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Literature Review of Dairy Extension in Indonesia

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Literature Review of Dairy Extension in Indonesia

Report by Vyta W. Hanifah, Indonesian Center for Agricultural Technology Assessment and Development (ICATAD), the Indonesian Agency for Agricultural Research and Development (IAARD)

This report is a deliverable of the research project ***AGB/2012/099: Improving milk supply, competitiveness and livelihoods in smallholder dairy chains in Indonesia – IndoDairy*** funded by the Australian Centre for International Agricultural Research (ACIAR). The project is led the University of Adelaide's Centre for Global Food and Resources (GFAR), the Indonesian Center for Animal Research and Development (ICARD), Indonesian Center of Agricultural Socio-Economic Policy Studies (ICASEPS) and Bogor Agricultural University (IPB). The project aims to increase milk supply (quantity and quality) by 25% and net-household incomes by 2020 for at least 3,000 dairy producers in West Java and North Sumatra, Indonesia. This review of dairy extension in Indonesia contributes to the design of an integrated extension program for smallholders in Indonesia.

More information: www.indodairy.net

I. General information

Dairy production in Indonesia is characterised by small-scale farms with low productivity, poor reproduction performance, poor replacement rate, poor feed quality and availability, lack of support from dairy experts as well as from government in the form of the real market and the increase supply. There is high demand for milk in Indonesia due to growing middle class, but still domestic supply is low. Therefore, increasing milk production from the level of local farmers could be an opportunity to develop small-scale dairy farming in Indonesia.

Government support is need in the following three areas to support the development of dairy businesses: (i) create a situation where people make money from dairy farm; (ii) create a situation where dairy farming is very attractive business to get involved in; and (iii) create policies to increase investment in dairy farming business.

To create a situation means to empower farmers. It also means that farmers need such of assistance in terms of applying good technology and improving knowledge or skills. IAARD, through the function of the Indonesian Center for Agricultural Technology Assessment and Development (ICATAD) and Assessment Institute for Agricultural Technology (AIAT) in 34 provinces, has implemented many kinds of approaches to disseminate technology to help farmers to improve their livelihoods. AIATs have the human resources to do research and disseminate the technology; they are researcher and extension officer.

II. Resume of literature on dairy extension

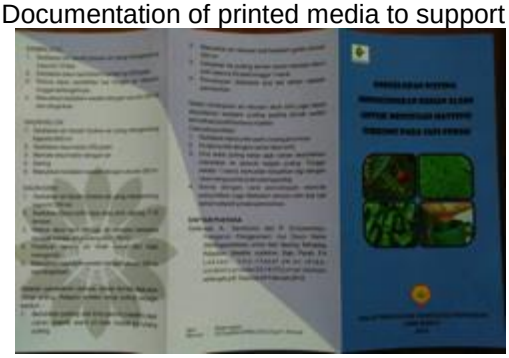
This literature review was written based on the experience of AIAT West Java in doing dairy extension activities as explained in the Report of Assistance in Developing National Livestock Area 2016, or other topics related with the livestock extension activities. This literature also presents other approaches that have been implemented in the regards with the effort of IAARD to develop dairy farming in Indonesia. Further literature was reviewed relating to research on dairy farming, and is summarised. The outline of presentation as follow:

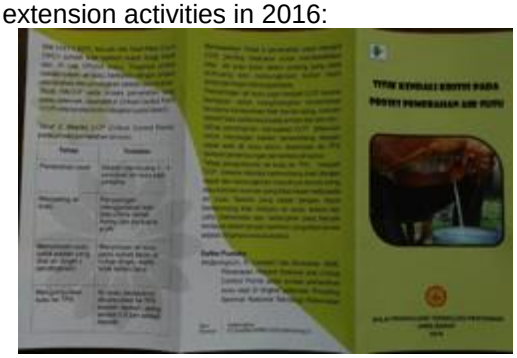
1. Experience from AIAT West Java

- A two-year programme of dairy extension was started in 2015 in Bandung Barat District with 1 farmer group. In 2016 the programme worked with 2 farmer groups in the same district with approximately 25 members.
- The innovations introduced to the groups was silage complete feed. This choice of innovation was recommended from 2015's research, when the programme compared palatability of silage complete feed and fermented rice-straw complete feed. The results showed that silage complete feed was more palatable.
- Methods in 2016:

