

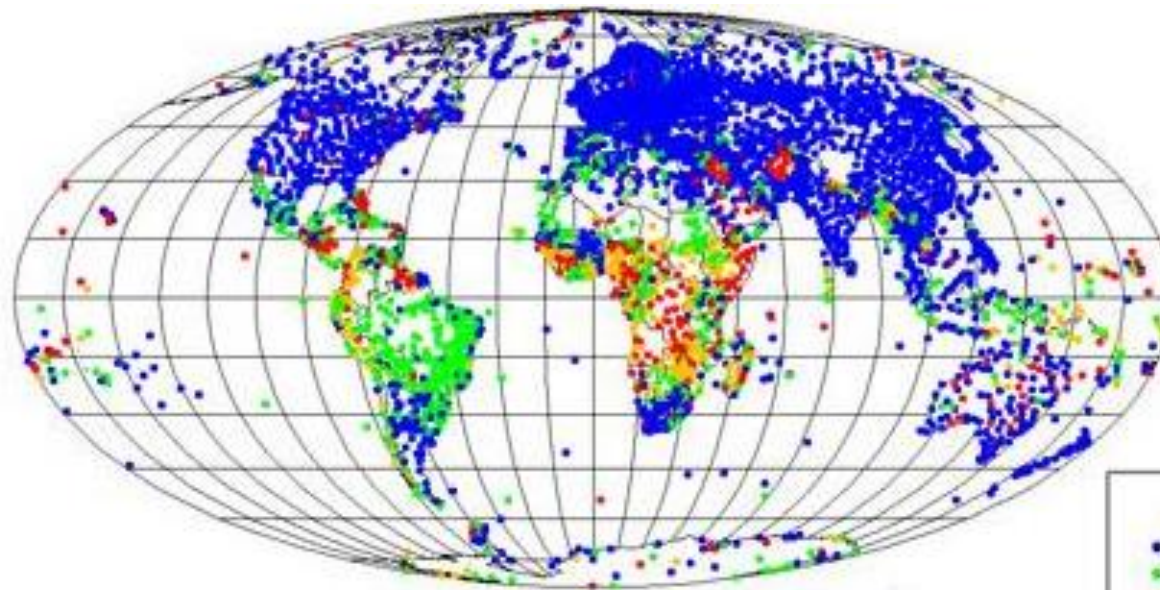
# Trans-African Hydro-Meteorological Observatory



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John Selker (OSU)

# Background

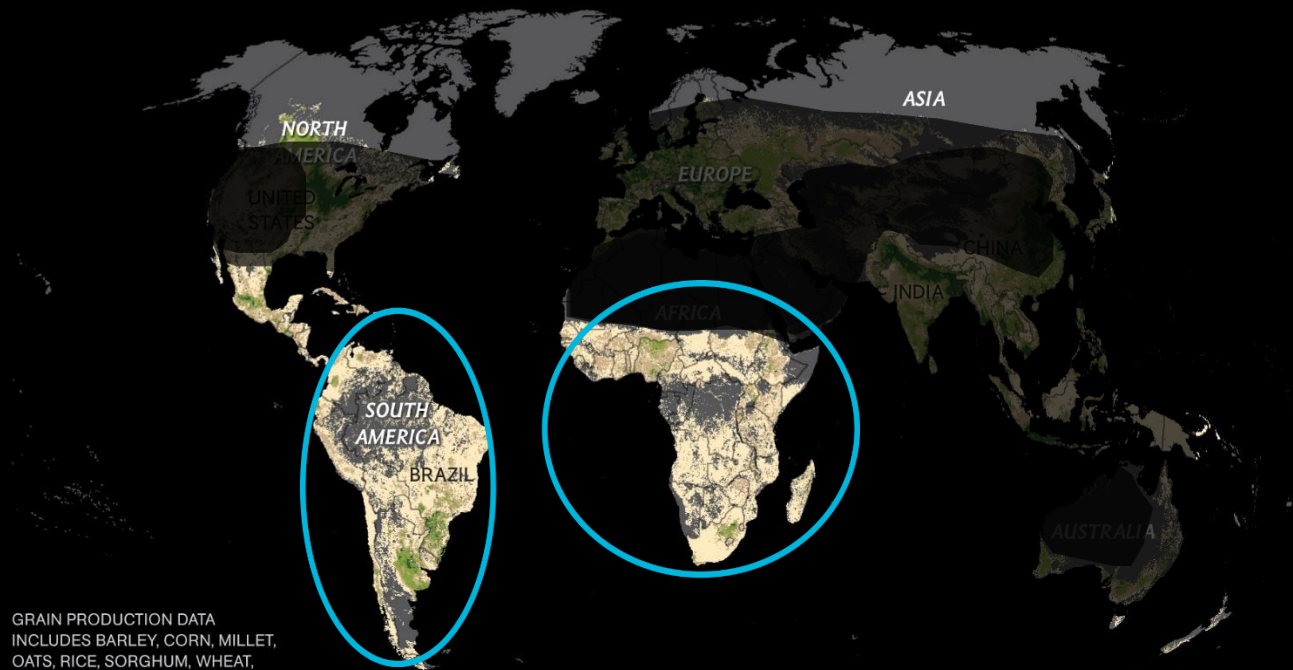
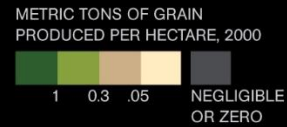
## WMO Stations



