<u>**Summary Record of the Fourteenth Monthly Briefing meeting held under NCAER Project on Agricultural Outlook on 7th December 2012.**</u>

Fourteenth monthly briefing under NCAER Project on "Outlook and Situation Analysis for Food Security" was held at 4.30 pm on 7th December, 2012, in Committee Room No. 142, Krishi Bhawan, New Delhi. List of participants is attached.

Three presentations were on the agenda: (1) Achieving High Reliability of Crop Area Statistics Using GPS/GIS technology by Prof. Gopal Naik of IIM Bangalore; (2) A Novel ICT solution to integrate the interactions in agriculture ecosystem by Dr. A. Prabhuraj, Associate Professor, University of Agricultural Sciences (UAS), Raichur, and (3) E-pest surveillance by Dr. O. P. Sharma, Pr. Scientist, National Centre for Integrated Pest Management (NCIPM), New Delhi.

Joint Secretary (Crops) gave a brief introduction on the context of the presentations. He noted that application of information technology in agriculture, particularly of hand held devices in crop area mapping and other data will provide timely and accurate information. He mentioned that utilization of a single device for getting information on various aspects and activities of agricultural operations would be extremely helpful.

Presentation by Prof. Gopal Naik, IIM Bangalore:

Initiating his presentation, Prof. Naik said that because of lag in compilation and reporting of agricultural data on area and production, often crucial policy decisions are made on crude estimates which may lead to policy errors. Formulation and implementation of effective agricultural policy and food security measures require timely and accurate crop area estimates. Currently, crop statistics are based on land revenue system where village level agency, Patwari /Village accountant (VA) is responsible to provide data on crop area coverage. The traditional approach of observing crop area and recording data requires considerable time and given the other work commitments of the Patwari/ VA, have the data collection exercise is not conducted properly. The quality of crop statistics has suffered as a result.

Prof. Naik said that alternative approaches which would improve the accuracy of crop area information are i) Remote Sensing (RS) and ii) GIS/GPS technologies. Remote Sensing approaches have been advocated and practiced in recent years. RS has contributed substantial inputs for a few important crops. The approach has some limitations in the case of minor crops and mixed crops as these pose spectral as well as textural and canopy uncertainty.

Prof. Gopal Naik, in his presentation, discussed how the GIS/GPS technology can be effectively and more accurately used to estimate crop area. GIS is an information system used for editing, storing and displaying geographic coordinates. GPS is the tool which references the ground data using longitude and latitude coordinates. GPS devices are easier to use and gather coordinated information, and therefore, were selected as an alternate approach for a pilot study was conducted in Nallur village in Karnataka.

A comparison of the result of the pilot study with the traditional approach of manual collection of crop area data by Patwaris showed significant variations between the two approaches.

The process of data collection involved generating boundaries of each plot of farm land in the village and then recording the data for each of these plots such as crops grown and any other features such as irrigation, type of soil, etc. The GPS tool provided the boundaries of plots, their coordinates and also their area. Thus, the process allowed fairly accurate (2-3% variation) recording of area covered by crops.

The maps generated by the PDAs were compared with the cadastral maps of the village and they matched well. However, there were significant differences in the reported area of some of the crops and the estimates provided by the GPS/GIS tool.

In the discussion that followed it was felt that while some of the differences may be due to the methodologies used in calculating area in the two approaches, the difference may also be due to changes in cropping pattern that may not have been recorded in the traditional approach. It may also be difficult to accurately determine area when the topography of the land surveyed is not plain.

Prof. Naik also mentioned that the cost of data collection using the application was high in the first round where maps were to be generated, but cost involved in the subsequent rounds of data collection would be low as in the subsequent rounds data would be entered in the spatial categories. The data can be used for several applications such as land revenue records, crop loans, yield data estimation, etc..

Prof. Naik concluded his presentation by saying that the new technology will be able to improve the accuracy of the data substantially and make it available timely.