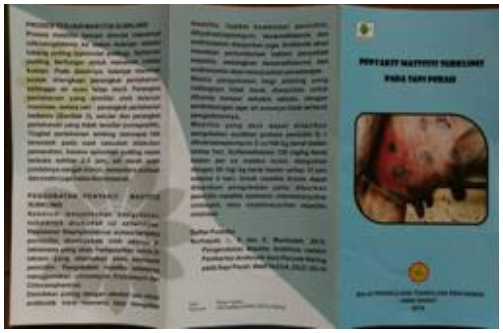
- Demo-plots using 2 lactating cows (selected cows to have second lactation), in the area of:
  i. Demo-plot of silage complete feed
  ii. Demo-plot of Urea Molasses Block (UMS)
  iii. Demo-plot od manure management (composting an bio-urine)
  iv. Demo-plot of self-producing MOL (micro-organism-local)
- Training on several topics, such as:
  Trainings conducted by AIAT West Java:
  i. Training on producing MOL, in a class and practice
  ii. Training on producing UMB, in a class and practice
  In addition, there were also trainings facilitated by local office (Dinas), for example:
  i. Training on milk processing based on Standard Operating Procedure (SOP), in a class and practice
  ii. Training on reproductive and veterinary, in a class
- Visiting another farm (Farmer Group of S28 in Bandung District) that already applied silage complete feed and composting the manure under supervision of AIAT West Java in the year before. The report described that members of Farmer Group of S28 convinced that feeding silage complete feed, indeed, increased cows performance as well as milk production. They also benefited from applying compost to their horticulture-crop cultivation. Learning from this experience could motivate other farmers to be more confidence in applying introduced innovation from AIAT West Java.

- Silage complete feed consists of:
  - Fresh rice straw
  - Onggok (by product of processing cassava to be tapioca flour)
  - Rice bran
  - Pollard
  - Pellet
- Result of technical assistance during the extension activities:
  - Application of feeding silage complete feed on 2 cows
    → increase milk production from 11.25 litre/day/cow to 13.63 litre/day/cow.
  - Application of feeding UMS on 2 cows
    → increase palatability but no effect on milk production yet.
- Documentation of printed media to support extension activities in 2016:

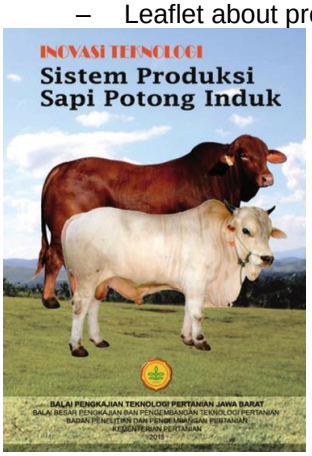

About good milking practice


About good milking practice


How to handle mastitis


Introduction of mastitis in dairy cattle

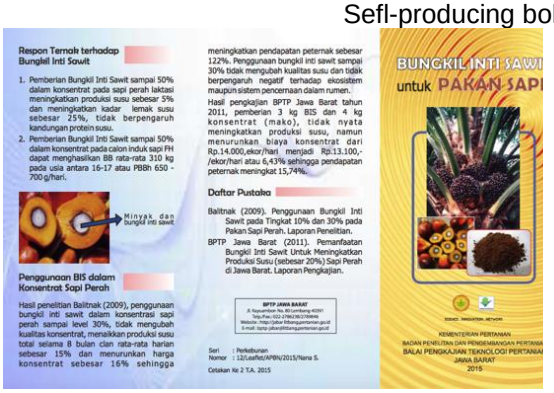
- Additional materials were uploaded on **BPTP WJ's website**: (www.bptp-jabar.litbang.pertanian.go.id)
  - Brochure about Production System of Cows (beef cattle)
  - Leaflet about forages composition based on physiology (dairy cattle)
  - Leaflet about palm kernel meal (BIS) (beef cattle)
  - Leaflet about producing compost (bokhasi) (beef and dairy cattle)
  - Leaflet about complete feed (beef and dairy cattle)
  - Leaflet about reproduction on beef cattle
  - Leaflet about producing liquid organic fertilizer (beef and dairy cattle)



