THE SCIENCE OF DELIVERY:

Exploring Dynamics Between Technical and Local Knowledge Within Delivery Systems

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ABSTRACT

This monograph proposes an approach to agricultural extension, as inspired by the Science of Delivery (SOD) concept. It aimed to (1) design and develop a delivery model based on the SOD and its four dimensions; (2) apply this delivery model in the agriculture sector involving the interface of scientific knowledge from agricultural researchers, operational knowledge from extension workers, and local knowledge from farmers; and (3) seek empirical validation of this model within the Department of Agriculture-Philippine Carabao Center (DA-PCC). Translating the SOD's four dimensions into four elements that may be situated within a model, we arrived at the following: Local Knowledge; Research-Based Innovation; Delivery Skills Sharing; and Delivery Systems Framework. As applied to the Philippine agricultural sector, in general, and the DA-PCC, in particular, this innovation-delivery model submits that effective delivery of innovations requires that: (1) Research-based innovation or technology should be informed by local or indigenous knowledge; (2) The model that informs and explains the delivery strategy adopted by the agency should be studied and shared within the agency, particularly the tacit knowledge gained by the more experienced personnel; and (3) Innovation should be combined with the delivery system. Delivery will not be effective if any one of these elements is missing. The innovation-delivery model was validated empirically at the DA-PCC through the production or publication of its knowledge products (KPs) in the forms of document (Innovative Answers, Solutions, and Knowledge or iASK Series) and video (Knowledge Brokerage, Guidance, and Advisory Network or KBGAN Learning Series). Both types of KPs were designed, developed, and disseminated with farmers and partners from the local government units, and nongovernmental organizations as intended users or audience. The contents of the KPs were innovations generated by research in the DA-PCC laboratories and farm sites. Research results were informed and corroborated by local knowledge and practical experience from farmer-cooperators. The KP delivery system makes use of a knowledge management framework and the designer-developer-disseminators have been trained on the most appropriate means of framing their messages.

Keywords: Science of Delivery, knowledge products, innovation-delivery-model, agricultural extension

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We appreciate very much the active participation of the DA-PCC staff particularly those stationed at the Knowledge Management Division, Planning and Information Management Division, Research and Development Division, and regional centers for their valuable contribution to the generation and evaluation of knowledge products, two of which are featured in this monograph. Likewise, we extend our deep gratitude to the farmers, co-operative officials, technicians, and carapreneurs for sharing their precious time and valuable feedback during the pretest and posttest of the said materials.

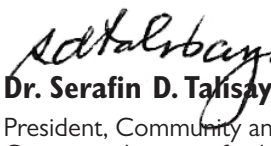
Finally, we express our sincere thanks to Dr. Serafin D. Talisayon, known as the "Father of Knowledge Management in the Philippines", for introducing to us the concept of Science of Delivery and for sharing his wisdom and continued guidance to more effectively translate the DA-PCC's organizational and human assets into meaningful and actionable knowledge products.

FOREWORD

Development does not take place in classrooms, laboratories and offices. Ultimately, development happens "on the ground." Local communities are where the development tire "hits the ground", so to speak. Yet, development frameworks are often formulated by government planners, United Nations experts and NGO advocates - people who do not lack excellent knowledge and good intentions. What is lacking is a better framework that embodies local knowledge and worldviews, respects local interests and contexts, and genuinely listens to the needs and wishes of local people.

The value of this paper is that it offers a better framework, a "new eye" to see the development world afresh. True, it was written by researchers, academics and government officials but I know that the authors were steeped in years of listening and assisting local people and seeking better ways of delivering that assistance to them. They are practitioners of scientific and humanistic self-reflection: the fine science and art of examining, challenging and revising - if needed - their assumptions and mental models.

From my personal and professional perspectives, I highly recommend this paper to the reader.



Dr. Serafin D. Talisayon
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ACRONYMS

DA-ATI	Department of Agriculture - Agricultural Training Institute
BAEx	Bureau of Agricultural Extension
CBE	Carabao Based Enterprise
iASK	Innovative Answers, Solutions, and Knowledge
KBGAN	Knowledge Brokerage, Guidance, and Advisory Network
KM	Knowledge Management
KM4D	Knowledge Management for Development
KMD	Knowledge Management Division
KP	Knowledge Product
LGU	Local Government Unit
MBM	Mediated Bilateral Model
M&E	Monitoring and Evaluation
PATH	Program of Advancement through Health and Education
DA-PCC	Department of Agriculture-Philippine Carabao Center
SDG	Sustainable Development Goals
SEARCA	Southeast Asian Regional Center for Graduate Study and Research in Agriculture
SOD	Science of Delivery

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INTRODUCTION

Background

From 2015 to 2017, the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) collaborated with the Department of Agriculture-Philippine Carabao Center (DA-PCC) on a project titled ***Building Capacity and Strengthening Partnerships for the Carabao Development Program.*** A knowledge audit of DA-PCC was conducted during the initial phase of the project. The results of the knowledge audit highlighted the need for new and better institutional and individual capacities to effectively deliver Carabao-Based Enterprise (CBE) knowledge and services to the farmer. This monograph proposes a framework that defines and details the elements of such capacities inherent within an effective delivery system.

Extension and Delivery Systems. The agricultural sector oftentimes refers to this delivery system as ***extension***, a term borrowed from the original American state universities, which, because of their initial focus on agriculture, were called "cow colleges" (Javier, 1994). During the early 20th century, these land-grant institutions (which included the University of the Philippines College of Agriculture) "extended" most of their agricultural research results to nearby communities, earning them their current trilogy of functions - instruction, research, and extension.

Because of the traditional links between these functions, the Philippine agricultural extension system became one of the most vital extension services in the Third World serving as an exemplar for neighboring countries in Southeast Asia such as Thailand and Indonesia. Since the late 1980s, however, the service has significantly weakened with devolution (Flor, 2002). Replaced by the Department of Agriculture - Agricultural Training Institute (DA-ATI), the Bureau of Agricultural Extension (BAEx) ceased to exist. Decentralization has effectively severed the link between research conducted by national and regional institutions and extension implemented at the municipal level.

Nevertheless, the concept of ***delivery systems*** is not exclusive to the agriculture sector. The term is used freely in other areas, from nuclear warfare to marketing, and from education to healthcare. The most commonly attributed

definition of delivery systems comes from the **Medical Encyclopedia (2011).** This definition, a means or procedure for providing a product or service to the public, is what we shall adopt in this monograph to be applied to the agricultural sector using a knowledge sharing or knowledge management framework.

Science of Delivery. Former President Jim Yong Kim of the World Bank believes that a deep understanding of delivery is essential in development work and has proposed a science of delivery or SOD. According to this view, demand-driven knowledge products and services are not enough to bring about the desired result. There must also be effective delivery to be useful at the local level where development results are produced. Kim believes that inconsistencies in development results may be attributable to lapses in delivery.

He gave four dimensions to the emerging science of delivery:

> - *It will support frontline implementation by collecting local experience and feeding that knowledge back into practice.*
> - *It will teach delivery skills based on the experience of the most successful practitioners.*
> - *It will incorporate prospective research to spur innovation and evaluate new interventions.*
> - *It will develop theoretical and analytical frameworks that can help explain and adapt successful approaches to solving delivery problems.*
>
> **(Kim, 2013)**

Objectives

The objectives of the monograph are:

1. To design and develop a delivery model based on Kim's science of delivery and its four dimensions;

2. To apply this delivery model in the agriculture sector involving the interface of: scientific knowledge from agricultural researchers; operational knowledge from extension workers; and local knowledge from farmers.

