

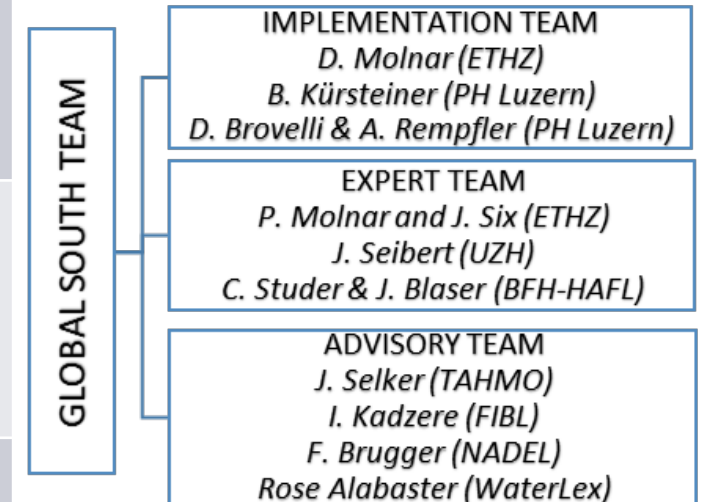


Science Action in Schools for Sustainable Development SAS4SD

swissuniversities Consortia for Education and Research (COFER)

SAS4SD Structure - Switzerland Partners

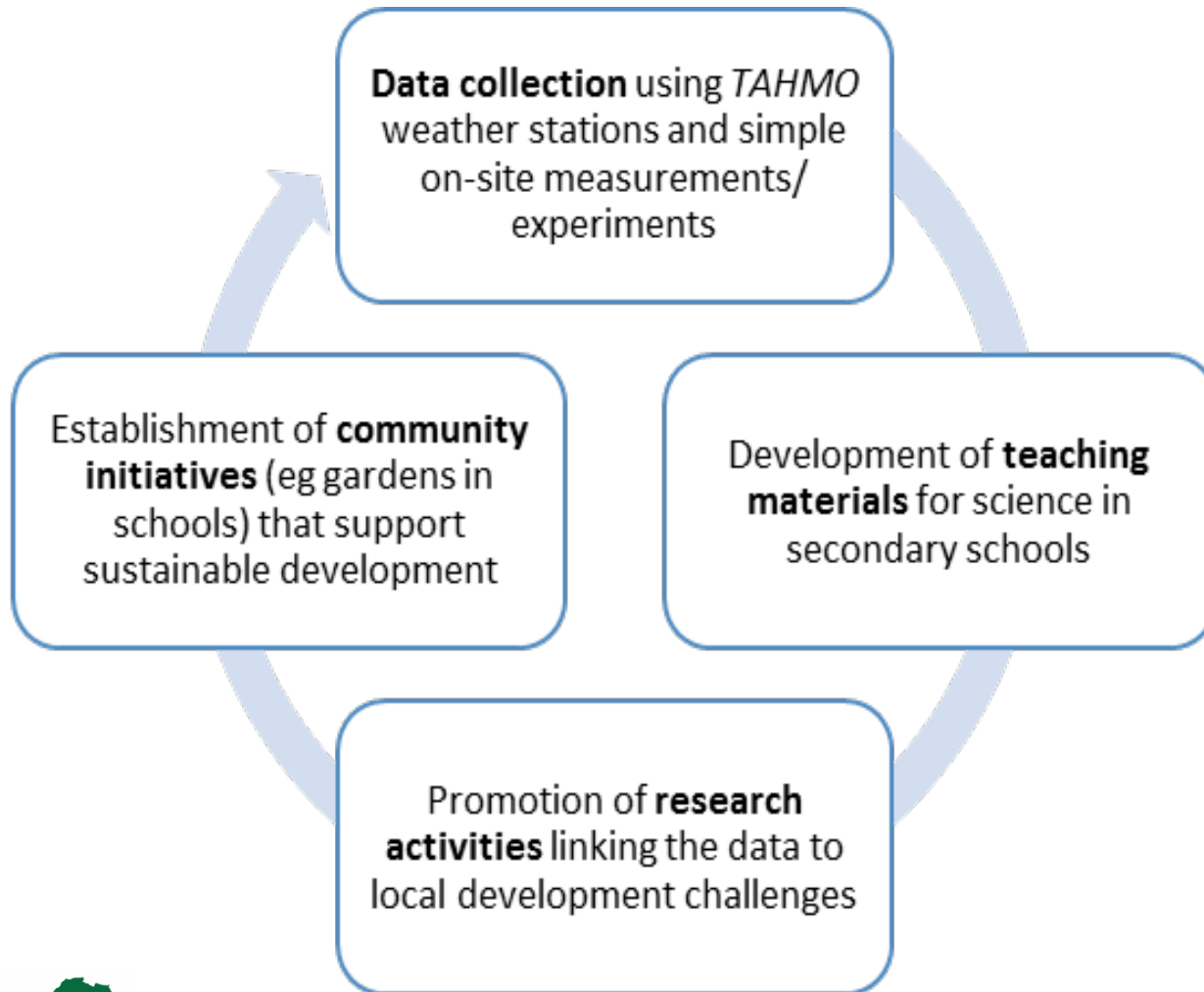
UNIVERSITY	INDIVIDUAL	SPECIALIZATION
ETH Zurich (ETHZ)	Prof. Dr. Peter Molnar Prof. Dr. Johan Six Dr. Darcy Molnar	Hydrology, Fluvial systems Soil Sciences, Sustainable Agriculture Water Resources, Climate Change
Pädagogische Hochschule Luzern (PHLU)	Prof. Dr. Dorothee Brovelli Prof. Dr. Armin Rempfler Brigitte Kürsteiner	Natural Sciences, Physics, STEM Geography, Teacher Training Pedagogy, Intercultural Communication
University of Zurich (UZH)	Prof. Dr. Jan Seibert	Hydrology, Climate, Water Resources
Bern University of Applied Sciences (BFH)	Prof. Dr. Christoph Studer Prof. Dr. Jürgen Blaser	Natural Resources, Agriculture International Forestry, Climate Change



