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Building a robust pipeline of scientists leading climate change research in Africa

Candidate Profile

Yao Saraka Didier Martial

2021 One Planet Laureate Candidate

Position

Associate professor

Institution

Peleforo Gon Coulibaly University, Korhogo

Country

Côte d'Ivoire

Education

PhD, Molecular Genetics, Management and Improvement of Plant Genetic Resources, University of Nangui Abrogoua (UNA), Côte d'Ivoire

Mentor

Dr. Christophe Kouame, Director, West and Central Africa, World Agroforestry Centre (ICRAF), Côte d'Ivoire

Research Area

Plant breeding, genetics, and improvement.

Yao Saraka Didier Martial is a Senior Lecturer at the CAMES (African and Malagasy Council for Higher Education) University Peleforo Gon Coulibaly (UPGC) in Korhogo in the north of Côte d'Ivoire.

As his field of research is plant breeding, the geneticist is studying the domestication of the shea tree in Côte d'Ivoire. He aims to improve the incomes and competitiveness of female shea butter processors and producers in general through access to improved plant material adapted to climate change to create natural shea plantations in Côte d'Ivoire. He intends to model climate data to make the exploitation of shea parks more profitable by increasing their resilience to climate change by using regeneration techniques and the associated cultivation of suitable plant varieties. A survey conducted throughout the shea production zone in Côte d'Ivoire identified 1,250 elite genotypes. These elite trees now constitute the basic plant material for the genetic improvement of shea in the country. The successfully implemented grafting of shea trees has made it possible to shorten the period before the tree bears fruit from 20 years to five years, multiply the identified elite trees, and produce improved seedlings to create shea orchards in Côte d'Ivoire. To limit the erosion of existing shea parks and allow them to continue playing their carbon stores role, assisted natural regeneration (ANR) was implemented from 2018 to 2020 in Côte d'Ivoire to restock 56.6 hectares of them degraded shea parks. He also hopes to broaden his knowledge of fruit tree hybridization to successfully crossbreed and create hybrid shea species that are better adapted to climate change.

Together with his research team, he would like to set up a research center exclusively dedicated to shea trees in the country (a specific research program that does not yet exist). Looking at the mapping of research stations in Côte d'Ivoire, several research stations are exclusively dedicated to one type of crop but none to the shea tree. The role of this research center dedicated solely to shea butter would be to support the local shea butter industry and to accompany rural communities through genetics, agronomy and/or biotechnology.

He was born in Sinfra, a town in the Marahoué region of western Côte d'Ivoire, where he grew up and completed his schooling. He inherited an appreciation for academic education from his father, a schoolteacher. Yao is the third child in a large family.

In year 7, his mother introduced him to geometry, even though she only had a middle school education. He remembers with emotion the scientific spirit of his mother. She instilled in him a passion for science at an early age.

He obtained his scientific baccalaureate in mathematics and physical sciences in 2000. Yao then enrolled in Natural Sciences at the UNA in Abidjan, the economic capital of Côte d'Ivoire.

After completing his DEUG (foundation degree) in natural sciences in 2003, he obtained a bachelor's degree in 2004 and a master's degree in plant and environmental protection the following year. Since most of the courses were biology, he preferred courses with a mathematical emphasis, especially genetics.

Yao is working on the creation of improved shea hybrids adapted to climate change in order to improve the income and competitiveness of women shea butter processors and producers in Côte d'Ivoire. through access to improved plant material.

As part of his master's degree, he did a three-month internship at the Marc Delorme research station of the Centre National de Recherche Agronomique (CNRA), which researches the coconut tree, another oilseed crop grown in southern Côte d'Ivoire.

Young and motivated by a thirst for learning, he was eager to go further after each academic cycle. Despite a very rigorous selection process, he finished first in his class to enter the third academic cycle of the university. He continued with a master's in management and valorization of natural resources, biodiversity, and sustainable management of ecosystems option at UNA.

As part of the preparation for this master's, he did an internship where he worked for six months on the effect of the quality of pollen used in producing improved seeds adapted to climate change in coconut.

At the end of his master's, which he defended brilliantly in 2008, he enrolled for a PhD at the UNA.