WMO Secretariat

# Background

**GRAIN PRODUCTION** is high in only a handful of countries. Regions that cannot grow enough to meet their demand must depend on imports.



GRAIN PRODUCTION DATA INCLUDES BARLEY, CORN, MILLET, OATS, RICE, SORGHUM, WHEAT, RYE, AND MINOR GRAINS.

MAPS: VIRGINIA W. MASON, NG STAFF. SOURCES: PROGRAM ON FOOD SECURITY AND THE ENVIRONMENT, STANFORD UNIVERSITY; UN FOOD AND AGRICULTURE ORGANIZATION (FAO); CONSORTIUM FOR SCIENCE, POLICY & OUTCOMES, ARIZONA STATE UNIVERSITY; DEPARTMENT OF GEOGRAPHY, MCGILL UNIVERSITY; INSTITUTE ON THE ENVIRONMENT, UNIVERSITY OF MINNESOTA  
CHARTS: SEAN McNAUGHTON, NG STAFF. SOURCES: USDA "PRODUCTION, SUPPLY AND DISTRIBUTION ONLINE"; FAO; WORLD BANK

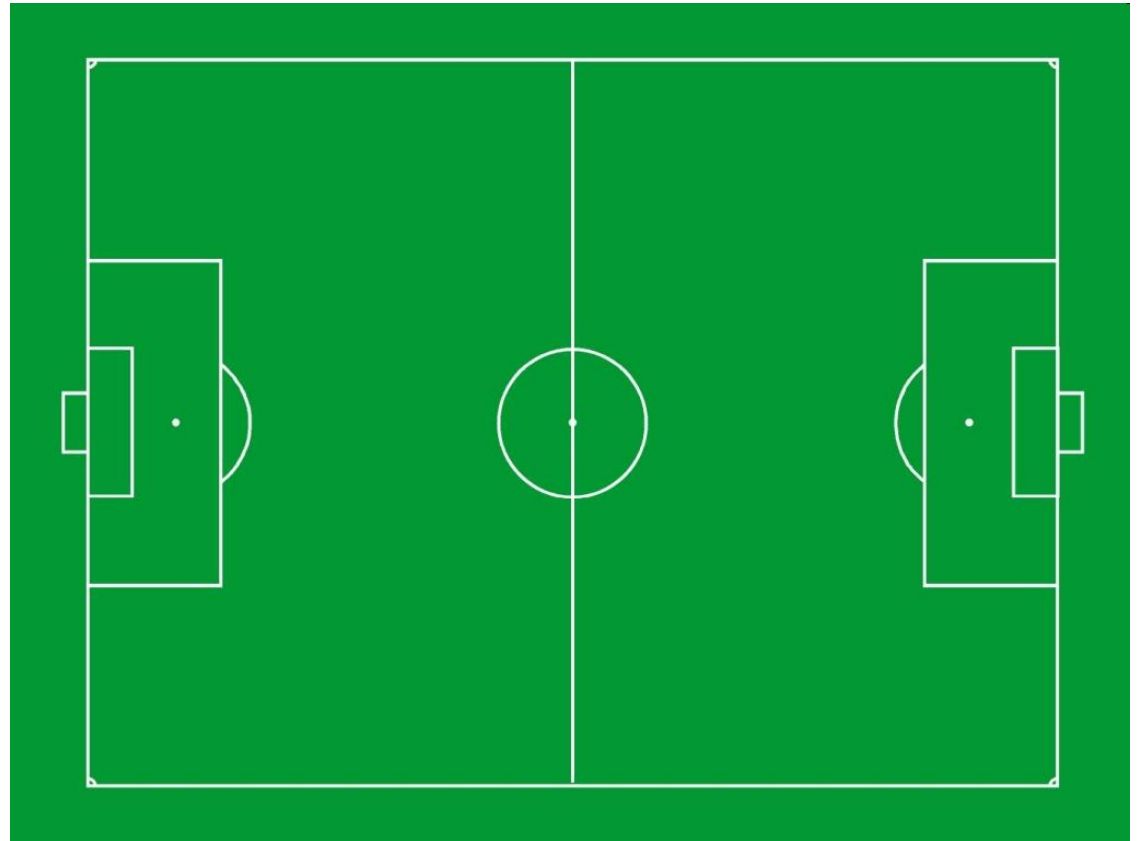
# Background



**60%**  
**world's**  
**uncultivated**  
**arable**  
**land!**

# Background

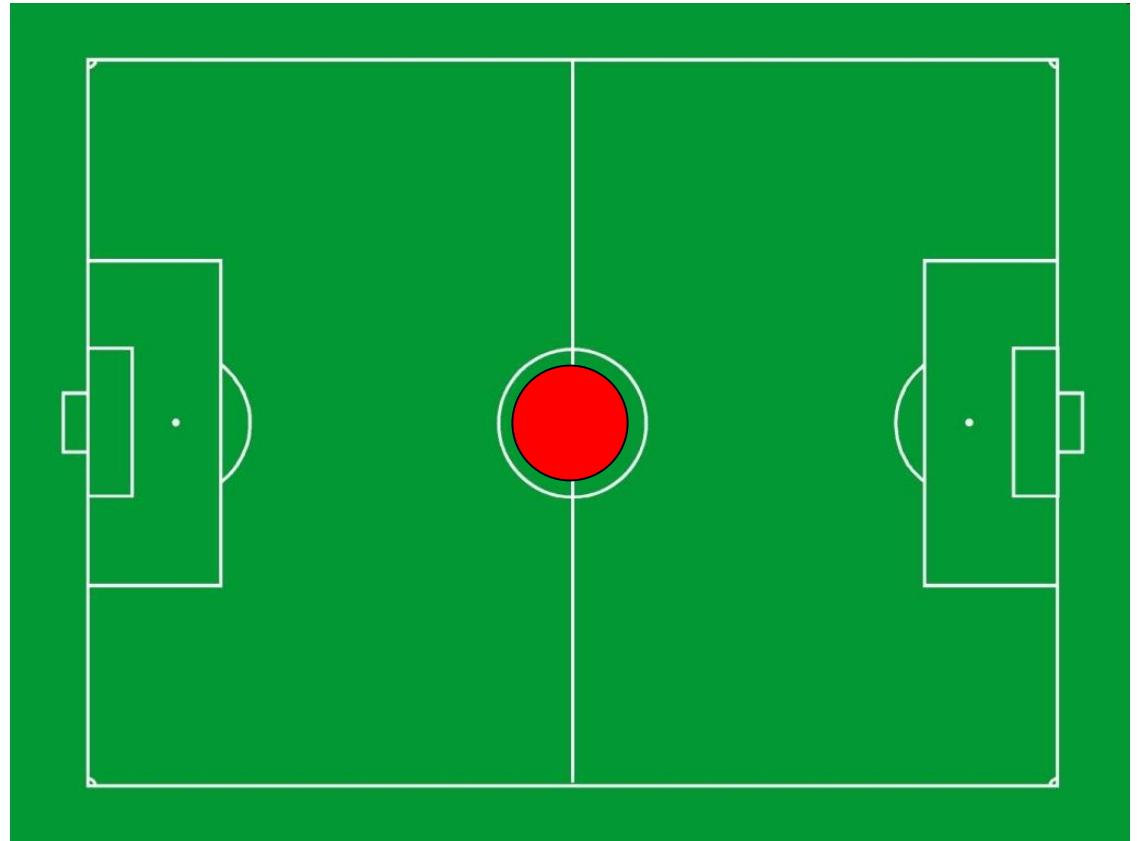
WMO Stations



# Background

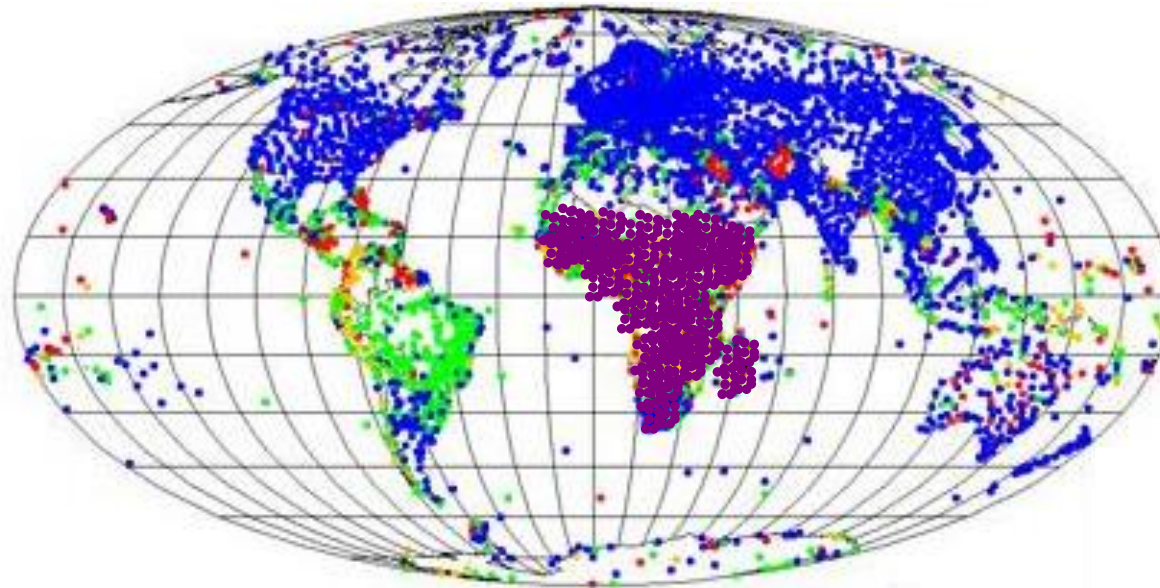
## WMO Stations

5,000



# Background

Leapfrog: 20,000 TAHMO Stations!



# Design

## Principles

- Robust
- No moving parts
- No cavities
- Cheap (<\$500)
- Self calibrating
- Cross calibrating





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Picture: Jens Liebe



# Design

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# Design

## Precipitation

Video disdrometer



Microwave disdrometer



>10,000 Euros

Laser disdrometer



Joss-Waldvogel  
(acoustic)

