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Agricultural Data Collection Methodologies

Submitted by: APEC Secretariat (On behalf of consultant)

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Workshop to Assess and Improve Agricultural Data Collection and Dissemination by APEC Member Economies
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Agricultural Data Collection Methodologies

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In APEC Workshop to Assess and Improve Agricultural Data Collection and Dissemination by APEC Members , 27-28 October 2011, Manila

- Methodology covers many areas/choices: basic data capture, incl sources, measurement; survey strategy, incl sampling scheme, sampling units & frame construction, use of multiple frames; combining multiple sources, incl model-based estimation, small area estimation; etc.

- Presentation based
  - mainly on Asia-Pacific developing economies experience;
  - more intensively on recent experience in planning for the Philippines 2010 decade of agri census and surveys.

Some General Observations … 1

- Major differences in developed economy (DC)/less develop economy (LDC) agri – aqua - fisheries influence methodology choices; e.g.
  - DC consolidation / LDC fragmentation → fewer/more farms → more units to cover in LDC, esp. in a census
  - more /little record keeping → more face-to-face interview in LDC
  - low internet and modern communication modes in LDC → field visit

Some General Observations … 2

- Statistical system structure influences methodology choices; e.g.
  - NSO-led census/surveys tend to use household interviews;
  - Agri Dept more inclined to use also LGU and attached agency key informants and secondary data.
  - Agri Dept may use non-standard concepts to fit specific client need.

→ variations in choices affect comparability, accuracy.

General Observations … 3

- Multiple frame methodology almost universally called for by
  - data split among households, establishments, enterprises
  - "holding" may be host to multiple crops, livestock, aquaculture and fishing activities ("chopsuey" farms)
- Demand for more statistics in increasingly smaller areas shifts focus on
  - cost saving sources and methods, e.g. key informants, admin data
  - more LGU-NSS collaboration in data collection
  - variance-reducing but technically more demanding estimation methods; e.g. sample reuse (jacknifing), model-based estimators (ratio, regression, small area)

Some General Observations … 4

- Use of satellite imaging, remote sensing and the like
  - Progressed little beyond pilot tests due to skills lack in NSS, year-round cultivation in small holdings.
  - Application confined to constructing large strata.
  - Limited use in direct estimation process, e.g. forecasting crop yields.
  - Livestock and wildlife inventory still at talking stage.
  - Potential in estimating large areas and changes ; e.g. irrigated rice, by region and national .

General Observations … 5

- Use of GPS and internet maps (e.g. Google) **more likely and imminent**
  - to set/identify/update stratum and sampling unit boundaries
  - measure areas of irregularly shaped polygons (holdings, crop cover)
- OMR use in computer encoding widely adopted in censuses;
  next step is large-scale adoption of real-time electronic data entry during interview.

Recent Thinking on Census Taking

- For 2010 rounds, FAO recommends splitting census into:
  - *Core Census* – structural variables only, full count or large sample
  - *Supplementary Modules* – in-depth subject scope, sample only
  - *Community Census*

Moreover, do agriculture and aquaculture together (CAA), and fisheries separately (CF).

(More on this later)

Crops Statistics – Current Situation

- Too many crops. After staples, others based on less objective methods (e.g. main growing areas only, non-probability samples, interview vs crop-cut), and less accurate sources (e.g. KIs, any 'knowledgeable' household member).
- 1 crop - 1 survey → too many separate surveys to run
- heavy emphasis on production surveys → serious data gaps
- Census-surveys disconnect → frame data problems impacting quality of estimates
- Difficult measurement problems from "chopsuey" farms, varied contractual and tenancy arrangements.

Crop Statistics – Priority Agenda for Improvement

- Do Core Census that will
  - serve well as frame for intercensus surveys
  - Close discrepancies between census and survey estimates
  - fill data gaps in the crops database, e.g. through census modules
- Replace single crop surveys with a system of multi-crop surveys
- Develop more accurate methods of area measurements, e.g. GPS.
- In short, more and sustained research on census/survey sampling and measurement methodologies.

Some Quick Data Comparisons

NSO – CA totals (ooo hectares):

Philippines	**2,296 (1991)**	**2,930 (2002)**
Gravity	1,274	1,356
National	735	774
Communal	538	581
Indiv'l	626	1,000
Others	395	673

Memo: These are physical areas from parcel data regardless whether irrigated whole or part of year.

BAS Irrigated Rice (000 ha.)

	1991	2002
1st Sem	940	1,214
2nd Sem	1,089	1,295
Total	**2,030**	**2,509**

- Totals are effective areas, but < CA physical areas!
- BAS physical area (e.g. 2nd Sem) < ½CA physical area!

→CA gross overestimates even factoring BAS are rice only.

→CA Private (indiv + others) too large.

NIA Service Area Rice (ooo Ha.)

