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Intermediate UN

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Global Access to Timely Weather Data

By Katherine Toldy

Introduction

Regular information regarding agrometeorological advisory and weather forecasts, especially in relation to agriculture, is an important part of a country's economy as the effective use of weather aids in reducing the risks of investments made into a state's agriculture (Mersha, 93). Extreme weather and climate events can have deep-seated effects on economies, especially in developing states. These negative impacts may include: agriculture, health, safety, and food security. Floods and droughts, especially when communities are unprepared can lead to the destruction of property on a massive scale, loss of human life, diseases, and food shortages. Yet, advances in weather technology makes it possible to predict weather patterns with increasing accuracy (Oludhe, 39). Such knowledge can be utilized to maximize agricultural output and minimize loss of life by providing weather information to inform decision-making (Oludhe, 39). By using related information in advance, producers can make informed strategic decisions about the use of land, water, and type of crops.

Historical Background

Natural disasters that affect the developed world tend take fewer human lives than those that affect developing nations. Hurricane Sandy, the second costliest hurricane in United States history, caused ample damage and claimed 100 lives (Curry, 2013). The storm hit the northeast coast of the United States with plenty of advance warning, thanks to widespread and accurate weather forecasts, thus local citizens were informed to prepare and evacuate the area (Curry, 2013).

In the developing world the toll of human life of severe storms is much higher. "Severe Storms Sidr in 2007 and Nargis in 2008 caused over 10,000 and 138,000 fatalities in Bangladesh and Myanmar respectively" (Curry, 2013). 40 million people have been displaced due to flooding in the Ganges and Brahmaputra basins in the past several years (Curry, 2013). Indian crops failed due a lack of rain in 2002 causing a serious food crisis (Curry, 2013). Severe weather warnings are issued several days in advance, or not at all, in the majority of developing countries (Curry, 2013). In the case of severe weather systems at least a week of prior notice is necessary to insure that the people and area is prepared to deal with the impeding weather (Curry, 2013). Short droughts require several weeks' notice, extended droughts, and several months to allow farmers to prepare and make adequate choices based on the prediction. Such a disruption in the livelihoods of millions of people warrants the attention of the international community.

Seasonal forecasting can range from short- to medium- range forecasts (Céron, 10); their predictability is limited to about fifteen days in advance using the predictable conditions of oceanic and continental surfaces (Céron, 10). Long-range reasonable forecasts can be made up until a range of four months (Céron, 11). "The development of this service is necessary since modern day agricultural operations are becoming increasingly dependent upon detailed and accurate predictions of meteorological elements" (Mersha, 93).

The three major floods of 2007 and 2008 are examples of the successful implementation of a weather warning system in Bangladesh. The Bangladesh government worked with the European Centre for Medium-Range Weather Forecasts (ECMWF) to develop a 1-10 day flood forecasting system and a Climate Forecast Applications Network (CFAN) (Curry, 2013). CFAN produced daily broadcasts of the Brahmaputra and Ganges river flows to the Bangladesh Flood Forecast and Warning Centre (Curry, 2013). Each of the three major floods of 2007 and 2008 the flood was forecast 10 days in advance and the local leaders were trained to interpret the data and take appropriate action in their communities (Curry, 2013). A report made by the World Bank concluded that about $40 was saved for every dollar invested in the regional forecasting and warning system (Curry, 2013).

However, in 2009, CFAN handed over operation to the Bangladesh Flood Forecasting and Warning Centre (FFWC), and it proved difficult for the FFWC to handle the immense amounts of data (Curry, 2013). As a consequence, the Regional Integrated and Multi-Hazard Early Warning System (RIMES) took over operations (Curry, 2013). It has faced difficulties with funding and maintaining up-to-date information and technology (Curry, 2013).

Current Status

Floods

Floods can be devastating to any community, especially the rural areas of developing nations. For example, a lack of drainage, both natural and artificial, cause serious water congestion in India (Stigter, 111). High rainfall, flat topography, and poor water transmission characteristics in the soil only increase the consequences of flooding. Landslides often follow floods, only multiplying the damage already inflicted (Stigter, 112). Even later, the increase of water influences the nutrient conditions of the soil (Stigter, 112).

