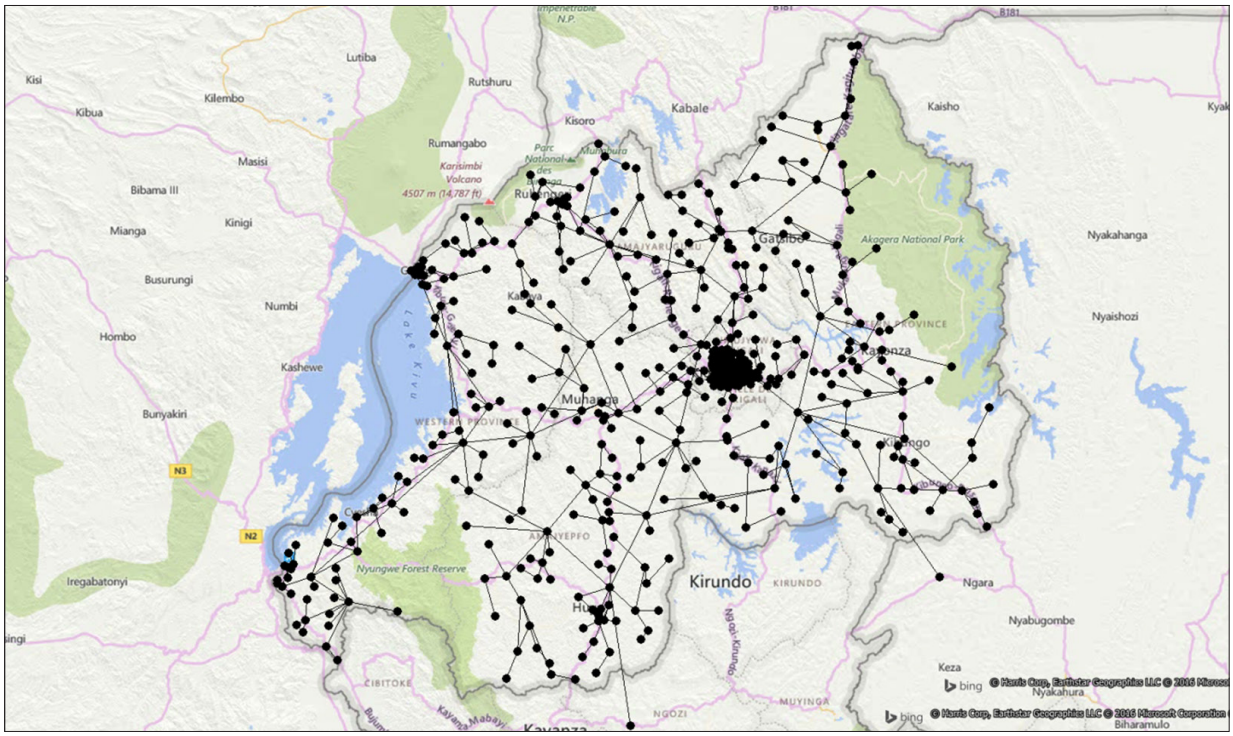
SMHI

CONCEPT NOTE

MICROWEATHER RWANDA

For many developing economies in sub-Saharan Africa, the availability of accurate, localized weather forecasts can be of immense benefit to the millions of small scale farmers whose livelihoods depend on rain fed agriculture. The need for reliable weather and climate information is amplified by the adverse effects of a changing climate resulting in more erratic weather patterns, variations in planting seasons and more frequent and intense weather extremes. These effects are already taking their toll in climate vulnerable countries like Rwanda.



Telecommunication Microwave links across Rwanda

PROVIDING HIGH-AVAILABILITY WEATHER INFORMATION SOLUTION FOR RWANDA

The general lack of widespread reliable data has meant that access to much needed information for agricultural decision making is limited. There is a need to complement and strengthen the existing capabilities and coverage of National Meteorological Agencies in making weather forecasts available in a robust way that adds value to the livelihoods and well-being of the general populace.

PROBLEMS

Historically, rain gauges have been the singular data source for rainfall measurements. Some 50 years ago, weather radars came into use and have been refined substantially over the following decades. Satellites are also used, mainly for data sparse tropical regions. While a country like Sweden has up to 12 weather radars covering the entire country and complementing a network of 600 automated rain gauge stations, approximately 40 out of 50 countries in Africa have no weather radar at all. The deployment of rain gauges is low and in many cases there is no automated collection mechanism, making the collection process unreliable and irregular. Another obstacle for a developing country like Rwanda is the prohibitively high costs of installation of rain radars as well as the attendant high level of expenses for the needed yearly maintenance.

INNOVATION

Refined and post processed Microwave link data from mobile telecommunication networks is the latest innovation in rainfall measurements. This unique technology can be used to fill the gap where neither gauges nor radars are capable of completely observing rainfall and its variability, especially at high temporal resolutions and small spatial scales. Microwave links can also fill a much larger gap in regions where there are no gauges or rain radars at all. The cost for utilizing data from microwave links is very low since the infrastructure cost is already taken and the added cost for extracting the data from the network is minimal.

SOLUTIONS

The large amount of microwave links worldwide implies a huge potential to increase the number of rainfall observation points. The total amount of microwave radios worldwide is about 10 million units, of which about 1.2 million are installed in Africa.

Using new and cutting edge algorithms, SMHI and one of our partners Ericsson can, in conjunction with mobile network operators in Africa, provide a robust, reliable and highly available rainfall measurement and forecast solutions in many parts of Africa. Rwanda has a fairly dense network coverage ideal for the deployment of MicroWeather solutions (see coverage map).

BENEFITS

This could greatly enhance the capability of the Rwanda Meteorological Agency in improving the spatial and temporal coverage of rainfall as well as quality of forecasts. This will also be crucial in strengthening Early Warning services in Rwanda, where landslides and floods could result from extreme rainfall events. MicroWeather solutions will also improve the quality and availability of much needed information for the agricultural sector. Apart from the crucial benefits to the society as a whole, developing this capacity at RMA would also enhance cost recovery services to commercial sectors in Rwanda such as fisheries, energy and tourism which all stand to benefit from potential spinoff products.

Possibilities exist to use this new network to provide:

- Improved meteorological forecasts in Rwanda.
- Early Warnings Services for extreme precipitation events.
- Data for driving hydrological models e.g. HYPE for provision of water information services.
- Cost recovery services to the commercial sector.

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