grapes and mangoes. This strategic positioning offers significant opportunities for countries in the southern hemisphere to capitalize on.

Q: How does the global demand for mangoes compare to other commodities, and what does this mean for Tanzania?

A: The global mango market is valued at about \$67 billion and is expected to rise to \$90 billion by 2030. This growth rate might eventually allow mangoes to surpass other commodities like coffee, which is currently valued around \$130 billion [Much less for Raw Coffee] but much higher once you consider the total economic impact. The most significant aspect is the seasonal market dynamics; for instance, when mangoes are out of season in India, which produces about 47% of the world's supply, it creates a huge market opportunity. Countries like Malawi have already begun exploiting this gap, exporting mangoes to India during its off-season. This

presents a tremendous opportunity for Tanzania and other African countries to expand their mango production and tap into this lucrative market.

Q: Dr. Diwani, apart from mango, what other agricultural chains are you passionate about developing in Tanzania?

A: Apart from mangoes, I am pretty passionate about jackfruit. I've introduced some varieties to my farm that are performing exceptionally well, producing fruit almost year-round. Starting with seeds, you can begin harvesting in just one and a half years, which is significantly faster than traditional methods. We have about an acre planted, and we're closely observing their performance because the year-round production offers a continuous cash flow for the farm.

I'm also revisiting papaya cultivation. I had previously grown papayas but had to stop due to high costs associated with fertilizers and irrigation. Now, with electricity available on the farm and reduced costs, we've started a trial with about 1,000 plants to see how they perform.

Additionally, I work with guavas, especially some varieties from the Philippines with good market potential, although pest control remains a challenge. Citrus fruits like lemons and limes are also part of my portfolio.

Q: How do you address productivity challenges in your agricultural ventures?

A: Productivity is a primary focus for us. While working with Bayer East Africa, Nairobi, I travelled to several countries to study coffee production. For instance, while Tanzania's coffee production averaged around 250 to 450 kilos per hectare, Kenya achieved two tons, Zimbabwe four tons, and Malawi an impressive seven tons per hectare in one of the farms I visited. These figures highlight the critical need to boost productivity on our farms.

Moreover, comparing Tanzania to Turkey, despite our similar land sizes and populations, Turkey's agricultural exports were recently valued at \$36 billion, while ours were significantly lower. This disparity underscores the urgent need for Tanzania to enhance agricultural productivity and export capabilities.

Q: You mentioned the importance of productivity in Tanzanian agriculture. Can you elaborate on that?

A: Absolutely, productivity is crucial. Focusing on productivity is the key to changing our earnings and overall performance in agriculture. Optimizing productivity can make a significant impact, even in small areas. We must work hard to improve productivity—it can make a big difference.

Q: What are your thoughts on organic farming practices in Tanzania, and how feasible is it to shift toward more sustainable farming methods on a larger scale?

A: Organic farming is gaining traction, and there are developments in using organic tools to grow crops. However, fully organic production can be challenging. For instance, certain mango diseases can be controlled with organic products like sulfur, but other diseases can't be managed organically. Despite my efforts, fully organic methods often resulted in significant crop loss, which buyers aren't willing to compensate for. However, certain crops like coconuts are inherently organic in Tanzania, as no pesticides are applied. So, while growing some crops organically is possible, the overall productivity might be lower. Nonetheless, advancements in organic fertilizers, such as fungal materials that boost productivity, show promise for the future.

Q: How do you envision the role of youth in the future of Tanzanian agriculture, and what steps should be taken to encourage more young people to enter this field?

A: The role of youth is critical for the future of Tanzanian agriculture. Historically, many young people lacked interest in agriculture, preferring urban opportunities. However, as more youth engage in agriculture, we expect substantial development. Encouraging this shift is vital because our youth population is large and energetic, representing a tremendous opportunity for the sector. By promoting agriculture as a viable self-employment option and highlighting its potential, we can motivate more young people to consider agriculture as a career path.

Q: With ample land available, what are the opportunities and challenges for young Tanzanians entering agriculture?

A: Land availability in Tanzania offers young people a significant opportunity to engage in agriculture swiftly. However, it requires more than land access; agriculture success demands commitment and a willingness to learn. Today, technology plays a crucial role. Young farmers can leverage electronic gadgets and platforms like YouTube to learn advanced global agricultural techniques, such as how Brazil grows coffee or how tobacco is cultivated in other regions. This access to knowledge can radically improve how agriculture is practised locally.

