DOWNLOAD PDF CURRENT CLIMATE FORECASTING AS A HELPING TOOL FOR AGRICULTURAL DECISION MAKING

Chapter 1 : MyPest Page - IPM Pest and Plant Disease Models and Forecasting

Bibliography Includes bibliographical references and index. Contents. Preface-- Current climate forecasting as a helping tool for agricultural decision making-- Droughts as a climatic variability.

This will be achieved by building the capacity of African smallholders and the boundary partners through which those farmers access scientific research. The result will be actionable climate advisories, index insurance, and integrated climate services that will reduce the impact of seasonal climate risk from the farm to the national levels. All activities build on existing climate services initiatives in the region and will match supply with real demand based on a combination of: By scaling up climate services in Senegal through rural radio and supporting index-based insurance development in Nigeria, CASCAID is establishinged as an outcome-oriented process. It frames subsequent activities as participatory action research where innovative communication methods including information and communications technology ICT , and crowdsourcing is will helping achieve a deeper impact. This process is will be facilitatinged by linkages with other CCAFS projects in West Africa which are focused around adaptation, and is will be leveraginged by CCAFS-supported national and sub-national science-policy platforms. By , over 2 million farmers including , women will use climate information in support of seasonal agricultural decision making in Burkina Faso, Ghana, Mali, Nigeria, and Senegal. The four groups of boundary partners will implement equitable climate advisory services that reach at least , farmers and will incorporate project outputs into improved crop monitoring and food security early warning systems, reaching a further , smallholder farmers. Through public-private partnerships, the project aims to provide index-based insurance services to farmers in Ghana or Senegal, reaching 50, farmers, and rural radio umbrella networks will continue to broadcast seasonal climate forecast information to about 5 million smallholder farmers in Senegal. Outputs A pilot activity that will connect climate information with users to assess its social and local relevance. Improved field-scale yield predictions with remote sensing to improve in-season estimates of cotton, maize, millet, peanuts, and sorghum biomass and grains. Real-time forecasting of district-level food security situations. Three grassroots co-forecasting networks in the Kaffrine Senegal , Lawra-Jirapa Ghana , and Segou Mali districts to improve seasonal climate and crop performance predictions. Weather index-based insurance services in Ghana, and improved information flows for index insurance in Senegal through public-private partnerships. Downscaled, probabilistic forecasts and climate risk management interventions in Senegal disseminated through rural radio networks. Maprooms for Met Agencies, to aid decision making e. Finally, gender issues is taken into consideration through all of the research and knowledge gathering processes. The gender research has been used to push the Ghanaian insurance industry for gender disaggregated statistics. Finally, gender issues will be taken into consideration through all of the research and knowledge gathering processes. Further information Fort further information, please contact the Project leader, Pierre C. Project Publications Journal article

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Chapter 2 : CLIMATE | Northwest Climate Toolbox

With the current global challenges of climate variability and climate change posing risks to food security, it is vital to develop appropriate agro-weather tools for disseminating information on farming practices and alerts, directing weather forecast related decisions during cropping seasons.

