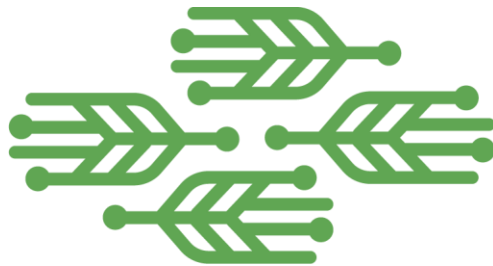


Deliverable 3.1 – WP3. HIKR data best practices and methodologies



EURAKNOS

***Connecting Thematic Networks as Knowledge Reservoirs towards a European
Agricultural Knowledge Innovation Open Source System***

Task 3.1 HIKR methodologies and practices for data generation, selection, collection and storage

Summary

Deliverable 3.1 deals with the issue of knowledge acquisition by Thematic Networks (TNs). Each TN sets up its own Knowledge Reservoir (KR), in order to make knowledge in the form of specific contents available to the end-users (farmers, foresters and advisors).

At this stage of the EURAKNOS project, it was essential to identify and define the processes used by the TNs to compile knowledge content in the KR and then disseminate it to the end-users. This fundamental step helps to describe and define how to design an High Impact Knowledge Reservoir (HIKR). In order to achieve this objective, Task 3.1 focuses on the issue of knowledge acquisition by the TNs.

Task 3.1 involved the organisation of a working group to assess the needs of the end- users and also to collect their specific expectations from the existing TN knowledge reservoirs.

Then in a second step, it was useful to describe the different steps of the knowledge capitalization process, an active process of capturing knowledge assets and making them available to end-users. Finally, additional recommendations related to practices emerge for future TNs based on the consolidation of knowledge from the working group on identifying recommendations for best methodologies and practices to select, collect and store data in a harmonised way in a HIKR, in addition to those already acquired during the Budapest workshop.

Deliverable 3.6 will go into more detail and elaborate on these recommendations to formulate technical guidelines for TNs by all the WP3 task leaders with contributions of all partners involved in WP 3.

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	DEC	Websites, patents filing, press & media actions, videos	
	E	Ethics	

Dissemination Level	PU	Public	X
	CO	Confidential, only for members of the consortium	

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List of abbreviations

EURAKNOS – Connecting Thematic Networks as Knowledge Reservoirs: towards a European Agricultural Knowledge Innovation Open Source System

EUREKA – European Knowledge Repository for Best Agricultural Practices
HIKR: High Impact Knowledge Reservoir

ICT: information and communication technologies

KIP: Knowledge Innovation Panel

KR: Knowledge Reservoir

MA: multi-actor

MS: member state

TN: Thematic Network

WG: working group

WP: work package

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1. Introduction

‘The future of innovation in European agriculture and forestry is based on the improved (digital) exchange of best practices between farmers, researchers and advisors from different sectors and member states (MS).’¹ This statement represents a real challenge to which the EURAKNOS project must explore solutions in order to provide recommendations and solutions. EURAKNOS aims to reinforce the European Union agricultural knowledge base through the development of a blueprint for a Knowledge Reservoir (KR) that enables the farming/rural community easier access to best practices from all European Union H2020 Thematic Networks (TN).

WP3 of the EURAKNOS project explored the ways to design a High Impact Knowledge Reservoir (HIKR) in a H2020 project context. The objectives was to define the best ways to collect, store and share information, knowledge and data based and making outputs targeted to specific agriculture and forestry sectors and/or European regions. The KR methodology provided is supposed to strengthen the response to the end-users’ needs and to facilitate the knowledge management and its sustainability.

A KR is a collection of materials, practices, instruments, methodologies and tools, that contribute to the use of innovative solutions for sustainable agriculture and forestry. A HIKR strives to maximize impact through best content, structure and methodologies focused on urgent end user needs. It provides the ways, channels and tools, to reach the end user (farmer, forester, researcher and adviser).

To determine the harmonised and the best design and format for a HIKR to be used in projects such as TNs and other multi-actor H2020 projects, several steps were planned. The WP3.1 was in charge of the first level, i.e. the best methodologies and practices to generate, select, collect and store knowledge and data as outputs of TNs.

The WP2 dedicated to a general overview of KR assembled within the H2020 TNs, showed the great diversity of Information and Communication Technologies (ICT) solutions developed to insure the innovation transferring. Format, design, type of data and the ways data are produced, collected and stored, appeared unlike and disparate. The user needs have been related but not often prioritised.

Therefore this WP 3.1 focused on the knowledge capitalization, dedicated to make this knowledge accessible to the largest possible number of users. The knowledge capitalization aims to safeguard the knowledge acquired and held by users in the daily practice of their activity, mainly know-how and experience feedback.

We have tried to answer the fundamental questions through the organization of a working group that brought together different categories of field actors questioned on specific issues (knowledge needs, searching information habits, frequently asked questions). This consultation

¹ This reference is an internal formulation, which figures on the home page of the EURAKNOS website <https://www.euraknos.eu/>.

phase enables to identify different social contexts (connected farmers versus unconnected farmers, awareness of digital tools, autonomy in the search for information) to be taken into account in order to disseminate knowledge in line with the needs expressed.

The WG process aimed to follow the knowledge capitalization steps: from the collection and inventory of available content to the adaptation of content and formats to the dissemination uses. For this, it was necessary to take into account the context (cultural, socio-economic and relevant environmental considerations) that concerns the end-users and determines the end-users needs' (types and nature of information sought: technological information, economic information, practical issues, peer to peer learning, etc.).

The description of these key steps enabled us to draw up a list of recommendations for the development of an effective and sustainable KR, referred to as a HIKR.

2. Methodology

2.1. Working group objectives and methodology

A 2-day participatory workshop (working group 3.1) was organised in Paris on 12th and 13th December 2019. This workshop built on the outcome of task 2.2 '*design of knowledge reservoirs within current and past TN*' and the discussions during the Budapest workshop (deliverable 2.5 '*Report of EURAKNOS workshop 1 in Budapest*').

The working group (WG 3.1) was set up to identify recommendations for best methodologies and practices to select, collect and store data in a harmonised way in a HIKR. This group gathered different actors from researchers to farmers interested in innovation brokering. Various working sessions conducted them to specify the user needs in terms of knowledge and the best impact knowledge support. Regarding task 2.2 outputs, this workshop was able to identify areas for improvement and standardization. The detailed outline of the workshop can be found in annex A.

The knowledge exchanges involved in the TN can be figured out in this diagram.

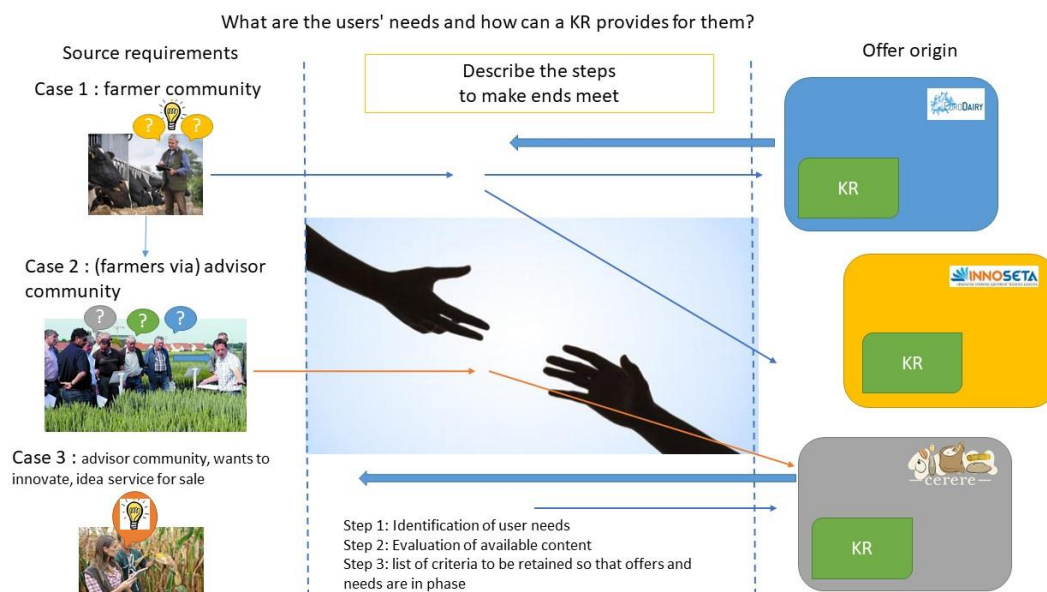


Figure 1: end-user needs and link with TNs

- On one side, the '*knowledge users*': farmers, foresters and advisers etc, enquire such depository in their daily professional life and are therefore looking for reliable sources of information adapted to their needs. Once this source of information has been identified, tested and approved, it could then become their agricultural "Wikipedia".
- On the other side, the TNs '*knowledge providers*' create functional knowledge reservoirs and seek to share all their knowledge sources as much as possible, targeting as many users as possible.

The steps that separate user and TN are therefore listed here :

- 1) *End-users request: "I have a question", "I am looking for information"*
- 2) *Evaluation of the content available in the KRs*
- 3) *What are your recommendations emerging?*

In between, barriers of communication occurs and slows the dissemination process as well as social representations and materiality of practices are central elements of change. In T2.2 overview, some access limit have been expressed such as the language used, skills and competences requested, the lack of information maintenance (updating).

But how do these actors come to meet and establish a reliable relationship of trust?

