Proceedings of the Fourth Consortium Advisory Committee (CAC) meeting for the Sub-Project "Research into Development of Decision Support Systems for Management of Insect Pests of Major Rice and Cotton Based Cropping Systems" (C2046) under NAIP Component 4 held on

15 December 2011 at CRIDA, Hyderabad

The Fourth CAC meeting of the sub-project was held at CRIDA, Hyderabad under the chairmanship of Dr TM Manjunath, Chairman, CAC on 15 December 2011. The following CAC members of the sub-project attended the meeting:

1	Dr T.M. Manjunath	Chairman
2	Dr S. Lingappa	Member
3	Dr V.U.M. Rao, Director (i/c)	Member
4	Dr Y.G. Prasad, CPI, CRIDA	Member Secretary

Dr Sudhir Kocchar, National Coordinator and Dr N.H. Rao, Members could not attend the meeting. CCPIs and Co-PIs of DRR & Co-PIs of CRIDA were co-opted to participate in the meeting. CCPI, Nagpur could not attend the meeting and was granted leave of absence by the Committee. The Action taken report on 3rd CAC was tabled and discussed. The following presentations were made before the CAC and discussed:

Sl.No.	Presentations	CPI/CCPI/Co-PI
1.	Rice based cropping systems	Dr G Katti, CCPI, DRR
2.	Cotton based cropping systems	Dr M Prabhakar, Co-PI, CRIDA
3.	Progress at NCIPM, New Delhi	Dr S Vennila, CCPI, NCIPM
4.	Progress at SAC, Ahmedabad	Dr Sujay dutta, CCPI, SAC
5.	Decision Support System and way forward	Dr YG Prasad, CPI, CRIDA

CPI presented the consolidated action taken report (Annexure 1) which was followed by technical presentations (Annexure 2).

The following observations were made on the action taken report and technical presentations:

- In the case of cotton mirids, apart from being phytophagous they also exhibit predatory behavior and this may be explored in future studies.
- With regard to lead time for forecasting/forewarning, the lead times depend on the pest type and hence will vary according to the target pest and cropping system
- In case of rice BPH, predicting the population buildup is more important than hopper burn.

- The Chairman and members reiterated the suggestion to publish popular articles by all the project scientists
- Meaningful data interpretation may be made on the data generated on cohort based field studies for YSB in rice
- Effect of temperature on BPH & WBPH may be shown separately for development, survival and fecundity so as to understand clearly each aspect
- Data on predation rate on WBPH & BPH as a mixed population may be assessed as this may be encountered more often than individual populations under field conditions
- Fecundity of leaf folder moths emerging from weed hosts may be compared with those emerging from rice and look for any compensatory mechanism.
- The relevance of GIS maps prepared by NCIPM on cotton pests at selected locations may be assessed
- More ground truth data points may be needed to test the validity of dryness index based model using satellite data for identification of mealybug severity spots on cotton at Sirsa, Haryana

Dr T.M. Manjunath, Chairman, CAC in his concluding remarks expressed that four key words viz., bioecology, weather, forecasting and decision making summarize the work envisaged under the subproject. A wealth of data has been generated by all the project partners. However, the key issue is the analysis and interpretation of data which requires repeated scrutiny of data generated and extensive consultation of published literature to make meaningful interpretation of results. Work envisaged under the subproject has been challenging and useful results have emanated. The final report should be comprehensive and easily understandable.

Dr S. Lingappa, Member, CAC chaired the afternoon session. In his concluding remarks suggested that the visibility of the project will come from the validation part and operational use of project results. All the project scientists working with models for specific target pests need to verify the closeness of prediction vs observed values. The subproject has generated valuable inputs for pest modeling. As we are moving towards precision farming, advocating timely and accurate alerts for avoiding adverse economic impact through cost effective protection measures is important. The initial version of the DSS developed appeared to be much improved than the earlier expert systems developed by earlier researchers for vegetable crops.

Recommendations and action points emerged from the deliberations:

1. Authentic taxonomic identification of White Stem Borer in rice may be taken up at CABI, UK for authentic identification. PAU, Ludhiana centre may supply the adults to DRR for further needful action. DRR will meet the identification charges payable to CABI from the project funds (Action: Co-PI, PAU, Ludhiana & CCPI, DRR).
2. As a number of publications are in the draft stage, appropriate journals may be identified for submission. The committee recommends that the journal page charges, if any may be met from operational contingencies of respective centres (Action: CCPIs and CPI).
3. Undertake taxonomic identification of predators (spiders and coccinellids) on rice BPH and WBPH (Action: V. Jhansi Lakshmi, Co-PI, DRR).
4. The crop weather calendar prepared by Mohanpur centre may be revised by incorporating the life cycle of the BPH in the calendar (Action: C.R. Satpathy, Co-PI, Mohanpur).
5. Phenology models useful for IPM of rice leaf folder and cotton mealybug may be developed using the results of linear and non linear models fitted to development data generated from five constant temperature experiments keeping in view the information on broods and choice of an appropriate biofix date (Action: Ch. Padmavathy, Co-PI, DRR; CCPI, Nagpur and CPI).
6. Adopt staining technique for identification of jassid eggs in cotton (Action: CCPI, CICR, Nagpur)
7. Chairman and members strongly suggested that the raw data generated under laboratory and field conditions is to be shared with CCPIs and CPI. The collated data may be provided as an appendix to the final technical report (Action: Co-PIs / CCPIs / CPI).
8. Test/Validate the pest models in the extended period of the project. Even otherwise this activity may be taken up in a small way as it will be a logical and useful step for operational use of the models developed (Action: CCPIs / CPI).
9. An easily understandable technical report highlighting the research achievements under the project may be brought out by end of January, 2012 (Action: CCPI and CPI)
10. CAC approved the recommendation of 10th CIC for approval of additional budgetary proposal by DRR, Hyderabad in view of the discrepancy arising due to revision of SoE with respect to 2010-11 by DRR which was made after 1st half release of funds in the current financial year. DRR may take all necessary steps required for the release of funds from PIU-NAIP (Action: CCPI, DRR & CPI).

(YG Prasad)
CPI & Member Secretary, CAC

(T.M. MANJUNATH)
CAC, Chairman

Annexure 1

ACTION TAKEN REPORT on the recommendations of the 3rd CAC MEETING

Held on 20 May 2011 at CRIDA, Hyderabad

Sl.No	Action to be taken	Action Taken Report
1.	Publish the information generated on YSB larval incidence vs. tiller damage, extent of dispersal and mortality. Forecast of egg parasitoid activity vis-à-vis crop age, parasitoid species and egg hatchability is also important (Action: Co-PI, DRR, Hyderabad)	One article on off-seasonal biology of YSB communicated.
2.	With regard to the reported occurrence of white stem borer at Ludhiana, it is recommended that immature stages and adult moths (atleast 20 numbers) be preserved for taxonomic identification and to serve as voucher specimens. It is better to preserve all stem borer species for future reference (Action: Co-PI, PAU, Ludhiana)	Complied. Moths have been preserved and taxonomic identification undertaken.
3.	Publish the information generated on lifecycle parameters of Brown plant hopper and White backed plant hopper. Confirm the longer development duration at higher temperatures and compare the present work with earlier work carried out at TNAU. The finding that Echinocloa can act as an alternate host for WBPH is noteworthy. Also the fact that there are no alternate hosts for BPH is also important. (Action: Co-PI, DRR, Hyderabad)	Work compiled and presented in a symposium. Draft article is being readied for communication. Non-linearity of development at higher temperatures confirmed. Non-linear modeling of data is underway. Article on Echinocloa an off season host of BPH communicated
4.	Field studies on BPH at Mohanpur to take note of planting delays. Life table parameters need to be confirmed with more reliable data in Kharif 2011. (Action:Co-PI, Mohanpur)	Complied. Life table parameters confirmed, article accepted for publication
5.	Preserve leaf folder moths collected from different hosts including rice and send for identification. The high moth emergence and the issues of migration/dispersal/reproductive diapause may be investigated critically. Identify the parasitoids of leaf miner to species level. (Action: Co-PI, DRR, Hyderabad)	Preserved moths collected from different hosts. Sent for identification. Parasitoids identified. Article on survival of leaf folder on weed hosts communicated.
6.	Continue studies on field growth rates of BPH at Maruteru and construct field life tables. Define the critical weather parameters and crop factors that trigger outbreak of BPH in a short period. (Action: Co-PI, Maruteru)	Field studies taken up. Outbreak conditions prevailed during kharif 2011 at Maruteru
7.	Undertake taxonomic identification of coccinellids and spiders predating on cotton mirid bugs. (Action: Co-PI, CICR-RS, Coimbatore)	Undertaken.