Alberta Climate Information Service ACIS Bringing you up-to-date Alberta weather and climate data Welcome to ACIS, an interactive tool that helps producers, farm consultants, and researchers to see Alberta weather forecasts, browse over maps of Alberta weather and Alberta climate related information, and access near real time station data from over meteorological stations operating in the province of Alberta. Alberta Weather Station Conditions Summary Obtain up-to-date current weather conditions measured by the weather station of your choice. Interact with dynamic graphs that resize to the time period that you select. Additionally, view at-a-glance weather derivatives for the current growing season to make more informed operational decisions. Alberta Weather Station Data and Graphs Find out where the meteorological stations are in Alberta and download, graph and compare near-real-time data from more than stations. Both hourly and daily data is available with the hourly data usually only about 2 hours old and daily data current as of yesterday. The data has been quality controlled and missing or erroneous data values have been filled and flagged. Data flags that are included with the downloaded data indicate if the data is actual, computed or missing. Many of these maps date as far back as Each week about 40 new maps are added to the viewer, describing current conditions and trends. Currently map categories include precipitation, temperature, soil moisture, snowpack, drought indices and others. AF is committed to adding new categories all the time. Give us some feedback and if we can benefit a wide enough audience, you may see a brand new set of maps. Alberta Weather Conditions Map View a map of current weather conditions near any location or across the province. See values for a variety of weather elements plotted on an interactive map interface. You can also go through historical records and see how the weather conditions were spatially distributed in the past. Alberta Weather Radar Imagery View current weather radar imagery on an easy-to-use, interactive map interface. You can zoom the radar map right to any location to see if it received precipitation in the last few hours or if a storm system is headed in its direction. You can also view the entire province at a glance to get the big picture. The radar viewer also lets you display the most recent radar image, automatically fetching new data as it becomes available. View a week-long forecast for several locations as issued by the Environment Canada Weather Office. Our tests showed that on some systems not all browsers performed the same. If you find performance to be slow, particularly when using the applications that rely upon Google maps, try a different browser. If you are having issues viewing and using our site, please do a full browser refresh usually Ctrl-F5. If you are still having problems, do not hesitate to contact us. Smaller images are about 70kb and the higher quality images are about kb. When viewing Station Data and Graphs, the underlying database queries can take up to 30 seconds or so to return information, independent of your internet connection speed. This will depend on how much data you are trying to retrieve and how many people are accessing data at the same time. Contact Information For information and issues concerning the data and map products delivered through ACIS, please contact: Ralph Wright

Chapter 3 : Global Forecast Drought Tool

The QDMC offers a range of decision support tools to help producers adapt to both the current climate and to a changing climate, so they can prepare more effectively and become more resilient to droughts.

Uttam Singh, Published on: The disseminated climate and crop information helps farmers manage weather risks, maximize productivity, and minimize the environmental impacts of farming practices. They use their prior experience to adapt their agricultural practices according to the changing weather. However, changing climate is affecting these age-old practices. Extreme weather events such as drought and flood are becoming more frequent with enhanced climate variability and climate change, and the damage that they cause to agriculture, human health, productive assets and infrastructure affects livelihoods long after. Managing the risks associated with increasingly variable climate is essential for successfully adapting agriculture, and to reduce the cycle of poverty, vulnerability and dependence brought about by climate-related disasters. A common problem in developing countries is the lack of integrated means of processing and delivering agro-meteorological information to the farming communities. Even with improved agricultural technology and improved level of farm inputs, the agricultural sectors in these countries operate below their potential level owing to the challenges imposed by marked intra-seasonal weather and inter-annual climate variability. These countries lack a formal system that integrates data from different sources such as agricultural research institutes, meteorological monitoring stations, agricultural advisory agencies and the actual ecological requirements. Now that farmers have access to modern ICT tools web access and mobile connectivity , it can pave the way for agro-meteorologists to analyse weather and climate induced risks, and provide this valuable information to farmers on a real time basis through these channels. These tools can help assess climate impacts using cropâ€"weather interactions for formulation of highly practical advice that could be shared with famers who can apply these directly to their operations in near real time. The internet provides free information to masses about climate and the environment, and increasingly accurate weather and climate predictions. However, there is a need to better translate this raw information into accessible forms that are understandable and relevant to agricultural decision-making. They should address a range of climate-sensitive decisions spanning a range of scales, and generally must share two common features: Weather and climate data and critical extremes should be translated into estimates of impacts on various aspects of agricultural systems Decision-makers should be allowed to explore the risks and potential consequences of different decisions before they have to put their own livelihoods, or the livelihoods of others, on the line. With the current global challenges of climate variability and climate change posing risks to food security, it is vital to develop appropriate agro-weather tools for disseminating information on farming practices and alerts, directing weather forecast related decisions during cropping seasons. This will help local and national authorities in unlocking the potential of climate-smart agriculture in developing countries. While the agricultural productivity varies greatly by region due to uneven impacts of daily, monthly and seasonal weather intra-seasonal variability in temperature and rainfall , climate variability and climate change is expected to exacerbate the impact on agricultural productivity and could contribute to a possible shift in existing crop patterns. The policy implications are far reaching, as changes in agriculture could affect national food security, trade policy, livelihood activities and water conservation issues, affecting the society at large in Kenya. Hence, appropriate tools are required to better translate raw weather and climate information into accessible forms for all stakeholders and particularly the farmers preferably in vernacular languages that are understandable and relevant to make decisions. Through increased relevant knowledge provided by the decision support system, and collaborative efforts, they can develop on-farm adaptation strategies that reduce potential loss to crops due to impacts of climate variability. It should address a range of climate-sensitive decisions for the best agronomic management practices. Such agro-weather tools are vital to unlocking the potential of climate-smart agriculture in developing countries as weather and climatic information plays a major role