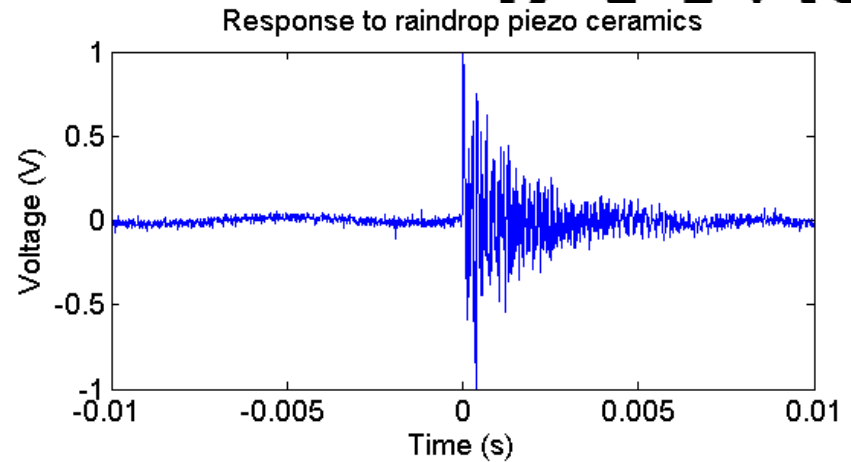


# Design

## Precipitation

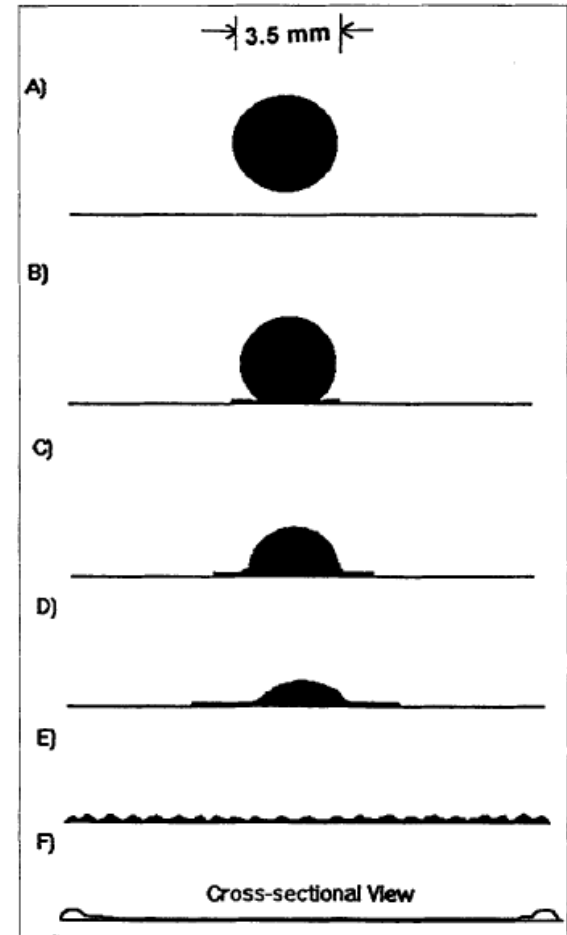
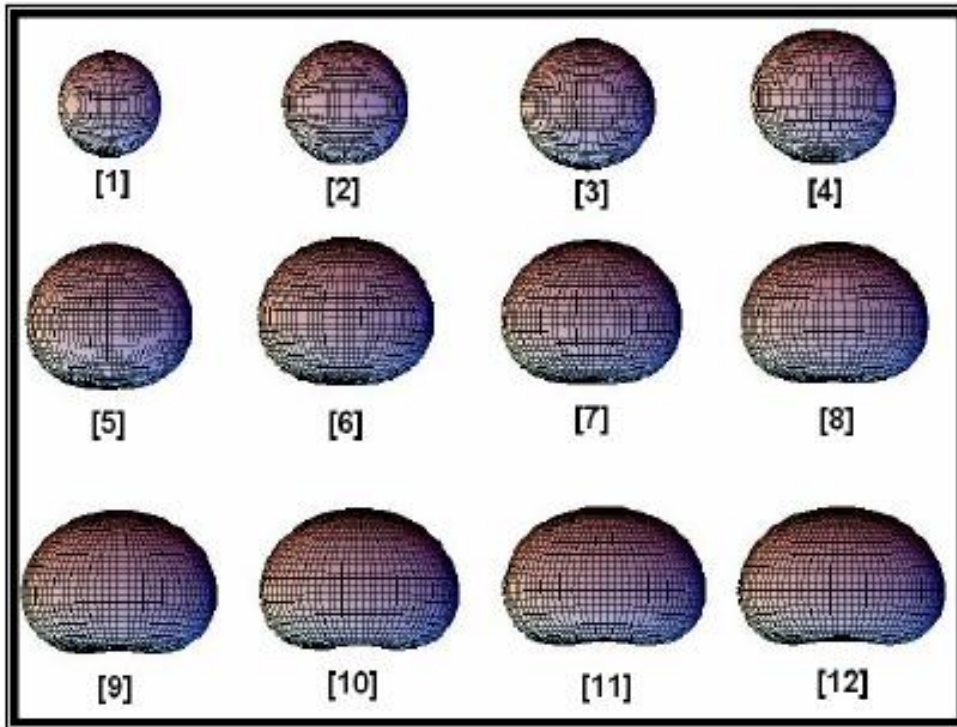
