

Networks for Education, Training,
Research and Innovation

Suggestions for Best Practice

ETNET 21 (2000-2003)

**European Thematic Network of Education and Training for
ENVIRONMENT-WATER**

Networks for Education, Training, Research and Innovation

with reference to the domain of Environment-Water

Suggestions for Best Practice

by

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Executive Summary

This report on networks for education, training, research and innovation discusses basic concepts of abstract networks as models of society. Networks must have declared **objectives** related to the target group of **actors** and based on the intensity level of the **interaction** among actors. The following typology of networks is proposed:

Low-intensity networks

- *A. a **FORUM (market-place, agora)**: a regularly organised meeting where information and ideas are exchanged and discussion can be freely engaged; nowadays this forum-type of interaction among actors is often complemented by a “virtual forum” through Internet.*
- *B. a **PLATFORM**: a group of actors that supports an existing programme/project or plan a new programme/project; such an interaction could be the outcome of a forum.*
- *C. an **ALLIANCE**: a more or less diffuse link between actors or between several networks, whatever their type, with common objectives.*

High-intensity networks

- *D. a **CLUSTER**: a group of actors or partnerships which shares common support structures and seeks to exploit complementary characteristics of the group or results of projects.*
- *E. a **PARTNERSHIP** or **CONSORTIUM**: a group of actors executing a project of limited duration.*

Networks can be **multi-modal**, operating at different levels of intensity. They can be established either top-down or bottom-up or as a combination of both approaches.

The **structure** of the network describes the actors, the objectives and the interactions amongst actors. It may be a **horizontal** network when most of the actors are of the same nature; or **vertical** networks when actors are of a quite different nature, e.g. universities and enterprises. Vertical networks are rare and have more difficulty surviving. Internal and external coalitions amongst actors define the integration of the actors in the network.

The **culture** of the network is essentially democratic and non-hierarchical, based on a **code of conduct** for interaction among the actors. Also important to consider is the **strategy** of the network, and an understanding of the **expectations** of the actors. One can only talk about a network if there is minimum **stability** of the network, and this depends on the **mutual trust** and **confidence** between the actors.

The **selection and type of actors** play an important role. **Inclusive networks** accept all actors fulfilling the description of the target group and subscribing to the code of conduct. **Exclusive networks** invite selected actors to join and the number of actors is deliberately limited. The actors may be either individuals or representatives of a legal body (an institution). **Excellent networks** are those where actors have strong ties and few **isolates** exist.

A feasibility analysis based on available or expected internal and external resources must define the **management** model to be adopted when initiating/creating a network. A feedback mechanism between structure, culture and management is required. The role and competence of the **facilitator** (for low-intensity networks) or **coordinator** (for high-intensity networks) is crucial.

The **quality of networks** is described by the **effectiveness** and the **efficiency**. The former is related to the satisfaction of the actors and is best evaluated through a **self-assessment** procedure by the actors, regularly repeated. The latter should be made measurable as much as is possible but it should be recognised that both resources and benefits of networks are often also 'intangible': e.g. the expertise of the actors, and the prestige of the network.

Based on a project-wise approach of the objectives, on the number of actors and on the number of countries involved, six **performance indicators** are proposed:

- the Density Δ of the network
- the Actor-Project-Integration API index
- the Actor-International-Integration AII index
- the Actor-Country-Integration ACI index
- the Project-Duration-Index PDI
- the Actor-Project-Closeness APC index

Some of these indicators are applied to three different real-life networks. Many more performance indicators could be introduced if data are available, e.g. about resources allocated to different projects and actors. Trend analysis allows for evaluation over time within a network or amongst networks.

A **survey on networks** was conducted based on a theoretical part A (the expectations of the people interested in networks), and an applied part B (for identified networks where also '*obstacles encountered*' were investigated). The results of the survey (in Part A) generally confirm the concepts introduced above. Part B, in general, shows a realistic approach from both the co-ordinators and the other actors with respect to the limitations of the identified networks. However, Part B fails to recognise the '*obstacles encountered*' because the quality aspects of the network are rarely evaluated more than satisfactory. **It is concluded that quality issues in terms of effectiveness and efficiency of networks are not well addressed.**

Global Observatory of Units for Teaching, Training and Ethics, called **GOUTTE of WATER**, is a project of the International Hydrological Programme IHP phase VI (2002-2007) of UNESCO. It can be considered a vertical, partly inclusive and partly exclusive network of individual or institutional actors. Given its objectives it is a low-intensity, multi-modal network of the FORUM/PLATFORM/ALLIANCE type. A blueprint for its mission, its objectives and proposed activities, its structure, culture and management is presented.

The report concludes with a list of **suggestions for best practice** when creating or when developing/operating a network.

Forword

1. Justification

There is great interest in the concept of networks. Examples of this interest can be found in Belgium at the regional level (e.g. the Co-operation Cluster scheme between universities and other institutions of higher education or the “cluster”-policy for economic development in Flanders) and at the federal level (e.g. the Interuniversity Attraction Poles for development of *lasting networks* with the aim to reinforce the scientific potential by promoting collaborative research).

At the European level networks were explicitly promoted through several education, training and research programmes of the European Commission (EC) since 1986 onwards. The latest research programme, called the 6th Framework Programme (FP6 2002-2006), will establish “*networks of excellence*” as part of the instruments to create a **European Research Area (ERA)**. Meanwhile, the SOCRATES/ERASMUS Programme for Higher Education has launched since 1996 its “*thematic networks*” for reflection and analysis in selected disciplines or domains. The European Thematic Network of Education and Training (ETNET) for ENVIRONMENT-WATER”, co-ordinated by the author, is one of those thematic networks funded through this Programme and has as general theme: “*The relation between education and research within a perspective of lifelong learning*”. The intrinsic link between education and research – the dual mission of universities – being more and better recognised in policy-making, one can anticipate the development of a **European Higher Education Area**, which could launch, together with the ERA, joint programmes of education and research.

At worldwide level, UNESCO has established its **UNITWIN/UNESCO Chairs** Programme since 1992, based on a university twinning and networking scheme.

The Plan of Implementation of the **World Summit on Sustainable Development (WSSD 2002)** states:

- in its Article 102: “*Build greater capacity in science and technology for sustainable development, with action to improve collaboration and partnerships on research and development and their widespread application among research institutions, universities, the private sector, governments, NGOs and networks, as well as between and among scientists and academics of developing and developed countries, and in this regard encourage networking with and between centres of scientific excellence in developing countries.*”
- and in its Article 117 (b): “*Promote, as appropriate, affordable and increased access to programmes for students, researchers and engineers from developing countries in the universities and research institutions of developed countries in order to promote the exchange of experience and capacity that will benefit all partners.*”

Concrete actions in this regard are:

1° the recommendation to the UN General Assembly of adopting an **International Decade of Education for Sustainable Development 2005-2014**;

2° the launching of the **ERASMUS World Programme 2004-2008** of the European Commission.

*Nowadays universities, and in general all organisations,
are the product of their networks, rather than the reverse.*

The launching of the VUB research contingent for a Sabbatical Leave in 2001 was a fortunate occasion for the author to present a proposal in March 2001, which was accepted in June 2001. The proposal matched fully with his task of co-ordinator of ETNET21 (2000-2003) and his long-term involvement with the International Hydrological Programme (IHP) of UNESCO.

The project intended to:

1. Analyse the conceptual, methodological, organisational and substantial characteristics for sound networking activities.
2. Categorise different networking goals and structures, their advantages and limitations.
3. Discuss operational management, quality assurance and sustainability.
4. Prepare a sound basis for the project « GOUTTE of WATER » (Global Observatory of Units for Teaching, Training and Ethics of WATER) within the framework of the International Hydrological Programme Phase VI (IHP VI, 2002-2007) of UNESCO and the long-term UNITWIN/UNESCO Chairs Programme.
5. Publish the results of this research.

The author's twenty years of experience with regional, national, European and international networks allows for a studious pondering of the concept of networks and **networking** (i.e. *the active dimensions of networks: initiation, design, operation and, eventually, termination*). Given the limited disciplinary knowledge of the author – being an engineering scientist without any training in sociology or related sciences– the study approach is pragmatic and mainly empirical. It should be seen as a humble contribution to a better understanding of a daily, and thus important, activity of everyone: networking always raises new expectations, offers generally benefits, but can also lead to disappointments.