before and during the cropping season. Pre-cultivation and crop growing phase decisions are important because they cannot be postponed, are often irreversible , represent a substantial allocation of resources, and have a wide range of consequences that impact farmers for years. It may be noted here that all these advisories are based on weather deviations in the cropping calendar under reference with respect to the climatological means of essential climate weather variables for the site see Figure 1 and Figure 2 as example for wheat and bean crops cultivated in Ethiopia and Kenya. Long rainy season climatological normal for Embu district of Kenya daily temperature and rainfall trends for Bean The agro-weather DSS tool aims at disseminating information on farming practices and alerts focusing on decisions linked to weather forecasts during cropping seasons for local application in Kenya and Ethiopia. The crop-specific agro-advisories disseminated through the tool are generated using historical weather data, historical crop data, crop management practices, and DSSAT Decision Support System for Agro-technology Transfer crop simulation model. The tool sends vital information in a variety of formats and in a timely manner, thereby allowing farmers to better plan and manage weather risks and maximize productivity. It addresses a wide range of climate-sensitive decisions for the best agronomic management practices and includes the following advisories for farmers: The purpose of this advisory is to inform the farmers to sow the seed at right time during the crop sowing window so that farmers can avoid the loss in the event of deficit or excess rainfall. This advisory is generated based on the seasonal rainfall onset date forecast. Two types of advisories are generated in this case: The purpose of this advisory is to help farmers select the right crop and variety. This advisory will be generated based on the seasonal rainfall and temperature forecast. Types of advisories in case of Ethiopia which will be generated based on the seasonal rainfall and temperature forecast is given in Table 1. Rainfall is likely to be normal but duration of rainy season is likely to be shorter Go for conventional crops e. Seasonal temperature forecast scenario Types of advisory that will be generated against the season temperature forecast information Temperature is likely to be normal Go for conventional crops e. Temperature is likely to be higher than the normal Go for conventional crops e. The purpose of this advisory is to avoid crop yield loss due to deficit or excess of rainfall in a particular stage of crop growth cycle. This advisory is generated based on the rainfall forecast. Subsequently, irrigation option was used in DSSAT model to overcome the yield reduction against each water deficit stress. Optimum water required to overcome the yield reduction against each stress was recorded and used in the advisory to be generated if such events are forecasted. The purpose of this advisory is to avoid the loss of fertilizer due to heavy rain as sometime fertilizer gets leached out if it rains heavily after the fertilizer application in the soil. This can be avoided if farmers get advisory in advance about the probability of rainfall during the next five days. Besides, if it experiences light rain during the fertilizer application then fertilizer can be best utilized due to enrichment of soil moisture. This advisory will be generated based on the 5-day rainfall forecast throughout the cropping season. The purpose of this advisory is to alert the target farmers against the harvest related losses which may occur due to heavy rainfall immediately after the harvesting. This loss can be avoided if farmers get advisory about the probability of rainfall during the harvest time. This advisory will be generated based on the 5-day rainfall forecast during the crop harvest window. For example, if crop sowing date is between June then, the cropping calendar being days for lentil crop, it would be harvested during November. The purpose of this advisory is to alert the farmers against infestation with pest and diseases. This advisory is generated based on the relative humidity forecast information. In the advisory, all types of pests and diseases have been listed from the literature which might infest under the different relative humidity level. Additional information on choice of pests and diseases can be added in the list by the administrator according to their preferences at a later stage, if so warranted. In order to ensure that more number of farmers benefit from the agro-weather DSS tool, multiple delivery channels were developed for the dissemination of the advisories. The tool sends out the advisories at two levels, to users with access to the internet and to users with access to mobile phones Android based or feature phones. The various channels developed for dissemination of information include: A web-based application which provides information on crops and location-specific farming practices and alerts on decisions linked to weather