He worked at the same research station, which hosts one of the five most important off-site collections of coconut trees in the field, which was set up in 1999 as an international collection for Africa and the Indian Ocean by Bioversity International and the Food and Agriculture Organization of the United Nations (FAO). The thesis work carried out by Yao has made it possible to determine the level of agromorphological and molecular diversity of regenerated coconut accessions, which now enables Côte d'Ivoire to continue improving its coconut varieties.

Yao believes plant genetics has its place in climate change because it addresses aspects such as the creation of high-performance varieties that are resistant to pests and adapted to the environment crop association with adapted varieties.

A brilliant student, he was awarded a scholarship granted by the State of Ivory Coast from bachelor's level to thesis level. "I was comfortable when doing my studies thanks to this financial aid," he recalls.

Holder of a PhD in molecular genetics, obtained in July 2014, specifically on managing and improving plant genetic resources, Yao warmly thanked his mother during his thesis defense. Yao is married and has two lovely daughters.

He is proud of his family, including a younger sister who is currently studying for a PhD in Spanish, a brother who is an administrative officer, a brother who teaches mathematics at the college, and another brother who is a physiotherapist.

Yao is also keen to influence decision-making bodies. Like most researchers in Africa, he faces problems related to funding his research.

Recruited as an associate professor, he developed speculation of interest in rural communities in the north of the country. Yao wanted to conduct research that would have a high impact on communities. He, therefore, approached an associate professor specializing in the shea tree (Professor Nafan Diarrassouba).

He then realized that this plant has very little research results in Côte d'Ivoire. Moreover, by happy coincidence, the State of Côte d'Ivoire was looking for researchers to carry out research work to support the sustainable exploitation of shea butter and revitalize the shea butter sector at the national level.

In Côte d'Ivoire, women produce shea butter from a collection of wild fruits, but their income is low. The objective is to develop shea plantations. The impact of such an initiative would be considerable on the lives of the population in general and women in particular.

Yao is sensitive to this because he works with rural communities daily. In previous projects, he has even trained rural women to conserve shea parks in two large regions of the country (Bagoué and Tchologo regions) to help restore these parks through an agricultural innovation such as assisted natural regeneration (ANR).

Currently, as part of the work carried out on grafting shea trees, which has a success rate of over 90 percent in rural areas, Yao provides training to farmers, thereby disseminating the innovation to provide the country with shea trees nurseries.

His objective is to provide farmers with improved shea seedlings for shea plantations because there are no real shea plantations, and wild trees are still used there. The aim is to have shea plantations with plant material adapted to different agro-systems. It would also be interesting to invest more in shea orchards by promoting crop combinations (other food crops) with shea.

Yao aspires to be a senior lecturer and then full professor in genetics and plant breeding in his academic career.

The One Planet Fellowship represents a huge opportunity for interpersonal development and leadership, skills that are essential for his ambitions. This program will enable him to fill certain gaps, especially through mentoring, which requires him to work on himself with the help of his mentor, Dr. Christophe Kouamé, Director of ICRAF in West and Central Africa and an expert in climate change.

"I have never benefited from such an international training program outside my academic training, which took place entirely in Côte d'Ivoire," Yao says.

To accelerate his genetic improvement, he would like to improve his scientific skills to develop extensive knowledge of biotechnologies such as somatic hybridization, haploidization, transgenesis, and induced mutagenesis of shea.

By taking an interest in other research topics, Yao also wants to share his knowledge with the younger generation. From now on, he intends to encourage young researchers and students to apply for the One Planet Fellowship program.

The challenges faced by his fellow researchers are not specific to Côte d'Ivoire but are faced by all who are conducting scientific research in Africa.

Research is often carried out depending on the available equipment and materials, limiting factors. Funding of scientific research and innovation is a major issue on the continent.

Yao believes African states do not invest enough in research and do not support the work of researchers because our states do not understand the scope of basic research and, paradoxically, expect conclusive results that can be transferred to the farming environment. However, the majority of researchers do not have access to international donors.

Yao Saraka Didier Martial is one of the growing number of candidates selected to participate in the One Planet Fellowship. The One Planet Fellowship is a career development initiative that is building a robust pipeline of highly connected, inter-generational scientists equipped to use a gender lens to help Africa's smallholder farmers cope with climate change. The One Planet Fellowship is funded by the Bill &Melinda Gates Foundation, the BNP Paribas Foundation, the European Union and Canada's International Development Research Centre (IDRC). African Women in Agricultural Research and Development (AWARD) and Agropolis Fondation are jointly implementing the Fellowship.