To try to answer this question and thus identify the methods and practices to be implemented by the TNs to achieve this goal, we have reconstructed the steps that separate the user who is looking for information and a TN that proposes one or more practical solutions. We assess whether the needs expressed are in line with the offers provided by the TNs. Based on what we

observe, then we are able to propose ways of improvement in order to considerably increase the impact of the TNs, in terms of approved and reference contents.

Then in the following sections, we will detail them and especially to mention the contributions that were made by the participants in this working group.

2.2. Working group participants

The WG was composed by taking into account several elements:

- *The function of the participants*: it was intended that this working group should be multi-stakeholder. To this end, a balanced distribution was ensured between different groups of stakeholders sought (farmers/foresters, advisers and policy makers as knowledge users and TN participants, researchers as knowledge makers).
- *Geographical origin*: as far as possible, an attempt was made to cover the whole of Europe in order to be able to take into account the geographical diversity, even if the Estonian delegation was predominant.
- *Fluency in English*: this is a necessary prerequisite to participating in such a working group, but at the same time a major obstacle to mobilising a wide range of European farmers. The only respondents present were from Northern Europe.
- *Available contacts*: the list of KIP members assembled within EURAKNOS but also and above all by the contacts of the EURAKNOS partner network.

The Working group 3.1 was composed as follows:

Table 1: workgroup 3.1 participants

Affiliation - organization name	Profession	Country
Estonian Agricultural Registers and Information Board	Policy maker	Estonia
Estonian Ministry of Rural Affairs, Department of Research and Development	Policy maker	Estonia
Agricultural Cooperative Society A Carqueixa	adviser	Spain
Koivakonnu OÜ	farmer	Estonia
ALLIKA TALU OÜ	farmer	Estonia
ABioDoc -VetAgroSup	document database manager	France
NUTRIMAN (TN) Terra Humana Ltd	researcher	Hungary
European Forest Institute	researcher	Spain

We created a multi-actor group, bringing together policy makers, advisers, researchers, farmers and even a document database manager.

The programme followed by the WG is presented in detail in Annex A.

WG 3.1 was led by Patrick Sarzeaud and Maxime Marois from IDELE, as task leader of task 3.1, with the support of other partners involved in this task, namely : Nathan de Geyter (UGent), Ilse Rasmussen (ICROFS), Pille Koorberg and Hanna Tamsalu (ARC) and Dario Arias (USC).



Photo: all the participants of WG 3.1, bringing together experts and partners involved in EURAKNOS, a real MA group!

2.3. Characteristics of the selected potential targets

To carry out this characterization, we used the user personas, meaning the group put itself in the shoes of a :

- Researcher,
- Policy maker
- **Farmer and foresters**
- **Advisor**





We will retain only the last two categories of users which are our main targets to reach.

The user persona² is a fictional character created to represent a user type that might use a site, brand, or product in a similar way. Personas are useful in considering the goals, desires, and limitations of brand users in order to help to guide decisions about a service, product or interaction space such as features, interactions, and visual design of a website. A user persona is a representation of the goals and behavior of a hypothesized group of users. In most cases, personas are synthesized from data collected from interviews with users.

➔ What did we learn about farmers/foresters?

Participants positions about agriculture innovation, are described in table 3 how they position themselves:

Table 2: positioning of farmers and foresters on innovations

Topics	Verbatim
 Fear of new things	"What is that?"
 Investment of time, money	"Great, but how to apply it or pay for it?" "Will it save me time and money?" "Cost and payback?"
 Reproducibility / process accuracy	"It probably doesn't work in practice." "Has it been proven in practise? Show me!"
 Desire to stand out	"Not like dad did" even if "Traditional practices can be innovative" Need to challenge oneself "Let's do it" "It's adding risk." "A hype"

We therefore realize that it is essential to overcome a certain amount of reluctance for the farmers to come spontaneously to seek information. To do this, it is essential to offer them the





² [https://en.wikipedia.org/wiki/Persona_\(user_experience\)](https://en.wikipedia.org/wiki/Persona_(user_experience))

ideal support that will hold their full attention. We have the impression that we have no right to make mistakes; one bad experience is enough so a farmer doesn't come back for more information.

We need to ensure that the proposed content is presented in a clear and simple way, easy to use and understand in their own language/alphabet.

- Why should farmers/foresters be interested in TNs?

Table 3: interests in TNs for farmers and foresters

Topics	Verbatim
 Joining a community	<p>"We all need each other"</p> <p>To meet like-minded farmers, to come outside of the farm</p>
 Willingness to access available knowledge	<p>Access to new knowledge/technology from other farmers and civil society</p>
 User-friendly tool	<p>Easy access to information</p>
 Search for solutions	<p>Easy to set up</p> <p>Finding solutions to problems</p> <p>Finding sustainable measures</p> <p>Increase profitability</p>

- What are the reasons given for using a knowledge platform?
 - Search for approved practical solutions
 - Identified access means
 - smartphone, get info in less time (more efficient)
 - by people relaying information (advisers), because they trust the responsible organisations involved in the platform
- What are the barriers expressed for not using a knowledge platform?
 - Tool limitations
 - not useful for them, no update of the content, too complicated (scientific language), too much text
 - too many requirements/barriers (login etc.)
 - No digital access (no computer, no internet)

- Lack of investment in the search for knowledge: no time
- Language barrier
 - o not in their native language
 - o the level of simplicity of the wording
- Lack of trust: they do not trust the platform
- Already have their own network: they have a personal connection to input providers or other farmers
- No awareness of the tool: they do not know the platform

➔ What did we learn about advisers?

- What are the main characteristics of these profiles?

They express interest in agriculture. They have passion to inspire change. They want to share their experience and to maximize the impact.

About their behaviour, they are promoters in innovation. Their currency is "It's great! Use it!".

The place of advisers is legitimized by the needs expressed by farmers. Advisers bring knowledge to farmers by sharing practices and leave with new ideas that enrich their advice.

- What can the TNs do for them?

Knowledge library-info: they always need to learn something new for their farmers community. They are fond of sharing knowledge.

The following list of key words is a good illustration of what advisers expect from TNs:

- Meet peers/compare
- Being a better adviser
- Getting something out of the farm (money, products, experience)
- Pre-made validation group
- Perspective on the world
- Don't miss out on things
- Find and promote solutions across the EU

- What can an adviser expect from a KR platform?

They expect to have more time to collect information through readymade resources and easy access in their own language. They want to stay updated on knowledge (policy/new tools/tailored factsheets) that they cannot produce on their own, but they can trust.

They have high expectations about the implementation of a platform that would contribute to the growth of their community.

- What are the barriers expressed for not using a knowledge platform?

The main reasons for not using a knowledge platform are: not useful for them, no update of the content, too complicated (scientific language), too much text, no time, no computer, no internet, not in their language, bad usability and difficult to navigate.

Other reasons can be: they don't know the platform, they don't trust it and no cross platform approach exists yet. For each field of agriculture treated by different TNs, it is necessary to go and consult each time the knowledge hosted by each KR.



3. WG 3.1: participatory workshops, main results and inputs collected

3.1. Target request

What type of question could a user ask to a KR? // What type of knowledge would a user like to find in a KR?

Preliminary investigation phase to be carried out by TN when setting up a KR: ensuring that the content to be offered is in line with the expectations of potential users. This is what could be called a market study, which, if carried out, contributes to the success of content dissemination by the TN.

Each farmer, forester and adviser, in their daily job ask themselves some specific questions. These questions can be classified regards to the degree of reactivity that this requires for the implementation of the proposed solutions.

It is thus possible to define 4 degrees of reactivity:

- 1) Questions for 'today': a technical problem still unknown today occurs in a farmer. Then he needs immediate technical advice, in the form of a practical sheet that will enable him to identify the origin of the problem and to identify concrete courses of action that he can take now to continue his activity.
- 2) Questions for 'tomorrow': a farmer has learned that a crop disease is emerging in his region. He would like to know more about it from a technical point of view, so that he can react if necessary.
- 3) Questions for 'next month': a farmer is planning to introduce a new crop that has never been tested before. He has had the opportunity to discuss it with neighbouring farmers. However, he is looking for a fact sheet to get a clear idea of the next crop project.
- 4) Questions for 'next year': are mainly strategic and/or topical questions, which require investments in time, money, etc.

It is therefore this approach that has been chosen to lead to the collection of the following information from the participants.

Table 4: positioning by users on a time scale of the knowledge required

Timescale	Farmers/ Foresters	Advisors
Today	Practical questions Buy & sell Management & new ideas: to be thinking now for a further future Keep up to date with legislation	Precise answers for specific (new) problems – <i>e.g. how to treat disease problem</i>
Tomorrow	Same as 'today' + Prices	Prepare for upcoming problems, <i>e.g. disease in the proximity likely to come to local area – what to do?</i> Literature monitoring and foresight
Next month	Which subsidies are available? Was the year profitable?	Practical measures to prevent/mitigate damages of climate change (or other events) that are already here Involvement in network and expert groups to be reactive when needed
Next year	Exchange with others doing similar things/thinking in similar ways (e.g. invest in solar powered feed drier): join and take part in groups of innovative projects How to start with organic farming What changes to make on the farm	Strategic measures to prevent damages of climate change (or other events) expected to arise in the future Advise for self sufficiency

The raw production that made it possible to construct this table is presented in Annex B.