forecasts during cropping seasons for local application. This application was developed using Asp. In this application PostgreSQL was used to store the database. An Android phone application was also developed to make the information easily accessible on a broader scale. Farmers and other users in the agricultural sector can access the outputs of the web-based application through the phone app, which provides all crop advisories directly to Android mobile phone users. In the same direction, an IVRS Interactive Voice Response System application and SMS module was also developed, which allows for crop-related advisories from the web-based application to be sent to other mobile phone users who do not have access to Android phones. Better planning and management of crops to overcome the weather risks; Maximizing crop productivity under the backdrop of climate change; Minimizing the environmental impacts on farming practices due to climate change; Devising and adapting new strategies for achieving greater climate resilience in agriculture. Consultation Meet â€" RMSI expert interacts with a panel of key stakeholders in Kenya This agro-weather tool is relevant far beyond the two African nations it is currently implemented in, considering the fact that for the most important cereal crops, it is the developing world where production is likely to be impacted by It is a tool that might well be replicated in other parts of the developing world with substantial benefits for local farming communities from the withering effects of climatic vagaries. WAY FORWARD Agro-meteorological services in developing countries have to shoulder greater responsibilities due to larger population pressure and changing modes of agricultural practices. The future will see a constant increase in demand from the farming communities for agro-meteorological information, on technologies, farming systems patterns and practices, water management, weather based pest and disease control etc. The ultimate goal of using all agro-meteorological information is to improve and protect the livelihood of farmers in terms of increasing yield quality and quantity, thereby establishing a self sufficient economy in the agricultural sector. During the last decade, grain yields have remained stagnant in most African countries because of high temporal rainfall variability, significant spatial soil nutrient heterogeneity, and weak and volatile markets. A massive investment in agriculture is indeed required, primarily focused on the creation of knowledge that does justice to the local variation in water and nutrient availability. It should aim to empower farmers to experiment and be innovative, and reinvent agricultural extensions and agricultural engineering in line with the changing climate landscape. Using agro-meteorological information has thus gained paramount importance in order to cope more effectively with climate variability and minimize losses in agricultural production. Agro-meteorological information is part of a continuum that begins with scientific knowledge and understanding and ends with the evaluation of the impact and adaptation. Intermediate processes are collection of data, changing data into useful information and dissemination of information. In principle, these advisories represent the expert knowledge of the national meteorological agency and national agricultural research institute for all the countries in their capacity to provide the rural communities and farmers the opportunity to assess extreme events and disasters in a historical perspective. Agro-meteorological information and advisory systems can contribute effectively in the decision making process, provided they are streamlined to meet the specific needs of policies and farmers and are delivered in a timely and user friendly format. In order to make this tool usable by the farmers and extension workers most effectively, a well equipped, decentralized system for agro-meteorological and remote sensing data handling to support real time rainfall monitoring , crop modeling, processing and analysis, as well as information product generation compatible with relevant background databases, need to be operational on real time basis. Improving the content of these bulletins will facilitate timely and efficient decision making for operational farms. The effectiveness of ICTs for agro-meteorological information dissemination can be enhanced by linking them to other communication media, especially media which are more accessible to farmers such as mobile, radio, and TV and the use of local languages. Evaluation of impact of information quality, usefulness, and its delivery systems must be undertaken by surveys and through the use of focus groups and innovative end-users alternatively, develop a monitoring and evaluation tool for obtaining the user feedback on the agro-meteorological products directly through web service. The training needs of end-users and of the various intermediaries that provide them with