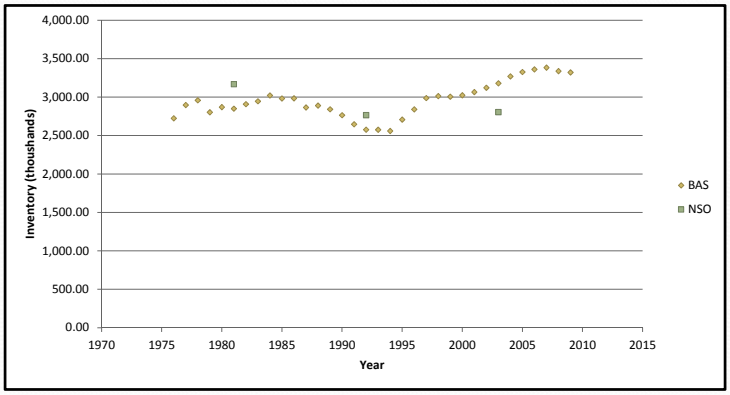
	1991	2002
NIS	645	689
CIS	724	523
Subtotal	1,370	1,213
Private	152	174
Total	**1,522**	**1,387**

- NIA numbers declining, but BAS and CA increasing!
- Private a very small fraction of CA private, --> Large discrepancies in totals.
- Service area (NIA) < gravity irrigated (CA)??

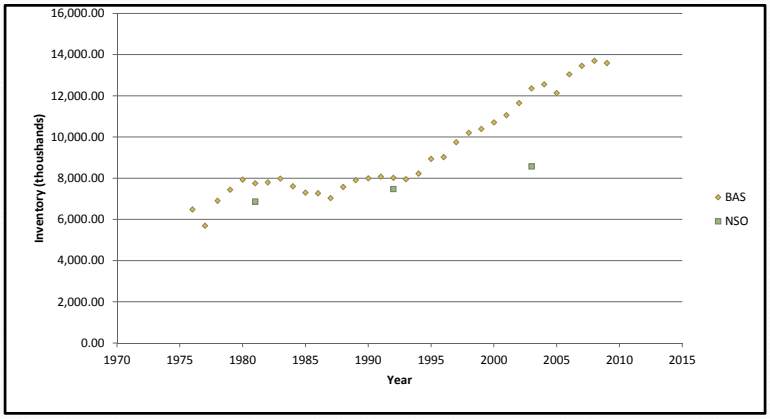
Livestock and Poultry Statistics – Current Situation

- Data needs articulated well by raisers associations, and data producers respond to the best of ability. **Accuracy of results is the main problem.**
- Large discrepancies between census and survey stock estimates; estimating flows from stocks still problematic.
- One survey per type (cattle, buffalo, swine, chicken, etc).
- Sources of survey difficulties and weaknesses:
  - frame defects, incl obsolescence
  - Key informants data: cheap, but you get what you pay for
  - High geographic spatial distribution of producers
  - High seasonal variation of stocks and flows; esp swine, poultry
  - Contract growing arrangements scatters info among households, managers, establishments, enterprises.

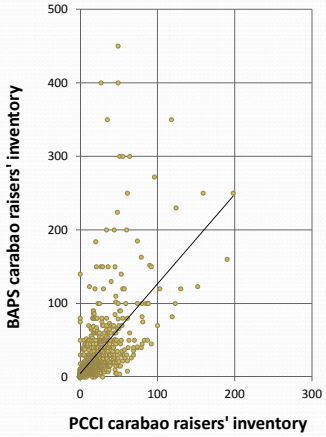
Carabao Inventory, National Level



Swine Inventory, National Level



PCCI x BAPS Barangay Carabao Inventories



L & P Statistics – Priority Agenda for Improvement

- A census that will provide adequate L & P sampling frame.
- A large-sample L&P Supplementary Census module to (i) fill gaps between Core Census and inter-census surveys and (ii) serve as master sample for the latter; i.e.
- Redesign surveys into integrated system of one or two (livestock, poultry) household-based surveys; similarly for establishment –based surveys. Multiple frame methodology again, with household-based surveys.

Aquaculture Statistics – Current Situation

- Aquaculture has or will in near future surpass Fisheries' share in economy, but not treated as such in statistical data collection activities.
- Concepts, definitions not as developed as other sub-sectors; e.g.
  - What is an aquafarm?
  - Volume for hatchery, cages, fish condos; surface area for pens, ponds?
  - Output measure for hatchery, fingerling operation vs. grow out (tons)?
- Serious data gaps vis-à-vis users' expressed requirements. Collection mostly on production, not on inputs or processes; e.g. stocking rate, survival rates, production costs.
- No error estimates (actually the case in general, except for main crops)

Aquaculture Statistics – Agenda for Improvement

- Develop standard concepts, definitions, classifications
- Use Core Census to collect frame data
- Do Aquaculture and Fisheries Supplementary Module (large sample)
- Design Sample Survey System as subsamples from Supplementary Module
- Serious measurement problems requiring research; e.g. Pond caretaker, manager, owner may be different persons (individual or juridical). Who responds to survey?