This REPORT is the final outcome of the project. Since networking is present in all domains, it is believed that the report will be of practical use for all disciplines and fields of knowledge. If the SUGGESTIONS, presented as a conclusion of this study, would become **help for best practice in networking** and for avoiding failures, the author would consider it as his reward.

2. What is a “Network”?

As soon as we see the word “network”, everyone immediately has preconceived ideas of what is a “network”. Our ideas about **physical networks** (such as transport networks of different kind, pipe-networks for water distribution or storm water and wastewater collection, gas-, electricity-, and telephone networks) are quite straightforward because we can “see” them. But what about networks of airways, radio/television-networks, the mobile telephone networks or the Internet?

This study deals with “**conceptual networks**”, i.e. concepts or models of the complexity of society as seen as a **system of interdependent “actors” who interact with each other**. This definition is very flexible and therefore sometimes too vague. E.g. a “*knowledge¹ driven network*” or a “*knowledge based network*” is a model of society of those who have knowledge in a given domain, create or increase and transfer this knowledge, i.e. the group of scientists and teachers or their organisations in which they work. But should we not add the end-users of these activities, i.e. the students and all those who will benefit of the scientific progress by increasing the knowledge in the given domain? And what about the policy- and decision-makers who control the funding of the institutions where scientists and teachers can perform their tasks?

This example shows that conceptual networks are always “*social networks*”: they belong to the society as a whole. But understanding society and acting in society, given its complexity, is only possible if we split it up in simpler components represented by these “models” or networks.

Networks must have declared “objectives” related to the target group of actors: if those objectives and actors are unknown, one cannot define a formal network.

Among the many possible objectives of networks, the following can be listed as examples:

- information and communication, discussion and exchange of ideas
- articulation of needs and demands
- learning from others and sharing their knowledge
- transfer of knowledge and skills; improvement of competencies
- mobility and exchange of students and staff
- developing capacity building and cultural/linguistic capabilities
- joint development of projects and activities
- optimisation of means and methods
- innovation through transmission of new knowledge and skills;
- validation, demonstration and exploitation of methods and techniques
- dissemination of research results
- benchmarking and searching for best practices
- creation of a professional community
- synergy and pooling of expertise
- creating critical mass
- creating spin-offs.

¹ The author is reluctant to use the common term “*knowledge network*” because the word “knowledge” is often misused, e.g. in the business term “*knowledge management*”. The business world has created – unfortunately – a terminological confusion between “*information*” and “*knowledge*”: the former term has a totally impersonal dimension and is pointless if not properly selected and wisely used, while the latter term is the outcome of a painstaking process of learning, memorizing, understanding, reflecting, comparing, selecting, critical and strategic thinking. It is of the highest personal value to an **individual** and is not “manageable”. Making information available for learning purposes and facilitating the learning process is still not yet the learning process itself that leads to “knowledge”.

Connections among actors are the third characteristic of a well-defined network: without connections, there is no network. In other words, there is certain interdependency between actors, which generates interactions and may lead to co-operation. The level of interaction will determine the “**network-intensity**”: sharing information can be seen as a low level of interaction, merging (of two or more actors) would be the highest level of interaction.

To understand better the linkage between objectives, actors and the level of interaction among actors - resulting in a network-intensity - the following **typology of networks of increasing intensity** is proposed:

Low-intensity networks

- *A. a **FORUM (market-place, agora)**: a regularly organised meeting² where information and ideas are exchanged and discussion can be freely engaged; nowadays this forum-type of interaction among actors is often complemented by a “virtual forum” through Internet.*
- *B. a **PLATFORM**: a group of actors that supports an existing programme/project or plan a new programme/project; such an interaction could be the outcome of a forum.*
- *C. an **ALLIANCE**: a more or less diffuse link between actors or between several networks, whatever their type, with common objectives.*

High-intensity networks

- *D. a **CLUSTER**: a group of actors or partnerships which shares common support structures and seeks to exploit complementary characteristics of the group or results of projects.*
- *E. a **PARTNERSHIP or CONSORTIUM**: a group of actors executing a project of limited duration.*

A network can be all of these at the same time or can limit itself to one (**uni-modal network**) or more (**multi-modal network**) of these interaction levels. The network can have long-term objectives and develop many partnerships or several levels of interaction to fulfil its objectives during its lifetime. Or it may from the start declare short-term objectives with a single level of interaction and terminate within a predetermined period.

The establishment of a network can be **bottom-up** or **top-down**. Historical examples of typical **top-down** approaches are the “Academies” established from the 17th century onwards in many countries. **Bottom-up** approaches were very popular and flourished from the 18th century onwards till today through scientific and professional associations: they contributed and still contribute largely to the scientific and professional world. In some cases these associations were the ancestors of governmental or intergovernmental institutions (e.g. the World Meteorological Organisation, a UN agency established in 1945, which developed from the International Meteorological Society founded in the nineteenth century).

² In a commercial environment such meetings may involve also *brokerage*.

A combination of both approaches is nowadays very common because it often stems from a financial incentive: a funding authority may offer only support to existing partnerships or to partnerships created for the purpose. This will have important consequences for the network, which will be discussed in the following chapters. The reasons for such initiatives of funding authorities can be found in the general perception that economic growth, or revitalizing the whole economic structure of a region, relies on stimulation of **innovation**:

- Enterprises, trying to survive and to flourish in an increasing global and competitive environment, seek alliances or clusters;
- Universities, struggling to meet the needs and changing expectations of society, seek to exploit better their capabilities through networking.

Another reason for such combined approach is the role networks can play as **organisations at the MESO-level** with respect to the MICRO-level of its actors and the MACRO-level of the policy- or decision making authorities (Figure 1). The latter will prefer to communicate with a MESO-level organisation rather than with a multitude of individual actors at the MICRO-level. And the individual actors will generally not have ready access to the MACRO-level. Networks often derive their usefulness or prestige from this role at the MESO-level.

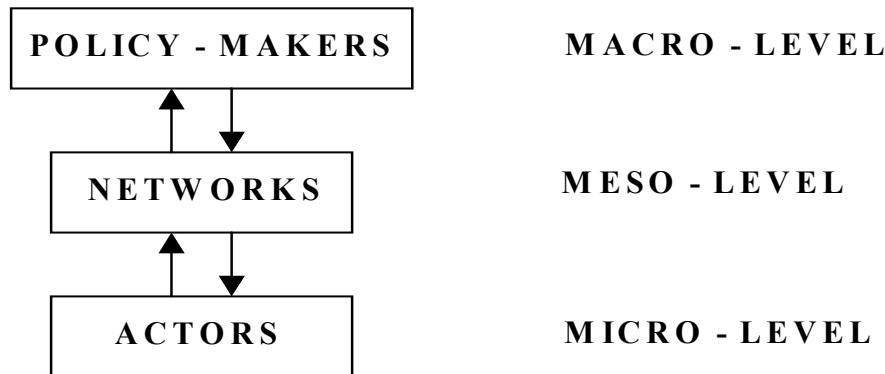


Figure 1. The role of networks at the MESO-level.

3. Structure, Culture and Management of Networks

3.1 The Structure

The above three characteristics (**actors, objectives, interactions**) which define a network, form the **structure** of the network. It is by no means a static structure, nor is it a uniform and closed structure. Some authors call it the “*black box*” structure of networks; others describe it as the “*garbage can*” structure of networks.

- Actors within a network may have different objectives, therefore the objectives of the network are potentially diffuse and pluralistic; there may be long-term objectives and operational short-term objectives which can be opportunistic, depending on the funding opportunities.

It has been said: a network is full of doors and windows for people to walk in and walk out and to look in and to look out; these doors and windows must stay open for the network to remain strong and to prevent the network of becoming isolated.