3. To seek empirical validation of this model within the DA-PCC.

With this model, the DA-PCC may trailblaze in this SOD and propose a new approach to agricultural extension. The design, development and testing of a delivery system for carabao-based enterprises may result in an innovative extension model and knowledge sharing protocol where local knowledge and operational knowledge supplement technical knowledge. If proved sound, then the entire agricultural extension community may emulate DA-PCC's SOD model.

REVIEW OF RELATED LITERATURE

Most literatures on the SOD that preceded this monograph were in the form of case studies from the World Bank Group (WBG) published through the Global Delivery Initiative (GDI) website. These references submit that SOD plays an integral role in improving the impact of different interventions on peoples' lives.

Technical knowledge by itself will not achieve an organization's purpose because most of the disruptions arise in its delivery phase. In many cases, technical knowledge is substantial but the delivery systems are poor. Most program initiatives encounter the majority of their problems during the implementation stage and are referred to as non-technical challenges such as lack of capacity and lack of coordination among interested parties.

There is this need to strongly bridge the gap between the technical and the non-technical aspects of every intervention and properly match the "what to deliver" with the "how to deliver." The challenge then is how to develop an effective SOD for every technical solution.

Science of Delivery vs. Science of Discovery

Catford (2009) described the struggle that health practitioners experience in their pursuit of delivering health promotion. He stressed that although there are significant results produced out of their effort to study health issues, there has been less attention paid as to how these things will be delivered effectively. For that reason, the sector's effort to promote health has been weak if not ineffective. This is because practitioners tend to focus on the 'science of discovery' rather than the 'science of delivery'. A lot of issues has been discovered and studied but has not been truly addressed because of failure in the delivery stage.

Research in the health sector has looked into the cost-effectiveness of health promotion. Examples of these include the examination

of the UK Treasury on the 'economic costs of health care and the role of prevention', the study of Australia's Department of Health and Ageing on the positive impacts of previous investments given in tobacco control, vaccination and road safety and the results reported by the Trust for America's Health on how to make significant savings on future health costs by strategically investing small amounts now. Catford underscored that these studies built on the foundation of cost-effective health promotion, which leads to the more complicated task of empirically examining the potential results of using 'alternative delivery and capacity-building structures at the local, regional and national levels'.

Catford also discussed that despite poor delivery instruments, the actions identified by the Ottawa Charter to facilitate health promotion remained the same. This is enumerated as follows: 'build healthy public policy, develop personal skills, strengthen community action, create supportive environments and reorient health service'. These tasks became the guiding principle in creating policies for health promotion. Catford mentioned that during the First International Conference in Ottawa in 1986, practitioners labeled three ways to promote health namely: to advocate, to mediate, and to enable. To advocate means to encourage a favorable environment for health promotion in terms of 'political, economic, social, cultural, environmental, behavioral and biological conditions'. To enable means helping people achieve their capacity to reach the highest level of health condition by providing useful information and imparting relevant skills to be able to come up with better choices regarding their health. Lastly, to mediate means to coordinate these efforts to other stakeholders. As the promoter of health, the sector has to initiate the coordination process.

In the end, Catford concluded that there is a strong need to match the 'science of discovery' with the 'science of delivery'. He emphasized the need for applied research to document and analyze the previous experiments about health promotion delivery and the 'knowledge of sustainable resourcing and funding models for health promotion' should also be developed.

As can be seen in the next sections, SOD is deeply rooted in knowledge management.

Knowledge Management

The SOD sits well within the purview of Knowledge Management (KM), which is an evolving discipline that considers intellectual capital as a manageable asset (Leibmann,

1999). It was initially conceived from a corporate-organizational context with wealth-generation/profitability as its primary concern. It is based upon the assumption that today's global economy is knowledge-based and that knowledge is a primary commodity as well as a valuable resource that can generate or lead to other resources (Flor, 2001).

"Knowledge", in this sense, and as defined under ISO 30401:2018 by the International Organization for Standardization (ISO), refers to "human or organizational asset enabling decisions and action in context, which is "acquired through learning or experience" (ISO, 2018).

As a discipline, KM "promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's knowledge assets, which include database, documents, policies, procedures, and previously uncaptured expertise and experience of individual workers" (Janus, 2016: 4). Figure 1 presents a basic KM framework (Talisayon, 2008; 2016).

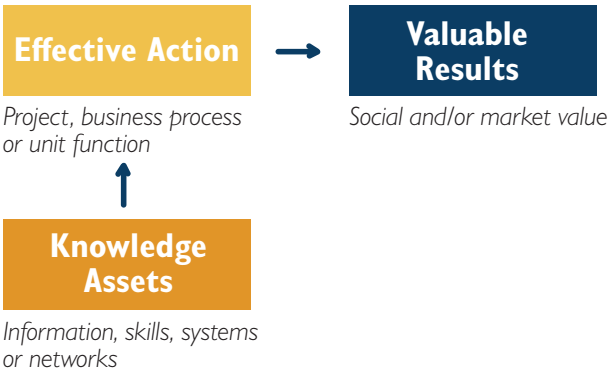

Figure 1. Basic Knowledge Management Framework (Talisayon, 2008; 2016)

Knowledge assets *refer to the intellectual resources of an organization, which include human capital (e.g., skills and experience), structural capital (e.g., manuals, procedures, and information systems), relationship capital (e.g., networks, customers, partners) and other tangible assets (technology, books, patents).* ***Effective action****, as an expected response to knowledge assets, can include physical action, project activity, problem solving, answering questions, management decision, policy or legislative enactment.* ***Valuable results*** *can include achievement of a development outcome, customer satisfaction, profit, cost savings, revenue growth, or any benefit enjoyed by a stakeholder (Talisayon, 2016).*

KM also entails digitally capturing documented and tacit knowledge and storing these for sharing and reuse. Thus, knowledge is managed through a complete intranet system and guided by organizational policies that provide incentives to knowledge sharing. The goal of KM is the sharing and reuse of intellectual capital (Leibmann, 1999). Although, distinctions are made between undocumented or tacit knowledge and documented or explicit knowledge, both are captured digitally and stored in a knowledge base. These are also made available digitally in a variety of multimedia formats for sharing and reuse.

KM was borne out of the need to systematically leverage the intellectual assets of an organization to achieve its goals. We can trace its origins to Nonaka and Takeuchi's treatise on the knowledge-creating company (1995), which was informed by the tacit-explicit knowledge dichotomy of Polanyi (1967). However, it was Davenport and Prusak (1997) who introduced the term "knowledge management" to the wider management science community.

At the very onset, KM was intended as a tool for the private sector, a means to increase an organization's IQ, as Gates (1999) puts it. Soon after its introduction to the corporate world, however, both the government sector and the international development assistance community owing to the fact that governments and international agencies are, by nature, knowledge organizations, embraced it. These include United Nations agencies; international financial institutions such as the World Bank, the International Monetary Fund (IMF), and the International Fund for Agricultural Development (IFAD); regional financial bodies such as the Latin American Development Bank, the Asian Development Bank, and the African Development Bank; and bilateral aid agencies as well, such as USAID, AusAID, CIDA, JICA, AFD, DFID and others.

In recent years, researchers have begun applying KM to indigenous knowledge systems and practices (IKSP), which makes it particularly relevant to the local knowledge dimension of SOD. Moreover, one can easily discern the relevance of KM to delivery systems with its emphasis on sharing and reuse. Furthermore, its affinity with extension becomes evident when one considers development agencies as knowledge organizations and their stakeholder beneficiaries as knowledge users, sharers, and reusers.

