



Government of India  
Ministry of Agriculture & Farmers' Welfare  
Department of Agriculture, Cooperation & Farmers' Welfare

## **Mahalanobis National Crop Forecast Centre**

Near Krishi Vistar Sadan  
Pusa Campus, New Delhi-110012

### *Invitation for*

Expression of Interest  
for GP (Gram Panchayat) level Crop Yield Estimation Using  
Technology

File No. 6/7(2)/PMFBY/2017-MNCFC  
(May 2019)

(Visit us at <http://www.ncfc.gov.in>; <http://agricoop.nic.in> )

## **TABLE OF CONTENTS**

<b>Title</b>	<b>Page No.</b>
<b>Nature of EOI</b>	<b>4</b>
<b>Eligible Agencies</b>	<b>4</b>
<b>Scope of Work</b>	<b>5</b>
<b>Criteria for Work</b>	<b>5</b>
<b>Technology Expected to be Used</b>	<b>6</b>
<b>Specific Terms &amp; Conditions</b>	<b>6</b>
<b>Format of EOI to be Submitted by The Agency</b>	<b>6</b>
<b>Additional Information/Document to be Provided</b>	<b>7</b>
<b>Selection Criteria</b>	<b>7</b>
<b>Annexure –I</b>	<b>8</b>
<b>Annexure-II</b>	<b>8</b>


## NOTICE INVITING EOI

<b>Government of India</b> <b>Ministry of Agriculture &amp; Farmers' Welfare</b> <b>Department of Agriculture, Cooperation &amp; Farmers' Welfare</b> <b>MAHALANOBIS NATIONAL CROP FORECAST CENTRE</b> <b>Near Krishi Vistar Sadan, Pusa Campus, New Delhi-110012</b>	
<b>NOTICE INVITING EOI</b> <b>(For publishing in the Website)</b>	
<b>Tender No. File No. 6/7(2)/PMFBY/2017-MNCFC</b>	
<b>Office of issue</b>	<b>Mahalanobis National Crop Forecast Centre (MNCFC), DAC&amp;FW, Nr Krishi Vistar Sadan, Pusa Campus, New Delhi-110012</b>
<b>File No.</b>	<b>File No. 6/7(2)/PMFBY/2017-MNCFC</b>
<b>EOI Notice Available at Website</b>	<b><a href="http://www.ncfc.gov.in">http://www.ncfc.gov.in</a> <a href="http://agricoop.nic.in">http://agricoop.nic.in</a></b>
<b>Date of Issue/Publishing</b>	<b>10<sup>th</sup> May, 2019</b>
<b>EOI submission last date and time</b>	<b>—24<sup>th</sup> May, 2019— 31st May, 2019</b>
<b>Date of Presentation of EOI</b>	<b>Early June (to be informed)</b>
<b>Place of Presentation of EOI</b>	<b>Committee Room, MNCFC, Nr. Krishi Vistar Sadan, Pusa Campus, New Delhi-110012.</b>

On behalf of President of India, Expression of Interest are invited from experienced agencies for **GP (Gram Panchayat) level Crop Yield Estimation using Technology**, for the Kharif 2019, for its adoption in **Pradhan Mantri Fasal Bima Yojana**.

EOI Invitation document can be downloaded from MNCFC website [www.ncfc.gov.in](http://www.ncfc.gov.in) and, DAC&FW website [www.agricoop.nic.in](http://www.agricoop.nic.in)

The EOI can uploaded online (facility will be available soon) on [www.ncfc.gov.in](http://www.ncfc.gov.in) and copies can be sent through email to [ncfc\[at\]gov\[dot\]in](mailto:ncfc[at]gov[dot]in) or [neetu\[dot\]ncfc\[at\]gov\[dot\]in](mailto:neetu[dot]ncfc[at]gov[dot]in).

Sd/-  
**HEAD OF OFFICE, MNCFC**  
 **011-25843224**

## GENERAL ASPECTS OF EOI INVITATION

### 1. NATURE OF EOI

This EOI is for obtaining services of reputed technical/research agencies (including start-ups) for conducting **GP (Gram Panchayat) level Crop Yield Estimation Using Technology (henceforth will be referred as study)** in agricultural fields, for Pradhan Mantri Fasal Bima Yojana. **The study should be carried out for Kharif 2019**, and may be extended depending upon the requirement of **Mahalanobis National Crop Forecast Centre (MNCFC)**. Presently, services are required for conducting the study at Agricultural fields in at least 5 districts, well distributed in 3 states of different agro-climatic zones on 3 crops. The tentative list of crops is presented in Annexure I.