Presentation by Dr. A. Prabhuraj, UAS, Raichur and DR. Y.B. Srinivas, IWST, Bangalore:

Dr. Prabhuraj introduced his associate Dr. Y. B. Srinivasa, of the Institute of Wood Science & Technology, Bangalore to make the first part of the presentation covering Information and Communication Technology (ICT) Solution to Integrate the Interactions in Agriculture Ecosystem.

Dr. Srinivasa noted that in the field of agricultural extension, timely delivery of technologies is difficult through current approaches, be it a 'Direct human approach' – the Krishi Vikas Kendras (KVKs), RSKs, etc. or a 'Mass communication approach' – print, radio, TV, internet, mobile phones etc. He said that under the presently available ICT applications, farmer is expected to know what & how to search. This system does not provide feedback and data generation in the process of this communication. The information requirements of the farmers can be met effectively only through interactive mode. ICT applications provide a solution for this to be widely available,.

With this background, an entirely dedicated system which will bring all players of agriculture to operate on the same platform has been developed. The unique platform facilitates storage/access and

capture/transfer of information between all players. It enables real-time forward flow of multimedia-based agriculture content to individual field workers; and return flow of data to the other players like policymakers and researchers.

The system demonstrated enables rapid and effective dissemination of technologies to farmlands, and delivery of farm data in various forms, including multimedia, to researchers, policymakers and other users.

The instrument used is a handheld device which contains the application and content, which is accessible online/offline, has the ability to capture multimedia data (pictures, voice recording) and which can send and receive data, including multimedia, in GPRS/3G/Wi-Fi modes. It uses a web-based application which enables retrieval and presentation of data generated from field devices; forms the entry point for agricultural content to be disseminated to the field devices, provides data in raw and synthesized forms and enables device management.

Dr. Srinivasa mentioned that the handset can be used even by illiterate farmers and provides information irrespective of remoteness of the farm and comes with substantial inbuilt intelligence for on-farm decision support.

For those at the other end of the spectrum, like policymakers and researchers, the platform delivers field information in real-time.

All field devices can be connected to the cloud solution built on the platform. Continuous feed from the cloud provides the field devices with latest agricultural technologies, modifications of past recommendations, etc. Delivery of content happens over a secured connection handling all noise intervention scenarios. Backup of data happens automatically resulting in recovery without any data loss. The presentation was well appreciated by the participants.

Dr. Prabhuraj followed up on the earlier presentation by Mr. Srinivasa to illustrate some applications of the system. His presentation was entitled "Electronic Solutions against Agricultural Pests (e-SAP)". It is an application built in the backdrop of Agricultural Pest Management and its foundation lies on a unique platform that facilitates storage/ access and capture/ transfer of information between all players of agriculture described by Dr. Srinivasa. E-SAP has been successfully built, tested and deployed by UAS, Raichur.

Benefits of the e-SAP have been realised by all players of agriculture i.e. by the farmers, extension workers, researchers and policy makers/ administrators. The administration of the University was convinced of the contribution of the initiative to early and timely decision making.

Dr. Prabhuraj said several changes were expected in the application. Any new package of practices developed by the University will reach the field directly, in real-time. He pointed to the case of incidence of 'white tip' in paddy which was diagnosed through the application. Experimental trials were initiated and used effectively to treat the problem. A real time solution to pest attack was made

possible by this technology. The prediction models that the University has started building will be continuously strengthened and human resources will be better utilized. He hoped that the device developed will be the "Future Extension Worker". He stated that the device is quite popular among the farmers and several farmers were interested in actually buying the device for their own direct use.

Presentations by Dr. Prabhuraj and Dr. Y. B. Srinivasa evoked much interest and appreciation from the participants. They discussed how the e-SAP using hand held device at the farm level, can be cost effectively used in providing agricultural extension services to farmers.

Mr. Khullar said that both the devices presented in the meeting are performing a role that needs to be integrated.

Appreciating the good work done by UAS Raichur, the Agriculture Secretary indicated that the Ministry would like to work closely with them.