3.2. Evaluation of the content available in the KRs

It was proposed to the participants to consult the knowledge contents proposed by the KRs of the 3 following TNs :

- AFINET (<http://www.eurafagroforestry.eu/afinet/knowledge-cloud/search>)
- SMART-AKIS (<https://smart-akis.com/SFCPPortal/>)
- INNO4GRASS (<https://www.inno4grass.eu/en/dissemination>)

The evaluation criteria were not clearly formalised in advance because what was really important was to gather the participants' feedback on the content offered by the different knowledge platforms tested, as test users.

Thus, we start from what was expressed by the participants during the WG, which led to the compilation of the tables below:

Table 5: evaluation by farmers of TNs' contents

Farmer		
Criteria mentioned by test users	Observations by test users	Favorite of test users
Usability of the platform	Personalized access	Very useful and indispensable function to be integrated, provided a few lines of explanation on the proposed contents are included.
	Paying attention to the platform design to make the content attractive Little introductory text but it should be catchy. Attractive presentation of the different content categories	
	The user must not get lost while using the platform.	Tree structure remains present on the side
Searchability and accessibility	Ease of access to content: limit the number of mouse clicks and ensure display on a single page	When they go looking for content, they only want access to content produced for and valued by farmers not interested in information relating to the project, on the contrary, they find such information embarrassing
		Make sure the results are displayed: the most relevant first, limit the number of displays, if several pages: only the first one will be consulted, so you might as well limit yourself to a single page!
	Once the content is displayed, think about how to retrieve it.	Provide action buttons 'ready to use', 'download' / 'ready to print' 'Sharing'
Content attractiveness	Videos first	Videos attract attention
Content recipients		Provide pictograms : ready to use for...

Table 6: evaluation by advisers of TNs' contents

Adviser		
Criteria mentioned by test users	Observations by test users	Favorite of test users
Translation	All content is available in English and most of the time only in English.	A major effort should be made to translate content into at least the EU languages.
Usability of the platform	Access defined according to their profile (adviser / farmer)	Very useful and indispensable function to be integrated, provided a few lines of explanation on the proposed contents are included.
Searchability and accessibility	Difficulties in quickly and easily finding out all the content by theme that is actually available	Need to be provided with the content assessed as most relevant to a given topic

In terms of methodology, it would be interesting and highly recommended that the development of content put online by TNs be subject to an MA approach, i.e. that end-users be involved from the outset in the development of content, so as to provide their input on the content, validate the form and are fully involved in this process from the beginning. A farmer talking to a farmer always carries more weight.

3.3. Drawing up a list of criteria

This step consisted in proposing a non-exhaustive list of criteria to all the WG 3.1 participants in order to gather their opinions in two stages. In the first stage, they expressed themselves in their own opinion, then in the second stage they expressed themselves by putting themselves in the shoes of a persona.




A first set of criteria was elaborated by the organization team before the WG.

The criteria are varied but correspond to elements to be taken into account to constitute a KR. When a TN seeks to build a KR, this TN must be able to answer a certain number of questions, which for the most part correspond to the list of proposed criteria.

The expression of the participants on these different criteria is shown by the orange banner, which makes it possible to report on the levels of opinion expressed (the thicker the banner, the more the participants agreed).

The list of criteria evaluated and selected by the participants is as follows:

Table 7: list of criteria to be taken into account in a HIKR

Criteria / arguments	Rating scale		
Target audience = profiling	Researchers / teachers	all	Farmers first
			
Comments		Innovation brokers	Farmers organisations / Advisers / teachers
	The participants are unanimous in mentioning that the priority target that is being sought includes farmers and advisers. This is a fundamental element to be taken into account, as it must be borne in mind that the knowledge made available by KR is intended for farmers and advisers.		
Information source Depends on quality standard and trust	Researchers	Advisers	Farmers
			
Comments	The participants agree that a majority of the information comes from research work. Their expectation is to have information from results validated by tests and approved by field trials and demonstration events. Before this knowledge can be transferred to the users, it is essential to put it in a format appropriate to the final recipients.		
Geographical origin	International	National	Local
			
Comments		applicability	Taking into account geographical constraints and specificities: impact on the applicability of shared innovation
	The origin of the source of information is not perceived as a constraint. On the contrary, it is an opportunity to open up and capture as many tested practical solutions as possible. On the other hand, it is on the transfer to the users that particular attention should be paid. A certain number of recommendations will have to accompany the proposed practical solution, which will have to mention		

	the criteria of applicability (constraints and geographical specificities to be taken into account).		
Solution practicality	Scientific	Technical (not theoretical)	Practical, ready for use
Comments	The participants are unanimous; they expect practical, technical and ready-to-use knowledge.		
Argumentation for benefits	none	Specific interests	Economical, environmental and social interests
Comments	Taking into account the context of applicability of the proposed practical solutions is fundamental. It seems appropriate to assign to each practical solution proposed (whatever their format: fact sheets, leaflets, videos, etc.) a global or individual score on predefined criteria (for example: level of practicality, economic impact, environmental impact, etc.) which will enable it to be ranked and guide the user in his choices.		
Ranking criteria 'Searchable' versus 'exploratory'	None	Languages and production	Technical needs (for end-users)
Comments	One can easily define two content search behaviors and thus influence the provision of content: Searchable': you have to enter keywords to access content. Exploratory': the user moves through the platform from the tree structure of the site.		
Search engine / key word searching	General	Intermediary	Technical
Comments	The two criteria above are linked. The participants agree that the practical aspect of knowledge is the element to be emphasized as much as possible and that the indexing of the proposed documents should be done through the use of appropriate technical wording.		
Format	Scientific paper	Technical leaflet (two-sided)	Video farmer testimony + specialized adviser // podcasts
Comments		Recipe	Short summary // recipe
In terms of format, participants expect to find a certain diversity, depending on the message to be conveyed and the target audience. It should be noted, however, that some formats are given more prominence than others. For example, participants expect to find technical booklets in a short format (only front/back) that provide ready-to-use technical advice in the form of recipes. They also highlighted videos that provide testimonials from farmers and specialist advisers and promote peer-to-peer learning. The use of a short video can be useful and necessary to promote a brochure or other approved material by the consortium of the TN.			

Consultation frequency	Annually	Once a quarter	Once a week
Comments	It is not necessarily obvious to be objective in answering the question about how often the KR is consulted. In any case, what is certain is that it would be ideal to build user loyalty and that they consult this knowledge platform once a week. It is usage that will provide the answer. In any case, it is the rate of consultation that will make it possible to evaluate the relevance of the contents made available.		
Platform updating frequency	Annually	Once a quarter	Once a week
Comments	In order to build user loyalty, it is important to regularly add new content. A quarterly update frequency seems reasonable. A little new on the front page, it is necessary to show that the platform is 'alive', to retain regular users.		
Consultation time (in the site per access)	1 hour	15 min	5 min
Comments	Researcher/adviser	Farmer	
	There is a different viewpoint depending on the users. However, it must be remembered that farmers are looking for practical information but do not spend much time in consecutive search. This observation must therefore be taken into account in order to offer an ergonomic platform and suitable searchable media.		
Maintenance Updating for functionalities	Annual	Monthly	Permanent
Access	Total : no registration	Limited	Private: only with registration
Comments		First, access limited to registered members. After one month, contents available for all	
	An interesting strong idea has been proposed which consists in limiting for a short period (one month maximum) the access to new contents, only for registered user members. After this period, all content is accessible to all: registered and non-registered members alike. This is certainly an effective option to build user loyalty and at the same time offer them a more personalized selection of content.		

Language	English only	English + other	EU languages
Comments	There is consensus that the proposed materials should not be available only in English as they will not be consulted by farmers. The recommendation that is made is to provide for the translation of all the contents at least in all the languages of the TN, but it would still be necessary to invest in translation and to offer contents in all the languages of the European Union.		
Contact details	LOW		HIGH
Author (provider of information) identification			Full name Organisation Email - country
Comments	The platform user must be able to easily access contacts to find out more. Either these contacts are systematically mentioned in the content or they are listed in a specific section to be provided.		

The raw production that made it possible to construct this table is presented in Annex B.

In order to complete the previous list, other criteria to be taken into account were mentioned during the consultation with the WG 3.1 participants. However, these criteria are given for information purposes only, as they have not been thoroughly evaluated, unlike those mentioned in the table above.

- 1) **Lawfully identified knowledge:** criterion that refers to the notion of trust and approved content
- 2) **Browse:** it would be nice to have a simple platform on which you can quickly get an overview, without spending a lot of time searching to get an idea of all the available content and features.
- 3) **Seeing user feedback:** complementary criteria to the previous ones, indeed users will be sensitive to the evaluation made of the contents by other users. Seeing feedback from other users reassures and arouses curiosity, so using this can help to engage more end users. This system also makes it possible to better identify users' needs over time.
- 4) **Keeping up to date by domain of interests / Use persona access :** two slightly different but complementary criteria. The participants would like the platform to allow personalized access according to the user's profile in order to target the information offered according to his or her areas of interest. Coupled with the previous criterion mentioned, these two criteria would make it possible to provide personalised support to users, which will be appreciated, thus being able to build user loyalty.








In order to complete more precisely the evaluation of the set of criteria, the participants were asked to add descriptive elements and expectations by the two categories of users addressed: farmers and advisors.

The main recommendations that have been made are summarized in the following two tables.