SAS4SD Structure - Ghana & Cameroon partners







ORGANIZATION	INDIVIDUAL	SPECIALIZATION
University of Cape Coast (Ghana)	Prof. Dr. Peter K. Kwapong	Pedagogy, Entomology
University of Education Winneba (Ghana)	Dr. Richard Kuffour	Pedagogy, Water Resources
University of Ghana	Dr. Irene S. Egyir	Agricultural Economics
Kwame Nkrumah University of Science and Technology Kumasi (Ghana)	Dr. Evans Dawoe	Agriculture, Agroforestry
Ecole Normale Supérieure de l'Université de Yaoundé 1 (ENS) in Cameroon	Prof. Dr. Marie-Thérèse Ambassa	Pedagogy
Ecole Pratique d'Agriculture de Binguéla (EPAB) Cameroon	Roland Amougou Etogo	Agricultural Education
Ministry of Scientific Research and Innovation, Cameroon	Dr. Wilson Fantong	Hydrogeology expert

SAS4SD Goals – from data collection to community initiatives



TAHMO (Trans-African HydroMeteorological Observatory) station in Cameroon

SAS4SD and the SDGs

	<p>Climatic data will be used to assess which measures are needed to ensure food security and sustainable agriculture in the local communities, and appropriate solutions will be integrated into the teaching materials</p>
	<p>The educational material that is developed will enhance the scientific and mathematical skills of the students, broadening their horizons, and giving them the opportunity to become leaders in promoting sustainable livelihoods</p>
	<p>Meteorological data measurements, including precipitation measurements, will provide insight into the available water resources</p>
	<p>SAS4SD will encourage the sustainable use of natural resources by emphasizing action research and learning through practice</p>
	<p>The data from weather stations will provide an understanding of local climatic conditions and the communities' potential vulnerability to climate change</p>
	<p>By empowering schools and communities to investigate themselves conditions of sustainable rural livelihood, SAS4SD will promote behavioral changes regarding the exploitation of natural resources</p>