advisory service, is also crucial. The specific survey instrument or the techniques for gathering information may differ from community to community, but the goal should essentially be the same: Included in this survey should be a brief on changes in positive behaviour impacts as this may positively influence government funding or funding from other sources. While it is true that information and communication technologies will improve in the future as will accessibility, the generation and dissemination of agro-meteorological information in the future will improve only with continued interaction of people, from scientist to extension worker, in the continuum from basic understanding to practical applications. Thus, to prepare for the future now, the country shall have to better integrate the human capital available at all levels of organization. Impacts of climate change, occurrence of extreme events, changing temperatures, unpredictable seasonality and other stresses are emphasizing the need to redefine the way in which we understand and approach development challenges. Within resource-dependant contexts affected by more frequent and intense climatic manifestations, redefining the approach to food security involves embracing the notions of change and transformation. This includes the adoption of climate-resilient practices, the use of emerging tools, and technologies in close association with proven indigenous knowledge to better prepare for, withstand and recover from climatic aberrations. The agro-weather tool developed by RMSI is targeted for the dissemination of information on farming practices and alerts focusing on decisions linked to weather forecasts for enabling farmers to protect their crops against the weather vagaries, and thus sustain the livelihood of rural farming communities. This web and mobile-phone based agro-weather tool, which incorporates climate-information and best-bet agronomic management recommendations, will help farming communities to plan and manage weather risks, maximize productivity, and minimize the environmental impacts. In addition to the web-based application i. The SMS platform is designed to be used for alerts, targeted to provide farmers with specific information, which will allow for easy adoption and create further demand for such agro-meteorological tools. The voice solution could by far be the most promising platform for farmers as it is customized for language, and is readily accessible. On making a call, farmers are automatically connected to an IVR Interactive Voice Recording , which will prompt them to get critical information in either English or their indigenous language e. The next priority objective should be to critically consider up-scaling scenarios and move from pilot program to the actual Climate Information Service Program for more wide-spread application of this agro-weather tool.

Chapter 4 : Potential yield tool | Agriculture and Food

Tools are available to help you manage your climate-related risks and opportunities, and to help guide you in building resilience to extreme events. Browse the list below, or filter by topic and/or tool functionality in the boxes above.

Potential yield tool Page last updated: Friday, 5 October - Potential yield can be used as a tool in the seasonal decision making process. Stored soil water at the start of the growing season is estimated as one third of summer rainfall. Growing season rainfall is composed of cumulative rainfall at the time the tables are produced plus decile rainfall finishes for the remainder of the growing season. Rainfall deciles are generated from years to the year prior to the growing season of interest. The potential yield model assumes that: If any of these assumptions are not met, then potential yield could be considerably lower than shown in the tables. While potential yield estimates can help create a narrative for the progress of a crop and aid key in-season decision-making, other key factors also need to be considered to arrive at an accurate picture. The timing and event intensity of rain during the growing season can also greatly influence the conversion of rainfall to biomass and yield. To use the tool, first select a weather station from the drop-down list below. Next, select the summer start date. Usually, the start of summer is set to 1 November of the year prior to the current growing season. This can be changed, for example, if a large rainfall event occurred in early November that is unlikely to affect the soil moisture status at the end of summer then you may set the summer start date to exclude that event. The start of summer must be before the start of the growing season. The end of summer will be automatically set as the day before the growing season starts. Now select the growing season start and end dates. Usually, the growing season is set to be from 1 May to 31 October. However, some growers may find 1 April to 30 September to be more appropriate depending on their location. The growing season start and end dates must be within the same calendar year. Potential yield for the current growing season is calculated using the forecast date. Growing season rainfall must be known up to the forecast date, projected decile finishes are used to forecast growing season rainfall after the forecast date. During the growing season, the forecast date is usually set to the current date. How the model works The default start to summer is 1 November of the previous year to the growing season. The default growing season in April to October. Different combinations of WUE and Evaporation may be used to give estimates of potential yield in different situations. For instance, WUE tends to increase from north to south across the grainbelt, and from lower to higher rainfall areas. Typical combinations of WUE and evaporation.

Chapter 5 : Agriculture, Landscapes and Livelihoods

In this study, a decision support tool, SIMAGRI, was developed to translate climate information into agricultural and economic terms that can support strategic and tactical decisions in crop production e.g., crop choices, agricultural management practices, insurance needs, among others.