### 2. ELIGIBLE AGENCIES

All service providing agencies must be have at least three years service record beside at least two year of experience related with yield estimation using technology (to be reckoned on the last date for submission of bids), of providing similar services i.e. Crop Yield Estimation for the Ministries/Departments, Central/State Autonomous Bodies, statutory bodies, public or private sector organizations and fulfilling the following conditions are eligible for submitting proposals:

- a) **The Agency can be government/private/autonomous organisations from India or abroad. However, International Agencies should have technical units in India.**
- b) The agency should have permanent/ On roll Remote Sensing Expert, Agriculture Expert, Data Analytics, Machine Learning and Artificial Intelligence expert.
- c) The Agency should have experience in working in at least 1-2 states of the country in different (2-3) crops.
- d) Agency should have experience of yield estimation and processing of Remote Sensing data.
- e) Agency should have experience of using modern tools like Artificial Intelligence, machine Learning, Crop Models, DSS, High resolution data from satellite & UAV

The Private Agencies/Companies should fulfil following additional criteria.

- f) The Agency must not have been blacklisted by any Government/Ministry/Department/PSU, nor should they have been debarred from dealing with any public Department.
- g) The firm must be registered with all Government/statutory authorities such as Sales Tax Department, Income Tax Department, etc. as required in the normal course of business to render providing similar services.

### 3. SCOPE OF WORK

Pradhan Mantri Fasal Bima Yojana (PMFBY) is yield-based crop insurance scheme that uses Crop Cutting Experiments (CCEs) to determine the yield loss suffered by the farmers due to natural catastrophes and adverse weather conditions. Owing to lowering of insurance unit level from block level to Village panchayat/GP, number of CCEs to be conducted has increased manifold. Yield obtained from the CCEs is accurate but laborious and time-consuming which results into delay in settlement of claims. Further, in the current methodology of yield estimation, the allocation and selection of fields for conducting CCE is based on the information of crop of previous years due to non-availability of current year information at the time of planning of survey. As a result the precision of estimates is affected.

2. Currently MNCFC is carrying the technology based yield estimation operationally at district level for 8 major crops covering more than 80 % agriculture area. Due to lack of high spatio-temporal satellite data and field measured data at village/GP level data, yield estimation at village/GP level remains challenging in the country.

3. **In view of the above, DAC&FW decided to carry out pilot studies with the support of Government/private/international organisations to estimate crop yield at village/GP level using innovative technologies like high spatio-temporal remote sensing data, Unmanned Aerial Vehicle (UAV), advanced intelligent crop simulation models, machine learning, artificial intelligence etc. The outcome and finding of the pilot projects will be assessed for taking a decision/strategy for accurate yield estimation at village/GP level. The overall monitoring of entire process of implementation of pilot project would be overseen by MNCFC.**

### 4. CRITERIA FOR WORK

- i. The criterion for conducting the study is mentioned below:
- ii. Agency should carry out the study in at least 5 districts, well distributed in 3 states of different agro-climatic zones on 3 crops. The number may change depending upon the future requirement.
- iii. Each Agency should take at least one multi-picking crop and one non-cereal crop.
- iv. Minimum 10 GPs should be covered in each block of every district.
- v. Data of at least 5 properly distributed CCEs in each GP, should be used for developing yield model
- vi. Annexure-2 gives the guidelines of conducting CCEs, which can be used by the Agency (or its outsourcing partner)
- vii. Model should be developed for 50% GPs and validated using the remaining 50%.
- viii. Technology proposed to be used should be an advanced technology, feasible and up-scalable.
- ix. It should be attempted to have all these studies in diverse crops and region.

- x. **The final study report needs to be submitted by Mid of February, 2020. However, the Agency should provide interim reports, as and when asked, and also provide regular updates, through a special portal designed for the purpose**
- xi. The budget will be in the same pattern for all studies and as recommended by the expert committee based on the districts taken and the amount of work to be carried out.
- xii. The selection of the agency will be done by an expert committee, as per the selection criteria given in the Section 9.
- xiii. The expert committee may reject any proposal, if not found suitable.

