

# Knowledge Management for Sustainable Forest and Land Management in Indonesia

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## Introduction

Knowledge management (KM) is the systematic management of information to develop strategy and guide practice. This is particularly relevant in the context of forest and land management in Indonesia where policy development and application is informed by a diversity of issues (e.g. demography, culture, ethnicity, religion, economics, environment, climate, geography). There are also structural issues such as location (capital city versus regional town), organisation (e.g. central vs. provincial or district agency). Accordingly, responsive policy development can be frustrated by poor co-ordination and/or communication among government agencies responsible for different aspects of forest and land management (e.g. Ministry of Environment, Ministry of Finance, Ministry of Forestry).

Modern technology can aid communication and assist in information dissemination (e.g. information technology, the Internet). However, it can also frustrate a co-ordinated approach to tasks by focussing on individual disciplines (e.g. forestry) or issues (e.g. economic returns) rather than facilitating information sharing or resolving the often contradictory demands of different stakeholders (e.g. developing a holistic approach necessary to develop and apply alternative livelihood strategies for forest-dependent communities). A KM approach supports the consolidation of diverse information streams including formal (e.g. science) and informal (tradition, social norms, local lore), and provides the means to build a shared understanding of problems (e.g. land and water management) and innovative solutions to those problems (e.g. sustainable management practices) involving all stakeholders.

As a relatively new discipline, mainstream KM focuses on either individual knowledge or the formal processes at the organisational level (e.g. a government agency). Both approaches assume that knowledge is codified as information, and that technology is deployed to capture, store and disseminate this information. KM in this approach is strongly process oriented and, most importantly, is a process that can be managed, controlled and measured. However KM also needs to be responsive to social networks in the work place and, of course, the political environment which influences knowledge use.

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Our distinct approach is based on the recognition that most innovations are generated through the work of groups who share an understanding of their work activities by engaging in collective information sharing (i.e. collaboration). This is particularly important in addressing challenges that are intrinsically multi-disciplinary and which involve diverse stakeholders responsive to climate change and poverty alleviation in Indonesia (and other developing countries). The Monash approach is therefore focussed on understanding what work is actually done, how that work is done, and who does it. By this understanding we can identify appropriate technology to both support those activities and to facilitate learning through the performance of those activities.

The critical issue for organisational growth and innovation is the phenomenon of collaborative knowledge work rather than the accumulation, capture and management of knowledge as an asset, which is the concern of mainstream KM. Thus, in our view, KM is about facilitating knowledge work practices rather than the management of information assets (knowledge). This is particularly important in understanding practical policy development and application in Indonesia. Here a collaborative approach to knowledge management across agencies is necessary to address challenges in climate change and in poverty alleviation. These issues are developed below.

### **Knowledge management in practice**

Knowledge work involves participants working together on organisationally defined tasks. It is characterised as a collaborative activity that:

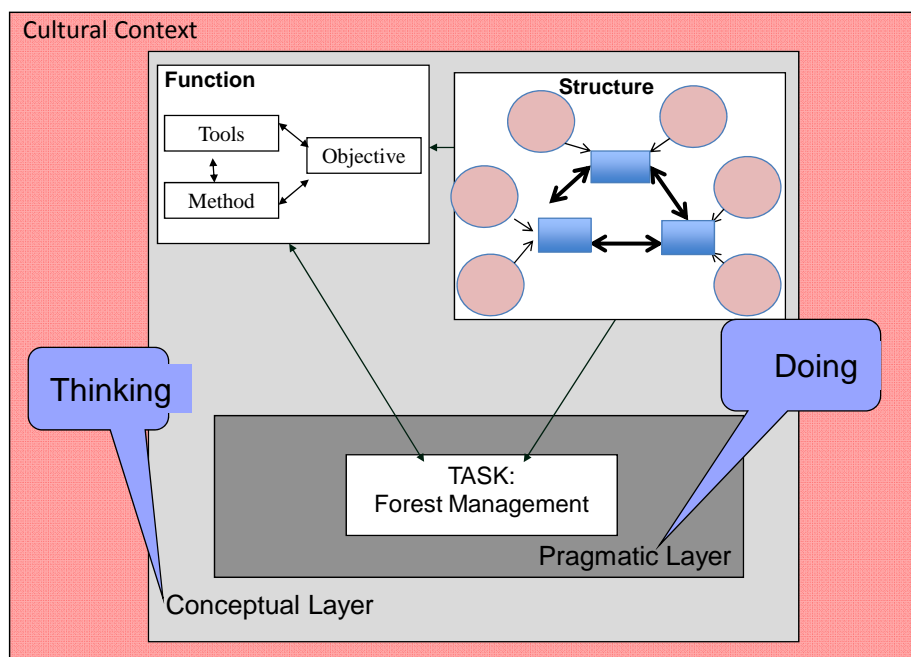
- allows the object of work to be defined (the inputs, outputs and performance);
- identifies the body of knowledge that underpins the work (the conceptual models);
- allows explanation both in terms of the item of work and the models (sense-making);
- supports the production of knowledge as one element of the outcome (learning); and
- documents the processes (the models) to be used to perform the activity (application).