Table 8: farmers' point of view on the list of criteria

Farmers	
Themes	Priorities highlighted by the participants
 <p>Practicality</p>	<p>To circulate on the platform, define a coherent path The user needs to be referred and taken care of. In a maximum of 5 clicks the user must reach information contents Clear information, contents ready to apply!</p>
 <p>Maintenance and updating</p>	<p>In order to build user loyalty and increase user numbers through the sharing of testimonials from convinced users, it is fundamental to want to:</p> <ul style="list-style-type: none"> - regularly supply the platform with new content <i>Minimum frequency: every month during the first year of operation in order to attract and retain users</i> - update the platform in order to implement new fundamental functionalities. <i>Minimum frequency: as infrequently as possible in order to cause as little disruption as possible to users who would otherwise get lost.</i>
 <p>Approved contents</p>	<p>Plan to disseminate only content for which the information is validated and approved. The user needs reliability and trust.</p>
 <p>Provide sharing tools</p>	<p>Information coming from other farmers (peer-to-peer learning). To provide tools to interact with other farmers (like forum, chat-room) "your digital neighbour"</p>
 <p>Content adapted to the target audience</p>	<p>Information understandable, not scientific, not too simple : find a compromise that can be adapted according to the subject matter and also the message to be communicated.</p>
 <p>Benefits <i>how much will I save?</i></p>	<p>The financial argument is to be put forward on the content supports. Before testing a proposed solution, it is strongly recommended to estimate its cost. It was also important to the participants to include environmental and societal benefits.</p>
 <p>Language</p>	<p>Understandable for every European farmers and advisors. Decide country by country, is the information reasonable to translate to all languages, if 50% of users understand English, no need to translate to local language, to sort out where the translation is needed, or where the advisers can provide translations.</p>

Table 9: advisors' point of view on the list of criteria

Advisors	
Themes	Priorities highlighted by the participants
 <p>Practicality</p>	<p>Scientific format but the possibility of also having content support for which knowledge has been vulgarised in order to make it more easily transferable and assimilable and thus help the adviser in his key role of knowledge transfer.</p> <p>Have access to a keyword search engine integrated in the platform</p> <p>Classification of content according to the technical requirements of users.</p>
 <p>Maintenance and updating</p>	<p>how to keep updated on the searched object (consultation time),</p> <p>keeping updated on areas of interest → subscription possibilities</p>
 <p>Approved contents</p>	<p>Information source should be research, not only practice information.</p> <p>Take the research, what is already proven.</p>
 <p>Provide sharing tools</p>	<p>Big influence on the sharing of the most relevant content</p> <p>Adviser as applicant to expand their peer community</p>
 <p>Content adapted to the target audience</p>	<p>Many advisers are also in farming as well</p> <p>Need registration: in the first instance, advisers will be more reluctant to register, it will be less of a dissuasive barrier for them, unlike many farmers. This necessary registration is the only way for them to have access to content tailored to their interests.</p>
 <p>Benefits</p>	<p>It must be possible to attribute to each content a technical note of applicability of the proposed solution, which will guide the adviser in his choices.</p>
 <p>Language</p>	<p>It is probably not necessary to have the language for each country – in many (small) countries, 50 % or more of the farmers – and mainly those that use the internet – can read English – and for the rest, the adviser will read and interpret the relevant material.</p>

4. The exploitation and management of knowledge

4.1. Introduction

The exploitation and the management of knowledge involves five operations: identification, creation, storage, share and use³. Behind each of these key steps lies a fundamental question.

Identification → Where are the possible sources?
Creation → How to organize knowledge in order to adapt them to a given target group?
Storage → How should knowledge be stored to make them accessible?
Share → How to promote the available knowledge?
Use → How to identify shared knowledge ambassadors?

Application to the TN context

Identification

A TN makes an inventory of the existing and available knowledge on the subjects that concern it. One of the challenges for the TN is to know where the available knowledge is. Among the available knowledge, the TN must also ask itself what knowledge is useful and which will be used to propose contents available to the targeted end-users.

Creation

This creation stage essentially involves taking over existing content that will be adapted to meet the needs of end-users.

Storage

For a TN, storage consists of creating a KR in the form of a digital library where the TN's productions are stored and available to end-users.

Share

The knowledge sharing focuses on the tools for sharing and using the knowledge made available. The knowledge sharing is one of the dimensions of knowledge management within a community of requesting users. The implementation of access to knowledge is a key factor in enabling individuals to take ownership of knowledge in order to make use of it.

Use

This step involves the exploitation of available knowledge by the end-users. This step is correlated to the means, tools and dissemination channels that are used, as described in deliverable 3.3.

³ According to https://en.wikipedia.org/wiki/Knowledge_management & https://fr.wikipedia.org/wiki/Management_des_connaissances

4.2. Basic concepts: definitions and clarification

Knowledge capitalization⁴ is the action of extracting, formalising and safeguarding knowledge acquired and held in the daily practice of an activity.

TNs⁵ have two main aims:

- collecting existing scientific knowledge and best practices which are close to being put into practice, but not yet sufficiently ready for farmers and foresters to implement.
- translating this knowledge into easily understandable end-user material such as short, informative recommendations and solutions: ‘practice abstracts’, leaflets, guidelines and audio-visual material (photos, video clips, etc.).

The objective of TNs’ is to collect already created knowledge (capitalising step) and to format (creating new content step) and share it (dissemination step) in a way to make it more accessible to the end-users.

⁴ https://fr.wikipedia.org/wiki/Capitalisation_des_connaissances

⁵ https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri_brochure_thematic_networks_2016_en_web.pdf

At this stage, it is essential to define the following terms and the complementarity that exists between these different terms:

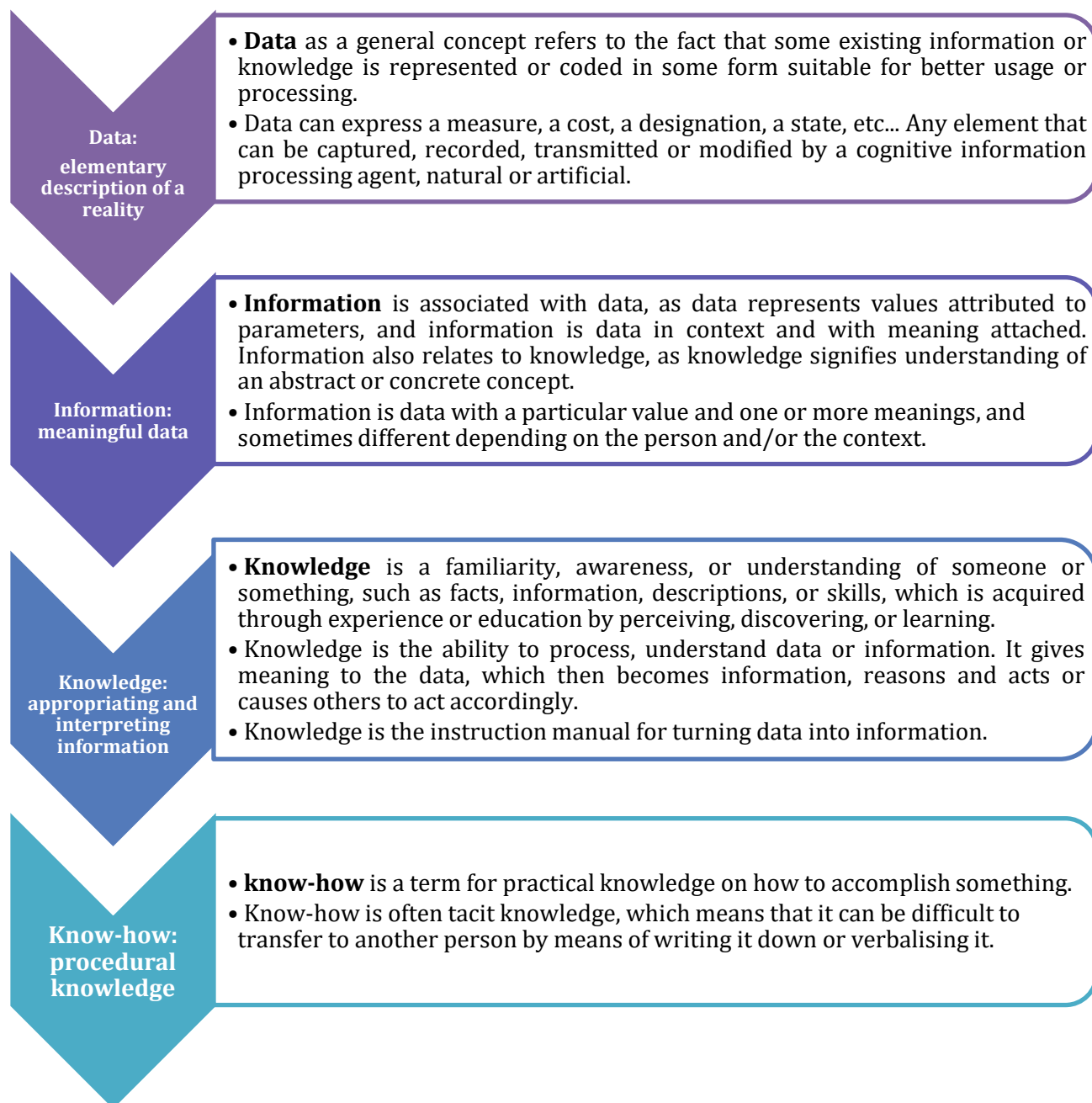


Figure 2: data, information and knowledge, some concepts to be distinguished ⁶⁷⁸⁹¹⁰

⁶ According to the reference <https://www.knowledge-management-tools.net/knowledge-information-data.php>

⁷ <https://en.wikipedia.org/wiki/Information>

⁸ <https://en.wikipedia.org/wiki/Data>

⁹ <https://en.wikipedia.org/wiki/Knowledge>

¹⁰ <https://en.wikipedia.org/wiki/Know-how>

From data to know-how:

All data pass through media to go from individual to individual. Information, must be used by the person to become useful information. Skills and know-how are dependant on the person's ability to adapt.