## Coen Degen

## Piezo ceramic element



# Design

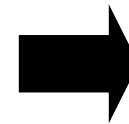
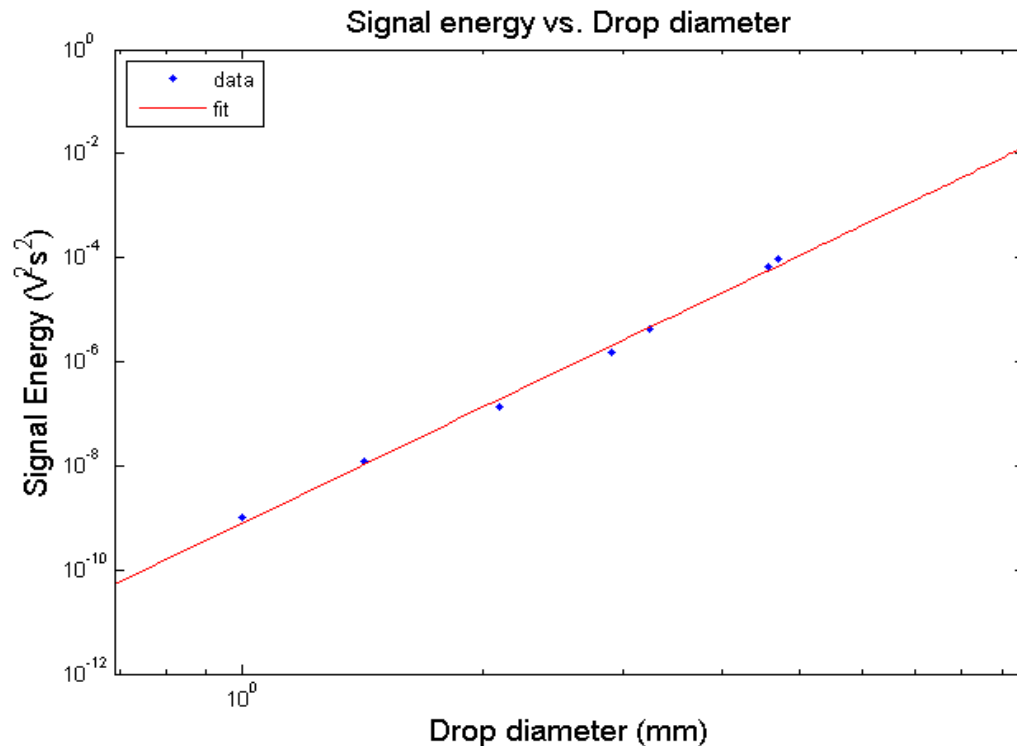
## Precipitation