Knowledge Management for Development (KM4D), an offshoot of KM, also recognizes intellectual capital as a manageable asset but it is leveraged not to increase the corporate bottom-line but to further the development agenda, nowadays consolidated as the Sustainable Development Goals or SDGs. KM4D is likewise founded on knowledge science and knowledge economics. It is also anchored on Davenport and Prusak's KM theory and thus adopts a digital environment. However, it is applied within the development context and targeted at the achievement of national, regional or global development goals. From the point of view of governments and development assistance agencies, KM need not be exclusively applied to organizations. It can very well be employed to on-going concerns such as projects and to larger systems, communities, or development sectors. For instance, knowledge within academia, scientific circles, or communities of practice, can be managed, particularly so with social media and content management systems (Flor, 2017).

Knowledge Translation

Knowledge translation preceded Kim's SOD by about five years. However, it has become one of the major impetus in the development of SOD. Knowledge translation bridges the gap between knowledge discoverers and knowledge users, i.e., the science of discovery and the science of delivery. It involves processes that convert knowledge into its practical application or processes that convert less actionable to more actionable information (Talisayon, 2012). Such process is considered iterative, dynamic, and complex and concerns both the "creation and application of knowledge" (Strauss, Tetroe, and Graham, 2009). It is also the meeting ground between research and action, as knitted by communicative relationship (Bennett & Jessani, 2011). The latter is seen here as being facilitated by intermediaries.

In a previous study by Palacpac (2010; 2011), the need for knowledge translation through intermediaries was highlighted in the differences between the cultural scripts of farmers and scientific scripts of scientists. Script is akin to "mental map" that guides or influences how an actor behaves or acts in a particular space in society. In the said study, a model was developed utilizing a science-society communication framework to understand the dynamics of adoption of innovations for dairy buffalo development, as spearheaded by the DA-PCC.

The model was called Mediated Bilateral Model (MBM), which analyzed the distinct scripts of farmers, scientists, and intermediaries.

Unmediated and unilateral performance of scripts by scientists was evident in the introductory Technical Training sessions given to farmers, which resulted in low adoption rates for particular innovations. Mediated performance of scientific scripts became possible via field negotiations engaged in by farmers and field technicians (the main DA-PCC intermediary actors). These were anchored on joint inscriptions of scientific script (technical and objective knowledge) and farmers' cultural script (local and practical knowledge) to what become 'interface instruments', which resulted in integrative agreements regarding the performance or adoption of some innovations. In short, intermediaries facilitated a communicative relationship between the farmer and the scientists such that knowledge is effectively translated into practical action (adoption of innovation).

An "interface instrument" can take the form of training design, information, education and communication (IEC) materials (e.g., manuals, extension bulletins, and the like), and other documented processes, which contain or represent a "hybrid knowledge", a result of integrating the scripts of farmers and researchers (Palacpac, 2010).

Knowledge Product

Knowledge product (KP) is an output or embodiment of knowledge translation. It is defined as "tangible outputs e.g., publications and other products of development, sharing, or application of information and knowledge contents" (ADB, 2012). Talisayon (2012) provided a similar definition but with emphasis on the actionable feature of knowledge, i.e., KP as "an output of a process, team or organization in the form of a document that enables effective action". But aside from documents, KPs could also include recorded music, films, television programs, and even art and software whose relevance and utility reside in the content that can be extracted from them (Taylor, 2009).

The above definitions call for demand-driven instead of supply-driven KPs. The latter was cited as the main reason why more than 31 percent of KPs (in the form of policy reports) produced by the World Bank were never downloaded and that some 87 percent of such KPs were never cited (Doemeland & Trevino, 2014).

In a similar vein, a 2010 survey study by the ADB indicated that "the majority of KPs in the ADB's regional missions and regional

offices are primarily supply-driven", and that "some important audiences like beneficiaries and communities are minimally catered to" (Schaefer-Preuss, Yao, Serrat, & Casorla, 2010). It then called for a need to be more "discerning to the local demand for knowledge, identifying audiences and preparing matching KPs". The end-in-view is for the KPs to be actionable by the client or stakeholder and produce socially desirable results for them.

The KP is itself an "interface instrument" (Palacpac, 2010), as described earlier, in that it is a product of joint inscription of knowledge (local and scientific or technical), which at the same time, facilitates extension or delivery systems.

In preparing effective KPs, Talisayon (2015) suggested the following points: (1) there should be a demand for the KP before starting to produce it; (2) KP delivery follows after KP publication; (3) define user action that the KP seeks to enable or facilitate; (4) KP should be actionable, understandable, short, concise,

and simple; (5) there should be a contact information of the author; and (6) include potential or actual benefits derived from previous successful cases. Likewise, obtaining feedbacks from the clients and the ensuing design or redesign of KPs are also important elements of knowledge translation.

Operationalizing SOD

According to the GDI-WBG, the SOD is the "collective and cumulative knowledge base of delivery know-how that helps practitioners make more informed decisions and produce consistent results on the ground". Asis and Woolcock (2015) discussed the five core principles of the SOD as follows:

1. Relentless focus on citizen outcomes
2. Multidimensional response
3. Evidence to achieve results
4. Leadership for change
5. Adaptive implementation

According to them, these characteristics should be integrated with an organized and accumulated body of knowledge to establish principles that will serve as guide for various sectors.

The first core principle means that projects should shift its focus from merely producing outputs to creating impacts on the intended beneficiaries. It is not enough to complete a project cycle to prove that it is successful. The final measure of the project's effectiveness will be seen on the improvement on the lives of the people itself.

The second principle is called Multidimensional Response, which posits that in order to develop effective and lasting solutions to complex problems, different perspectives should be heard and incorporated during the stage of problem examination. It emphasizes the importance of collecting ideas from various standpoints from several stakeholders.

The next principle is the Evidence to Achieve Results, which reflects the people's need and the ways to achieve it. There should be an extensive collection of evidence from different disciplines and methodologies that will be used as an essential ingredient to arrive at a certain decision or solution.

The fourth principle, Leadership for Change, stresses the importance of a thorough analysis of the political economies existing among various settings. This is needed to lessen the resistance of different leaders or people involved in implementing an intervention. This will also establish a strong support system.

Last is Adaptive Implementation, which is the most challenging part of an intervention. To make it successful, the implementers should learn how to adjust with the existing environment they are facing during the course of project implementation.

With the help of these core principles of SOD, the WBG aims to deliver a magnified effect on the lives of their beneficiaries especially on the objectives of wiping out poverty and encouraging prosperity around the globe. Improving on the SOD means strengthening the bridge between policies and programs and its beneficiaries.

Monitoring and Evaluation

Wessal, Treuth and Wescott (2013) lamented that challenges on improvements that developing countries undertake as interventions often result in uneven and unjust progress among beneficiaries. The improvements achieved in some regions are not equivalent with the progress achieved in the other. Despite the use of the same effort, goals remain unattained in other places.

This increasing gap leads to the formation of the new knowledge referred to as science of delivery, which is originally used in the healthcare sector.

Contrary to the institutional reform model, which is often employed in public management, SOD focuses on the "local factors" affecting a project. These factors include political and organizational concerns. The use of this approach will result into the generation of a project that has adapted locally to its intended recipients and will deliver remarkable impacts on their lives. It will also lead to the production of relevant information that will enable the implementers to examine the reasons why the project failed or succeeded and how it happened. In the end, a higher level of good impact will be generated.