To manage knowledge, it is therefore useful to dissociate the two concepts '*information*' and '*knowledge*' (which processes information, reacts and evolves). This is the first principle of knowledge management¹¹, it has to answer these two questions: *what is there to know? Who needs to know what?* The formalization of knowledge is part of this problem: '*what knowledge needs to be safeguarded?*', '*To whom should I transmit an expert's knowledge and in what form?*'

4.3. Tacit and explicit knowledge

There are two main categories of knowledge¹².

Table 10: presentation of the two main categories of knowledge

	Tacit knowledge	Explicit knowledge
Description	<ul style="list-style-type: none"> - belong to mental representations, to lived experience - combine innate or acquired skills, know-how and experience - is difficult to verbalize or formalize → random transmission (e.g. when transmitting knowledge between an expert in a field and an apprentice). 	<ul style="list-style-type: none"> - clearly articulated on a written document or in a computer system - appearing in tangible form (paper or electronic file), are physically transferable. <p>They are then verifiable and reusable as with the knowledge contained in an encyclopedia.</p>
Main feature	Undocumented	documented
Examples	<p>know how to plough a field with a tractor</p> <p>know how to harvest a cornfield</p>	<p><i>How explicit knowledge is created ?</i> Writing an electronic document and posting it on a website</p> <p><i>How explicit knowledge is used?</i> Follow a detailed recipe step by step</p>

From tacit to explicit

New knowledge within an organization is always due to individuals. Indeed, an innovation almost always stems from a tacit idea from an individual or a group of individuals, an idea that will have to be transformed into explicit knowledge (knowledge about), like a specification.

¹¹ <https://www.knowledge-management-tools.net/>

¹² According to <https://www.knowledge-management-tools.net/different-types-of-knowledge.php>

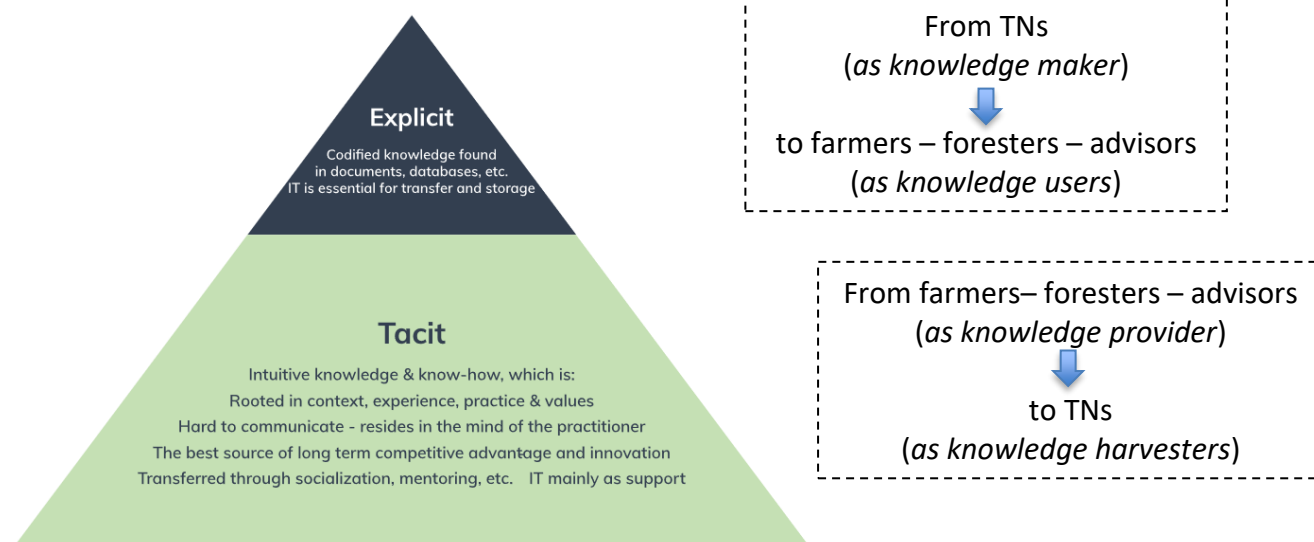


Figure 3: explicit and tacit knowledge in the context of TNs¹³

Challenge for the TNs :

The challenge is therefore to capture this tacit knowledge, channel it, and finally make it explicit so that it can be transmitted to the rest of the network.

The classic scheme would be to learn tacit secrets (public disclosure of local knowledge), translate them into explicit knowledge, standardize this knowledge into a procedure or manual, and exploit this knowledge at the individual level.

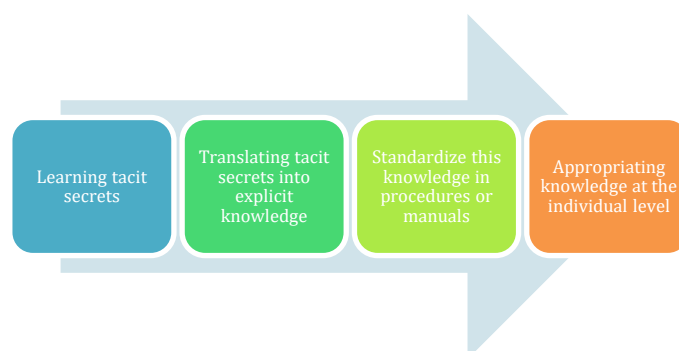


Figure 4: illustration of the real challenge for the TNs

¹³ According to <https://www.knowledge-management-tools.net/different-types-of-knowledge.php>

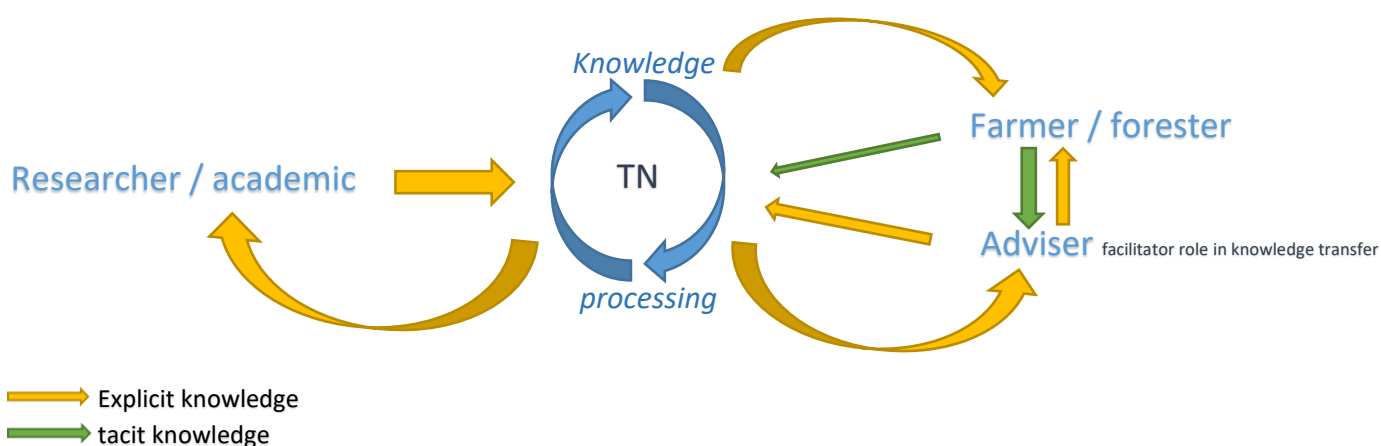


Figure 5: knowledge flow within a TN community

The transformation of tacit knowledge into explicit knowledge through a translation process (a codification process) is not neutral. The explicit knowledge elaborated is therefore not identical to the tacit knowledge related to the experience that one has sought to translate.

This is an important point of vigilance to keep in mind as it contributes to the success of knowledge transfer by TNs. A TN must ensure that the content produced and disseminated is in line with the needs and expectations of end-users.

Codified knowledge can take different more or less abstract forms and focus on 'how' and/or 'why'. To achieve good codification then means to ask oneself what form of codification is appropriated to the given situation.

Codification process

This process moves from tacit knowledge to explicit knowledge¹⁴.

However, here are the issues (facilitates the transfer, reinforces the cognitive alignment of the members) and the limits of codification (costly in time and resources):

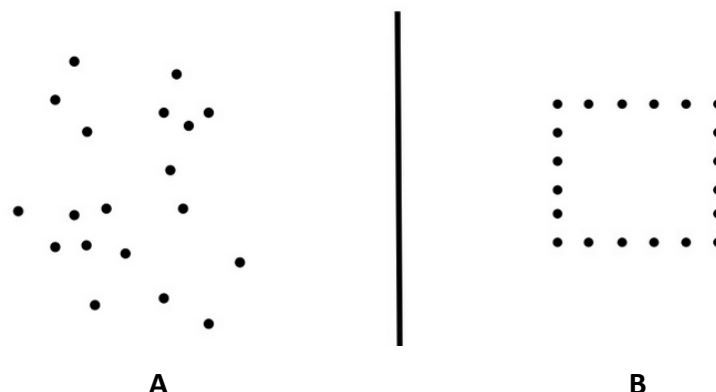


Figure 6: transfer and structure

Explicit knowledge spreads more easily if it is structured and its structure is shared.

Figure 6 illustrates the role of structure in facilitating knowledge transfer. Imagine that you want to transfer one of these two diagrams A or B to an individual without him/her having access to the image of the diagram. Which schema do you find easier to transfer?

