Experiences of IASRI with CAPI - Study entitling "Improving methods for estimation of crop area, yield and production under mixed and continuous cropping"

11th July, 2016

Introduction

(1 of 2)

- IASRI is mandated to develop appropriate methodologies for estimation of parameters related to crops, livestock, fisheries and allied sector
- IASRI was actively involved in developing sampling methodologies for cost of cultivation surveys as well as agricultural census in India
- Useful data generated from the two sources
- PAPI method used for data collection
- Data from both the sources take long time to reach to users

Introduction (2 of 2)

- The results of Agricultural census take as much as 5 years to be made available to users- primary reason being the long data processing time
- Data processing handled by National Informatics Centre
- Delay in release of data to users is also common in cost of cultivation surveys though the sample size is 8100 operational holders across States in India
- Still voluminous data generated due to multi round nature of the survey- use of CAPI in data collection is expected to bring down data processing time and costs substantially

Overview - study awarded to IASRI by GO (1 of 3)

- The primary objective of the study is to develop appropriate methodology for estimation of crop area, yield and production under mixed and continuous cropping
- Methodology: sampling design, estimation procedure and sample size
- Sampling design used in the survey: Stratified two-stage sampling with two phases at each stage both for crop area and crop yield estimation
- Each preceding sample used as sampling frame for the succeeding sample. The sample selection was made two times, for area and yield estimation, through the SAS package - there is no provision in CAPI for sample selection

Overview - study awarded to IASRI by GO (2 of 3)

- Three/four important crops were targeted for estimation purpose from a single sample in the study area
- Mixture by mixture sample selected for crop yield estimation, while a overall sample was selected for crop area estimation - domain estimation approach used for crop area estimation- overall multipliers used in estimation of crop area at both stages of sampling
- Overall multipliers used at first stage while strata specific multipliers used for crop yield estimation

Overview - study awarded to IASRI by GO (3 of 3)

- The sample was selected at IASRI and uploaded on the server- IASRI server was used
- The dependency of implementing agency on IASRI for sample selection marginally delayed the progress of field work
- Unlike in socio-economic surveys where the method of data collection is inquiry based, in agricultural surveys the measurement based methods are frequently used
- We believe that a combination of subjective and objective methods are more appropriate in agricultural surveys, hence the use of two phases in the proposed stratified two-stage sampling design. Use of subjective and objective methods allow use of auxiliary information based estimators
- Several methods are being tried in the study for determination of crop area and crop yield
- Stringent criteria devised for identification of a suitable method as well as the estimator

CAPI training and related preparatory work for the survey

- Training on CAPI software was provided by Dr Michael Rahija, Research Officer, FAO, Rome last year
- Short trainings were given two times by World Bank
- Questionnaires created in Su So designer were shared with Dr Michael who gave useful suggestions
- Ms Nancy Chin also gave useful suggestions
- The questionnaires designed in Su So were converted into local language by BPS, Indonesia
- Dr Michael Rahija is constantly in touch with IASRI to provide solution to CAPI related problems
- Experts from World Bank give support as and when requested
- Skype meetings are organized regularly by Dr Michael Rahija to monitor progress of the study

Tablet specification - usage at IASRI

- Samsung Galaxy tab 4 SM-T231
- Android version 4.4.2
- Display 7"
- RAM 8GB

Preparatory work in survey to test the developed methodology (1 of 3)

- Questionnaires used
- Profile of EA/CB/ED (PSU)
- List of farmers involved in cultivation in the randomly selected PSU
- Enumeration of crop area of all parcels owned by selected farmers in the selected PSU (by inquiry as well as GPS)
- Crop/crop mixture wise list of parcels by re-tabulation method
- Area of crop(s) sown/planted in the selected parcel/sub-parcel/plot by crop diary
- Assessment of crop produce in the selected parcel by farmer's inquiry near maturity of crop
- Produce of crop(s) sown/planted in the selected parcel/sub-parcel/plot by crop diary