Sources: "Tropical raindrop anatomy," S.K. Shariah *et al.* & "Newtonian drop impact with a solid surface", B.L. Scheller and D.W. Bousfield 14

# Design

## Precipitation



$$E_s = 8 \cdot 10^{-10} \cdot D^{7,34}$$

## Design

One sensor down... n to go!





# Design

Present model



# Operation

## Business case: Insurance

- Droughts
- Floods
- Diseases?

# Kilimo Salama Registration Process



**1 Purchase**  
Farmers buy inputs and pay 5% extra to insure the inputs at selected stockists.



**2 Registration**  
Farmers receive a card from the stockist on which they fill their details received by SMS.



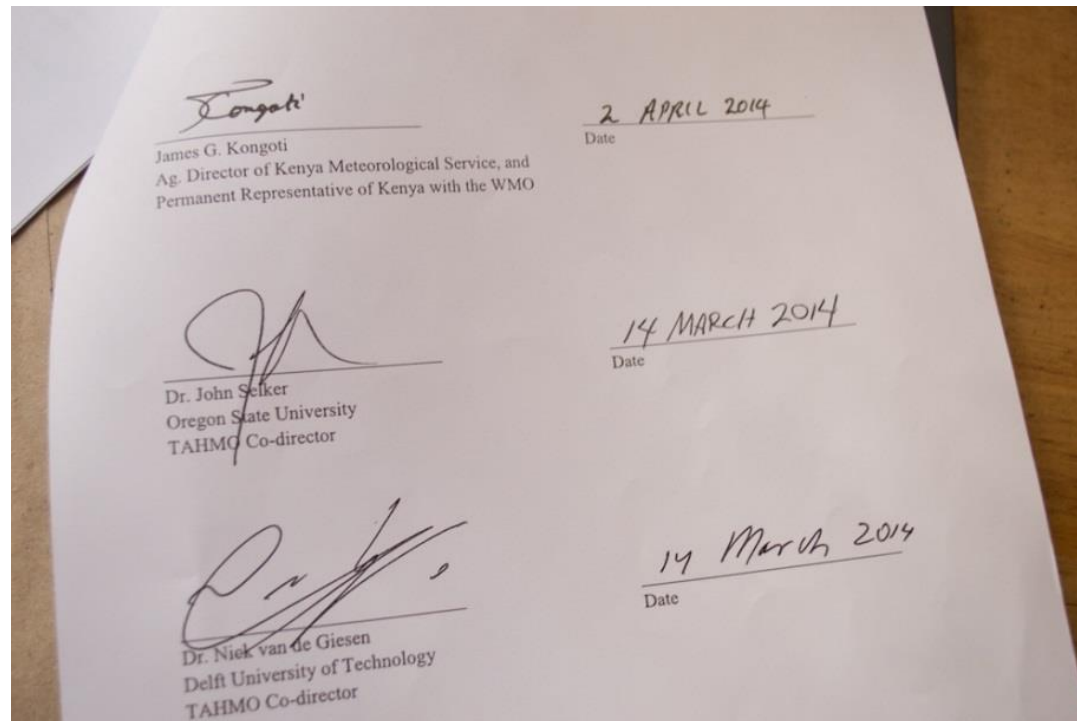
**3 Measurement**  
During the season the weather station measures the rainfall.