The usual answer is diagram B. Just say or write that it is a square, each side of which is made up of 6 points, specifying the diameter of each point and the distance between them. It is indeed much more difficult to describe diagram A which represents a cloud of points.

Why is this?

Diagram B has a structure, the square, which is known by a very large number of individuals. Conversely, diagram A has no apparent structure. To be able to transfer it easily and faithfully, it would be necessary to create, for example, an orthonormal marker in order to locate each point by its coordinates (abscissa and ordinate), in other words create a structure.

¹⁴ https://www.agecso.com/wp/bourbakem/codifkorg/#_ftn1

4.4. Knowledge production process

- **Principle of knowledge capitalization**

The figure below presents the general schema of the principle of knowledge capitalization applied to the context of TNs:

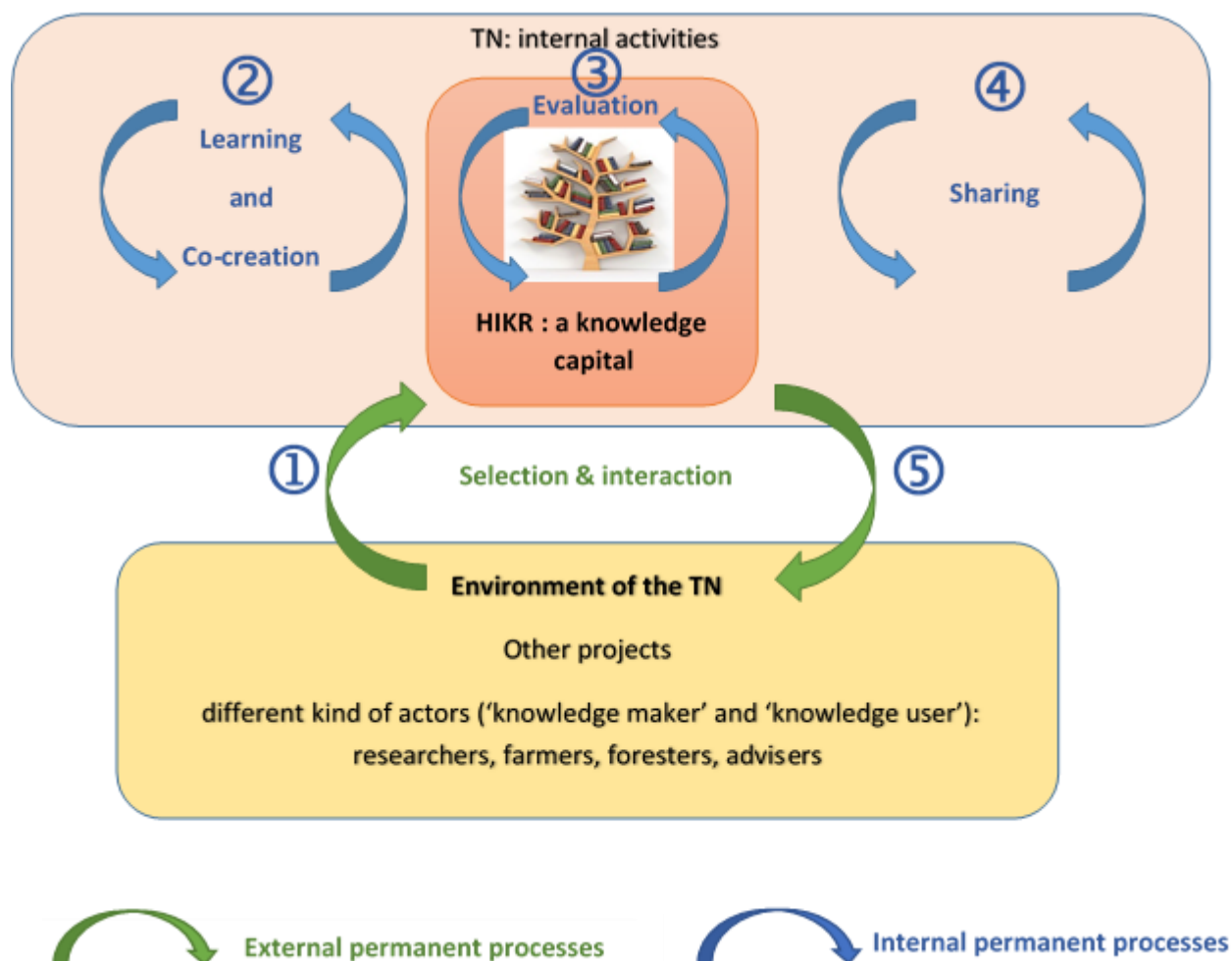


Figure 7: the knowledge management process adapted to the TNs context¹⁵

Detail of the different steps of the knowledge management :

- ① Selection/identification of available sources of knowledge: knowledge acquired in the course of projects, through specific research work by 'knowledge maker' mainly the researchers to a lesser extent the farmers, foresters through the advisers.
- ② Knowledge capitalization step:
 - evaluation of content on several criteria: interest, relevance, reliability, repeatability, etc.
 - development of content appropriate to the expectations of end-users researchers, farmers, foresters as 'knowledge users'.
- ③ Implementation of a KR, a digital library useful for online content storage

¹⁵ According to Nada, Matta & Ermine, Jean-Louis & Aubertin, Gérard & Trivin, Jean-Yves. (2001). How to capitalize knowledge with the MASK method.

- ④ Provision of content, dissemination and promotion to end-users
- ⑤ Interaction with the 'knowledge users', in order to create a loop of permanent enrichment of the KR contents and to guarantee the sustainability of the proposed knowledge, which until now has certainly been lacking in the KRs constituted by the NTs.

- **What to capitalize on?**

The two types of knowledge we want to capitalize on are:

- Scientific knowledge resulting from all the actions undertaken in the field of research.
- Technical knowledge: all the means used to bring a project to completion.

- **How to capitalize on this knowledge?**

The capitalization process is specific to a given organization. Knowledge is explained and then formalized to be made available for exploitation by users¹⁶.

The parallel with TNs is easy to draw, all the more so by integrating the results of the workshops conducted with the WG participants.

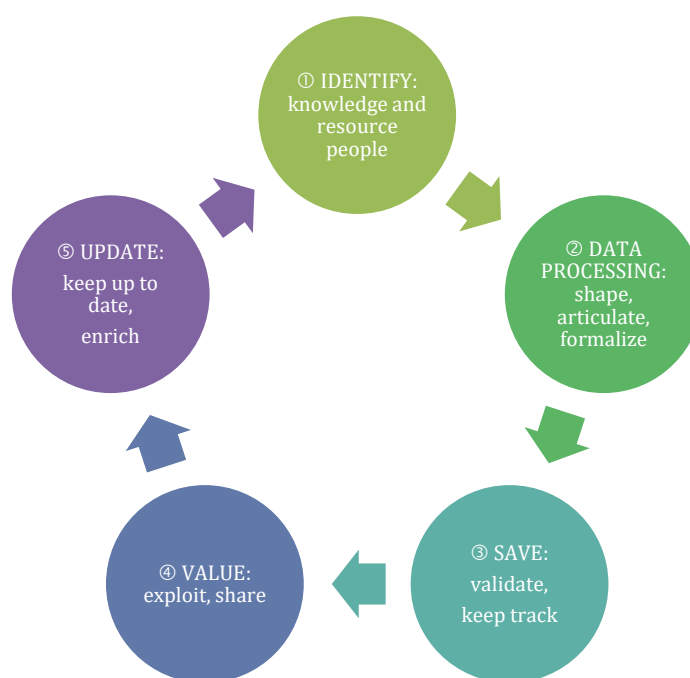


Figure 8: knowledge capitalization cycle

Step 1: Identify knowledge :

In order to identify the knowledge required by the TN as a whole if it necessary to appoint a facilitator. His/her role will be to identify and collect needs. A preliminary work of identification

¹⁶ According to Leroy, D. (2002). Knowledge management and projects' capitalization: a systemic approach. Paper presented at PMI® Research Conference 2002: Frontiers of Project Management Research and Applications, Seattle, Washington. Newtown Square, PA: Project Management Institute

of the knowledge needs must be carried out at the time of the design phase of the project. Then, during the life of the TN, it is advisable to plan to organise special events (e.g. specific workshops) in order to identify the expected knowledge supports.

Step 2: Collecting, formalizing:

A dual-flow process as shown in Figure 5 would be very useful.

It is necessary both to collect practical knowledge from the field (useful, used and recognized by the field actors) and also to collect basic research knowledge, which is intended to be transferred to the community of field actors.

At the very least, this stage is organised around the organisation of two MA groups:

- One that focuses on collecting practical knowledge from the field. The main task of this group is certainly to list the available knowledge as well as the supports, appropriate contents and tools for dissemination. It is also necessary to think about the flagship contents approved by the user community. These contents will be used to disseminate the new knowledge acquired by the TN.
- One that focuses on the collection of basic research knowledge : the main task of this group is to identify what information is useful for the user community and to determine its form. It is at this level that there is the most work to be done to organize this knowledge transfer and invest in finding the right final content support.

The next step would be to set up a test group of end-users (farmers/foresters and advisors) so that they can express their feedback, particularly on the relevance of the contents but also on the adequacy between the level of understanding expected and the level of understanding experienced.

Step 3: Validate, back up:

This step requires the appointment of a domain manager or expert.

Another pertinent point is the quality control of the knowledge produced and stored. For this, it seems essential to appoint a quality manager.

