



2014 AWARD Fellow
Flower Ezekiel Msuya

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Position	Senior Researcher
Institution	Institute of Marine Sciences, University of Dar es Salaam
Country	Tanzania
PhD	Seaweed in Integrated Mariculture, Tel Aviv University, 2004
Mentor	Professor Keto Mshigeni, Vice Chancellor, Hubert Kairuki Memorial University, Tanzania
Research Area	Value addition and innovative farming techniques focused on combatting the environmental, socio-economic, and climate change effects on seaweed farming.

Flower Ezekiel Msuya, a senior researcher at the University of Dar es Salaam’s Institute of Marine Sciences, didn’t even see the ocean until she was in high school, but today, exploring its bounty is her professional passion.

Msuya’s first real interest in the ocean began as an undergraduate at the University of Dar es Salaam, where she took courses in botany, statistics, and phycology—the study of seaweed. “I saw the beautifully colored ocean plants and I fell in love with them. I grew up weeding and harvesting crops on my mother’s fruit farm in Kilimanjaro in northern Tanzania, and I saw seaweed as another crop,” recalls Msuya, who conducted her BSc research project on seaweed.

For her PhD, Msuya studied using seaweed as a filter to clean the water flowing out of fishponds and back into the sea to ensure minimal contamination of the environment. She worked with colleagues to establish an integrated fish-seaweed pond system in Zanzibar during her research.

Currently, Msuya is the facilitator of the Zanzibar Seaweed Cluster Initiative, an innovative initiative that is dealing with the problems faced by seaweed farmers in Tanzania. They grow two types of seaweed: *Kappaphycus alvarezii*, or cottonii as it is commonly known, which fetches double the price at US\$0.50/kg versus US\$0.25/kg of *Eucheuma denticulatum* (or spinosum). However, cottonii no longer grows in shallow waters, which have become too warm due to the effects of climate change. Results have shown that it can be farmed

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in deeper waters (1 to 3 meters at low tide), but the rough seas at that depth tend to break the seaweed, and farmers must be able to swim in order to harvest it. To compound the problem, more than 80 percent of the farmers are women, who traditionally do not go into deep waters.

"I am designing devices that can be used to contain the seaweed even if it breaks off in deeper water," Msuya explains. "To encourage farmers to continue growing the crop, our initiative is also teaching them how to process seaweed into value-added products, such as powder, soap, and body creams, and foods like jam, juice, and salad. The farmers and processors are now selling seaweed powder at US\$6 per kg and soap at US\$1-3 per piece." She pioneered the introduction of a floating line system of seaweed farming to combat die-off, and introduced the production of seaweed soap in 2008, the first value-added product in Tanzania.

"For 10 years, it has been my dream to see locally farmed seaweed being used by Tanzanians rather than sold as a cash crop and exported," says Msuya proudly. She is working with 3,000 of the country's 24,000 seaweed farmers, both men and women, and the initiative is also gaining prominence with youth.

Falling world market prices for the cheaper seaweed, coupled with the disappearance of cottonii, has prompted Msuya to work on developing other types of seaweed as alternatives. "Two seaweeds have been identified and plans are under way for trial farming followed by dissemination," she notes. "I am also doing research on integrating seaweed farming with the production of sea cucumbers, which are highly valued in Tanzania and worldwide."

In her work, Msuya trains entrepreneurs, including government officials and academics, on innovations and how to start and launch cluster initiatives not only in marine biology, but also in agriculture, animal husbandry, and engineering. Through AWARD, she expects to further develop her research skills and increase her linkages and networking, while promoting seaweed farming and value addition in Tanzania.

"In the future, I envision a strong interaction between innovative, competitive seaweed farmers, the government, and researchers who are all working toward the same goal: Tanzania being known worldwide for its top seaweed production and usage," reflects Msuya. "I want to be known as the creative 'seaweed farmers' friend/expert' who worked with them to bring a revolution to this important agricultural sector."