- The network is called a **horizontal network** when most actors are of the same nature (all actors are universities, or all are enterprises, e.g. in a federation of a given industry-branch; or all actors are of the same geographic region); in a **vertical network** actors are of quite different nature. This would be the case in the above example of a “knowledge driven network” if end-users and policy-makers are included. Horizontal networks are the more common ones. Vertical networks are rare and (or because) difficult to make them sustainable, but they respond to the general trend for “integrated” approaches in society. Vertical networks are often seen as a threat by horizontal networks and a change of policy may bring these networks to an end.

*Many vertical networks were established under the EC-COMETT Programme (1987-1995) wherein **University Enterprise Training Partnerships – UETPs** in several domains were operating quite successfully at a Europe-wide transnational scale. The LEONARDO Programme, successor of COMETT, decentralised to a large part the project-funding procedures towards the national or regional level and, in so doing, did not offer any further major role to UETPs, thus challenging the survival of these vertical networks.*

- Ad-hoc coalitions among actors may be formed within the network (**internal coalitions**): they create preferential interactions among some actors. There can also be **external coalitions** with actors not belonging to the network. Both types of coalitions affect the **integration of the actors** within the network, and thus the development or growth and eventually the termination of a network. These non-random connections between actors may be driven by external rules of eligibility for funding of projects.

*Networks can be seen as living organisms:
they are born, they grow, they mature, and they decline.*

3.2 The Culture

The **culture** of the network is the set of rules (**code of conduct**) for interaction among the actors; it is also the **strategy** (anticipation, facilitation, organisation, evaluation, adaptation) of the network. The **expectations of actors** are mostly unwritten but are an important part of the culture. Actors, by joining a network, recognise their “dependency” but wish to minimise this dependency and maximise the benefits for reaching their own objectives. The uncertainty about these benefits is often higher than the risk of losing benefits by not joining the network. “Value for money” is often the creed. But actors should be willing to invest with own resources in their network, because in the long run, this is in their own interest: belonging to a strong network.

The **bottom-up** or **top-down approach** for creating the network is obviously of great importance for the culture of the network. If actors are **ONLY** interested in the financial support and do not have long-term expectations for co-operation – as may be the case if the funding agency is not selecting the partnership upon the basis of long-term objectives or does not have by itself a long-term policy for funding- the **stability of the network** will be minimum and the **mutual trust and confidence** among the actors will be weak.

One can only talk about a network if there is a minimum stability of the network.

Given the structure of networks, the culture is essentially **democratic, without hierarchy** (“*equivalence of nodes*” in social network analysis) and based on a spirit of **voluntarism**. In creating a network, the basic objectives must be formulated carefully and a feasibility analysis must be made, knowing the resources available in the nucleus (i.e. the initiators) of the network and the environment in which it will operate.

For the more intensive networking (see the typology proposed above) both structure and culture can be laid down in **statutes**, often registered as regulated by law³. This helps for the stability of the network, but care must be taken that the statutes still allow for a reasonable flexibility of the network. Hence, structure and culture should be described in most general terms in the statutes, while detailed aspects of the code of conduct can be better laid down in the **bye laws**, that form part of the statutes but can be changed easier than the registered statutes.

³ Most countries made provisions for establishing *not-for-profit organisations* that respond in general quite well to the structure and culture of networks in the field of education and training. As far as the author knows, Belgium is the only European country with a law (1919) for establishing *international non-profit organisations*, even prior to the law of 1921 for national organisations. So far there is no European regulation in this matter. The EC made an attempt in the early nineties to promote so-called “*European Economic Interest Groups (EEIG)*” that would be applicable for business-networks as well as for research- and innovation-oriented networks.

3.3 The Selection and Type of Actors

A very important issue for both structure and culture of networks is the **selection of actors** of the network. While the target group of actors, clearly linked to the objectives of the network, is relatively easy to describe, the way in which actors can join the network is a matter of high importance and is often controversial among the initiators of a network. It is a matter of strategy how to reach best the objectives of the network and to fulfil the expectations of the actors (i.e. the initiators).

- In an **inclusive network** all actors fulfilling the description of the target group (as may be laid down in the statutes) can join, provided they subscribe to the code of conduct. Most scientific and professional associations are inclusive networks. In principle the number of actors may grow without limit in these networks.
- In an **exclusive network** actors are invited to join, following a well-known procedure (also laid down in the statutes), and the number of actors is deliberately limited.

It is clear that either case has consequences for the interaction among actors, their integration in the network, for the code of conduct, the trust and confidence, the stability and thus for the culture of the network.

Yet another important strategic issue is the **type of the actor**: is he/she a representative of an institution (a body) or is he/she an individual who only represents him-/herself? There are advantages and disadvantages with either choice and there may be also legal constraints involved at both sides (e.g. an international organisation, such as a UN agency, will not be able to join formally a network; individuals may not be eligible for collaborative contracting within the network). The individual actor may be highly respected and therefore contribute to the power of the network and enhance trust and confidence among the actors. An institution can also help to the prestige of the network, but if the representative is not at the same time an ambassador for the network in his/her institution (e.g. with respect to dissemination of information and co-operation potentials with other actors of the network), the effect may be very weak: it is the **interaction among actors** that counts. Strong ties among actors create “**solidarity**” and few “**isolates**” (actors who are not connected) are important features to characterise “**excellent networks**”.

3.4 Interaction among Actors

Interaction among actors, obviously not random in networks, is the subject of “**social network analysis**”, a branch of sociology using ideas and tools of sociometry. The aim of social network analysis is to uncover the patterning of actors’ interactions or to find out how actors are “embedded” in the network, because it is believed that the success of societies and organizations often depends on the patterning of their internal structure.

An extensive formal theory, organized in mathematical terms, has developed and systematic analysis of empirical data is undertaken. The specific terminology makes it easier to describe the features of the network. Sampling of the data is not by survey techniques, but by census and thus not independent. It often relies on documents. It is easily understood that these data are difficult to gather. In what follows we will only briefly touch on this subject in relation to the performance of networks expressed by the number of actors and the intensity of the interactions through projects.

3.5 About the Management

Networks, being essentially democratic, non-hierarchic and voluntary, are self-governing organisations. Before starting up a network, once the network type or intensity is chosen, the target group of actors identified and basic objectives formulated, a feasibility analysis should bring about a few possible management models. The essential decision factors for these models are the internal and external resources available or expected. The internal resources available (from the initiators) may include, for instance: infrastructure for a secretariat and basic working expenditure (communication, consumables) and support in kind by means of secondment of personnel. Internal resources expected are fees or subscriptions paid by the actors as laid down in the code of conduct. The external resources available or expected from funding agencies are overheads from the project funding or, in rare cases, direct funding for the network management itself (Figure 2).