While there are several good examples and stories of successful delivery of projects, they are not plainly available as some are stored as reports, compiled as files, accumulated in data forms and even stored in the minds of the project team members (Wessal, et al., 2013). These things should be shared and learned by the practitioners, too.

The SOD has two vital elements, which include adequate monitoring and evaluation (M&E) and a strong link between M&E and feedback. "Monitoring" entails on-going process of collecting data or information for program management and tends to focus on activities. On the other hand, "evaluation" involves a wider and long-term view of the entire program and places emphasis on outcomes (Janus, 2016). The feedback loop will encourage constant learning that will lead to conduct of various experiments and evaluation of results then to redesigning of the project itself. It is also an important component of knowledge translation (Talisayon, 2012).

An example of project with a strong M&E system is the Karnataka watershed (Sujala) Project in India (Allen, 2014). This project ended with vast improvements because of the use of actual M&E, which resulted in a more efficient delivery. Other examples are the Oportunidades in Mexico and the Program of Advancement through Health and Education (PATH) in Jamaica (Ayala, 2006). Establishment of a strong monitoring system at the onset of the program has led these projects to identify their outcomes whether it was short, medium or long term. At each stage, they conduct consistent monitoring to make necessary modifications in the project if needed. With the use of strong M&E system, both projects achieved better results and created good effects in the lives of their intended beneficiaries.

The Oportunidades program caused noteworthy improvements in health and education in Mexico while PATH was tagged as a better program than other Jamaican programs because it effectively reached out to the poor. However, apart from the establishment of a strong M&E system, one aspect that needs keen attention in the SOD is the utilization of data generated for a better understanding of the existing intervention.

A learning organization in India, the Social Observatory project is devoted in making sure that data accumulated from the project level are used in an effective manner. Their devised learning system includes three aspects: actual monitoring of the project, long-term learning through impact evaluation and conduct of case studies that will result in a better project implementation. Social Observatory generates research results that are helpful

to project managers. These data will enable them to further understand the effects of each intervention leading them to improve on how the project is being delivered to its target constituents.

The projects cited above were able to reap success because they created strong M&E systems, made accessible the experiences for practitioners use, created a strong link between M&E and feedback and utilized the available data for effective use of information. Applying the same concepts, stakeholders will be able to improve the SOD of particular projects.

Conclusion

The relevant literatures on SOD, while still quite limited (Wagstaff, 2013), provided a significant backdrop for the objectives of this monograph. Most of the available literatures delved on the application of SOD in the context of health care delivery systems, which is understandable, as Kim, the SOD originator and proponent, is also a physician and the World Bank, which he once helmed, had supported various programs and projects in the health sector. Nonetheless, SOD's core dimensions or elements can readily be applied in the context of agricultural extension and delivery system.

In particular, operationalizing the SOD dimensions through a KM perspective and ensuing development of appropriate KPs seem most plausible. A theoretical framework on SOD, which is one of the dimensions proposed by Kim, but this time as applied to agricultural extension, and empirical validation of the same are necessary.

THEORETICAL FRAMEWORK

Basic Construct

This section addresses the fourth dimension of SOD, i.e., "develop a theoretical framework that can help explain and adopt successful approaches to solving delivery problems" (Kim, 2013).

The preceding discussion supports Kim's view that a deep understanding of delivery is essential in development work. Elaborating on this view, ***demand-driven*** KPs and services are not enough to bring about a desired result. First of all, development beneficiaries may not know exactly what they need and

cannot be in a position to seek it or demand for it. Secondly, there must also be effective delivery to be useful at the local level where development results are produced. Again, inconsistencies in development results may be attributable to ***lapses in delivery.***

Our theoretical and analytical framework should have the four dimensions of SOD (Kim, 2013):

1. *Support for frontline implementation by collecting local experience and feeding that knowledge back into practice.*
2. *Increased capacity for delivery skills based on the experience of the most successful practitioners.*
3. *Built in research to spur innovation and evaluate new interventions.*
4. *Construction of an analytical model that can help explain and adapt successful approaches to solving delivery problems.*

This delivery model can serve as the basis for an innovative extension model and knowledge sharing protocol where local knowledge and operational knowledge supplement technical (or scientific) knowledge. If proved sound, the DA-PCC's SOD model may be emulated by the entire agricultural extension community as Extension 2.0.

Elements

Translating the four dimensions into four elements that may be situated within a model, we arrived at the following: Local Knowledge; Research-Based Innovation; Delivery Skills Sharing; and Delivery Systems Framework.

Local knowledge *refers to indigenous or homegrown knowledge on the innovation that the agency is introducing.* ***Research-based innovation*** *refers to technology generated by research by the agency concerned.* ***Delivery skills*** *sharing refer to the sharing of tacit knowledge of experienced agency staff (notably field technicians) on how the innovation is best shared given field conditions that they are fully exposed to but may not be generally known by their agency colleagues. Finally,* ***delivery systems framework*** *refers to a model of delivery (here, it is anchored on the KM framework) that informs, explains and operationalizes the strategy that the agency is adopting or adapting to. To reiterate, these four elements roughly correspond to the four dimensions of SOD (Kim, 2013).*

We can juxtapose these four elements into a model framed into quadrants (Figure 2). The quadrants on the left-hand side deal with the ***innovation*** to be delivered. The quadrants on the right-hand side refer to the ***delivery system***. The quadrants on top (research-based innovation and delivery systems framework) are ***conceptual*** constructs. The quadrants on the bottom (local knowledge and delivery skills sharing) are constructs dealing with ***practice.***

Innovation-Delivery Model

Found in the next page is the SOD Model that we are proposing for the Philippine agricultural sector, in general, and the DA-PCC, in particular. The model submits that effective delivery of innovations requires that:

1. Research-based innovation or technology should be informed by local or indigenous knowledge, thus the plus sign that combines both vertically;

2. The model that informs and explains the delivery strategy adopted by the agency should be studied and shared within the agency, particularly the tacit knowledge gained by the more experienced, thus the plus sign that adds the two vertically; and

3. Innovation should be combined with the delivery system, thus the plus sign that adds the two constructs horizontally.

Delivery will not be effective if any one of these elements is missing. A delivery system not guided by a framework is tentative, fluid, and ineffectual. The absence of tacit knowledge shared on the delivery system robs the deliverer of any conviction on his/her strategy. Furthermore, if local knowledge is taken out of the model, then the innovation may not be adopted as recommended since it may not be appropriate under local conditions. It goes without saying that the innovation or technology should be research-based.