It could also be useful to allow and ask end-users (farmers/foresters and advisers) to qualify and comment on the resources they use and in which context. That can help other potential users to select the relevant resources and pay attention to them.

Step 4: Operate, make available:

This step involves the implementation of adapted and efficient communication tools. This performance is achieved at different levels, within the consortium but also in the constitution of specific MA groups.

Step 5: Ensuring updating, enrichment:

To be efficient on this step, it is necessary to identify a person responsible and in charge of this step.

- **By whom is knowledge capitalized?**

Knowledge is only created, shared and evolved through the people at the heart of the problem, who must be mobilized and motivated by a facilitator.

This is of capital importance. Knowing how to surround yourself with the right people, at the right time.

A TN seeks to capitalise on knowledge and make it available to a greater number of people.

4.5. Direct application to TNs targets

On the basis of the concepts discussed in the previous part and also thanks to the contributions of the WG participants, it is then possible to situate the capitalization of knowledge in the context of TNs.

- **Farmers / foresters: a community of practice!**

TN is a group of informally connected people who interact, learn together on all aspects of their practices, share knowledge, build relationships and through this develop a sense of belonging and mutual commitment. This ongoing exchange creates a collective intelligence aimed at improving innovation within the group.

The functioning of a community of practice is based on four pillars:

- A team: a set of actors federated around the same objective, the same theme;
- People who share intangible resources;
- People who cooperate;
- A common culture and a system of common interest.

- **Researchers: a network of knowledge-based experts**

Scientific research is organized around a network of experts. This scientific research is part of a process of producing new knowledge. This is always done on the basis of establishing the state of the art, which consists in searching for all existing information concerning the field of research and synthesizing it. Thus, knowledge management is indispensable in helping, on the one hand, to better understand what already exists and, on the other hand, to better organize new knowledge in such a way that it is understandable and reusable by future generations.

- **The TNs: a community of interest**

A community of interest is a group of individuals who share either an identity or share experiences and concerns. It is made up of people who are personally affected by a common

problem, either directly or in their environment. Belonging to such a community helps them to understand and interpret their condition and to seek solutions to problems they may encounter. The project group is a group of people, temporarily brought together for their skills, responsible for studying a project to respond to a specific problem, giving it a rapid solution and closely monitoring its implementation.

This definition emphasizes the pooling of skills, expertise and knowledge in order to respond to a given problem. This makes it possible, in particular, to develop the group's capacity for innovation.

A TN seeks to capitalise on knowledge and make it available to the largest possible number of users. For more information see deliverable 3.3 'HIKR communication, dissemination & exploitation strategies' and deliverable 3.4 'HIKR multi actor approach'.

5. Step by step to a HIKR

5.1. Key steps to identify and to harvest knowledge

This part is devoted to the description of the first two major steps, prior to the constitution of a HIKR :

- 1) User need identification
- 2) Harvesting and co-generating knowledge

In order to visualize how these steps articulate with the other steps that make up the execution phase of the TN, all the WP3 task leaders met from 27 to 28 February 2020 and collectively developed the scheme below.

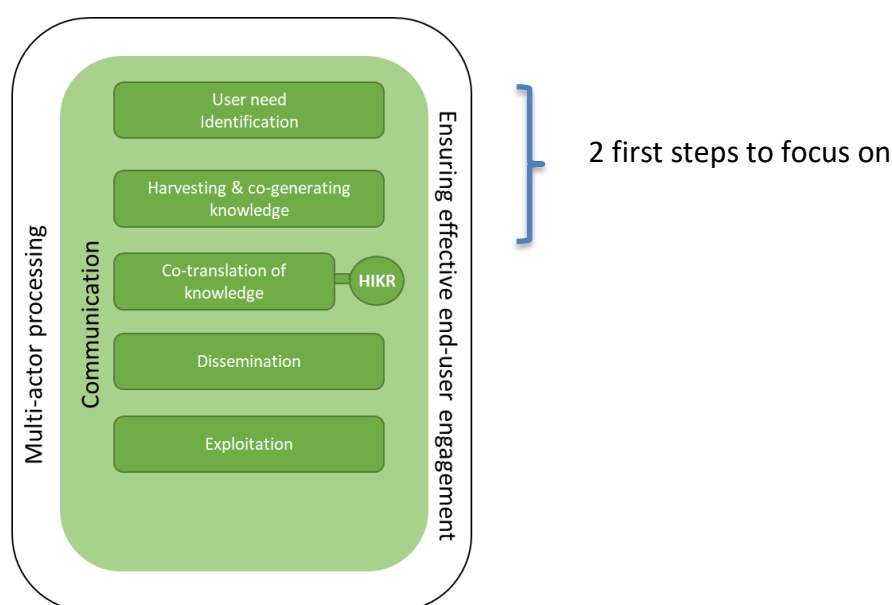


Figure 9: TN project execution : key steps

5.2. Items to be taken into account

In order to describe, the fundamental elements to which these two steps refer, the method of construction of a decision tree has been retained.

Thus, a decision tree has been developed to select data according to the project benefits and will emphasize the economically most sustainable knowledge applicable at a local / regional / European level. Cultural, socio-economical and relevant environmental considerations will be taken into account.

The objective of this decision tree is to present the different stages of the knowledge capitalization process. They will be described in two levels:

- **Needs content / knowledge:** what are the essential steps and recommendations we can give on this phase of the needs assessment process
- **Harvest content / knowledge:** what are the essential steps and the recommendations we can give on this phase of harvesting the most relevant knowledge content.