Technology innovation of production system on beef cattle cows

Technology of complete feed

Sefl-producing bokhasi (compost)



Palm kernel meal for feeding cattle

Reproduction management for beef cattle

2. **Experience from previous approach of dissemination by IAARD: PRIMA TANI** (*Program Rintisan Pemasyarakatan Inovasi teknologi pertanian* /Programme on accelerating dissemination of agricultural technology innovation, 2005-2009)

- Among 201 sites across all provinces in Indonesia, only 3 sites worked on dairy farming:
  - East Java Province (Pasuruan district) -- Koperasi Peternakan Sapi Perah (KPSP) "Setia Kawan" Nongkojajar
  - Central Java Province (Boyolali district) – GKSI
  - DI. Yogyakarta Province (Sleman district) -- Koperasi UPP Kaliurang, Koperasi Warga Mulya dan Koperasi Sarono Makmur
- Introduced innovations:
  - Feed bank; feed enrichment
  - Value added through milk processing
  - Milking practice
  - Stock replacement
  - Reproduction
  - Institutionalized the farmer group
  - Marketing of fresh milk
- Extension methods in PRIMA TANI:
  - Trainings by AIAT:
    - ✓ Good milking practice
    - ✓ Producing complete feed using local resources
    - ✓ Processing milk
    - ✓ Composting manure
    - ✓ Biogas
    - ✓ Animal health
  - Demo-plots in selected sites:
    - ✓ Complete feed using local resources/feed enrichment
    - ✓ Biogas

3. Research on dairy farming

Research on demo-plot for dairy farming, for instance:

- Research on improving milk production through Bovine Somatotropin injection and lactation period on post lactating cows:
  - In Bogor, West Java, using 18 lactating cows
  - Result: the injection increased milk production differently between 4th lactating cows and 6th lactating cows, by 28-30% and 17-20% respectively
- Research on introducing improved feed quality during lactation period to investigate its effect on thermoregulation:
  - In Boyolali, Central Java, using 8 lactating cows (farmer group)
  - Result: improved feed containing 12% of protein has no effect on thermoregulation in dairy cattle
- Research on supplementing FML (fermented mother liquors) as Non Protein Nitrogen:
  - In Pasuruan, East Java, using 6 lactating cows (coop)
  - Result: the supplementation increased milk production, no effect on milk quality

Research in field laboratory of university, for instance:

- Research on reducing subclinical mastitis by supplementing curcuma, Zn-proteinate and Cu-proteinate in FH cows:
  - Padjajaran University, using 24 lactating cows
  - Result: the supplementation reduced subclinical mastitis significantly on the day of 23th.

4. Literatures from postgraduate thesis (IPB):

- Communication intensity and dairy farmer's perception towards the sustainable adoption of improved feed during dry period at Sleman District, Yogyakarta:
  - Result: sustainable adoption of technology is related to respondent's perception about message and communication channels.
  - Message components are relative advantage (r=0,253*), complexity (r=0,263*), and compatibility (r=0,347*).
  - Communication channel is interpersonal channel (r=0,489**)
- Entrepreneurship competence of the dairy farmers: case study of dairy farmers at Pasuruan District - East Java and Bandung District-West Java:

- Factors influenced the entrepreneurship competence of farmers are ability to access information, motivation, and support from extension institution and government policy.