**4 Compensation**  
In case of a payout farmers receive compensation via MPESA.

# Operation

## MoU



# Operation

## Communication



# Education

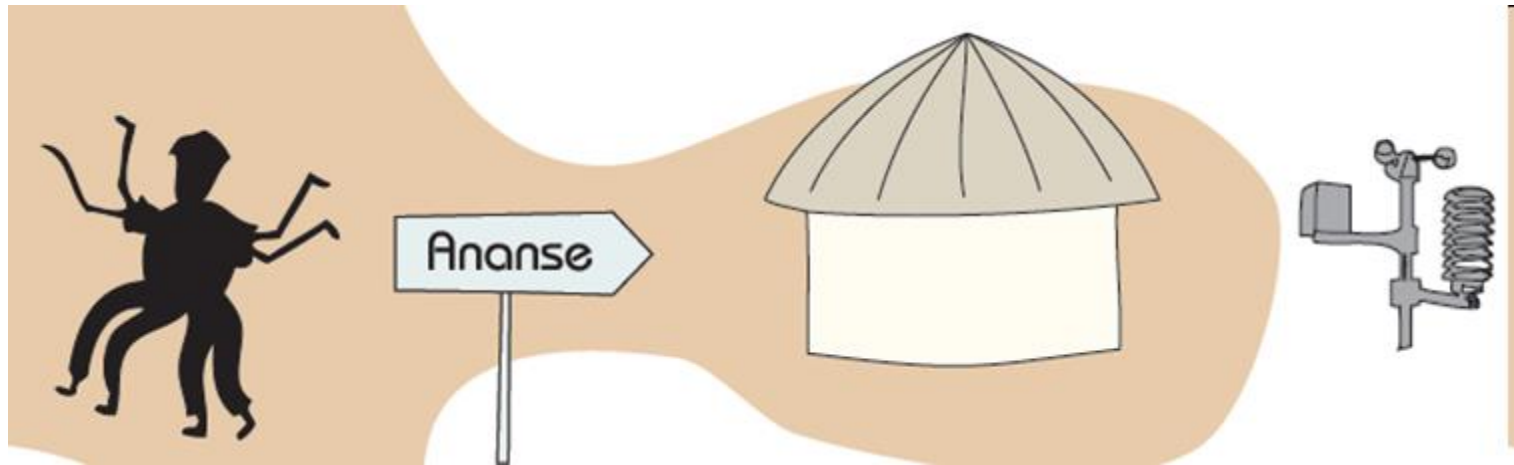
## School-2-School

- Develop environmental education package
- Teach children about their environment
- Teach children about their environmental connectedness