## **5. TECHNOLOGY EXPECTED TO BE USED**

- i. Satellite data
- ii. Unmanned Aerial Vehicle (UAV),
- iii. Advanced intelligent crop simulation models
- iv. Mobile Applications
- v. Machine learning approach,
- vi. Artificial intelligence
- vii. Internet of Things
- viii. Field based digital photograph
- ix. Hand held instruments
- x. Scientifically designed surveys
- xi. Statistically sound Sampling Plans

## **6. SPECIFIC TERMS & CONDITIONS**

- a. All the data collected (raw and processed) in the entire experiment will be the sole property of MNCFC/DAC&FW.
- b. There should not be any conflict of interest. The Agency should not take funding support from any other organisation for the same work, without prior formal approval of MNCFC/DAC&FW.
- c. The results of the study should not declared/published/ shared in any form, or with any organisation other than MNCFC/DAC&FW, till 1 year after the experiment is over.

## **7. FORMAT OF EOI TO BE SUBMITTED BY THE AGENCY**

- i. Introduction
- ii. About the Organisation
- iii. List of Technical persons with their qualification
- iv. Details of the previous study carried out
- v. Study Area, intended to be taken up.
- vi. Crops to be taken
- vii. Methodology/Technology to be used
- viii. Experimental Setup
- ix. Time line
- x. Expected Results
- xi. Tentative Cost
- xii. Lists of Patents/publications in the similar works

## 8. ADDITIONAL INFORMATION/DOCUMENT TO BE PROVIDED

- a) **Undertaking for the Study.** A certificate of Undertaking that the Agency will carry out the study as specified in the Section 4.
- b) **Certification.** The Agency should provide certificates of the past experience of conducting similar kind of studies.
- c) **Documentation.** The Agency should provide detailed manuals/data and technical specifications, charts/tables with respect to the studies and any other necessary software and documents.
- d) **Earlier Experiment.** The Agency should provide a report of earlier experiments conducted on similar line. The agency also should provide details of observations collected using similar observation system, as offered in the EOI.
- e) **Non-Disclosure Agreement (NDA).** The Agency should provide an NDA, with respect to point 7(c)

## 9. SELECTION CRITERIA

The selection of Agency will be made, by an Expert Team, based on following criteria

- i. Experience of the Company in similar work (10 marks)
- ii. Patents or reputed publications of the technology proposed to be used (10 Marks)
- iii. The Technology proposed to be used (20 Marks)
- iv. Crops and Geographical distribution of the proposed study (5 Marks)
- v. Technical personnel available with the Agency (20 marks)
- vi. Technical facility available with the Agency (10 Marks)
- vii. Planning of the study (10 Marks)
- viii. Presentation Made by the Agency (10 marks)
- ix. Budget envisaged (5 Marks)

### **ANNEXURE-1 TENTATIVE LIST OF CROPS**

- a) Paddy
- b) Soybean
- c) Cotton
- d) Bajra
- e) Maize
- f) Sorghum
- g) Groundnut
- h) Guar

### **ANNEXURE-2 GUIDELINES FOR CONDUCTING CCE**

- i. Each CCE plot should be of minimum 5x5 sq m size or as defined by the Revenue Department of the concerned state.
- ii. The plots for CCE should be selected based on the vegetation condition map (NDVI and NDWI) derived from high resolution satellite data
- iii. The Field, where CCE will be conducted, should be at least of 1 acre area.
- iv. The CCE plot within the field should be representative of the whole field, not affected by site specific external factors.
- v. The selected field should be sole-cropped (no mixed cropping) with the concerned crop.
- vi. The CCE should be conducted in the field, which is ready for harvest.
- vii. The CCE plot should be at least 3 m away from the field borders.
- viii. The CCE data will be collected through Smartphones using the Android App. It should be checked that the GPS accuracy is <5 m.
- ix. The smartphone should have Navigation App, for showing GPS reading and North Direction.
- x. Each CCE information should come along with latitude - longitude and 2 photographs (of crop cutting and grain weighing)
- xi. Additionally, 2 photographs i) of the field and ii) of the CCE plot (taken from 1 m above nadir viewing) should also be provided.
- xii. For Cotton crop CCE should be conducted for at least 3 pickings.
- xiii. The accuracy of Biomass weighing should be 2 decimal levels in kg and grain yield in 3 decimal levels.
- xiv. The Biomass and Grain yield should be weighed using high precision digital balance. Different digital balances should be used for weighing different items (Biomass, Grain Weight, 1000 Seed Weight)
- xv. Apart from the information coming through smart phones, the hardcopy form to be filled up and signed by the Observer, farmer and a third party not related to above two, along with their name and phone numbers should also be provided to the Centre.
- xvi. The moisture percentage of Biomass should be obtained, at least in 5% cases, through drying method.
- xvii. The Grain moisture percentage should be obtained using portable grain moisture meter