There are several ways to decrease the effect of flood disasters, especially in terms of the effects of agricultural production (Stigter, Das, Murthy, 107). By protecting and restoring soil cover to reduce run off is widely considered to be the most effective means of delaying a flood (Stigter, 107). This protection can be accomplished by monitoring soil erosion patterns and water use (Stigter, 107). By monitoring weather systems to include rainfall and river flow, it is possible to give early warning of the possibility of a flood to those it would affect, in both urban and rural areas (Stigter, 107). Unfortunately, most predictions are produced by monitoring climate variability and are not location or seasonal specific (Stigter, 107).

Wild Fires

The factors that influence aspects of agriculture also influence aspects of forestry and the management of rangeland. Weather information is important in planning the establishment of seedlings in forests, and detailed atmospheric parameters determine the level of fire danger within a particular area (Mersha, 95). Levels of rainfall, temperature, and dew determine the fuel moisture content and thus level of fire hazards in rangelands and forests (Mersha, 98).

Fires may also be caused intentionally as a land management practice. However, it becomes a problem when such fires get out of control (Mersha, 99). Most fires in the topics are created mainly by man and are largely uncontrolled (Mersha, 103). Prediction of wild fires, or the warning thereof is practically non-existent in developing countries, greatly increasing the risk to forest plantations, farmlands, and homes (Mersha, 103).

Agriculture

Agricultural forecasts include, at minimum, the rainfall distribution and its probability, temperatures, wind, humidity, dew, and dry spells (Mersha, 94). Daily rainfall analysis is especially useful for agricultural planning (Endalkachew, 36). The importance of these elements, however, may vary from location to location, season to season, and crop to crop. These factors directly influence aspects of agriculture such as: sowing, application of agricultural chemicals, disease control, and product transportation (Mersha, 94).

Agriculture is the main employer in the African economy, providing income and sustenance to the vast majority of citizens (Luganda, 122). Most of this farming is categorized as subsistence peasant agriculture (Luganda, 122). A lack of increase of agricultural output is in direct contrast to the growing African population (Luganda, 122). Because of this inverse relationship, many citizens are faced with persistent food shortages, and starvation (Luganda, 122). "Of the estimated to be food insecure worldwide, 779 million are in developing with a good number of these in Africa" (Luganda, 123). The Green Revolution of 1960-90, where global cereal production nearly doubled, per capita food availability increased by 37%, and real food prices declined by 50%, the number of undernourished in Africa only fell by 80 million by the end of the 1990s (Luganda, 123). This is mainly due to the inefficiencies of substance farming.

Many societies deal with the constant threat of drought and the ensuing famine constantly (Mersha, 102), especially as the majority of the agricultural system is rain-fed (Luganda, 122). Hundreds of thousands of rural farmers use rudimentary tools and technologies that produce insufficient amounts of harvest per unit area (Luganda, 122).

> "Since most of the farming in Africa depends on rain, knowing when the rain will come, how long it will last as well as knowing what amounts to expect is critical to realizing good harvests. Farmers need to exploit that crucial window of opportunity when to plant, which at times may last a few weeks." (Luganda, 123).

A delay in planting of only a few days can spell disaster and an inadequate harvest (Luganda, 124). These problems create a need of constant information to be made available to the citizens (Mersha, 102). The ancestors of modern African farmers used indicators such as the movement of birds and animals, along with vegetation to predict the weather, specifically rainfall (Luganda, 124). Information concerning climatological factors allow farmers to make long term decisions concerning the crop, its variety, the selection of agricultural equipment, markets, etc. (Mersha, 93). Once these decisions have been made, they are, for the most part, irreversible for that growing season.

Data Collection and Distribution

Adequate primary data collection, storage, and distribution is a huge task (Mersha, 96). However, most developing countries only have a sparse meteorology network and a lack of access to weather information among stakeholders. Manuel entry of data into outdated systems only further perpetuates the issue (Otim, 9). For example, Uganda operates two types of weather stations: manual and automatic (Otim, 9). Under these two types, there are four categories of stations: synoptic, rainfall, agromet, and hydromet. The locations of these stations are represented in the figure on the following page (Otim, 9).