Preparatory work in survey to test the developed methodology (2 of 3)

- Particulars of parcels/sub-parcel selected for crop cutting experiments as well as for physical observation
- Details of produce obtained from CCE plots
- Assessment of crop produce in the selected parcel by farmer's recall

Preparatory work in survey to test the developed methodology (3 of 3)

- The developed methodology is being field tested in three countries i.e. Indonesia, Rwanda and Jamaica- in two districts in each of the three countries
- For this purpose, training on the developed methodology was provided by IASRI. Training provided two times- at IASRI as well as in field testing countries
- The field work could be carried out in only one district/study area in the three countries. Partial field work through PAPI was carried out in second district (Cianjur district) in Indonesia. Data entry carried out at IASRI.
- The data collection work was squeezed into 5 visits after discussions with BPS Indonesia
- Provision was made for supervision of field work in the three countries by IASRI team

CAPI training in field testing countries

- The Global office in FAO, Rome made arrangements for providing CAPI training in Indonesia and Jamaica
- Field testing of developed methodology through CAPI was implemented in one district in each of the three countries except Rwanda where CAPI training could not be provided before the start of the survey
- Not surprisingly, the results of the survey in Rwanda took long time to reach to IASRI for analysis though they were the first one to complete the survey work!
- However, the NISR staff in Rwanda was CAPI trained by IASRI subsequently

Sample sizes observed in different phases

1. Indonesia – DI-Yogiyakarta- survey by CAPI

Name of Province	District	Number of surveyed HHs for listing	Number of eligible HHs
DI Yogyakarta, Indonesia	Gunung-kidul	1,770	1,536

Number of Selected HHs/parcels			
Area (HH)		**Yield (Parcel)**	
Large sample (inquiry)	Small sample (GPS)	Large sample (5A & 5B)	Small sample (CCE, WFH)
204	84	101	13

Sample sizes observed in different phases

2. Jamaica

Extension area	Number of surveyed HHs for listing	Number of eligible HH
Albert Town	165	165
Christiana	438	437
Comfort Hall	137	137
Lowe River	316	315
Warsop	87	87
Total	**1,143**	**1,141**

Number of Selected HHs/parcels			
Area (HH)		**Yield (Parcel)**	
Large sample (Inquiry)	Small sample (GPS)	Large sample (5A & 5B)	Small sample (CCE, WFH)
46	28	BY PAPI	
85	29		
25	16		
70	30		
26	15		
252	118		

Preparatory CAPI related work in field testing countries

- Creation of questionnaires in Su So designer
- Sharing of questionnaires with Dr Michael Rahija and incorporation of his comments for fine tuning
- Setting up of local server at iasri http://capi.iasri.res.in for Indonesia , creation of headquarters account for Indonesia for listing
- Setting up of three local servers at iasri for three countries and creation of headquarters account in three countries
- Sharing of questionnaires in Su So designer with countries for uploading on server, creation of supervisor as well as interviewer accounts.

Details of servers

SNO	Country	URL	Version	ADMIN (User Name)	HQ (User Name)
1	Indonesia	http://capi.iasri.res.in	5.1.0	sysadmin	HQINDONESIA
2	Indonesia	http://indonesia.iasri.res.in	5.3.10	admin	HQINDONESIA
3	Jamaica	http://jamaica.iasri.res.in	5.3.10	admin	HQJAMAICA
4	Rwanda	http://rwanda.iasri.res.in	5.3.10	admin	HQRWANDA
	IASRI				HQIASRI
	Global Strategy				HQGS

Current status of the study

- Field work completed in Indonesia as also Rwanda
- Analysis work completed in Indonesia
- Analysis work in progress in Rwanda
- Some field work pending in Jamaica
- But, analysis work started in Jamaica on the basis of available data. Data available instantly due to use of CAPI
- Report writing work in progress