SOD MODEL

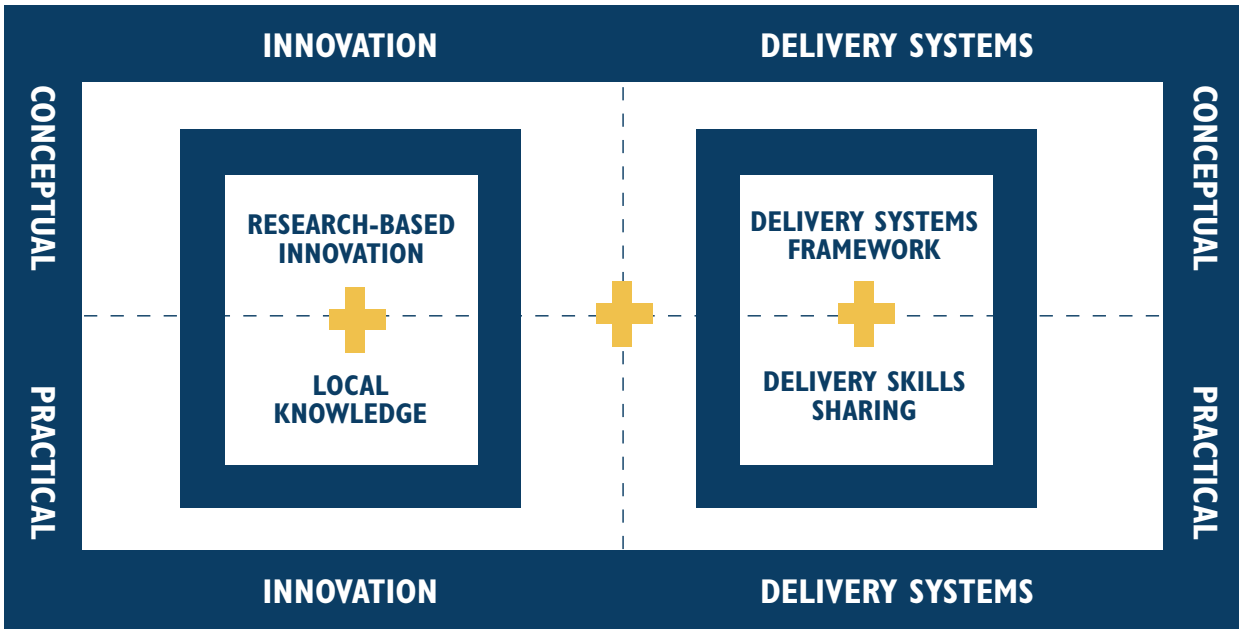

Figure 2. Innovation-Delivery Model

In short, the science of delivery is a deliberate and calculated strategy of providing services and/or interventions leading to a development goal wherein research-based innovation and/or technology is combined with local/homegrown knowledge employing a delivery mechanism guided by a systems framework and informed by tacit knowledge sharing within the development agency.

EMPIRICAL VALIDATION

The DA-PCC has embarked upon a KM strategy where the proposed Innovation-Delivery Model can be validated empirically through the production of KPs, in two forms, i.e., document (or publication) and video.

In general, the two forms of KPs were designed, developed, and disseminated based on the common problems or issues encountered by farmers, entrepreneurs, local government unit (LGU), and nongovernment organization partners coupled by their corresponding demands for knowledge or technologies related to dairy buffalo production.

The contents of the KPs were innovations generated by research in the DA-PCC laboratories and farm sites. Research results were informed and corroborated by local knowledge from farmer-cooperators. The KP delivery system makes use of a KM framework (Talisayon, 2016), and the designer-developer-disseminators have been trained on the most appropriate means of framing their messages.

iASK Series (KP in Document form)

The DA-PCC's iASK (Innovative Answers, Solutions, and Knowledge) is a KP developed by the agency's Knowledge Management Division (KMD), which features the following knowledge transfer elements or delivery strategies:

- *It is easily readable and actionable by the intended user, e.g., it is in the local language (Tagalog) or conversational language (e.g., a mix of Tagalog and English) if the target readers are farmers, co-op managers and technicians or English if the target readers are entrepreneurs, investors, or local government executives; and the specific action steps are clearly explained together with illustrations, examples, or photos.*
- *The first page clearly explains the benefits and rationale for the good practice (for motivating the busy decision maker to quickly make up his mind about whether to act on the KP or not).*
- *It is very short and intended for field use (four-page or folio format, heavy coated paper).*
- *There is a way for the user to contact the author or expert for more clarifications on how to correctly perform the actions.*
- *Repeated consultation and feedback from intended users (one at the field level and two at the agency level, from three user segments: farmers/co-operatives, entrepreneurs, and LGU executives).*

Structure of the iASK Series

The iASK Series, an example of a KP, follows a simple generic structure, with the following elements:

- *Title*
- *Context or Background*
- *Actions Taken (Solutions)*
- *Results*
- *Lessons Learned or Recommendations*
- *Contact details of the author(s)*

The Title says it all, i.e., it is expressed clearly and concisely and gives the reader a snapshot of what the KP is all about. Context refers to the background, rationale, circumstances, or problematic situation that the KP aims to address. Actions taken are stepwise or procedural solutions to the problem so identified in the contextual background. Results are the benefits derived from the actions taken or solutions. Lessons learned is a short synthesis or summary of the learning taken from the experience of implementing the solution. It could also include recommendations for further improvement of the suggested solution. Contact details allow the reader to directly get in touch with the author for additional information about the KP.

So far, 31 iASK materials have been produced by the KMD with the following titles intended for target user groups:

(1) For Entrepreneurs, and Investors

- *Homemade Dulce Gatas*
- *Mozarella, Stretchy No More?*
- *Factors Affecting the Yield Recovery and Quality of Kesong Puti*
- *Stirred Yogurt "Weeps" No More*
- *Churning: From Cream to Butter*
- *Improving the Quality of Chocolate Milk through the Use of Stabilizer Carrageenan*
- *Assessing the Business Performance of a Buffalo Dairy Farm*
- *Partial Budgeting: A Tool to Analyze Changes in Existing Dairy Buffalo Business*
- *Financial Reporting Tool Specific for Buffalo Dairy Farm Business*
- *Milk Processing and Marketing Outlet: A Village Level Model*

(2) For Local Government Executives

- *Village-Based Artificial Insemination Technicians as a Privatized Service*
- *Buyback Scheme for Breedable Buffaloes*
- *Development of Impact Zone for Carabao-Based Enterprise Development*
- *Strong Partnerships with LGUs and other Stakeholders: Results in Stable Program Implementation*
- *Development and Complementation of Impact Areas and Dairy Zones to Fast-Tracking Inclusive Growth and Sustainable Livelihood Among Farmers*

(3) For Farmers, Dairy Cooperative Managers, and Livestock Technicians

- *A Solution for Improving Carabao's Reproductive Efficiency (with a Tagalog version titled: Solusyon para sa Mas Mahusay na Reproduksyon ng Kalabaw)*
- *Silage-Making as a Steady Source of Feedstuff for Dairy Buffalo (with a Tagalog version titled: Paggawa ng Burong Damo Para sa Tuluy-Tuloy na Pakain sa Gatasang Kalabaw)*
- *Managing a Village Center for Milk Collection: The Eastern Primary Multipurpose Cooperative (EPMC) (with a Tagalog version titled: Pangangasiwa ng Sentrong Pangnayon sa Pangongolekta ng Gatas: Ang Eastern Primary Multipurpose Cooperative (EPMC)*
- *Urea-Treated Rice Straw*
- *Urea-Molasses-Mineral Solution (UMMS) for Effective Utilization of Rice Straws for Buffalo Milk Production During Summer*
- *Stylo for Seed and Profit*
- *Production of Sweet Sorghum for Livestock Feeds*
- *Kaalaman at Pagbabahagi ng Impormasyon Tungo sa Tuloy-tuloy na Pag-gagatasan*
- *Pagpaparami ng Gatasang Kalabaw sa Baybay, Leyte*
- *Community–based Crossbred Dairying in the Visayas*
- *Sa Wastong Sistema sa Pastulan Umaangat ang Pakinabang sa Gatasang Kalabaw*

- *Wastong Pagpapakain Para sa Sapat na Nutrisyon ng Kalabaw*
- *Total Mixed Ration Para sa Masustansya at Sapat Na Pakain sa Kalabaw*
- *Blockmate: Suplementong Pakain Para Sa Kalabaw*
- *Wastong Paggagatas ng Kalabaw Para Mapanatili ang Magandang Kalidad Nito*
- *Enriched Rice Straw (e-RS) Para sa Tuluy-tuloy na Mapagkukuhanan ng Pakain sa Kalabaw*

Feedback (M&E)

The iASK materials were presented for the first time and pretested using a set of questionnaires among sample informants from 200 participants who participated in the National Knowledge Sharing Forum in Carabao-Based Enterprise Development (CBED) held on November 15, 2016 at the DA-PCC National Headquarters, Science City of Muñoz, Nueva Ecija. The pretest was conducted to gather comments, feedback, and other ideas from the target end-users (subdivided into three groups, i.e., dairy farmers, entrepreneurs, local government executives) for further improvement of the said KPs.