### **The Monash Task-based Knowledge Management Framework**

The Monash approach to KM is called task-based knowledge management (TbKM). It addresses the practicalities of a particular work task (e.g. forest management) driven by a specific objective (e.g. reduced carbon emissions). The framework focuses on pragmatic outcomes, (actual work) and conceptual outputs (theoretical underpinning). TbKM is oriented to task outcomes (e.g. change in management practice) and outputs (e.g. reports, publications) as important drivers of organisational change leading to practical policy development and implementation. In addition, the TbKM approach acknowledges that work tasks occur in a social setting and communication (of information, concepts, alternative positions) between stakeholders is an essential aspect of the activity. Task outputs and outcomes are the information resources that are the subject of communications and information flows.

The TbKM framework consists of two nested interrelated layers that explicitly document knowledge work relating to thinking, doing, and communication:

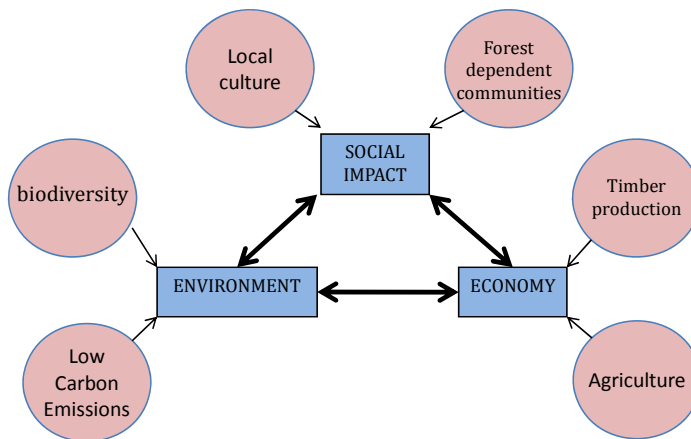
- the **Pragmatic** layer which is the actual work that needs to be done in order to produce tangible outputs (e.g. forestry management to reduce carbon emissions);
- the **Conceptual** layer which represents the body of knowledge required to perform the work defined by the task, (e.g. ecology, chemistry, botany, sociology applicable to forest management).



Both layers of the KM framework represent only those aspects of knowledge that can be articulated and documented: the first as management action, the second as information important in influencing management decisions. This is not limited to explicit knowledge such as published information but may include implicit knowledge representing what is actually done (e.g. traditional forestry management) rather than what is meant to be done (prescribed procedures) or what is said that is done (e.g. what is reported). This diversity of information provides a rich resource for policy development, implementation and evaluation (e.g. sustainable forest and land management).

The focus of the framework is on the conceptual basis of the work task, the intellectual work (thinking) that informs the performance of the task. For example sustainable forestry management requires that the economic drivers of timber production be reconciled with the sustainability goal of maintaining biodiversity, and the social goal of maintaining well-being for forest dependent communities.

The framework assumes that the tools and methods used in forestry are well established but that stakeholders need to be equally well supported in their endeavours to implement sustainable practices in forestry.



### Implementing the TbKM Framework

Implementation of TbKM in an organisational context is based on an architecture that distinguishes between the **structural** elements that support and facilitate the knowledge processes that are the **functional** elements of KM. This architecture provides the necessary elements to perform gap analyses, determine requirements, and design and implement KM as a socio-technical system.

#### *The structural dimension*

The structure of KM is the intersection of **organisational design**, **information infrastructure**, and **technology infrastructure**. This is the organisational infrastructure to support storing and transferring knowledge relevant to organisational objectives.