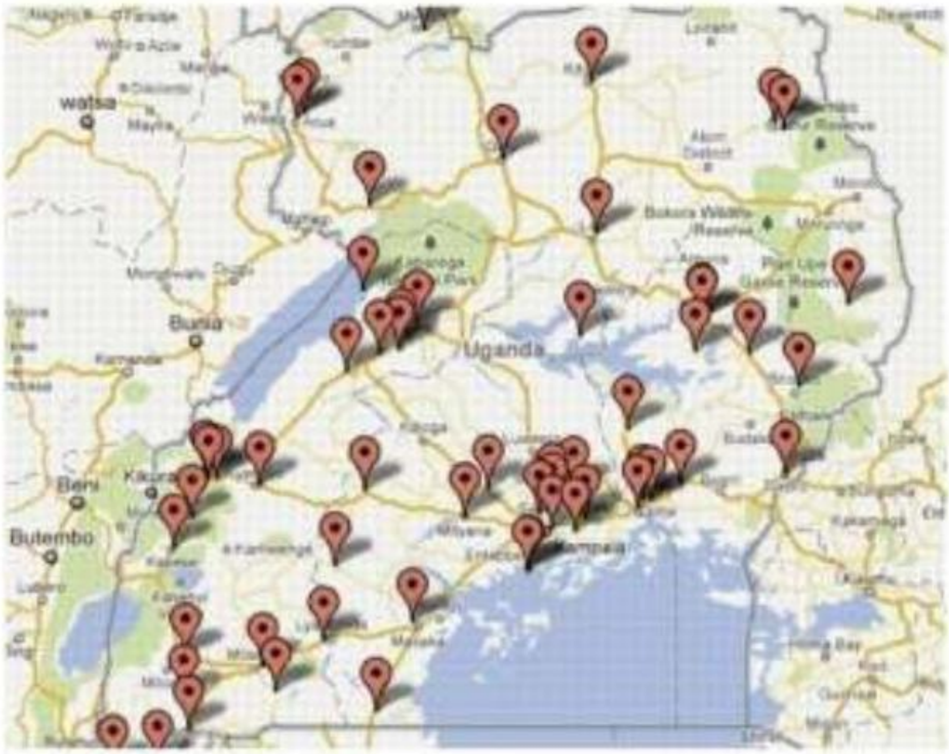

Figure 1: The Distribution of Established Weather stations in Uganda (source: DOM)

The distribution of these stations are uneven, especially in the north. In addition, only 50% of the established stations are operational, making the distribution even sparser (Otim, 9).

Data concerning local crops and pests and their relation to the given weather conditions are relevant to the effectiveness of the information distributed to farmers (Mersha, 102). Regionalizing the characteristics and identifying risks in time and space with respect to agricultural activity are very useful for agricultural planning (Endalkachew, 36). Such data is not usually collect nor considered. Thus, the analysis of data is inadequate as it excludes important factors relevant to the production of local farmers.

For adequate dispersal of information, Bulletins or information must be produced on time and distributed with minimum delay for the information to have an impact, as agriculture requires advance planning (Mersha, 102). African communities cannot easily access information from national meteorological services (Luganda, 124). The information is usually late in arriving to the farmers (Luganda, 124) and the delay provides opportunities for holes in the information to form (Otim, 9). In addition, these bulletins are most often produced by the official language of the country, such as English, French, or Arabic. Unfortunately, these languages are not always spoken by the citizens of every rural community (Luganda, 124). If only to further the issue, leaders of local communities are not educated in how to interpret and implement these bulletins, only furthering the breakdown of communication (Luganda, 124). Because the rural population cannot understand the bulletins and they often do not apply specifically to them, the local population tends to ignore them (Luganda, 124). Advisories are often released for the entire country instead of specific regions (Luganda, 124).

Bloc Positions

There are several global forecast models currently run by national or multinational government organizations. These include: the European Centre for Medium-Range Weather Forecasts (ECMWF), the United Kingdom Meteorological Office, and the U.S. National Center for Environmental Prediction (NCEP) (Curry, 2013). The World Meteorological Organization (WMO) officially recommends that every state have a National Weather Meteorology Service (Otim, 9). Such as service would provide weather, hydrologic, and climate forecasts, and locally relevant information. While there has been international action concerning global access to weather data, the international community as a whole, specifically the United Nations, has yet to address the issue.

Preparation Questions

1. What are some organizations already in place that deal with this issue?
2. What systems are already in place for the communication of weather data, especially in rural areas?
3. How can accurate and timely weather information be effectively communicated to rural areas?
4. How can more developed countries effectively aid developing countries in this issue?
5. What is the minimum/maximum amount of action required for to resolve the issue?
6. How will the process continue in the future?

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