Q: Can you provide an example of how bringing in external expertise has transformed agricultural practices in Tanzania?

A: Certainly. A notable example is the transformation in Tanzania's tobacco production. Historically, Tanzania produced about 28 million kilos of tobacco per year, which was primarily used as filler in cigarettes due to its lower quality. Recognizing the need for improvement, we brought in experts from Brazil and experienced farmers from Zimbabwe to share their knowledge with local Tanzanian farmers.

These experts were pivotal. For instance, Zimbabwe produced about 3.5 tons of tobacco per hectare, surpassing even Brazil's 2.8 tons per hectare. The collaboration of these experts with Tanzanian farmers led to a dramatic increase in production—from 28 million to 120 million kilos in just eight years. Moreover, the quality of Tanzanian tobacco improved significantly, moving from filler status to becoming a significant component in cigarettes.

This example underscores the profound impact of skilled guidance and international expertise on local agriculture. It mirrors other global success stories, like Chile's rise to become the world's leading producer of salmon through similar initiatives.

Q: How vital is technology transfer from more experienced agricultural nations to Tanzania?

A: Transferring real technology and knowledge from regions where agriculture is advanced is crucial for Tanzania. We must actively seek out and learn from global experts to accelerate agricultural development. This involves developing our expertise locally and embracing lessons from those who are achieving higher yields in their countries. For example, by interacting with and learning from farmers in countries like Israel, where mango yields are exceptionally high, we can identify practices that could dramatically increase our own productivity.

Q: What is your dream for Tanzania's agricultural sector and its impact on the nation?

A: My vision for Tanzania's agriculture is transformative. We should reevaluate the crops we grow, many of which were initially introduced during the colonial period for reasons that may

no longer be relevant. Instead, we should focus on crops with real economic potential, informed by global market demands and our unique climate advantages. For instance, despite importing large quantities of apples, we can grow them locally, as seen in recent successes in regions like Iringa. This approach not only satisfies local demand but also opens up export opportunities. Ultimately, embracing a diverse and value-focused agricultural strategy could significantly boost Tanzania's economy and the well-being of all its people, not just the youth.

Q: What significant challenges do you foresee in Tanzanian agriculture in the next decade, and how can these be addressed?

A: One of the major challenges is our limited understanding of soil health and its management. Soil is the foundation of agriculture, yet there is a lack of facilities capable of analyzing soil properties effectively. Expanding our capacity to assess soil health can lead to better crop choices and cultivation practices. Additionally, embracing technology to monitor and optimize agricultural practices will be crucial. We can substantially improve agricultural productivity and sustainability by understanding and addressing these challenges.

Q: How has the availability of soil testing equipment impacted agricultural practices in Tanzania?

A: Introducing soil testing equipment in every district has been transformative. I utilized these facilities myself and received soil test results within a week. These facilities are crucial and require robust support, not just in terms of equipment but also in analytical capabilities. Accurate analysis is essential for determining the right crops for specific soil types. This level of support can significantly enhance agricultural productivity.

Q: What improvements are still necessary in soil testing to maximize agricultural output?

A: Currently, our equipment mainly tests for macro-elements in the soil, but it's equally important to assess micro-elements like zinc and magnesium, which our current systems often overlook. In countries like Israel, detailed soil and leaf testing helps inform precise fertilizer prescriptions tailored to specific crops and fields. This kind of detailed, customized approach is something we need to develop further in Tanzania to ensure that fertilizers are not only correctly formulated but also quickly mixed and applied to match specific agricultural needs..

Q: What improvements are still necessary in soil testing to maximize agricultural output?

A: Tailored fertilization is critical. In Israel, for example, farmers receive specific fertilizer mixtures designed for their farms, enhancing crop yields significantly. In Tanzania, while fertilizers must be registered, there should be flexibility in formulating and using fertilizers specifically designed for local conditions and crops. This approach can dramatically improve productivity. We have soil quality, climate, and other natural advantages similar to prosperous agricultural nations. However, we must address gaps in capital, technology, and expertise—as we did with tobacco, where bringing in experts rapidly improved our output. There's no reason Tanzania can't reach or exceed the agricultural export values of countries like Turkey if these adjustments are made effectively.

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