Organisational design includes a broad range of issues that define how KM is organised within a specific task. Important issues include culture, governance, reporting, accountability as well as physical aspects such as location, space allocation, and staffing. This is important in addressing natural resource management issues as many different agencies are involved and communication among these agencies (e.g. Ministry of Forestry and Ministry of Environment) is important in developing and applying effective forest management policy (consistent with the aim of reducing carbon emissions in Indonesia). These are organisational factors that influence how knowledge work is performed in that specific situation. Information infrastructure focuses on how information is collected, stored, retrieved and disseminated.

From a KM perspective information includes traditional information repositories such as libraries and archives, but even more importantly, the less formal source of information (e.g. popular media, meeting notes, discussions or traditional lore and other cultural artefacts). Technology infrastructure is an essential element of KM given the potency of modern information technology. The focus is on the ability of technology to facilitate storing information and most importantly to link stakeholders and information sources and to transfer information effectively between them.

**The functional dimension**

The functional dimensions include the drivers of knowledge generation: **remembering, sense making, and learning**. Remembering relates to how organisational memory and information repositories are used to support learning and sense making. How does knowledge get used in the organisation? Similarly, sense making and learning contribute to the development of memory and archival knowledge. How is knowledge processed e.g. in model development or in developing an understanding of the dynamics of forest ecosystems? Sense making is particularly important in a multidisciplinary context because often, there is a need to reconcile conflicting issues e.g. economic opportunities from timber harvesting or from oil palm plantations versus the need to maintain forest dependent communities. Learning brings perspectives from different disciplines e.g. economics and social impact assessment in the example above. In TbKM, these elements are closely integrated to the practicalities of task performance: learning to improve how the task is done, understanding (sense making) the role of the task in the specific situation and remembering how the task was done in the past.