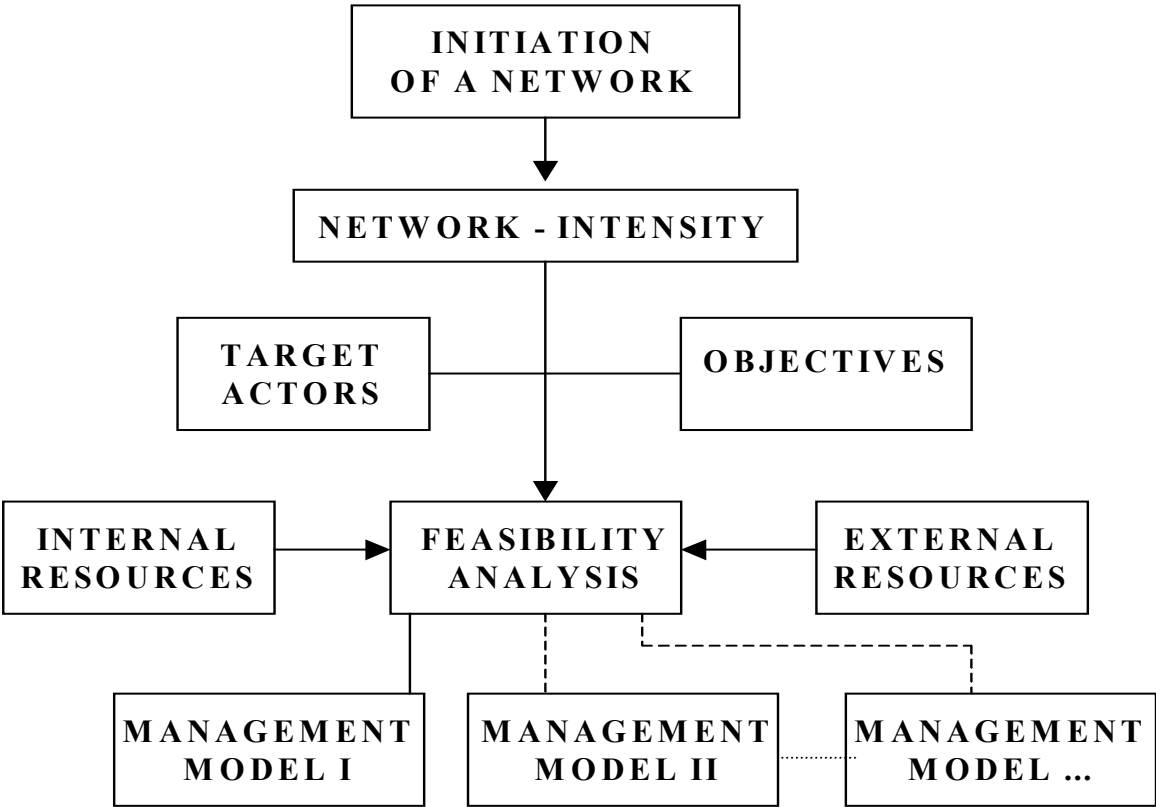


Figure 2. Initiation of a network and its feasibility analysis leading to some management models.

The management model that is finally chosen when the network is created should incorporate all these available resources, but should be adapted as resources may change along the life of the network (Figure 3).

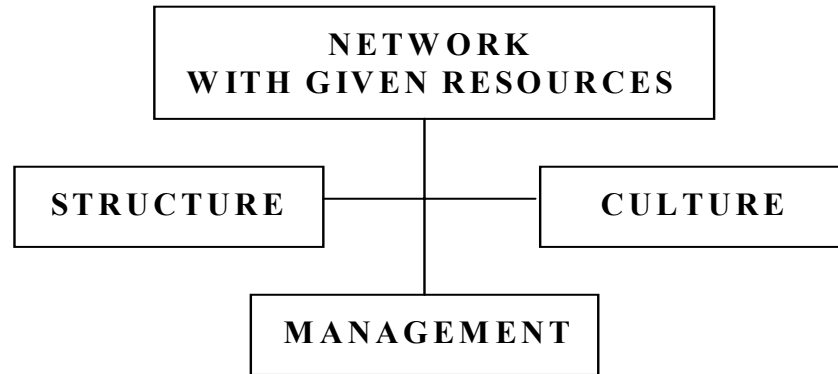


Figure 3. A network with its structure and culture, has a management adapted to its resources.

This requires a flexibility of the culture (code of conduct, strategy, etc) of the network and is, of course, more difficult when the network – intensity grows or changes, affecting the structure of the network. Thus, a feed-back mechanism is required between culture, structure and management.

Management relies on people and a ‘manager’, commonly called the ‘**coordinator**’ of the network, and sometimes also called the ‘**facilitator**’. The latter title is more appropriate for a low-intensity network. Coordination implies a strong role in conducting managerial tasks and financial control of the projects. Decentralisation and delegation are of course techniques to be applied as appropriate, following a project-wise approach of the activities of the network (see next chapter).

There is no doubt that the competence of the coordinator or facilitator is crucial to the success of the network. The survey, discussed below, has indicated this clearly: he/she should not only have excellent communication and managerial skills, he/she should also be a strategic thinker. Depending on the resources available, the management models proposed should allow for alternatives with respect to affiliation of the coordinator/facilitator. A fully independent, competent person, not affiliated with any actor, would enhance the confidence within the network.

4. The Performance of Networks

4.1 Quality, Effectiveness and Efficiency

Why should people (or institutions) join a network with a given structure and culture? Or why should they decide to establish a network? Most people have a “wait –and -see” attitude until there are clear benefits of joining or establishing a network. Therefore the **performance** of a network is the ultimate goal of networking: is the network effective and efficient? The general concept of “**quality assurance**” responds to this goal. The bottom line for quality in networking is its effect or impact after a certain period of time. Simplified one could state:

“Quality in networking is measured by its impact some time later”

The term **effectiveness** describes how the network reaches the expectations of the actors. Since these expectations are often unwritten, it will be always difficult to assess, lest to measure quantitatively effectiveness. Moreover, are these expectations of the institutions represented in the network, or are they expectations of the persons representing the institutions? The best “quality measurement” would be the measurement of the degree of satisfaction by the actors of the network.

An alternative to such measurements is to initiate among the actors a process of regular “**self-assessment**”⁴. In a self-assessment process the network will first define a number of quality standards and given input resources, and the process- and output- characteristics of the networking. It will then use a number of appropriate methods in order to assess to what extent these quality standards and characteristics have been achieved.

Self-assessment may serve a double purpose:

- first of all, through regular self-assessment the network will gradually come to understand better the effects and impact of networking activities performed and outputs delivered – and thus come closer to the real measurement yardstick of quality in networking;
- secondly, a good self-assessment process will yield many ideas and suggestions for quality improvement, which contributes to the development of a dynamic networking environment.

That, in itself will support the development of the network as a “*learning organisation*”: an organisation that has the intrinsic capacity to learn and develop as a whole – rather than as a set of individuals.

Let us compare “self-assessment” to “external assessment”, i.e. when the quality of networking is assessed by an independent “third party”, for instance a funding agency.

Advantages of an external assessment are:

- it has high credibility
- it ensures a neutral view and original perspective
- it allows comparability and benchmarking.

⁴ After Van den Berghe (2000): see Bibliography.

The most important disadvantages are:

- in general, it is very expensive
- assessors may not always fully be qualified
- it may interact with other activities.

Self-assessment is when the actors are asked to assess the networking. The advantages of such actor assessment are:

- it meets the real interest of the actors
- it involves every actor
- it is cheap
- the real impact may be assessed (if undertaken at the right moment).

Disadvantages are:

- actor assessment often only covers some characteristics (depending on the involvement of the actors in several projects)
- the possibility of high variability of satisfaction of individual actors
- actors may not understand their own needs
- it may not be credible (inside and outside the network)
- it may lack rigour and reliability
- it may interact with other activities.

From a quality management perspective, self-assessment is the preferred way. Indeed, assessment by externals tends to focus on input- and output-characteristics of networking, while the real source of improvement lies in the internal processes. These can only be measured adequately through self-assessment. Moreover, any form of external assessment may lead to a defensive, rather than a constructive reaction of the people assessed. Quality improvement requires a positive motivation towards improvement. This is more easily supported by self-reflection than by external evaluation.

The term **efficiency** describes how the objectives have been reached with respect to the available resources. Criteria can be based on outputs and benefits. However, full-fledged cost-benefit analysis is very seldom, if ever, possible. **Performance indicators** are popular but have their limitations. One should not forget that in networking, the available resources are partly intangible, e.g. the reputation and expertise of actors, and important benefits as well are intangible, e.g. credibility, prestige, etc.

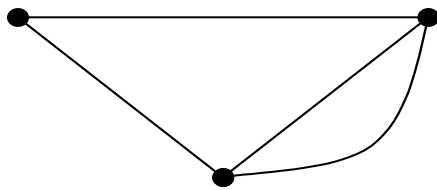
4.2 Some Performance Indicators

In what follows we will approach the efficiency of a network by using the number of actors and their involvement in projects. An essential feature is the **concept of projects**: whatever are the objectives of the network, any activity should be identified as a “project” for which a specific **partnership**, drawn from the total group of actors, is chosen. We may also call this partnership an **“internal coalition”** (called “*clique*” in social network analysis). Each project (or partnership) will encompass a set of objectives of the network, but not necessarily all objectives of the network.

The “project”-approach allows for a simple mathematical expression that can be considered as a first performance indicator. It is based upon the famous “EULER network rule”, discovered by the great mathematician Leonard Euler (Basle, 1707 – St.-Petersburg, 1783) when he solved the so-called bridge-puzzle of Köningsberg (now known as Kaliningrad). The network formula shows the fundamental relationship between the three properties that describe any network (Figure 4):

$$A + P - L = 1$$

where A = the number of vertices or intersections,
 P = the number of enclosed areas,
 L = the number of lines in the network.

