

# LOCAL SOLUTIONS FOR SUSTAINABILITY CHALLENGES

## THROUGH STEM EDUCATION AND RESEARCH IN ARUBA

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This contribution was written by part of the core team at (1) KU Leuven and (2) the University of Aruba that develop and implement the SISSTEM program: Dr. Anouk Mertens (1), Prof. Nadine Buys (1), Patrick Arens (2), Prof. Georges Gielen (1), Dr. Nigel John (2), Dr. Salys Sultan (2), Dr. Eric Mijts (2).

The sustainability challenges faced by small island states are increasingly underscored by some of the largest international institutions, including non-governmental organizations, businesses and academia. Small island states are recognized as the proverbial canaries in the coalmine when it comes to the sustainability challenges of our entire planet, as they face a greater vulnerability compared to larger and continental states. This vulnerability results from their scale and isolation, in turn leading to specific environmental, social and economic characteristics, and the tight interlinkages between these characteristics.

**In small island states like Aruba, attempts to build resilience towards shocks and to increase sustainability often take the form of external incongruent technological or economic quick-fix interventions.** These interventions are not always effective, firstly, due to a lack of local ownership of these externally implemented interventions, and secondly, because they disregard the need for locally tailored, contextualized and holistic solutions that consider the wicked nature of

the island's sustainability challenges. This challenge, although in a more general context, has also been voiced by Buelens (2022).

Today, the local critical capacity in the Caribbean to turn around the current situation remains limited. This situation is exacerbated by the brain drain of talented youth, often towards Europe or the United States. The island states need increased capacity for research – including resources, experts and research activities – to develop local sustainability solutions. Preferably, this should be provided by locally managed research-based educational programs and increased accessibility to such programs to educate local sustainability experts. This need is also expressed by both the public and private sectors in the region. They are increasingly looking for people trained in Science, Technology, Engineering, and Math (STEM) related subjects, with the necessary expertise to develop and implement projects related to innovative biotechnologies, renewable resources, and climate change mitigation and adaptation.



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The SISSTEM programme at the University of Aruba aims to respond to these needs and this gap in the workforce. **SISSTEM is the acronym for Sustainable Island Solutions through Science, Technology, Engineering and Mathematics (STEM).**

The programme started as a European Union Funded (EDF-OCT 11) project and is a collaboration between the University of Aruba and KU Leuven (Belgium). As can be read in detail in Mertens et al. (2022) and Mertens et al. (2023), SISSTEM has four main components: (1) a Bachelor of Science programme in Sustainable Engineering and Technology; (2) a Master of Science programme in Sustainability for Engineering; (3) an academic research center; and (4) service to society.

**The goal of the academic Bachelor and Master programmes is to educate a new generation of engineers and scientists, policy makers and entrepreneurs, who have a profound knowledge of STEM subjects in a sustainability context**, and who can apply this knowledge in the particular setting of a small island state, like Aruba. Moreover, research is currently being conducted by 10 PhD candidates and 1 postdoctoral researcher on a wide range of sustainability topics. In the Bachelor and Master programs, as well as in the academic PhD research program, collaboration with local stakeholders,

government and industry is key. Also sharing of the research results is considered important. As a result of this tight relationship with society, ownership of the research results is increased and chances of successful implementation of the results are higher.

The SISSTEM programme considers its graduated Bachelor and soon also its graduated Master and Ph.D. students as experts who have scientific and solution-oriented knowledge, skills and attitudes, allowing them to develop locally tailored sustainable island solutions for the challenges faced by Aruba and other small island states. Such locally tailored sustainable island solutions could take the form of a locally developed waste-management system as a solution for the overflowing landfill, the development of a vertical farm to increase local food production, the assessment of the islands' urbanization rate to advise local policymakers, etc. SISSTEM graduates can have a future career in local enterprises, for example as sustainability managers, start their own enterprises, work for NGOs, support international organizations or become policymakers. They will form part of the regions' local expertise in sustainability able to disseminate knowledge through interaction with community and local companies.

SISSTEM welcomes all students from across the



***Students doing a sea-grass monitoring activity***

Caribbean region and beyond, that have the drive to tackle the sustainability challenges in their own islands, anchored on a solid scientific knowledge base. SISSTEM welcomes collaborations with other institutes in the region and internationally to further accelerate the development of sustainable island solutions through STEM via exchange students and collaborations in research projects. With regards to the Caribbean context, SISSTEM is the evidence that further sustainable development of the Caribbean islands can be realized, not by external incongruent interventions, but through coherent island-based solutions developed by a locally trained workforce, based on local data-driven research.

#### **About SISSTEM:**

Overall, the SISSTEM academic STEM programme aims to be a change agent template in small island states through education, research and the development of locally owned and locally tailored sustainability solutions. If you want to take part in this growing program, reach out via [stem@ua.aw](mailto:stem@ua.aw).

More information on the SISSTEM Bachelor and Master programmes can be found at [www.ua.aw/sisstem/](http://www.ua.aw/sisstem/).

#### **References**

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