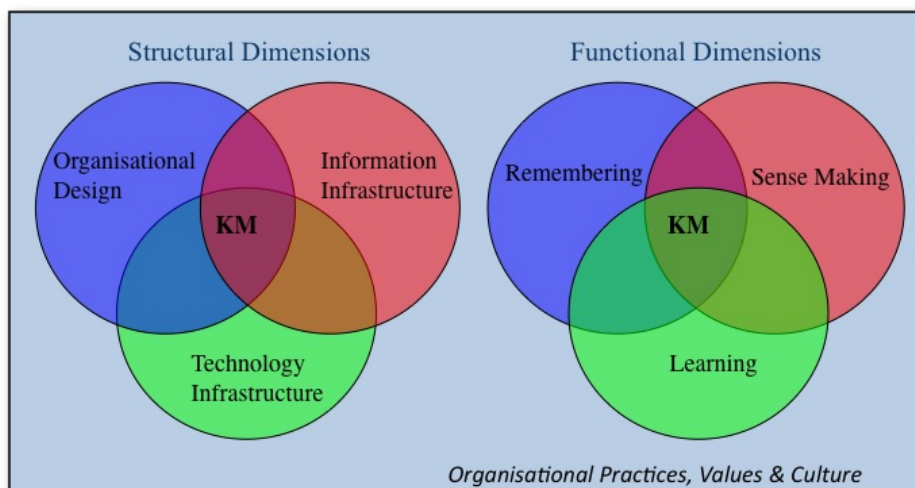


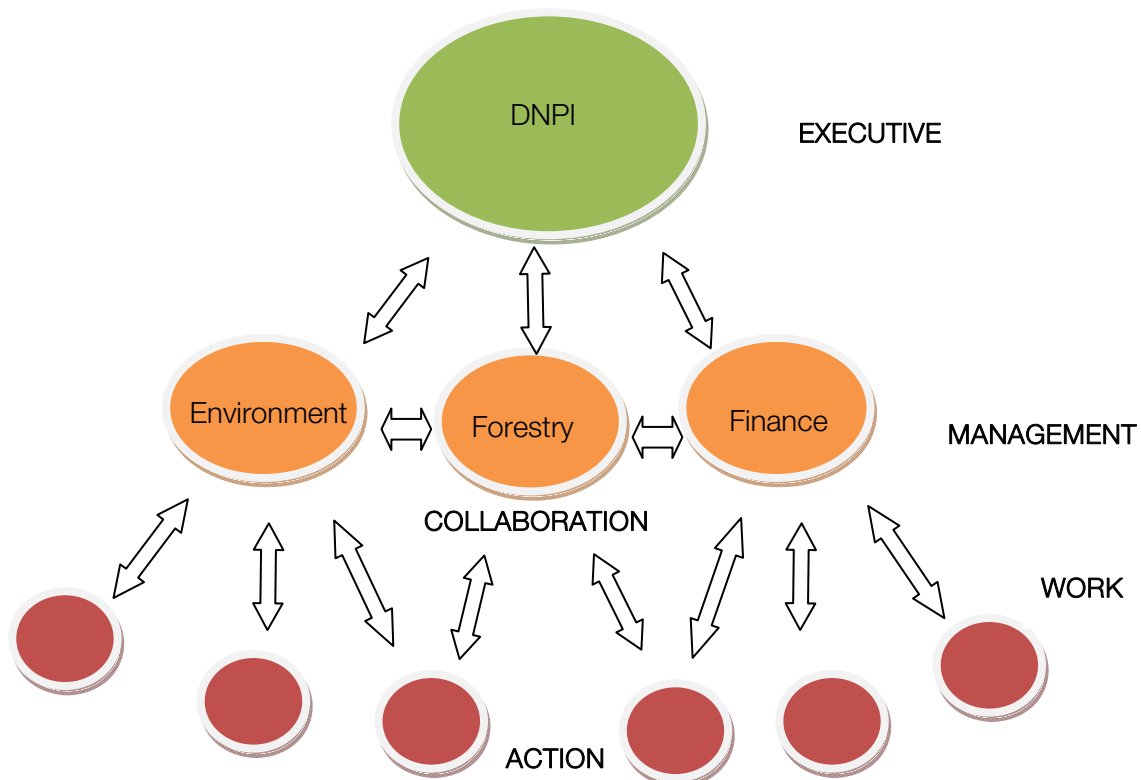
Fig. 1 Architecture for Implementing TbKM

The practical implementation of TbKM also needs to take into account the interactions between the structural and functional elements. Thus organisational design, technology and information have an obvious influence on how knowledge is generated through remembering, sense making and learning. This interaction highlights the dynamic nature of KM and the need to maintain flexibility in order to accommodate change in task performance and evolution of task objectives while at the same time maintaining links to archival knowledge.

**Application of Knowledge Management**

Policy development and application (e.g. land/forest management linked to REDD scheme trials) is a process of giving effect to a government strategy.

As a process it can be considered to apply to three levels: the executive level where the policy is formulated and defined (e.g. the National Council on Climate Change), the group level that includes all stakeholders who will apply and are covered by the policy (e.g. the Ministries of Forestry, Environment, and Finance), and the individual level where each stakeholder performs some work that contributes to the implementation of the policy (e.g. Forest managers in a province or district). Each level deals with knowledge relevant to its activities and this knowledge is filtered to inform the other levels about the policy.



Policy development defines the tangible objectives that are to be achieved (e.g. reduced emissions from deforestation and land degradation) and also an outline of how the objectives will be addressed (e.g. avoided deforestation) and which parties/stakeholders will be involved in the delivery of the objectives (e.g. community forest managers). At the executive (governmental) level, this also means articulating and authorising the capabilities required to implement those policies, not only assigning a budget to the policy but also in identifying the skills, and other human capital factors, required to implement the policy.

Monash University has current AusAID funded capacity-building initiatives working with the National Council on Climate Change (DNPI, Indonesia) and the University of Palangka Raya (UNPAR) (Central Kalimantan, Indonesia). Thus at the **governmental level** KM is focussed on building **capability** and on identifying practical ways of developing and applying policy responsive to low-carbon growth strategies.

Similarly, at the individual level, universities such as UNPAR, can play an important role in developing and applying a knowledge management approach to forest policy e.g. by encouraging a multidisciplinary approach, training KM practitioners, mapping capability across relevant agencies, and developing new knowledge.

A broad, multi-disciplinary policy (e.g. land/forest management linked to REDD scheme trials) is assigned to a number of parties (e.g. government departments and agencies) and other stakeholders (e.g. research institutes, local communities).

Such a collection of stakeholders need to co-ordinate their efforts in order to successfully implement the policy. This collection of stakeholders needs to determine how they work together and how information and knowledge is shared. In this way the stakeholders can develop a shared understanding of how the policy can be implemented practically. The stakeholders need to determine what capability they require to implement their part of the policy and what additional capability is required to effectively co-ordinate their efforts. Thus at this **collective level**, the focus of KM is on **collaboration**.