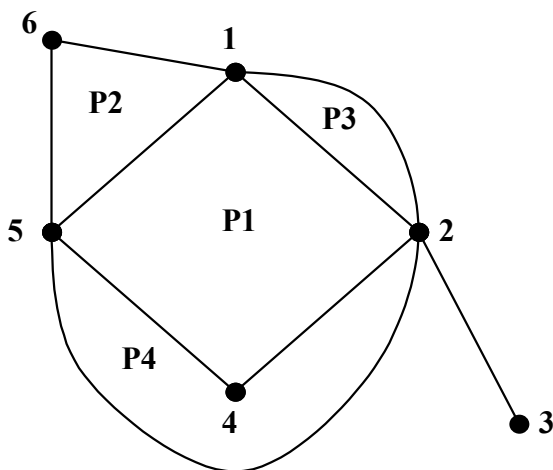


$$A = 3; P = 2; L = 4$$

$$A + P - L = 1$$

Figure 4. The network-rule of EULER.

All conceivable networks obey this formula and we can apply the rule to the abstract networks of this study if we translate as follows: the number of vertices A is the number of actors who are linked (or tied) to each other by the lines L . They form areas P of co-operation (projects), but not all actors are necessarily involved in all projects, while some actors may be involved in more than one project (Figure 5).



$$A = 6; P = 4; L = 9$$

$$A + P - L = 1$$

Project P1 involves actors 1, 2, 4 and 5
Project P2 involves actors 1, 5 and 6
Project P3 involves actors 1 and 2
Project P4 involves actors 2, 4 and 5
Actor 3 is not involved in any project

Figure 5. The network-rule applies to any number of actors A and projects P .

The number of all possible undirected⁵ ties T among actors is:

$$T = A*(A-1)/2$$

T is different from the links L as defined by the network-rule. We can consider also **the total number N of actors involved in all projects** of the network. Let us call them “partners” involved in projects, since some actors may not be involved. We can define the **density Δ** of the network as:

$$\Delta = N / T$$

The density Δ can be higher than 1 as will be shown below.

We now derive the **Actor-Project-Integration index API** of a network:

$$API = N / (A*P)$$

API is maximum 1 when all actors are partners in all projects.

For Figure 4 we obtain $\Delta=1$ and $API=0,83$ and for Figure 5 $\Delta=0,4$ and $API=0,5$. The example in Table 1 illustrates furthermore the density Δ and the API index.

Table 1: Illustration of the density Δ and the Actor-Project-Integration index API.

	Project P1	Project P2	Project P3	Project P4
Actor 1	*	*	*	*
Actor 2	*	*		*
Actor 3	*		*	*
Actor 4				

for actors 1,2,3 and projects P1...P4:

$$\Delta=8/(3*2/2)=2,67 \text{ and } API=(3+2+2+3)/(3*4)=0,83$$

for actors 1,2,3 and projects P1...P3:

$$\Delta=5/(3*2/2)=1,67 \text{ and } API=(3+2+2)/(3*3)=0,78$$

for actors 1,2,3,4 and projects P1...P4:

$$\Delta=8/(4*3/2)=1,33 \text{ and } API=(3+2+2+3)/(4*4)=0,62$$

for actors 1,2,3,4 and projects P1...P3:

$$\Delta=5/(4*3/2)=0,83 \text{ and } API=(3+2+2)/(4*3)=0,58$$

Thus both the density Δ and the Actor-Project-Integration index API respond correctly to the number of actors (partners) involved in each project: adding an actor will only be “efficient” if he is involved in at least one project. A network with a large number of “sleeping” actors, - or “isolates” in the terminology of the social network analysis -, not involved in any project, would result in a low Δ or API. If there is only one project in the network, Δ is a better performance indicator than API since the latter will be likely equal to 1.

⁵ “undirected” can be the information flow between actors; mobility at the other hand is always a “directed” link since there is always a sending and a receiving actor.

The **international scale** of a network, often a criterion for networks funded by international agencies, can be defined by an **Actor-International-Integration index AII** :

$$AII = 1 - (C_e / A * C)$$

where A = number of actors,
 C = number of countries,
 C_e = number of eligible countries.

Thus the index AII increases asymptotically to 1 for an increasing number of actors and is highest when the ratio C/C_e equals 1. Since the notion of “eligibility” does not always apply and the number of actors per country is also important, the **Actor-Country-Integration index ACI** is defined:

$$ACI = 1 - \{ \sum [a_i - A/C] \} / A$$

where $a_i \dots$ = the number of actors in country i ,
 A = total number of actors,
 C = number of countries.

$ACI=1$ if all countries would have the same number of actors in the network;
 $0 < ACI < 1$ for $\sum [a_i - A/C] < A$ and $ACI < 0$ for $\sum [a_i - A/C] > A$.

Another factor of efficiency is **the duration of the projects** in a network. The **Project-Duration-Index PDI** can help to express this feature:

$$PDI = 1 - D / (P * \sum D_i)$$

where D = time-span of the projects P ,
 $\sum D_i$ = sum of the durations of all projects,
 P = number of projects.

$PDI=0$ if there is only one project ($P=1$ and $D=\sum D_i$). PDI increases asymptotically to 1 for longer time-span of projects and for more projects. The example in Table 2 illustrates this performance indicator.

Table 2. Illustration of the Project-Duration Index PDI.

Year	Project P1	Project P2	Project P3	Project P4
1	*	*		
2	*	(*)	*	
3	*	(*)	*	
4			*	*
5				*

We calculate:

$$PDI = 1 - 5 / \{ 4 * (3 + 1 + 3 + 2) \} = 0,86 \text{ for projects } P1 \dots P4$$

$$PDI = 1 - 5 / \{ 4 * (3 + 3 + 3 + 2) \} = 0,89 \text{ for projects } P1 \dots P4 \text{ but } P2 \text{ has 3 year duration}$$

$$PDI = 1 - 4 / \{ 3 * (3 + 1 + 3) \} = 0,80 \text{ for projects } P1 \dots P3$$

$$PDI = 1 - 4 / \{ 3 * (3 + 3 + 3) \} = 0,85 \text{ for projects } P1 \dots P3 \text{ but } P2 \text{ has 3 year duration}$$

Thus this performance index PDI responds correctly to more projects with longer durations. More performance indicators could be defined for other structural characteristics of networks, e.g. about the nature of the actors (enterprises versus universities) in the case of vertical networks.

Social network analysis is very much concerned about the position of actors within the network and uses such terms as *actor degree*, *closeness*, *betweenness* and *centrality*. Since we consider only “projects” when dealing with the performance of networks, it is sufficient for our purpose to investigate the number of times a given actor is present in a project-partnership.

Whereas the Actor-Project-Integration index API is a performance indicator for the whole network, we are looking here at an individual actor: how *close* or *isolated* is he? We also take the duration of the projects into consideration.

The individual **Actor-Project-Closeness APC index** is defined as follows:

$$APC = p^*(\Sigma d_i)/P^*(\Sigma D_i)$$

where p = number of projects in which the actor is partner,

Σd_i = sum of durations of the projects in which the actor is partner,

P = total number of projects in the network,

ΣD_i = sum of the durations of all projects P .

The actor is fully “isolated” if he is not involved in any project: $p=0$ and thus $APC=0$. The index is $APC=1$ if the actor participates in all projects: $p=P$ and thus $\Sigma d_i=\Sigma D_i$. Combining the examples of Tables 1 and 2, we can calculate:

$$\begin{aligned} &APC_1 = 1; APC_2 = 0,5; APC_3 = 0,5 \text{ for } P=4 \text{ and } D_2=1 \text{ year} \\ &APC_1 = 1; APC_2 = 0,54; APC_3 = 0,54 \text{ for } P=4 \text{ and } D_2=3 \text{ years} \\ &APC_1 = 1; APC_2 = 0,57; APC_3 = 0,71 \text{ for } P=3 \text{ and } D_2=1 \text{ year} \\ &APC_1 = 1; APC_2 = 0,44; APC_3 = 0,44 \text{ for } P=3 \text{ and } D_2=3 \text{ years} \\ &APC_4 = 0 \text{ for all cases.} \end{aligned}$$

Other performance indicators for actors could be defined, which introduce resources (human and financial) allocated to the different projects and actors. Since most projects of networks are cost-shared, this would imply also detailed information about the input of resources by each actor.