III. Alternative extension methods

Above all, this literature also conveys alternative extension methods that are typically used to disseminate information and innovations, as well as influencing farmers in the decision making process on technology adoption. Table 1 below presents the list of alternative extension methods including identified strengths and weaknesses of each method.

Table 1. Strengths and weaknesses of different extension methods

Method	Strength	Weakness
Discussion Group	• Sharing updates • Topic is adjustable to current condition • Sense of belonging and being responsible toward extension activities	• Need a trained facilitator for active discussion • Active participation depends on farmers attending the meeting (very talk active or very silent person) • Sometimes, difficult to make a group decision
Demonstration	• Engaging farmers to have active participation • Learning by doing	• Need to distinguish demonstration during training and demonstration in the farm (demo-plot/demo-farm)
Demo-plot (super-imposed) – joint experiment or facilitated research activity (FEATI)	• Farmers fully engaged since planning, implementation, monitoring, and evaluation (feedbacks) • Strengthen collaboration between researchers, extension officers and farmers • Minimizing risk on adoption process	• Costly • Time consumed • Monitoring is a critical point to be well implemented
Poster	• Attracting attention of many people • Simple and straightforward message	• Need explanation for more understanding • Integrated with other methods (complementary) • Short period of usage (effect has ended as people being used to see it)
Trainings	• Effective to learn new knowledge and skills systematically • Initiating leadership among farmers • Alumni can be next trainers • Strengthen relationship among farmers	• Costly depend on topic, material, venue and facility • Need supporting environment to support training process • Challenges on selecting participants • Follow up action may be neglected after the training

There was another approach of extension in Indonesia that widely has been implemented by AIATs from the late 2000s to recent years, in order to support government programme in reaching self-sufficiency on rice, maize and soybean. The approach was named Farmer Field School (FFS) on Integrated Crop Management (ICM). Table 2 below illustrated the features between FFS and Training & Visit as prior methods in extension that was the most popular practiced from 1974-2000.

Table 2. Comparison between Training & Visit and FFS

Feature	Training & Visit	Farmer Field School (FFS)
Basic philosophy	Instruction	Experience
Farmers' role	Consume new know-how	Decide, then Master
Trainers' role	Teach	Facilitate
Duration	Continuous	Limited
Farmers' perception	Service for free	Part of a movement

Designing extension methods needs to address the objectives to be achieved. Table 3 below outlines lists of purposes in doing extension activities and the possible methods that could be applied.

Table 3. Lists of purposes and possible methods of extension

If the purpose is:	Methods could be:
Develop skills on certain topic	Demo-plot/demo-farm/joint experiment/facilitated research action; training
Change attitude	Field visit to other farms; group discussion
Attracting attention on new technology	Poster; video; visit to research institute
Improve new knowledge	Presentation in meeting; group discussion
Farmer empowerment	FFS; series of trainings

There are five levels of new technology adoption process, as follow:

Attention → Interest → Desire → Decision → Action

However, in fact, the pathway is not single and direct line from '*Attention to Action'*. As farmers have own perception and power to make decision after the Action (adopting a certain new technology), they might consider changing the practice so then they would do trial and error.

Therefore, the pathway of adoption is not straightforward as the level above; it could be in the form of flows, for instance:

Attention → Interest → Desire → Decision → Action → Desire → Decision → Action → …..

It seems to be never ending improvement as the knowledge and skills are enhanced, and moreover, there is a support from extension experts to provide enabling environment of adoption. Table 4 presents the roles of extension in each level of adoption process.

Table 4. Roles of extension in adoption process

Level	Source of information and support
Attention, first notice	Field extension, other farmers, printed/online media
Interest, looking for more info	Field extension, other farmers
Desire, considering advantages and dis-advantages	Family, other farmers, field extension
Decision, doing trial and error	Field extension, other farmers, technical guidance, input suppliers
Action, adopting new technology	Family, other farmers, input suppliers

To conclude, in designing extension methods needs to consider what the purpose in doing so. Also, combining more than two methods could bring the targeted people to change and to get closer to reach the goal.