Severe Dryness 1 in year event These two versions of the information are complementary. In one case, the consideration is what is the drought severity indicated at a given level of confidence. In the other case, the consideration is what is the likelihood that drought will be at a given level of severity or worse. Mouse over the map to access the Start Time control that selects the month when the forecast is issued the forecast is issued at the end of the month shown. Start Time The forecast Start Time shown at the top of the map denotes the end of the last available month of precipitation observations. By default, the forecast initially displayed is the latest available. Drought Risk Select the Drought Risk option from the Map Type drop-down menu to display the probability of wetter or drier conditions in the 6-month forecast period. When the Drought Risk Map Type is selected, the Drought Severity Levels drop-down menu allows a category of dry or wet conditions to be selected. The map will display the probability that the selected level of dry or wet conditions, or drier, will occur at the end of the forecast period, based upon the SPI6 forecast. For example, if a farmer in Bolivia wants to know the probability that precipitation over the 6-month period March to August will be near-normal or drier normal being an average of the precipitation for that period , he will select the option Normal in the Drought Severity Levels drop-down menu and select a Start Time of May The map will then show the probability that precipitation during the 6-month period March-August have a value equal to or less than normal. Why choose a Start Time of May , for example? In this example the probability shown is for the SPI6 over the full 6-month period of March to August , which includes the information from the "3-month initial conditions" observed state of wetness or dryness during March-May and the 3 months of model forecast information forecast for June-August made at the end of May. What is a Probability of Drier Conditions? The selected probability is the likelihood that the SPI6 conditions observed over the 6-month forecast period will be drier than what is shown on the map. This represents what the SPI6 value could be in the case that very dry conditions occur, given what the observed SPI was at the time of the forecast the initial conditions. Rationale Development of a drought tool to inform drought action and preparedness Monitoring drought development and the risk of its near-term evolution through timely seasonal forecasts, viewed in the context of the current hydro-meteorological conditions, are essential for drought risk reduction. Access to such climate information for decision-making is increasingly important for vulnerable countries and the international agencies that serve them. Most of the large-scale drought monitoring tools available today are based on satellite information that is not connected to real-time measurements on the ground. Most drought predictions are based on model output that is deterministic i. Additionally, the monitoring and forecasts are not brought together to consider the risk of existing drought developing or getting worse. The World Bank Group and the Pilot Program for Climate Resilience PPCR are interested in enhancing the visualization, accessibility, and use of a global-scale tool for drought monitoring and prediction, based on a reliable and well-tested methodology. The development of such a tool aims to enhance the visualization and user interface to allow user-directed investigation of current and future drought conditions. The ability to target the confidence of the drought outlooks can give decision makers of climate vulnerable countries a more quantitative measure of risk on which to base their decisions. The global drought tool intends to standardize an approach to monitor and project drought information. This could help provide consistency over space and time and facilitate regional monitoring and forecasting of drought risks, including recurrent events such as the climate impacts associated with the ENSO phenomenon. A global-scale tool could also allow potential users, who may be more interested in a more national-to-regional scale tool, to explore the information and envision its application for their stakeholders. It will serve as a demonstration of what a specific climate service on drought can do for risk assessments, and

will serve as a starting point, or training opportunity, to build data, capacity, and more tailored information at the national level. Dataset Documentation Model Forecast Data:

Chapter 6 : Web-based Tools Helping Farmers to Practice Climate Smart Agriculture

This session will be two-fold, covering weather-based decision support tools for Integrated Pest Management and crop management on the Network for Environment and Weather Applications (NEWA) website (www.nxgvision.com) and climate decision-making tools for agriculture on the Cornell Climate Smart Farming (CSF) Program website.

Chapter 7 : EUPORIAS â€“ the next step in seasonal forecasting

The Study Agency's decision making body is a Governing Board climate change, government policies, and economics are not very well Develop an Agricultural.

Chapter 8 : IRI â€“ International Research Institute for Climate and Society | Climate

SERVIR Develops Tool for Assessing Agricultural Practices This entry originally appeared on www.nxgvision.com SERVIR regions, agricultural measures such as irrigation, improved fertilization and advanced cultivars have the potential to increase food security and ensure climate resilience.

Chapter 9 : Time Series Analysis for Business Forecasting

Through multi-stakeholder communities of practice, the Capacitating African Smallholders with Climate Advisories and Insurance Development (CASCAID) program aims to extend the use of climate information for seasonal agricultural decision-making to over 2 million farmers (including , women) in.