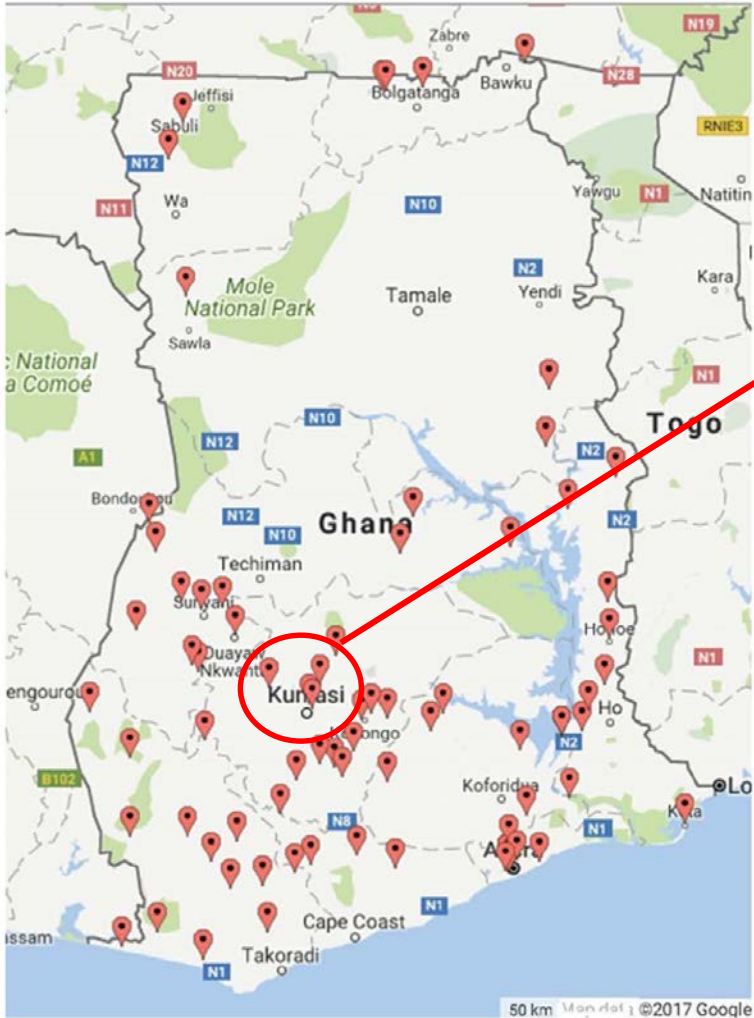
SAS4SD activities

The screenshot shows the SAS4SD website interface. At the top, there is a navigation bar with the ETH zürich logo and the text 'Dept. of Civil, Environmental and Geomatic Engineering | Institute of Environmental Engineering'. The main header features the title 'Science Action in Schools for Sustainable Development' and a menu with options: News & Events, The Project (selected), People, Education, Research, Case Studies, and Reports. A search bar and a 'Departments' dropdown are also visible. A breadcrumb trail indicates the current location: 'ETH Zurich > D-BAUG > IfU > sas4sd'. The left sidebar contains a list of activities: 'Kickoff Workshop', 'Ghana Reconnaissance' (highlighted), and 'Cameroon Reconnaissance'. The main content area is titled 'Ghana Reconnaissance' and features a large photograph of a group of people standing in front of a colorful building. Below the photo is the caption 'Meeting with stakeholders in Bibiani'. To the right of the photo is a flyer titled 'Science Action in Schools for Sustainable Development (SAS4SD)' with a download link: 'Download the SAS4SD flyer (PDF, 167 KB)'. The footer of the page includes the SAS4SD logo and contact information.