# Education

## Role out TAHMO



## School-to-School

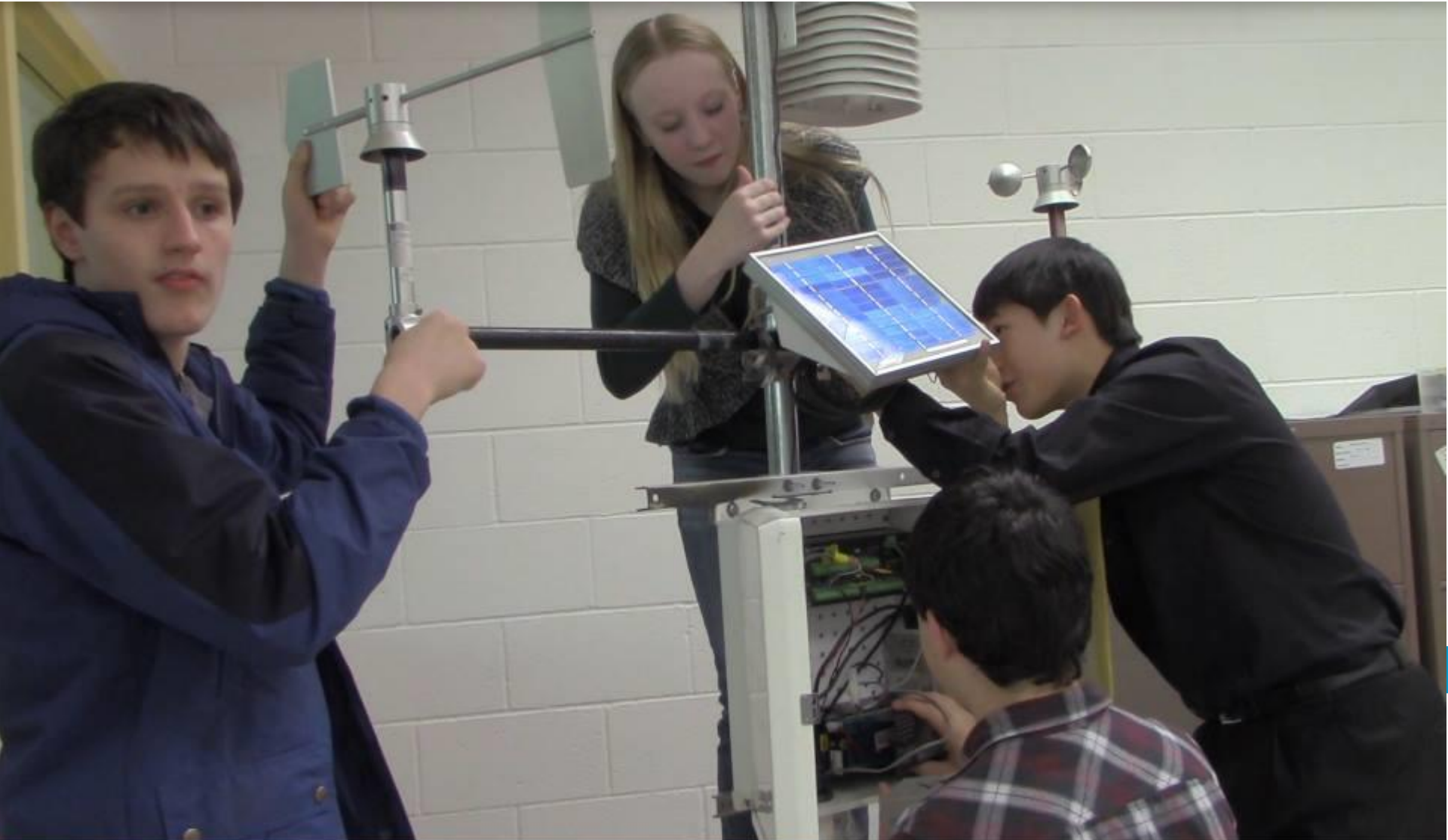
## TAHMO's Education Materials





# Education

International Climate Team - Idaho



# Education

## School2School program

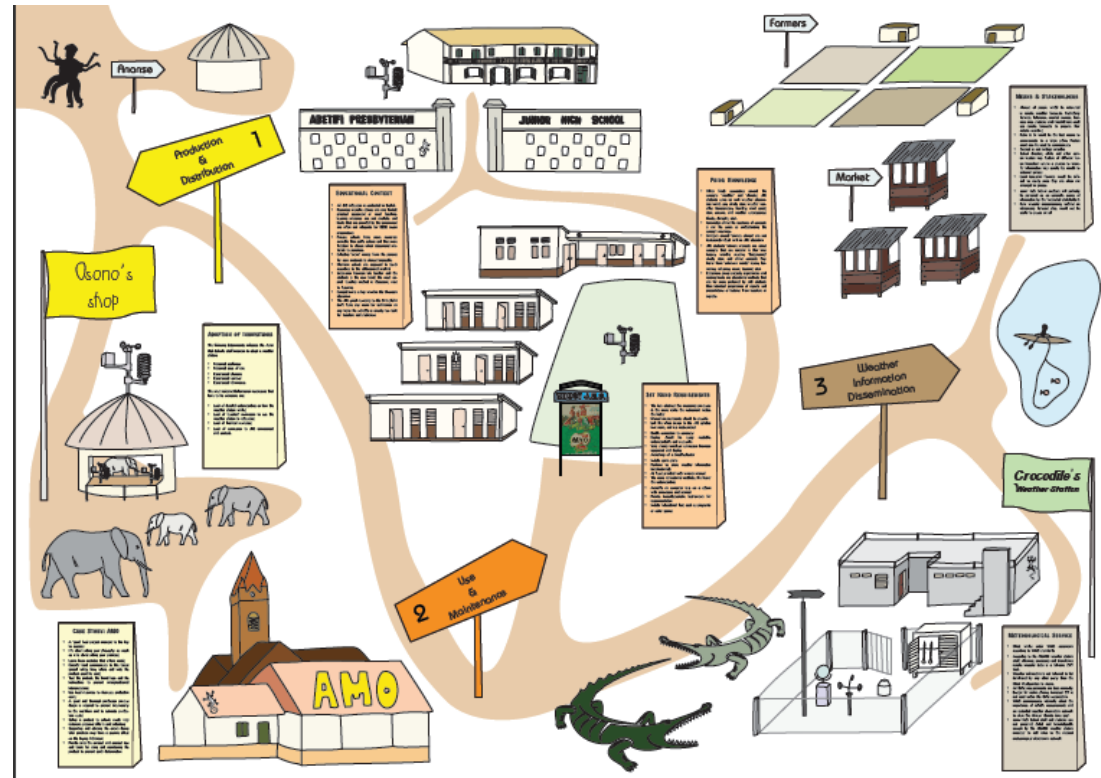
- Sister school
- Costs sharing
- Involvement
- Sharing ideas



# Education

## Role out TAHMO

High schools curriculum



- **Associate with schools**
- **Develop environmental education package**
- **Teach children about their environment**
- **Teach children about their environmental connectedness**



# Education

## Universities

- Nairobi
- Akure



## Sensor Design Competition

# Next steps

Pilo

- 
- 
- 





**Join!**

**WWW.TAHMO.ORG**

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