Fisheries Statistics – Current Situation

- How, and where, to count creatures caught from a population that swims and can't be seen? Ask the fishermen, go where fish are landed, to market, ask final consumers, or all of the above?
- Attribution – to village, province (not relevant?) or fishing ground (definition?)
- No permanent fisheries group in NSO (census); expertise lodged elsewhere (BFAR, SEAFDEC, Research Inst), not in the data collecting agency (BAS).
- "Proof of the pudding is in the eating". The last (Philippines) Census of Fisheries results were released at national levels only, and requests for the report had been rumored to be very low.

Philippines Plan for 2010 Round of Agri Censuses and Surveys: Good Practice in Developing a Data Collection System?

In present system,

- NSO did CAF, BAS all other agri surveys → problems with frame, use of non-comparable methods and defns → large discrepancies bet census and surveys data series → significant data gaps.

In 2007,

- Working Group (WG) established at SRTC to plan next census ; composed of staff from NSO, BAS, SRTC; with NSO funding. WG reports and recommendations vetted by Steering Committee co-chaired by NSO, BAS, SRTC heads.
- WG expanded activities to planning for whole agridatabase collection system covering censuses, surveys, secondary data for 2012-2022.

Philippines Plan … p2

- WG held regular meetings, did research on the existing system, field trips to gain first hand experience, organized users consultative workshops, constructed and pretested census instruments, etc.

WG's Steering Committee- approved recommendations to-date:

- Follow int'l (FAO recommendations) on census; i.e.
  - Split census into Core Census 2012, Community Census 2012 and Supplementary Modules (SMs) in succeeding years, viz: Irrigation and Cropping Patterns, Livestock and Poultry, Aquaculture and Fisheries, Capital Formation
  - SMs will have large samples and richer questionnaires that (i) allow in-depth analysis than the BAS inter-census surveys, (ii) fill gaps between core census and BAS surveys, and (iii) could serve as (1st-phase) sample for the BAS surveys (2nd phase).

Philippines Plan … p3

- NSO is lead agency for Core Census and Community Census;
- BAS is lead for the SMs (This is new and w/o precedent)
- BAS will continue its (redesigned) inter-census surveys.

WG and Steering Committee still exist, and may continue to be active in developing instruments and designs for the censuses, SMs and inter-census sample surveys.

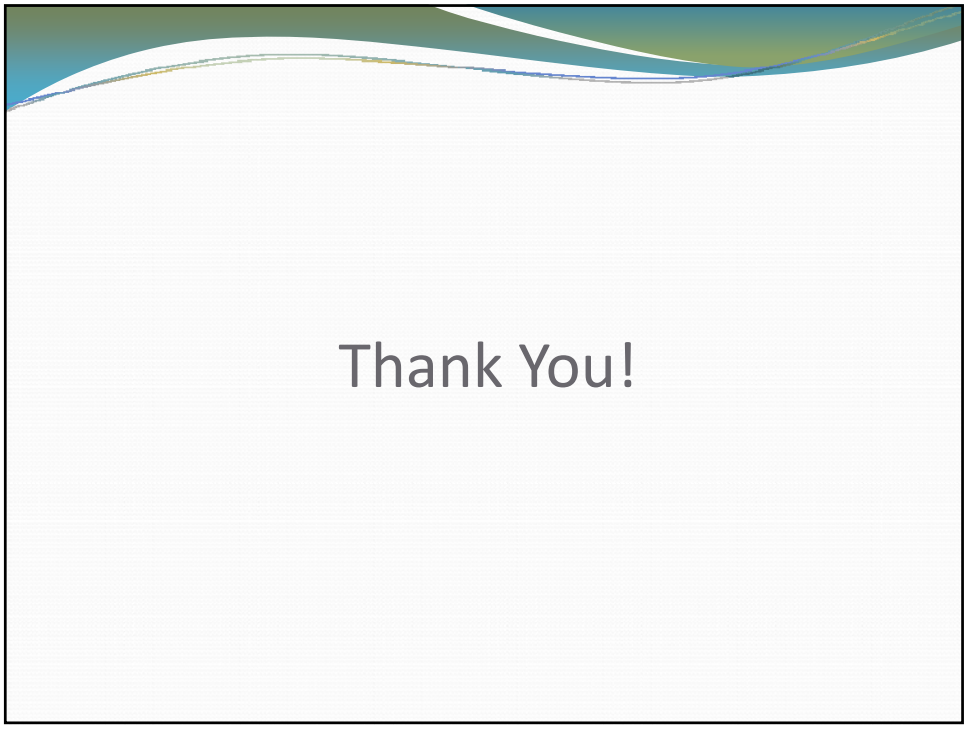
Philippines 2012- 2021 Plan, … p4

Success factors:

- *Long lead time used in research, user-producer dialogs, pretests*
- Included in 2011-2017 Philippine Statistical Development Plan (PSDP)
- Vastly improved NSO knowledge of agriculture, aquaculture and fisheries
- NSO-BAS merger provision in priority PSS Reorganization bill in 2011
- 100% domestic ownership/financing

Risk Factors:

- WG recommendations require multi-year budget vs annual budgeting.
- Competition from new data collection initiatives; e.g. farmers and fishers national registry.
- Technical human resources lack in PSS


Thank You!