SAS4SD – Ghana pilot studies

Bibiani Secondary High School
 St. Monica's Secondary High School

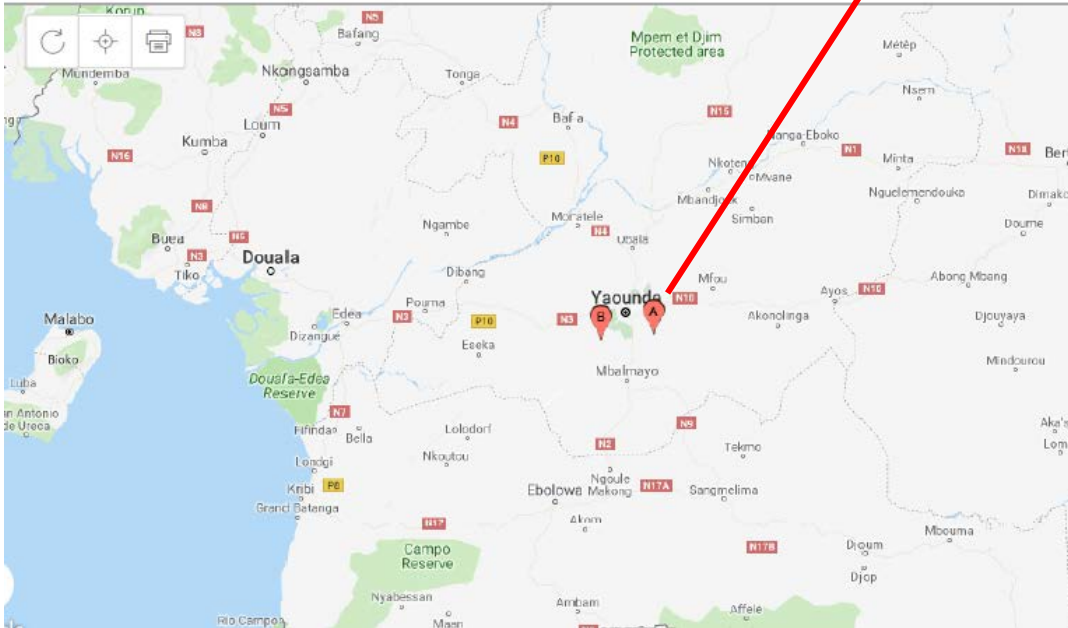


TAHO stations in Ghana



SAS4SD – Cameroon pilot study

Lycée Classique de Mfou



TAHO stations in Cameroon



SAS4SD – where we are now

- Teaching material development for **after-school science clubs**
 - ✓ Swiss team is developing material on «**Climate Smart Cacao Production**»
 - ✓ An ETH MSc student is developing material on **rainfall, runoff, temperature, climate change, and impacts of climate change** (field work Dec '18 – Jan '19)
 - ✓ A BFH Bachelor student plans to do his research in Ghana (field work spring/summer 2019) in collaboration with SAS4SD
 - ✓ The Ghana team is developing a concept note to apply for funding (e.g. to GEF, the Swiss Embassy in Ghana, Eawag) for science club activities that focus on **waste management** and the establishment **vegetable gardens, tree planting, and bee keeping** (as live labs).
- A Ghanaian partner, Dr. Evans Dawoe, will spend a 6 month sabbatical at ETH supporting SAS4SD activities and research in Prof. Six's group (Jan – June '19)

SAS4SD – next steps

- **Workshops** with secondary school teachers in Ghana/Cameroon, presentation of SAS4SD teaching material (06/2019)
- **Testing** of teaching material and concepts in pilot schools in Ghana/Cameroon (09/2019 – 06/2020)
- Final workshops and elaboration of next steps (07/2020)

CHALLENGES

1. Acquiring funding for local partners & local initiatives
2. Working «long distance» with Africa teams
3. Bureacracy & language in Cameroon

RISKS

1. Teachers do not have time or motivation to include topics in teaching
2. Key «on the ground» initiators cannot be identified

OPPORTUNITIES

1. Clear need for «problem based learning»
2. Secondary school teachers can be change makers
3. Involvement of country education services (e.g. through UN:CC Learn in Ghana)
4. Benefits of linking teaching and research (through university students)

Contact information & links

ETH Zurich

Institute of Environmental Engineering
Chair of Hydrology and Water Resources Management
Stefano-Francini-Platz 5
8093 Zurich

<http://www.hyd.ifu.ethz.ch/>

<http://www.sas4sd.ethz.ch/>

<http://tahmo.org/>

<https://school2school.net/> (TAHMO school to school)

Dr. Darcy Molnar: darcy.molnar@ifu.baug.ethz.ch

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TAHMO (Trans-African HydroMeteorological Observatory) stations

TAHMO MicroEnvironment Monitor (MEM) Station specifications

- Provided with solar charger for self-powered operation with 6-month backup battery
- Hourly GPRS reporting with 5 minute readings
- Soil moisture and groundwater sensors available upon request.
- Sensors: Anemometer, Rain gauge, Pyronometer, Barometer

Parameter	Range	Resolution	Accuracy
▪ Wind speed	0 to 60 m/s	0.01 m/s	3 %
▪ Wind direction	0 to 359 degrees	1 degrees	3 degrees
▪ Temperature	-40 to 80 C	0.1 C	0.5 C
▪ Relative humidity	0 to 100% RH	0.1% RH	3%
▪ Vapor pressure	0 to 47 kPa	0.01 kPa	0.3 kPa
▪ Precipitation	0 to 230 mm/hr	0.014 mm	5%
▪ Solar radiation	0 to 1,750 W/m ²	1 W/m ²	5%
▪ Barometric pressure	49 to 109 kPa	0.015 kPa	0.4 kPa

Weather station installed in Bibiani, Ghana



school²school