The informants were asked to evaluate two main aspects of the KPs, namely: a) Content/ Topic; and b) Layout and Design. In terms of Content/Topic, the informants were asked if the information conveyed in the KP or iASK series is interesting, useful, and easy to understand. They were also asked if they found the information that they were looking for in the KP and seeing how useful it is, if they will be inclined to share it to their colleagues and friends who they thought might be interested in the KP. The questionnaire used a five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

As for the layout and design, the user groups evaluated the KPs in terms of the appropriateness of the photos and images used in the message being conveyed. The target user survey also determined the effectiveness of the iASK materials in providing new knowledge, innovative answers, solutions and knowledge on CBED and also asked whether or not the knowledge product would lead them to action or adopt the

recommendation in the iASK material. A Question-and-Answer Forum followed after each presentation to allow further clarification on the content, layout, or format of the KP.

In general, the sample informants fully appreciated the KPs that were generated by the DA-PCC researchers and staff. They cited the following as some of the best features of the KPs or iASK materials:

- *Facilitates the replication or adaptation of a good approach or practice*
- *Provides an innovative development approach, tool or solution*
- *Solutions to help you take action or make decisions*
- *The simple problem-solution structure*
- *Short and can be read quickly*
- *Name and contact information of the author make it easy to ask questions*

Likewise, majority of the pretest informants felt that the information provided by the iASK is interesting, useful, and easy to understand. Also, majority agreed that they were able to find the information that they were looking for in the iASK material and will recommend it to others. There were also suggestions for further improvement of the KPs, e.g., elaboration of the relevance, overall design, and content.

Appropriate revisions (if any) were made following the results of pretests. Based on the results of pretests with the concurrence of DA-PCC's top management, the KMD decided to first prioritize packaging of 10 iASK materials. A limited number of the latter were then reproduced and disseminated during the DA-PCC's hosting of two events namely (1) International Conference on CBED on October 26-27, 2017 at the DA-PCC National Headquarters, Science City of Muñoz, Nueva Ecija, and (2) 4th National Carabao Conference and 1st Livestock Techno Expo in Tagbilaran City on October 8-9, 2018. The same materials were uploaded to the DA-PCC Website for ready reference and free downloads by interested clients.

An Example of iASK series

Figures 3a, 3b, 3c, and 3d present the pages in an example of an iASK material (intended for local government executives).

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VILLAGE-BASED ARTIFICIAL INSEMINATION TECHNICIANS AS A PRIVATIZED SERVICE

Expanded AI Program widens the coverage of artificial insemination and improves its efficiency in support of ongoing efforts toward massive herd build-up.

Over the years, the Department of Agriculture (DA) has rendered artificial insemination (AI) services in cooperation with local government units (LGUs). However, the limited number of AI technicians directly assigned to serve farmers in the villages has constrained the extent of delivering this AI service, not to mention the lack of support from some LGUs to carry out AI activities. The national AI coverage has not gone beyond five percent of the total breedable female carabaos and cattle (Cruz, 2007).

Solution

To address this gap, the PCC launched the Expanded AI Program (EAI) in 2006. It sought to widen the coverage of the AI program and improve its efficiency in support of ongoing efforts toward massive herd build-up. Likewise, the EAI aimed to generate additional income and new jobs from carabao-based dairy enterprises. Having village-based AI technicians makes it more convenient for farmers to report when animals are in heat or in estrus so that they may access insemination services at the right time. Water buffaloes that manifest estrus need to be inseminated within 24 hours to ensure pregnancy (Sarabia et al., 2009).

Figure 3a. Cover page of the iASK series showing the Title, Context or Problem, and Solution

In developing village-based AI technicians, PCC at Mariano Marcos State University (PCC@ MMSU) in the Ilocos Region undertook the following activities:

Pre-training activities

(1) Selection of trainees and submission of other requirements. Select applicants for AI training based on the following criteria:

- *Personal qualifications:*

  -between 18 and 40 years old
  -physically healthy
  -at least high school graduate
  -raises carabao(s)
  -village resident and not presently working outside the village
  -interested, willing and has time to conduct AI
  -accept the responsibilities of a village-based AI technician (VBAIT)

- Recommendation/Endorsement from the barangay chairman, municipal agriculturist and local chief executive (mayor)

- Submission of carabao census in the municipality, detailing breed, age, and name of farmer-owner

- Once accepted for training, the LGU and the applicant execute a contract to ensure the latter's active performance for at least two years after the training; otherwise, he/she would be compelled to refund training fee equivalent to Php30,000.

- In addition, once it has accepted VBAIT applicants for training, the LGU executes a Memorandum of Agreement with PCC regarding the operation of the VBAIT in the municipality.

(2) Census validation. The regional center conducts an estrus synchronization-AI activity to validate the carabao census submitted by the applicant.

PCC gives the TRAINING FREE of charge.

Post-training activities

(1) Equip and mobilize the VBAIT. The center provides the VBAIT complete AI paraphernalia. The center, together with the LGU, introduces and promotes the VBAIT and his services for a fee in assembly or barangay meetings. The PCC, likewise, assists in "setting the estrous cycle" of animals by means of the estrus synchronization technology.

(2) Conduct consultations. The center conducts regular consultations or meetings with VBAITs to solicit feedback regarding their conduct of AI, to determine emerging issues and concerns, to establish distribution schemes for liquid nitrogen (LN2) and frozen semen, and to promote camaraderie among AI technicians.

(3) Build capability. The center provides continuing education to the VBAITs, who have varied educational backgrounds, in the form of lecture-seminars particularly on animal health care and management; practicum on castration and pregnancy diagnosis; milk collection and handling; forage production; and waste management.

(4) Monitor and submit reports. As stipulated in the MOA and the contract, the VBAITs submit monthly reports of accomplishments to the PCC with a copy furnished to the municipal agricultural office (MAO). The MAO submits report of accomplishment of VBAITs in the municipality to the Provincial AI Coordinator (PAIC) and/or Provincial Veterinarian. The PAIC consolidates the reports of the MAO and submits to the Regional AI Coordinator (RAIC).

Figure 3b. Second page of the iASK series showing the Solution procedures

(5) Provide frozen semen and LN2 delivery support. The LN2 is a critical component of the AI system. To ensure frozen semen quality, the center developed a regular LN2 distribution scheme. Mother tanks are placed in the care of the MAOs, where VBAITs refill their field tanks at least weekly and PCC replenishes at least monthly (Fig. 1).