A common way to compare the performance of a network over the years or to compare different networks is the **trend analysis**: any variable or performance indicator can be plotted in a graph of the percent change from the reference year versus the percent difference from the mean as shown in Figure 6.

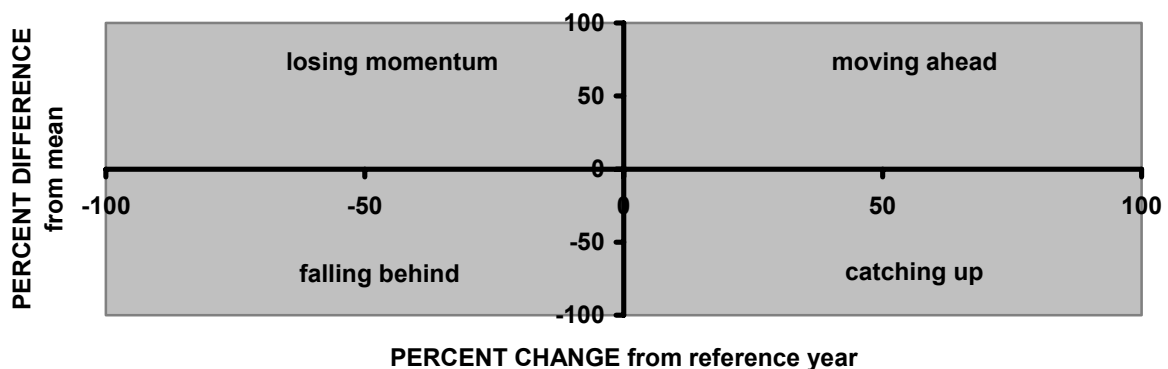


Figure 6. Trend analysis.

4.3 Examples

Some of the above performance indicators are applied to three real-life examples of networks. The first example is the **Interuniversity Co-operation Programme (ICP) “HYDROLOGY and WATER MANAGEMENT” of the EC-ERASMUS Programme**, which ran from 1989 to 1997. It was a typical *horizontal* and *uni-modal network* with only universities and with mobility of both students and staff as objective. Table 3 shows the growth of the ICP and its mobility's of students and staff. In this example C_e is 19 throughout, but 18 in the last year when Switzerland was no longer eligible in the ERASMUS Programme.

The **Actor-Country-Integration index ACI = 0,3896** was calculated for 44 actors in 14 countries with participations ranging from 1 to 8 universities per country. The **Actor-International-Integration index AII** was calculated per year regardless the actual participation in the activities: AII has reached its maximum in 1994-95 and stays constant in the following years. However, both the **density Δ** and the **Actor-Project-Integration index API** are declining for budgetary and external reasons. In Table 3 Δ in % and API are calculated for the staff mobility.

Table 3. The ICP “HYDROLOGY and WATER MANAGEMENT”.

Ac.Year	Actors	Countries	All	Student Mobility		Staff mobility			
				Number	Months	Number	Weeks	API	Δ in %
1989-90	9	7	0,698	4	16	2	7	0,222	4,76
1990-91	21	8	0,887	12	59	4	8	0,19	7,14
1991-92	27	10	0,93	22	138	8	8	0,296	8,89
1992-93	36	12	0,956	40	250	15	15	0,417	12,4
1993-94	38	12	0,958	49	364	22	22	0,579	18,2
1994-95(1)	42	14	0,968	63	516	10	10	0,238	5,49
1995-96(1)	47	14	0,971	108	788	13	14	0,276	7,14
1996-97(2)	45	13	0,969	76	437	5	5	0,111	3,2

Notes: (1) staff mobility decreased due to budget restriction. (2) CH is no longer an eligible country and the uncertainty of the new SOCRATES/ERASMUS procedures hampers the mobility's of both students and staff.

A second –living- example is the **European Thematic Network of Education and Training (ETNET21) for ENVIRONMENT-WATER**. ETNET21 runs from 2000 to 2003: it is a partly *vertical* network and partially *multi-modal* since it is as well *a forum, a platform, as a partnership*. For the sake of this example, we identify the following projects:

- a. Information and communication, through the newsletter LATEST NEWS (LN) and the website KeyWATER(KW);
- b. Survey on networks;
- c. Specific Project SP-I on teaching resources;
- d. Specific Project SP-II on distance learning opportunities;
- e. Specific Project SP-III on virtual laboratories;
- f. Specific Project SP-IV on European forum for doctoral students and young scientists;
- g. Specific Project SP-V on quality assurance, dissemination and sustainability;
- h. Plenary Assembly PA2001;
- i. Plenary Assembly PA2002.

The results in terms of the **Actor-Project-Integration index API** are shown in Table 4 for the activity years 2000-2001 and 2001-2002. In the second activity year several “sleeping” actors were

dropped and some new actors joined. Thus the number of actors decreased but the performance indicator API increased from 0,288 to 0,322 because more actors were active (partners) in several projects.

Table 4. The effect of “sleeping” actors in the living example of ETNET21.

Projects (1)	Number of active actors in 2000-2001	Number of active actors in 2001-2002
LN/KW	72	66
Survey		6
SP-I	13	30
SP-II	8	10
SP-III	6	10
SP-IV	10	5
SP-V	4	22
PA2001	32	
PA2002		21
Number of actors A (2)	72	66
API	0,288	0,322

Notes: (1) several projects generated “external coalitions” and the Plenary Assemblies were attended by people not acting in the network, but these are not taken into account in the calculation; (2) actors are institutions in ETNET21 and only the number of institutions is given in this Table; the actual number of individuals or contact persons are many times higher in several projects, e.g. LN/KW is distributed to 438 individuals.

The third example uses the data of a network, which ran 19 projects of durations between 1 and 3 years with a great number of diverse partners in 23 countries over the period 1990-2002. One can consider this network of the PLATFORM/ALLIANCE/CONSORTIUM type. The data were kindly provided by one of the participants of the SURVEY discussed below. Table 5 gives the essential data and some calculated performance indicators.

Table 5. Example of a large network.

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Actors A	11	30	37	32	51	68	87	85	56	43	25	32	17
Ties T	55	435	666	496	1275	2278	3741	3570	1540	903	300	496	136
Density %	0,2182	0,0851	0,0766	0,1028	0,0612	0,0448	0,0339	0,0314	0,0532	0,0698	0,1033	0,0665	0,125
Projects P	2	3	4	4	4	8	10	5	7	6	3	2	1
Partners N	12	37	51	51	78	102	127	112	82	63	31	33	17
API	0,5455	0,4111	0,3446	0,3984	0,3824	0,1875	0,146	0,2635	0,2092	0,2442	0,4133	0,5156	1
Countries C	7	12	15	15	15	14	17	16	15	10	5	8	7
ACI	0,5833	0,2613	0,2	0,216	0,11	0,242	0,1	0,107	0,196	0,14	0,174	0,197	-0,01

Figure 7 shows the evolution of the network density Δ and the API index: both indicators have clearly a different meaning for this network.