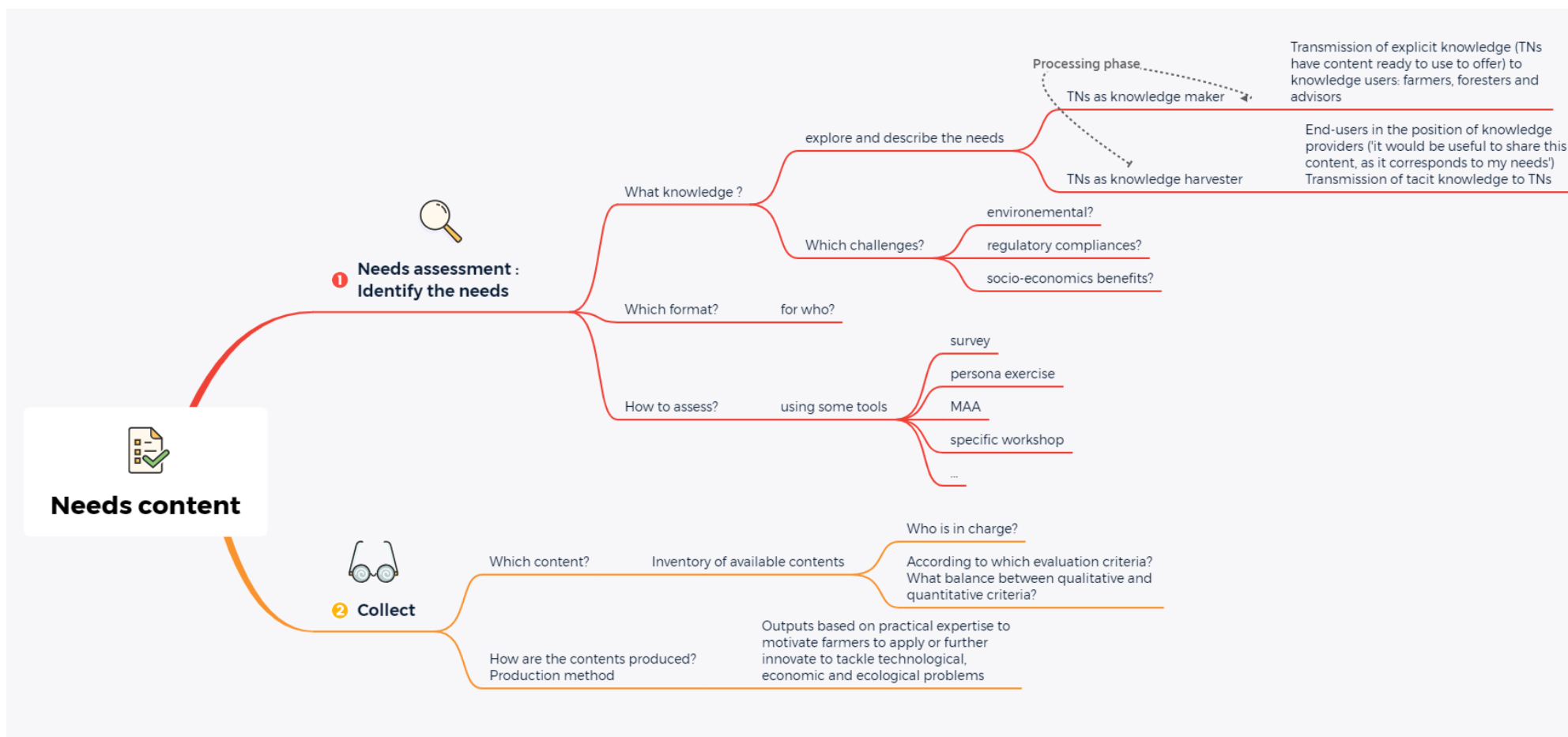


Figure 10: items to remember when assessing needs

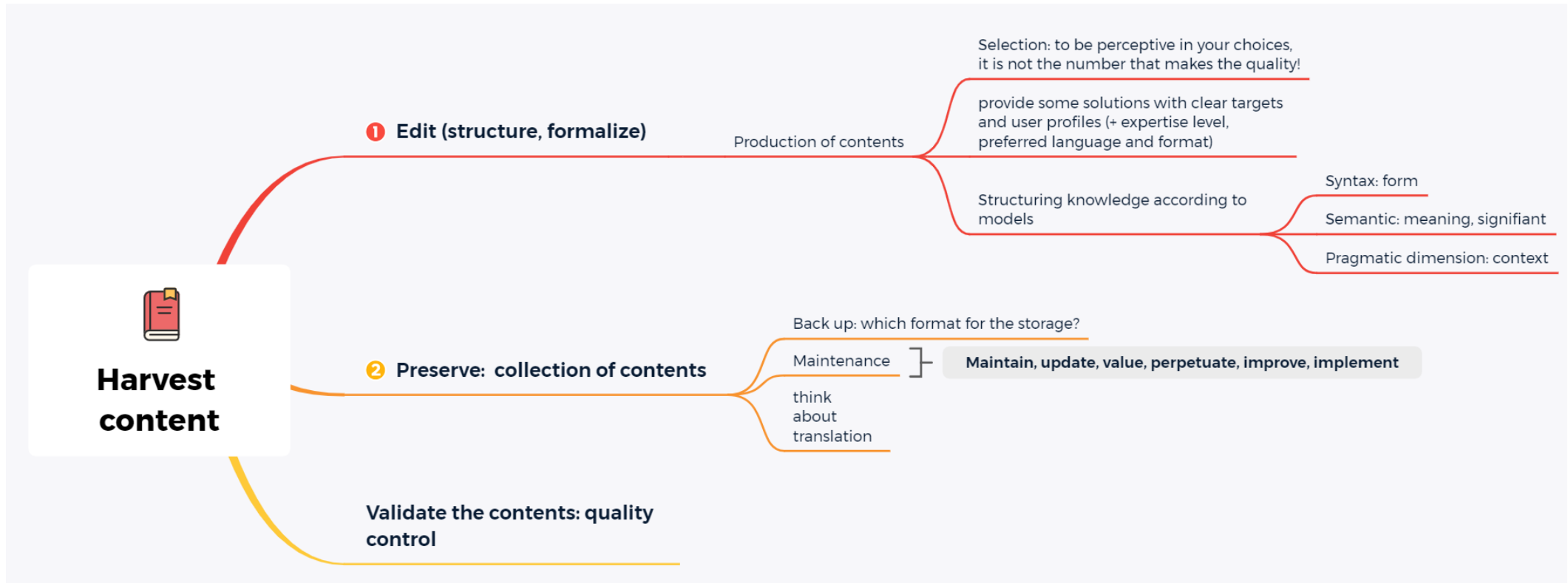


Figure 11: items to remember when harvesting content

5.3. Needs assesment recommendations

This stage is a way to identify the needs of the end-users and also to identify what the end-users expect from the TNS' KR in terms of:

- kind of knowledge: type of subject covered (to be positioned on a time scale), topics related to the environment, related to current or future regulations or topics that provide answers on the socio-economic context
- format of contents: this format is interdependent on the subject matter and the target to which it is addressed

In order to assess these needs, several tools can potentially be used (survey, workshop, persona exercise...).

Before being able to build up a collection of content, it is necessary to take some time to make an inventory of all the available content. To do this, it is advisable to appoint dedicated people who will have a set of evaluation criteria, both quantitative and qualitative.

All the elements will be included in deliverable 3.6, a guide of recommendations for future TNs.

5.4. Harvest process recommendations

The 3 successive steps underlying the harvest process are:

- Production of content in line with the needs of end-users
- The issue of content storage
- and a quality aspect of the proposed contents.

All the elements will be included in deliverable 3.6, a guide of recommendations for future TNs.

5.5. Additional recommendations

Throughout the WG, we asked the participants the following questions and the answers below are a synthesis of their answers as recommendations for the design of a KR.

The knowledge capitalisazation process is an ongoing process. It starts at the start of the project and theoretically never stops. As long as the knowledge pool remains active, i.e. updated and administered by a resource person. As described above, it is therefore a dynamic and cyclical process.

Our role here is to list a certain number of criteria that are fundamental to take into account, in order to store knowledge and share it with users (knowledge users and diffusers).



In summary, the answers to the following questions constitute a list of useful recommendations for the design of a KR:

- What is the background?

In order to build, design and develop a KR, it is first necessary to define a context. It is defined by the circumstances and conditions that are part of its environment.

- Who are the end-users, awaiting useful information?

This step consists of identifying the target users to be reached. For TNs, these are farmers, foresters and advisers, as priority targets.

- What needs do we want to meet?

The setting up of a TN starts from a need, to work and exchange in a network on a precise, common theme.

The content of the different steps presented in figures 10 and 11 will be included in deliverable 3.6, a guide of recommendations for future TNs in the form of more detailed practical sheets.

6. Prospects

The design of a KR is inseparable from the MA approach, efficient communication and dissemination networks and adequate computer tools.

The development of a KR must be a fully MA co-designed approach. All these essential steps will be discussed in detail in deliverable 3.6, which is a practical guide of recommendations for future coordinators of thematic networks and also of MA projects. One of the aims is to capitalise on knowledge from different sources and share it with the greatest number of people, particularly among communities of advisers, farmers and foresters. Thus, in this guide, which we want to be a practical reference for thematic networks, we aim to respond to these main challenges.

7. Annexes

Annex A: detailed workshop outline

Day 1 – 12th December 2019		
Time	Activity	Purpose & Method
8.30-11.00	Introduction plenary session Session 1	Introduction to Euraknos and welcoming exercise 5 min intro to WG3.1 Exercise 1: Persona body mapping
11.00-11.30	Coffee break	
11.30-12.30	Session 2: Introduction to Working Group 3.1	Exercise 1: Introduction: who is in this working group Method: Intro-exercise to identify who is in the room and capture experience (icebreaker exercise) <ul style="list-style-type: none"> What do you consider to have in common with this group? What do you consider to be your unique contribution to the group? Present and expand on the objectives of WG 3.1 (20 min) <ul style="list-style-type: none"> Context setting General presentation of the results obtained in the previous step of the EURAKNOS project.
12.30-13.30	Lunch	
13.30-16.00	Session 3: Target request & Evaluation of the content available	Exercise 2: Target request from an end-user: ‘What type of question could I ask to a KR? What kind of information would I like to find in a KR?’ <i>Session objective and method:</i> 4 groups of persona (researcher / policy maker / farmer / adviser) are using. All these personas are positioned in the context of their daily lives: they ask themselves a number of questions that require them to seek information. A time scale that is defined in terms of the time required to implement the concrete action generated by the answer to the question. It is question for: today? Tomorrow? The next month? The next year? A vote with sticks will help to prioritize the main requests of each group. Exercise 3: Evaluation of the content available in the KRs <i>Session objective and method:</i> Testing TN platforms: the tests were carried out as an expert in their daily function. We left out the persona.

16.00-16.30	Coffee break	
16.30-18.00	<p>Session 4:</p> <p>criteria to build a HIKR</p>	<p>Presentation session on specifics recommendations got from Budapest workshop for TN</p> <p>Exercise 4: define the types of content adapted for a given target audience (first part)</p> <p><i>Session objective and method:</i> Ask to the participants per subgroup according to their assigned persona to retain only 3 types of existing or ideal content (in view of previous exchanges, work + consultation of KR) according to their relevance, at least adapted to the most adapted and for each content to bring out a list of arguments to produce and to share contents.</p>

Day 2 – 13th December 2019		
Time	Activity	Purpose & Method
8.30-9.00		Reflection and summary of work WG day 1 and explanation of the day 2
9.00-10.15	<p>Session 5:</p> <p>An ideal HIKR related to end-users needs</p>	<p>Exercise 5: define the types of content adapted for a given target audience (second part)</p> <p><i>Session objective and method:</i> Feedbacks on the list of criteria Put into shoes of 4 personas (farmer / adviser / researcher / policy maker) and define the most essential criteria</p>
10.15-10.30	Coffee break	
10.30-11.30	Session 6: Market place	Intergroup exchange – overlaps and synergies between the 4 working groups – time for cross-exchange
11.30-12.30	<p>Session 7:</p> <p>WG3.1 Reflection consolidation, and way forward</p>	<p>Reflection on session 6: Identification of areas of overlap, things you learned, surprised to see frustrated</p> <p>In plenary consolidation and way forward</p> <p>Evaluation</p>
12.30-13.00	Workshop end	
13.00	Lunch	

Annex B : Presentation of examples of the raw productions of the Paris workshop

1) Target request exercise

I HAVE A QUESTION FOR				
PERSONA	TODAY	TOMORROW	NEXT MONTH	NEXT YEAR
FARMER	DO I SELL MY ANIMALS?	<p>WHAT CAN I SELL A COW FOR?</p> <p>WHAT ARE THE CATTLE PRICES NEXT WEEK?</p>	<p>WHAT CATTLE ARE AVAILABLE?</p> <p>HAS IT A PROFITABLE COW THIS YEAR?</p>	<p>WHAT CATTLE SHOULD I BUY NEXT YEAR?</p> <p>WHAT CATTLE SHOULD I SELL NEXT YEAR?</p> <p>WHAT CATTLE SHOULD I KEEP NEXT YEAR?</p>
ADVISOR	Provide answers on a new specific problem (cattle prices, etc.)	Provide answers on a new specific problem (cattle prices, etc.)	Provide answers on a new specific problem (cattle prices, etc.)	Provide answers on a new specific problem (cattle prices, etc.)
TEACHER				

2) List of criteria to build a HIKR exercise