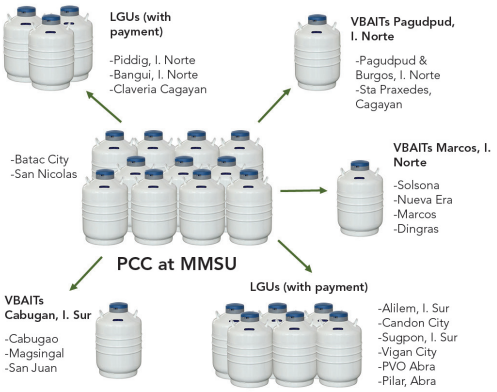
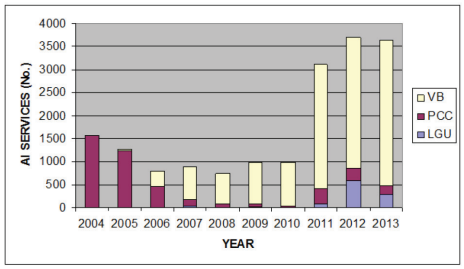


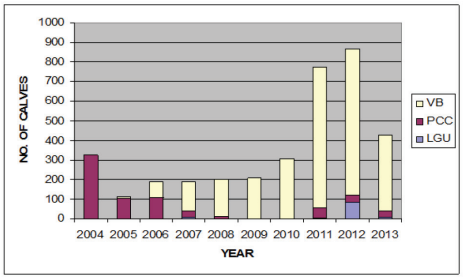
Fig. 1. Sample liquid nitrogen distribution scheme

Results

Increased AI output of VBAITs



Increased calves produced as a result of AI by VBAITs



AI Entrepreneurs

- *2012 Most Outstanding VBAIT in the Philippines*
- *Region I Gawad-Saka Awardee (Large Animal Category)*
- *38 years old when trained in July 2005*
- *Undergraduate, farmer of Brgy. Santiago, Marcos, Ilocos Norte*
- *CHARGE PER SERVICE- Php500.00; earns Php20,000 monthly out of his AI service fees*

Francisco Alex Dani Passion

- *One of the Outstanding VBAIT's in 2010*
- *21 years old when trained in 2006*
- *Full-time VBAIT, covers municipalities of Vintar, Piddig and Sarrat, Ilocos Norte*
- *CHARGE PER SERVICE- Php500.00- Php700.00 (depending on distance); earns average of Php15,000 monthly out of his AI service fees*

Daniel Natividad

Lessons Learned

• Provide continuous capability and confidence building for the VBAITs

• Train preferably undergraduate or out-of-school youth as they are more likely to remain as AI technicians compared to college graduates

Keywords: *village-based artificial insemination technician*

Figure 3c. Third page of the iASK series showing the Results and Lessons Learned

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ABOUT THE MATERIAL

iASK, an acronym for innovative answers, solutions, and knowledge, is a knowledge product series packaged and produced by the Philippine Carabao Center with the Southeast Asian Regional Center for Graduate Study and Research in Agriculture. This iASK issue is specifically intended for policy makers in supporting a privatized delivery model for village-based artificial insemination technicians in support of the carabao development program.

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Figure 3d. Fourth page of the iASK series showing a short description of the material and its target readers, its Production Team, and Contact details of the KP author

KBGAN Learning Series (KP in Video Form)

The acronym KBGAN stands for "Knowledge Brokerage, Guidance, and Advisory Network" (Palacpac, 2019), which serves as an umbrella term for the activities and outputs of a KMD-coordinated project called "Extension and Advisory Services Information System (EASIS)".

In 2020, Phase 1 of the EASIS Project was completed, which generated five learning videos. These videos were designed and developed by a private firm (Grameen Foundation or GF) in consultation with KMD through market research activities (e.g., desk research, focus group discussions, home and farm visits) to determine actual field conditions and realities and understand the needs or demands of local dairy buffalo farmers, field extension workers, as well as DA-PCC experts.

The GF applied adult education and learning approaches to make the contents of the KBGAN Learning Series informative, relevant, relatable, and actionable. These are seen to facilitate positive reinforcement and behavioral change among the prospective viewers.

The KBGAN Learning Series feature the following knowledge transfer elements or delivery strategies:

- *It is narrated in the local (Tagalog) or conversational language (mixture of Tagalog and English) of the intended viewer (farmer); the voiceover or narration projects a friendly, inviting, comforting, and casual tone*
- *It featured progressive local dairy buffalo farmer as the one demonstrating a particular technology based on his or her personal experience (to encourage farmer-to-farmer knowledge transfer)*
- *Video contents are informative, cognitive, prescriptive, and actionable to cultivate knowledge and skills; they present practical solutions and interventions*
- *Each learning video runs for a maximum of five minutes to retain the attention of the viewer*
- *Live video footages were mostly used supported by animations or still images or graphics when necessary or more practical; also included a variety of creative shots with upbeat music; text overlays were also used to support the voiceover*
- *Each learning video is self-contained i.e., complete and sufficient for a specific topic*

Structure of the KBGAN Learning Series

- *KBGAN Learning Series logo*
- *Friendly greeting from the voiceover and introduction of topic and resource person (mainly progressive farmers or sometimes field technician or veterinarian from DA-PCC)*
- *Action shots supplemented by graphics and text overlays with the resource person narrating or demonstrating the stepwise procedures of technology or best practices (a mix of DA-PCC technologies and farmers' own innovative practices or local or indigenous knowledge)*
- *Summary or takeaways*
- *Closing greeting of voiceover, KBGAN Learning Series Logo, and Credits*

KBGAN

Communication Platforms for the KBGAN Learning Series

The KBGAN Learning Series were distributed to intended audience by uploading them to the KMD-managed DA-PCC's Facebook Page, DA-PCC's Tropang KalabaJuan Facebook Group, DA-PCC KBGAN Facebook Social Learning Group, and DA-PCC You Tube Channel. For select farmers who do not have access to internet, tablet PCs containing the KBGAN Learning Series were lent out to them during visits of DA-PCC personnel to their respective farms or during a small group learning event organized at the farm sites or at the DA-PCC headquarters.

Below are the titles and QR codes for the five KBGAN Learning Series videos.

Silage

Feeding Management

Hygienic Milking

Calf Management

Health Management

Feedback (M&E)

Uploading the KBGAN Learning Series videos to social media platforms like Facebook readily provides a feedback mechanism by way of the platform's analytics, i.e., numbers of "views", "likes", "loves", and "shares". The viewers can also provide text comments on the uploaded videos or contact the Facebook page's or group's administrator for additional information or inquiries. Since they were uploaded sequentially starting November 2020 to the DA Facebook Page and/or KBGAN Facebook Social Learning Group, the five KBGAN Learning Series videos have so far generated close to 40,000 total "views", 2,500 "likes" and "loves", and 300 shares.

The KMD also administered a preliminary survey involving 34 farmer-informants who already watched all five videos under the KBGAN Learning Series. Among the five videos, "health management" emerged as the topic that the informants learned from the most followed by the videos on "calf management" and "feeding management". On a scale of 1 to 5 (1 as the lowest and 5 as the highest), average overall satisfaction scores of informants for various parameters pertaining to the five videos are as follow: 4.70 (for the quality of the videos), 4.54 (for the story or contents of the videos), 4.50 (for content delivery), 4.56 (for the language used), and 4.72 (for the new knowledge gained).

The KMD plans to conduct a more thorough survey to determine and evaluate the viewers' actions or actual adoption practices for specific technologies after watching the KBGAN Learning Series.

An Example of KBGAN Learning Series

Figures 4a, 4b, 4c, 4d, 4e, and 4f present some screenshots of KBGAN Learning Series on Buffalo Health Management.