General remarks

- Since headquarters accounts were created for IASRI and Dr Michael Rahija in the GO, we both could always see the progress of field work
- The data collection was done by respective countries independently, IASRI was not involved in the field data collection
- There was a problem in data exporting from server, as exported data showed less no of interviews than the interviews actually conducted
- The problem was solved with support from World bank
- The supervisors and HQ did not look at the data collected by the interviewers. Thus, there were no approvals/rejections. Completed interviews were as such uploaded on the server
- IASRI did lot of data cleaning at the time of analysis

Advantages of CAPI (1 of 3)

- Flexible, Configurable, Scalable
- Su So works online and offline: Interviewer can collect data even if he is offline. Interviewer application runs on Android based tablets
- Data can be synchronized to a local or cloud based server as soon as a connection becomes available
- Multiple levels of approvals ensure the highest data quality
- The equipment is sharable: same set of interviewers can collect data on different surveys
- If a set of questions have to be asked repeatedly the questions will be automatically repeatedly
- Interviewing is easy by the customizing of questions. The computer program can recall a piece of data from its memory such as a date or name

Advantages of CAPI (2 of 3)

- The Su So online designer allows multiple users to review the questionnaire, we shared the questionnaire with Dr Michael. He made useful suggestions as also Ms Nancy Chin
- It is possible to capture information on GPS location of the interview, a barcode, image of a house, person, document or product
- Agricultural surveys involving multiple plots and multiple crops within a plot can be handled through nested rosters- too much nesting likely to create problems in data export
- Data quality checks possible through automatic as well as manual validation
- Su So tester app helps in preview of questionnaire on a tablet
- Interviewers app is user friendly. Persons having little or no experience of computer can handle with ease

Advantages of CAPI (2 of 3)

- Since the supervisor is in touch with the enumerators he can provide instant solution to the problem faced by enumerators
- CAPI minimizes typing by Interviewer as the questionnaire has options to select the right answers thus it saves time, typing errors, spelling errors.
- HQ can review at any time the progress of on- going survey, interviewer & field or respondent location.
- …..Paradata, no data entry error, routing

Disadvantages of CAPI

- Preparatory work needed before the survey: creating the questionnaire in Su So designer
- Set up costs
- Replacement of parcels is not possible-huge disadvantage, particularly in agricultural surveys
- Manuals quite user friendly-some parts difficult to understand
- Synchronization needed on a day to day basis
- In Roster there is a limit of 40. Off course, this limitation did not affect our survey- sampling at second stage
- Data exported in pieces i.e. main file and several roster files, Picture files for which experienced Programmer is needed to merge roster files with main file and further analysis of data
- Unlike in paper questionnaire notes preparation is not possible

Study to test the developed alternative methodology for estimation of area and production of horticultural crops: IASRI Component of CHAMAN Programme under MIDH

- Schedule-1: General information of the selected village
- Schedule-2: Enumeration of fruit orchards, stray fruit trees and vegetable fields in the selected village
- Schedule-3: Selection of orchards and vegetable growers and list of selected orchards and vegetable growers of the selected village
- Schedule-4: Selection of clusters / CCE plot in the selected orchard for fruit production in the selected village
- Schedule-5 (Farmer): Fruit production (kilograms) obtained from selected fruit trees of the selected orchard (to be filled by farmer/contractor)
- Schedule-6 (Field Investigator): Fruit production (kilograms) obtained from selected fruit trees of the selected orchard
- Schedule-7: Selection of fields of vegetables grown in current season by the selected vegetable grower for recording vegetable production
- Schedule-8 (Farmer): Vegetable production (kilograms) obtained from selected vegetable field (to be filled by vegetable grower)
- Schedule-9 (Field Investigator): Vegetable production (kilograms) obtained from selected vegetable field (to be filled by Field Investigator)
- Schedule-10: Distribution of produce obtained from selected orchard and vegetable field

Thank You