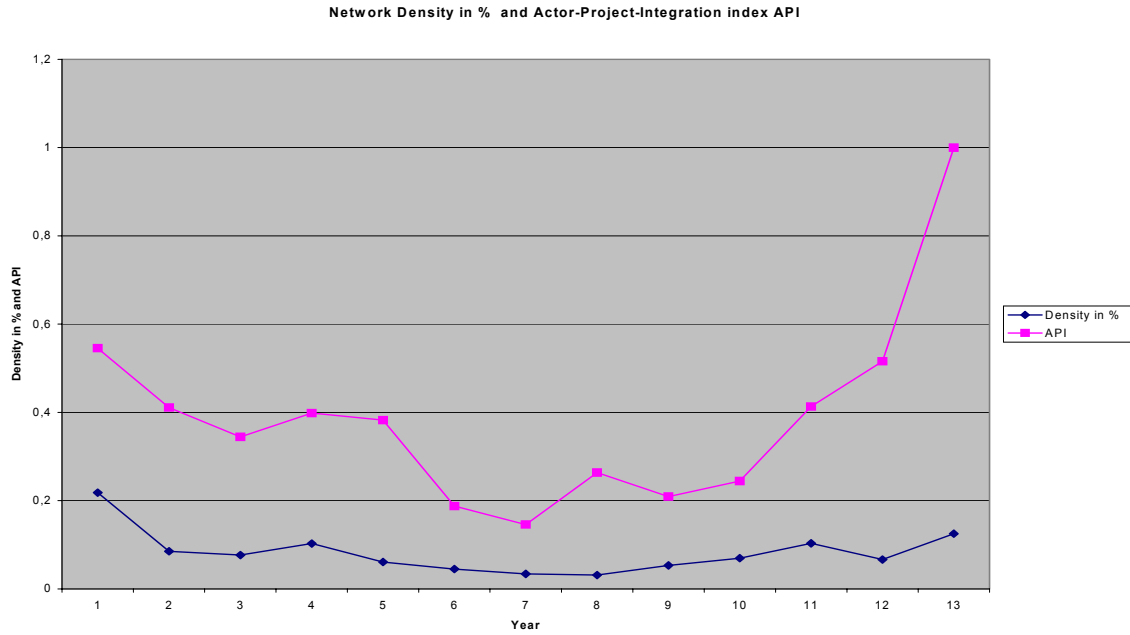
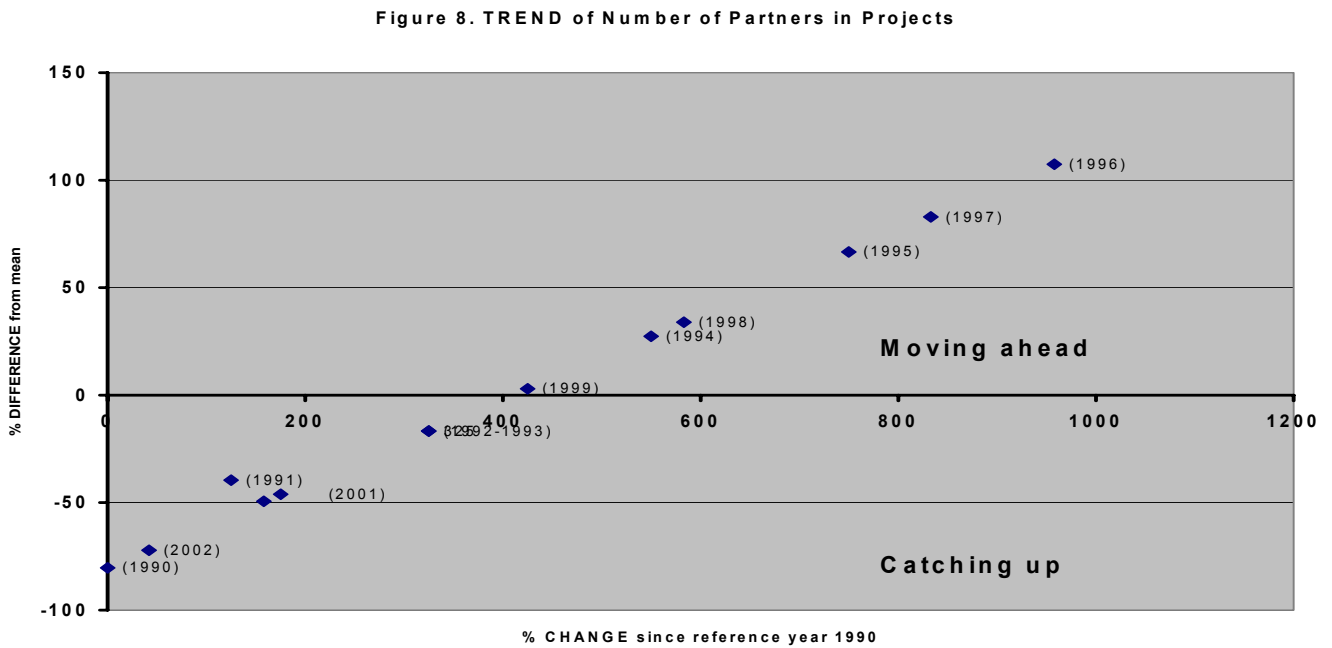


Figure 7. Large network example: network density Δ and the Actor-Project-Integration index API

Figure 8 shows the “trend” of number of partners during the lifetime of this network since the reference year 1990.



5. A Survey on Networks

Experience suggests that “networks” is a buzzword and that many people may expect different outcomes and benefits of networks, sometimes contradictory with respect to the objectives of networks and the resources generally allocated to networks. The aim of the survey⁶ was an assessment of the general perception about networks, compared to the reality of existing networks. Although the survey was organised within the framework of water-related projects, participants of networks in other fields were encouraged to submit the QUESTIONNAIRE: their judgement would enhance considerably the scope of the assessment and the results of the survey would become useful for a wider public.

The survey was conducted through a questionnaire. In a few cases an interview was held with guidance of the questionnaire. The questionnaire was available on the web.

The questionnaire itself had two parts:

- 1) A THEORETICAL PART A exploring the perception of the participants concerning networks (principles, characteristics, objectives, expected outcomes and benefits, resources needed).
- 2) An APPLIED PART B (optional) where the participant identified a past or on-going network and filled in a series of similar questions applied to the identified network. An additional group of questions on “*Obstacles encountered*” was added. The same participant could fill in this APPLIED PART for several identified networks if he/she was or had been a member of several networks.

The questionnaire was designed in October 2001 and was tested by a few partners of the European Thematic Network of Education and Training “ETNET21” for ENVIRONMENT-WATER” of the SOCRATES Programme of the European Commission. It was then slightly adapted, discussed and distributed at the *International Symposium on Human Capacity Building in the Water Sector through Innovation and Collaboration*, organised by IHE, UNU-INWEH, UNDP, UNESCO and WB, Delft (NL), 28-30 November 2001, aiming at a Water-Education-Training (W-E-T) Strategy, to be presented at the Third World Water Forum, 2003. At this Symposium, a “community of practice for promoting W-E-T through networking” was established and it was mainly through this community that the survey was further promoted. Members of the community have also translated the questionnaire into Spanish and Portuguese. Some further dissemination was organised and the survey was closed in principle on 31 March 2002. The preliminary appraisal of the results of PART A was sent to the participants in May 2002 for further comments. The analysis of the results of PART B gave rise to six additional questions to the participants, which were then included in a preliminary appraisal, sent to the participants in August 2002 for further comments.

The reader is referred to Annex 1 for the SURVEY OUTLINE and the full QUESTIONNAIRE PART A and PART B and to Annex 2 for the details of the results of this survey. Not surprisingly – since questionnaires are very unpopular - the number of returned questionnaires was low: 24 for PART A and only 19 for PART B (Identified Networks). However, since these respondents were obviously motivated and anonymity was guaranteed, the results may be considered as fair and useful within the scope of this study. It would be interesting to duplicate this survey with exact similar questions within another target group and to repeat the survey with the same questions within the same target group some time later (e.g. in 2005).

⁶ As said before, a SURVEY is not a “social network analysis”: it is the study of a sample and not a census. The “interaction among actors” was not investigated.

Appraisal of PART A

GROUP A1: Principles of Networks

The majority (between 92% and 73%) agrees with the statements but there are important differences in opinion with regard to “*member⁷-bodies*” or “*member-individuals*”: these questions receive most of the comments, also from those who filled in YES. There are also interesting comments regarding the long-term objectives or strategy beyond a project-life.

GROUP A2: Characteristics of Networks

YES ranges between 100% and 71%, with the lowest score and strongest comments for the structure of the network (non-hierarchical, decentralised).

