

SAVING
LIVES
CHANGING
LIVES



CROP MONITORING and YIELD FORECAST based on analysis of agrometeorological data and satellite images

WFP CUBA
Funding proposal



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The World Food Programme (WFP) supports Cuban communities, authorities and institutions **to contribute to the food security and nutrition of the population**, with emphasis on the most vulnerable.

Since the beginning of its work in Cuba in 1963, WFP has implemented 21 emergency operations and 8 development projects, accounting for more than **302 million dollars**.

Main lines of work of WFP in Cuba:

- **Provide food assistance to nutritionally vulnerable groups** – children, pregnant and lactating women, elderly people – through social safety nets (day-care centres, primary schools, maternity and elderly homes, community canteens);
- **Strengthen agricultural value chains and their linkages with social safety nets** for the stable supply of nutritious and quality food;
- **Strengthen the resilience of communities, disaster risk management and adaptation capacities to climate change** at the local level.

1. SUMMARY

Over the past four years, WFP implemented a project aimed at strengthening the management of and resilience to drought in the eastern provinces of Cuba, funded by the European Union (DIPECHO – phase 1). Key results included enhanced observation capacities of the agro-meteorological monitoring networks – through the provision of equipment to several agro-meteorological stations – and a greater articulation between meteorological (climate and agrometeorological) and hydrological services.

A regular and accurate monitoring of crop conditions can provide to smallholder farmers and decision makers valuable information during the agricultural season. The calculation of a simple crop-specific water balance can allow farmers to take decisions (irrigation) to minimise crop losses due to dry spell.

The monitoring of crop conditions based on the analysis of agrometeorological and remotely sensed data can provide to decision makers important information on the upcoming harvest in order to take prompt and informed actions on possible imports of food items.



This information would also support the Municipal Food Self-supply Programme, contributing to increased productivity and reduced losses caused by natural hazards.

Given the above context, this pilot proposal aims at supporting the implementation of an enhanced early warning system for the agricultural sector based on the measurement and analysis of selected agro-meteorological variables and interpretation of satellite images. The project will be implemented between 2020 and 2021 in one pilot province where the EWS has been previously strengthened by WFP (during the DIPECHO phase 1 project) and proper coordination mechanisms have been established.

2. CONTEXT AND RATIONALE

Experts of the Agricultural Meteorology Centre of the Cuban Institute of Meteorology have created a model that allows to monitor the temporal and spatial evolution of agricultural drought. This monitoring is supported by a network of 68 meteorological stations distributed throughout the country.



Over the past four years, WFP has been strengthening the network of agrometeorological stations in five eastern provinces through the provision of technical equipment to measure soil temperature and humidity, rainfall, evaporation and other agrometeorological parameters.

However, new models and new technology can be used for a more advanced and reliable monitoring of crops conditions. Crop-specific water balance models and satellite (NDVI) images are used in several countries to monitor the crop development during the agricultural season. Dry-spell in critical crop development stages (germination and flowering) can cause significant crop damage and production losses. The timely provision of information can allow smallholder farmers to take actions (irrigation) to reduce or minimise the risk of crop failure.



The use of crop-specific monitoring tools during the agricultural season can contribute to an effective EWS for the agricultural sector to provide timely and reliable information to smallholder farmers and decision makers.



Farmers can use the information provided by the EWS to take informed decisions on agricultural practices like planting, re-planting, irrigation etc. This would reduce the risk of crop failure and increase the efficiency of agricultural inputs and resources.

Decision-makers are the end users of any EWS. Timely information on the progress of

the agricultural season and on the harvest prospects will allow to take informed and timely decisions on import/export of agricultural products with consequent economic benefits.

In a country like Cuba, prone to drought and where 70% of the crops are rainfed, an accurate monitoring system of crop conditions is essential for planning purposes.



3. DESCRIPTION

3.1 Objective

Strengthen the Cuba early warning system for the agricultural sector through the use of crop monitoring tools based on agrometeorological and remotely sensed data.

3.2 Components

The following components will be implemented in municipalities of one eastern province to be selected for this pilot project:

- a) Develop the crop monitoring tools based on collection and analysis of agrometeorological data and interpretation of remote sensing images. This will entail:
 - i. provision of equipment to local agricultural entities (especially the territorial plant protection stations) and to key agrometeorological stations;
 - ii. training of personnel on the techniques and methodologies internationally used for the analysis of agrometeorological data and satellite images.
 - iii. preparation of regular early warning bulletins (on a 10-day and monthly basis) on the progress of the agricultural season to be widely distributed among smallholder farmers.
 - iv. development of a crop yield forecasting model based on historical series of data-set (agromet, production, satellite images etc).

- b) Enhance the local early warning system for the agricultural sector to ensure timely flow of information to smallholder farmers and decision makers. This will be achieved by:
- i. identification of the appropriate institution to be responsible for the overall analysis of the information generated by the EWS and on the weather and climate impact on agricultural production;
 - ii. establishment of an efficient coordination mechanism to ensure the exchange of data and information among the different institutions;
 - iii. set up of communication protocol and procedures to guarantee timely and regular provision of analysed information to smallholder farmers, cooperatives and decision makers at municipal, provincial and national level.

Based on the progress and results of the pilot phase described above, prepare a new project proposal to expand the coverage of the early warning system to the other provinces of the country and to set-up a national early warning unit responsible for the overall coordination and functioning of the system.

3.3 Expected result

R1. A provincial early warning system for the agricultural sector to support the local Food Self-Sufficiency Programme is strengthened and in place in one pilot-province in Eastern Cuba.





3.4 Geographical targeting

WFP aims at implementing this pilot phase in one province in the eastern part of the country. The main results will inform the scaling up of the activities to other territories.

3.5 Implementation strategy and sustainability

The proposal is aligned to the priorities of the Government of Cuba and its local food Self-sufficient programme and will leverage on the strengths of the agrometeorological monitoring system and disaster risk management.

4. TOTAL ESTIMATED BUDGET

The total estimated budget of this proposal amounts to **USD 450,000** mainly for:

1-Capacity Strengthening		359,000
<i>Provision of agrometeorological equipment</i>	100,000	
<i>Provision of technical equipment for the early warning units</i>	100,000	
<i>Acquisition of satellite (NDVI) images</i>	50,000	
<i>Provision of software for the processing and analysis of agromet and satellite data</i>	50,000	
<i>Training of technical staff on data and image analysis</i>	40,000	
<i>Design and production of early warning bulletins</i>	10,000	
<i>Printing and distribution of early warning bulletins</i>	9,000	
2- Implementation Cost		25,123
3- Direct Support Costs		38,412
Total Direct Cost (1+2+3)		422,535
Indirect Support Costs (6.5%)		27,465
TOTAL		450,000



United for strengthening resilience in Cuba

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