Dr. O.P. Sharma, Principal Scientist, NCIPM, mentioned that his organization is also providing advisories on pest management and have web based systems to monitor pest incidence. The system is, more on a macro level. The system provides forecast of pests and diseases and advisories are issued from the Central server. He said the e-SAP can take advantage of the work done by NCIPM.

Secretary thanked Prof. Naik, Dr. Prabhuraj and Dr. Y. B. Srinivasa, for their presentations on the use of new ICT tools in the field of agriculture.

Meeting ended with a vote of thanks to the Chair.

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List of participants for Fourteenth Monthly Briefing under NCAER Project on "Outlook and Situation Analysis for Food Security" held on 7th December, 2012 under the Chairmanship of Secretary (A&C).

1. Mrs. S. Bhawani, Principal Adviser, DES, DAC, Krishi Bhavan, New Delhi
2. Sh. Siraj Hussain, Addl. Secretary, DAC, Krishi Bhavan, New Delhi
3. Sh. Balvinder Kumar, Addl. Secretary, DAC, Krishi Bhavan, New Delhi
4. Sh. Mukesh Khullar, Joint Secretary (Crops), DAC, Krishi Bhavan, New Delhi
5. Sh. Sanjeev Gupta, Joint Secretary (Extension), DAC, Krishi Bhavan, New Delhi
6. Sh. Narender Bhushan, Joint Secretary (INM), DAC, Krishi Bhavan, New Delhi
7. Sgh. R.B. Sinha, Joint Secretary (Policy), DAC, Krishi Bhavan, New Delhi
8. Sh. U.K. Singh, Joint Secretary (PP), DAC, Krishi Bhavan, New Delhi.
9. Dr. A.K. Sinha, Plant Protection Adviser, Directorate of Plant Protection Quarantine and Storage, NH-IV , Faridabad-121007.
10. Dr. Dalip Singh, Additional Statistical Adviser, DES, DAC, Krishi Bhavan, New Delhi
11. Sh. B.S. Bhandari, Adviser, DES, DAC, Krishi Bhavan, New Delhi
12. Sh. Rajiv Lochan, Adviser, DES, DAC, Krishi Bhavan, New Delhi
13. Sh. S.K. Mukherjee, Adviser, DES, DAC, Krishi Bhavan, New Delhi
14. Sh. Amar Singh, Adviser, DES, DAC, Krishi Bhavan, New Delhi
15. Sh. Manoj Pandey, Addl. Director General, PIB, Shastri Bhawan, New Delhi
16. Sh. Gopal Naik, Professor, IIM, Bangalore.
17. Sh. S. Bhide, Sr. Research Counsellor, NCAER, Parishila Bhawan, I. P. Estate, New Delhi.
18. Sh. Prabhuraj A., Associate Prof., UAS, Raichur.
19. Sh. Y.B. Sriniwasa, Institute of Wood Science & Technology, Bangalore.
20. Sh. Govindan A. NCAER, Parishila Bhawan, I. P. Estate, New Delhi.
21. Sh. V.P.Ahuja, NCAER, Parishila Bhawan, I. P. Estate, New Delhi.
22. Sh. Saurabh Bandyopadhyay, Associate Fellow, NCAER, Parishila Bhawan, I. P. Estate, New Delhi.
23. Sh. S.K. Mondal, Consultant, NCAER, Parishila Bhawan, I. P. Estate, New Delhi.
24. Dr. P.K. Suri, Professor, Delhi Technological University, School of Management, Bawana, Road, New Delhi.
25. Sh. Sushil Kumar Singh, Director, Room no. 189, DAC, Krishi Bhavan, New Delhi
26. Dr. D.P. Malik, Addl. Commissioner, DAC, Krishi Bhavan, New Delhi.
27. Dr. O.P. Sharma, Principal Scientist (PP), NCIPM, IARI Campus, New Delhi.
28. Ram Asre, Joint Director (IPM),
29. Dr. J.P. Singh, Director (Millets), Room No. 492, DAC, Krishi Bhavan, New Delhi.
30. Dr. M.N. Singh, Joint Director (NFSM), DAC, Krishi Bhavan, New Delhi.