Figure 4a. KBGAN Learning Series logo floating on a backdrop

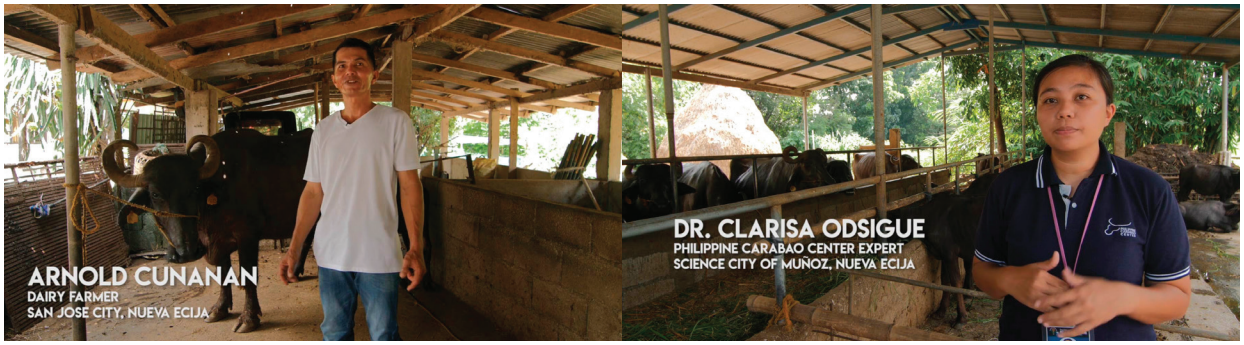

Figure 4b. Introduction of the Resource Persons (progressive farmer and DA-PCC field vet)

Figure 4c. Farmer-resource person sharing his local knowledge on determining healthy buffaloes and technical knowledge on body condition scoring

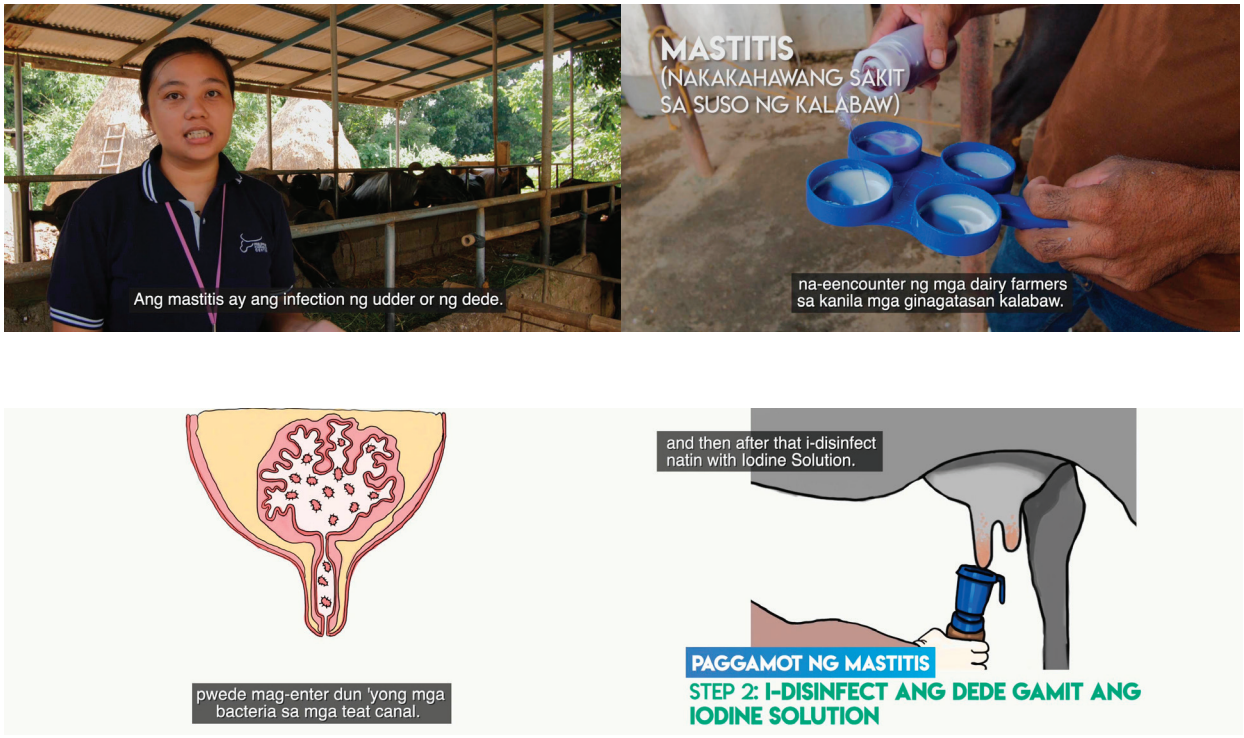

Figure 4d. DA-PCC field vet discussing on mastitis (inflammation of udder) using actual footages and illustrations

Figure 4e. Takeaways towards the end of the video

Figure 4f. Credits at the end of the video

SUMMARY AND CONCLUSIONS (EXTENSION 2.0)

From the mid-1960s to the mid-1980s, the Philippines excelled in agricultural extension science, strategies, and workforce. However, the devolution that solved many inequities in our system of governance on one hand also undermined several governance systems on the other. Among the latter was the agricultural extension system.

With hopes of reviving the Philippine agricultural extension service to its former glory, this monograph presents a novel approach to agricultural extension inspired by Kim's Science of Delivery (SOD). Kim (2013) believes that inconsistencies in development results may be attributable to lapses in delivery. He mentioned four dimensions to the emerging SOD.

First, it will support frontline implementation by collecting local experience and feeding that knowledge back into practice. Second, it will teach delivery skills based on the experience of the most successful practitioners. Third, it will incorporate prospective research to spur innovation and evaluate new interventions. Fourth, it will develop theoretical and analytical frameworks that can help explain and adapt successful approaches to solving delivery problems (Kim, 2013).

The objectives of this monograph were:

1. To design and develop a delivery model based on Kim's SOD and its four dimensions;

2. To apply this delivery model in the agriculture sector involving the interface of: scientific knowledge from agricultural researchers; operational knowledge from extension workers; and local knowledge from farmers; and

3. To seek empirical validation of this model within the DA-PCC

Translating the four dimensions into four elements that may be situated within a model, we arrived at the following: Local Knowledge; Research-Based Innovation; Delivery Skills Sharing; and Delivery Systems Framework. Local knowledge refers to indigenous or homegrown knowledge on the innovation that the agency is introducing. Research-based innovation refers to technology generated by

research by the agency concerned. Delivery skills sharing refers to the sharing of tacit knowledge of experienced agency staff on how the innovation is best shared given field conditions that they are fully exposed to but may not be generally known by their agency colleagues. Finally, delivery systems framework refers to a model of delivery that informs, explains and operationalizes the strategy that the agency is adopting or adapting to. This monograph proposes an innovation-delivery model for the Philippine agricultural sector, in general, and the DA-PCC, in particular. The model submits that effective delivery of innovations requires that:

1. *Research-based innovation or technology should be informed by local or indigenous knowledge;*

2. *The model that informs and explains the delivery strategy adopted by the agency should be studied and shared within the agency, particularly the tacit knowledge gained by the more experienced;*

3. *Innovation should be combined with the delivery system.*

Delivery will not be effective if any one of these elements is missing.

The DA-PCC has initiated an innovation-delivery system that conforms to this model through the production of two forms of knowledge products (KPs). First of these KPs is a document referred to as the iASK Series while the second is in video form called KBGAN Learning Series. The said KPs guided by the innovation-delivery system model may enable the DA-PCC to trailblaze in this SOD and introduce a new approach to agricultural extension. With the mainstreaming of the innovation delivery within our devolved extension system, we may see a revitalization and improvement of the efficiency and effectiveness of service delivery. From the DA-PCC, the rest of the agricultural sector should emulate the model.

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