8.	Bring out clearly the status of mirid bug species on cotton in the central zone and southern zones. It is most likely that mirid bugs are found both in non-Bt and Bt-cotton fields, not exclusive to Bt-cotton. The experiments on crop adjacency are mostly related to the local cropping pattern rather than the cropping system. This may be taken into account while reporting. (Action: CCPI, Nagpur/Co-PI, CICR-RS, Coimbatore)	Status of mirid bug species on cotton in central and south zone is being carried out through further experimentation. Care will be taken while reporting data on effect of crop adjacency.
9.	There should be uniformity in adoption of severity index/grade/ level etc across the centres. (Action: CCPI, Nagpur)	Uniform severity index/ grades were adapted and observations were recorded accordingly across all the stations.
10.	Each project scientist should scrutinize the data generated repeatedly so as to interpret and draw meaningful inferences. This will ensure greater clarity in presenting it in simple and easily understandable manner (Action: All project scientists)	The compilation and consolidation of data of all three years has been done and is being updated with kharif 2011 data. Will be interpreted and presented accordingly as suggested.
11.	Compare actual life tables with those of their visualized counterparts (i.e., hypothetically constructed life tables) without any impact by stage-specific mortalities. The idea is to highlight the potential population growth rates if such mortality factors did not exist. In other words, this comparison helps us to appreciate the role played by such mortality factors in checking the pest population. (Action: CCPIs)	Life table parameters related to development, survivorship and reproduction have been incorporated to project population growth rate for pests of rice and cotton which have been incorporated in the initial version of DSS
12.	A status paper referring to all kinds of approaches / methodologies that have been adopted globally for modeling of pests and development of DSS may be brought out. (Action: CPI & CCPIs)	Draft paper on pest monitoring, pest forecasting and DSS – a review was prepared and submitted to CABI publishing. Pest wise draft articles prepared.
13	A wealth of information has been generated in the project. The collected data needs to be scrutinized carefully for identifying useful data for development of prediction models with minimum number of variables.	Efforts are underway to synthesize the data generated in the sub-project in the form a technical report.
14	It is important to have clarity on whether the decision support contemplated is at the farm level or at the strategic level. Farm level or tactical decision support should facilitate advisories that are useful for pro-active or curvative interventions. This can take advantage of the advances in communication like 3G etc. Strategic level decision support at the macro level can come from remote sensing applications like damage assessments which are good for trade, industry and government initiatives. Parameters for identifying the problem at an early stage would be advantageous.	Both levels are being considered.

15	While developing tactical decision support tools, attention may be given to the lead times for prediction so that the end user has sufficient time for preparation and carrying out the intervention. Proper data collection formats used in this project from the inception has certainly helped to overcome the lack of commonality in data sets generally seen in historical data sets	Efforts are underway to bring out models that give sufficient lead time as suggested
16	Chairman, CAC and members complemented all the consortium partners for carrying out the envisaged technical programme and generating valuable data. In the remaining period of the project, scientist needs to focus on gaps in data requirements highlighted by the CPI.	Work on gaps identified has been taken up during kharif 2011 by respective centres
17	All the project scientists are urged to bring out popular scientific articles on the work carried out by them apart from publishing their work in rate journals.	Two articles published by CRIDA. Two articles on mealybug hosts communicated by CICR and NCIPM.
18	The consolidated project report should be finalized by the end of December 2011.Accordingly the Kharif, 2011 experimental results should be compiled and analyzed.	The compilation and analysis of data for Kharif 2011 is underway and will be compiled by December end as suggested
19	The CAC also felt that the encouraging data obtained so far with the project should be taken to a logical end and more time beyond the present tenure is required for this purpose .Therefore, the CAC recommends that a proposal for extension of the Sub-project for 2 years till 2014 may be prepared and submitted in the prescribed format to PIU-NAIP for consideration. This extended period should be utilized for validation and refinement of the models and DSS and come out with useful and tested products. Nano-sensors for early detection of pests and automatic alerts for impending attacks can also be thought of.	Extension proposal was submitted to PIU-NAIP in the prescribed format by 25th October 2011.

Annexure 2

Program Details

Fourth CAC meeting		
1015 h	Welcome	Director, CRIDA, Hyderabad
	Introductory remarks	Dr TM Manjunath, Chairman, CAC Dr S Lingappa, Member, CAC
Action taken report and progress		
1030 h	Rice based cropping systems	Dr G Katti, CCPI, DRR
1130 h	Cotton based cropping systems	Dr M Prabhakar, Co-PI, CRIDA
1150 h	NCIPM, New Delhi	Dr S Vennila, CCPI, NCIPM
1210 h	SAC, Ahmedabad	Dr Sujay Dutta, CCPI, SAC
1230 h	Decision Support System and way forward	Dr YG Prasad, CPI
1400 h	**Discussion**	
	Remarks & Recommendations of CAC	Chairman & Members
1430 h	**Vote of thanks**	Dr M. Prabhakar, Co-PI

Annexure 3

List of Participants

1. TM Manjunath, Chairman, CAC
2. S Lingappa, Member, CAC
3. YG Prasad, CPI, CRIDA, Hyderabad
4. M Prabhakar, Co-PI, CRIDA, Hyderabad
5. G Katti, CCPI, DRR, Hyderabad
6. AP Padmakumari, Co-PI, DRR, Hyderabad
7. Ch Padmavathi, Co-PI, DRR, Hyderabad
8. V Jhansilakshmi, Co-PI, DRR, Hyderabad
9. S Vennila, CCPI, NCIPM, New Delhi
10. Sujay dutta, CCPI, SAC, Ahmedabad
11. BMK Raju, Co-PI, CRIDA, Hyderabad
12. G Maruthi Shankar, Co-PI, CRIDA, Hyderabad
13. K Nagasree, Co-PI, CRIDA, Hyderabad
14. N Ravikumar, Co-PI, CRIDA, Hyderabad
15. K.V. Rao, Co-PI, CRIDA, Hyderabad

16-20. Project staff from CRIDA and DRR