Finally each stakeholder needs to mobilise their resources in order to perform the work assigned to them within the context of the policy. The practical work performed is informed by the overarching organisational goals of each stakeholder (e.g. timber production by the Ministry of Forestry). But these activities must be modified to take into account the role assigned to each stakeholder in the collaborative arrangements agreed to by all stakeholders. Thus at the **individual level** the focus of KM is on **action**.

Traditionally, strategy or policy development and implementation is considered a top-down process. But KM adds a bottom-up process that integrates action, collaboration and capability in order to reflect how the policy is implemented in practice.

This is particularly important when developing and applying policy involving several agencies such as forest policy in Indonesia. The KM approach emphasises the need for flexibility at all levels so that practices, structures and objectives can be adjusted reflecting learning from the implementation process to date. It also means that information needs to be shared between levels and that the information must flow both top-down and bottom-up. In our current work, top-down engages with DNPI and bottom-up engages with UNPAR (particularly in better understanding community development needs). Moreover the information must be diverse, not restricted simply to reporting against targets, but must include disconfirming and/or contradictory information as well as informal information such as anecdotal stories. The role of KM at each level is to share that information, store it as memory, make sense of it for each task, learn from it and ensure conclusions reached by each stakeholder are taken into account when practices, structures and objectives are being adjusted (e.g. by changes to current policy as Indonesia's aspirations to low-carbon growth are realised).

### **Building a Knowledge Management System**

A central theme of KM is that knowledge must be shared in order to add value to activities that rely on that knowledge. The concept of a knowledge management system (KMS) is therefore grounded in how knowledge is constructed, collected, stored, retrieved and disseminated. But there are important conditions:

- the KMS is not limited to explicit, coded and documented information but must include informal knowledge and information and not only the written word but also pictures, verbal stories, graphics or any other form
- The KMS is a socio-technical system that accommodates social activities and integrates them with technologically mediated communications and functions

To develop a KMS means to build a shared resource that is available to all stakeholders, develop practices that share that resource effectively, and develop a culture of trust that encourages interaction between stakeholders. In the context of policy development and application, such a resource must be available at all three levels of activity.

It must be open with little or no restrictions on access and contributions, and must contain sufficient data, information and knowledge so as to be useful in supporting the various activities undertaken to implement and evaluate the policy.

A KMS, as a socio-technical system, is manifestly different to more traditional hierarchically based information systems where information flows are highly controlled. Computer-based information systems are predominantly focused on automating and/or supporting the functional processes prescribed by the organisation. A KMS on the other hand focuses on allowing participants to explore the informational resources in order to learn and adjust the processes so that the activity can more effectively address goals set for the task.

This is particularly important in Indonesia where the policy setting is clearly influenced by balancing the needs of alleviating poverty (through economic growth) and addressing environmental degradation (by improved forest and land management). A KMS based on the TbKM approach integrates both the exploratory aspect of the task, the *thinking* work based on the conceptual layer of TbKM, and the task functionality, the *doing* work based on the pragmatic layer of TbKM. Moreover the social interactions around the use of the KMS represent the **communication** work that is integral to KM.

Constructing a KMS as a socio-technical system involves both building the technological resource and developing the capability that will allow stakeholders to effectively use this resource. While the technology usually already exists, it usually needs to be adapted and extended to incorporate a different set of functionalities. Furthermore, people need to understand KM principles in order to make decisions and judgements about appropriate use of the technology and about the potential of the information and knowledge resources. Those involved also need to learn to explore the situations they confront using the resources available through the KMS. Developing such capability requires education, training, mentoring and practical problem-based learning.

Even more important is to develop the capacity to work collaboratively with diverse partners and different context represented by the three levels of activity.

Government policy in the area of land and water management in Indonesia is inherently complex, multi-dimensional, long-term and requires a multi-disciplinary approach. This means that there is a need for a much broader range of stakeholders to be involved in the development and application of the policy and many of these stakeholders would not have previous experience of working together.

In turn, this places more emphasis on the need to collaborate and to facilitate knowledge exchange and information flows across the network of stakeholders. It is important therefore that the KMS does reflect the characteristics of a network, with each stakeholder able to communicate directly with any other stakeholder, rather than any externally imposed command and control hierarchy. Such an approach to the design of the KMS facilitates the development of trust relationships between stakeholders and this in turn ensure more open and comprehensive knowledge exchange and effective information flows. This approach is more likely to yield practical, cost effective, and consensual approaches to forest and land management policy development and application in Indonesia.