GROUP A3: Objectives of Networks

The results are presented as overall scores (between 90% and 61%) for each objective and level of action. Somewhat surprising is the result for objective “*A3.3 Dissemination, validation and exploitation of methods, techniques, research results and best practices*” at the level of EXECUTE: it receives the highest score; this means that the network should have the resources to act at this level. It is, however, not contradictory with the results of GROUPS *A4: Expected Outcomes and Benefits* and *A5: Resources Needed*, because *A4.1 Joint development of projects and activities among members* and *A5.5 Project-wise funding by sponsors* receive the highest scores of respectively 90% and 92% among these groups.

Some “other” objectives proposed can be considered as “modes” of the objectives already given in the Table, e.g. “Seminars, workshops, summer-schools” can be classified under *A.3.2. Transfer of knowledge....*

GROUP A4: Expected Outcomes and Benefits

While the highest scores (91%) are for *joint projects* and for *innovation*, the lowest score (65%) is for *increase of financial resources for members*. The added “other outcome/benefit” on *status, credibility, international recognition* is certainly worth mentioning in this appraisal.

GROUP A5: Resources Needed

As may be expected for this important group of questions, the divergence of answers is the greatest of the whole part A: the highest score is 81% (for *project-wise funding*) and the lowest is 56% (for *funding generated by selling products, expertise, services, etc....*). *Registered status* receives a score of only 62%: this could be in many cases an “operational” inconsistency because “*project-wise funding*” at the “EXECUTE”-level will make a “*registered status*” of the network a necessity for funding by sponsors.

⁷ In this survey the term “members” has been used whereas in this report the more general term “actors” has been introduced.

It is possible that some participants did not fully understand the meaning of the “levels of action” in GROUP *A.3 Objectives of Networks*:

- PROMOTE (or STIMULATE) is the lowest level of action by the network with respect to the given objective and thus requires the least resources;
- ENHANCE (or INCREASE) means that the network offers “help” to the MEMBERS WHO EXECUTE;
- EXECUTE (or PERFORM) is of course the highest level of action and would require the largest resources. For several objectives, there cannot be a role for networks at the level of EXECUTE.

An example of the confusion at the “level of action” is found in the objective *A3.6 Mobility of students/staff*: obviously it CANNOT be the network but the MEMBERS who perform, thus the level of action for the network is typically PROMOTE and ENHANCE, the latter e.g. by financing (through a project-wise funding) and by matching offers/demands (e.g. for training placements of students/young graduates). A similar reasoning can be given for objective *A.3.2 Transfer of knowledge, etc...* (in all its modes). Objective *A.3.1 Information flow, etc...* however, is a typical objective where the network can be performer and not only promoter or helper.

Appraisal of PART B

Nineteen questionnaires filled in for part B were received and sixteen networks were identified. The tables presented in Annex 2 bring the information as received from the participants: thus the information may be not identical in the case of corresponding networks and no attempt has been made to check or correct the information given. All individual comments and “other” items proposed in Tables B3, B4, B5 and B6 are listed.

The overall results for Part B, compared to those of Part A, show a more realistic perception of network activities: co-ordinators and members are aware about the limitations of networks. But even more important is the clear message that the overall quality of action to reach the *objectives of networks* is not more than SATISFACTORY. The overall quality of the actual use of the *resources of the networks* is between SATISFACTORY and GOOD. Unfortunately, the results of the group of questions “*B6 Obstacles encountered*” do not give an answer to this quality issue. **One can conclude that in general the quality of the identified networks is not well assessed by co-ordinators as well as by members.**

GROUP B1: Identification of Networks

Sixteen networks were identified: 7 by their co-ordinator and 9 by network-members. One network was identified three times (once by the co-ordinator and two times by network-members); another network was identified twice (by the co-ordinator and by a member). *This allows for a comparison of perceptions between co-ordinators and members of networks and also for an appraisal of internal comprehension.*

One identified network was a *university*: it must be recognised that universities share in many ways the structure and culture of networks, given the – traditionally - large autonomy of faculties, departments, schools or institutes of universities.

One respondent referred to a large number of projects with numerous actors for which the respondent was each time the coordinator or contractor: they formed a PLATFORM and ALLIANCE and established ad-hoc PARTNERSHIPS as appropriate. This group of actors is a typical multi-modal network and was analyzed in the section Examples of Performance of Networks.

The information presented in this group of questions is reported as detailed as possible, without violating the anonymity of the identified networks: it offers a picture of the type of networks with their general objectives.

GROUP B2: Principles and Characteristics of the Identified Network

Many networks (42%) accept individuals as members: however, 21% of the respondents did not know or did not answer the question and for 16% of the respondents the selection criteria were unknown. There is a large group of networks with EXCLUSIVE membership (25%) and 37% of the respondents define their network as CENTRALISED.

GROUP B3: Objectives of the Identified Network

The results are presented as overall scores, in percentage of the maximum possible, for each objective, at their level of action and quality of action. Similar to the answers in Part A, respondents did not recognize that they could choose a level of action at which the network operates best or wants to operate, rather than filling in scores for all levels of action. When only the highest scores at any level of action are considered, only objective “B3.1 Information flow...” gets an EXECUTE level, all other objectives score at levels ENHANCE or PROMOTE. Interesting is also that objective “B3.3 Dissemination, validation and exploitation of methods, techniques, research results and best practices” scores highest second to B3.1, but at level ENHANCE, while it scored highest at level EXECUTE in Part A. Thus respondents in Part B are more “realistic” than in Part A. Scores given by coordinators and by members are not significantly different, except for “B3.2 Transfer of knowledge, skills and improving competencies” which gets the highest score (96%) at the level PROMOTE from the coordinators, while the overall score was only 78%.

Concerning the quality of action, the overall results are clear for all objectives and levels of action: the quality is never more than SATISFACTORY and even drops to FAIR for the less important objectives. Here again it is interesting to find out that the opinion between coordinators and members are not significantly different.

GROUP B4: Expected Outcomes and Benefits of the Identified Networks

Similar to the results in Part A, the highest score (84%) is for *joint projects*, the lowest score (60%) is for *increase of financial resources for members*. *Internationalisation and Cultural and socio-economic integration* also score high.

The overall quality of the outcomes and benefits is somewhat better than the quality of action with respect to the objectives (GROUP B3): 5 out of 8 score GOOD with the highest score for *Internationalisation* (74%). Co-ordinators gave highest scores (94% and 83%, respectively under *importance* and *quality*) for *Internationalisation and Cultural and socio-economic integration*.

GROUP B5: Resources of the Identified Network

Here again, respondents are realistic: the highest score (88%) is for *Operational structure and management*, the second highest (79%) for *Project-wise funding*, but co-ordinators consider “*B5.6 Overheads from projects generated by the network*” somewhat more important (74% versus 64% overall). In Part A scores were 80%, 81% and 68%, respectively. The high score for *Operational structure and management* reflects of course the paramount importance of the *co-ordinator*, as very well commented in *B7: General remarks, observations, suggestions*. *Structural funding* gets only 70%, rather surprisingly while in Part A it scored 79%. *Funding by members* reached 70% in Part A but this resource only gets 64% in Part B and, surprisingly, drops to 57% among the co-ordinators. This is consistent with the financing of most networks as shown in GROUP B1.

Regarding *quality (effectiveness) of the actual use of the resources* of the identified networks the two most important resources (*Operational structure* and *Project-wise funding*) get the score GOOD, the other resources get SATISFACTORY.

GROUP B6: Obstacles encountered in the Identified Networks

The overall result for this group of questions is rather disappointing because respondents show NO OPINION EITHER WAY for most questions. *Lack of structural funding* is SOMEWHAT IMPORTANT, but most surprising is the opinion SOMEWHAT UNIMPORTANT for *Lack of professionalism in operation and quality assurance*. **The relatively low scores given to “quality” in the above groups B3, B4 and B5 are signals about the weakness of networks and this should be reflected in the opinion about *Obstacles encountered*.** The distinction between opinions of co-ordinators and members is not significant.

GROUP B7: General Remarks, Observations and Suggestions

These comments are mainly related to

- the characteristics and financing of networks
- the role and profile of the coordinator or facilitator of networks.

6. An Outline for GOUTTE of WATER

GOUTTE of WATER means “ **Global Observatory of Units for Teaching, Training and Ethics of WATER**” and is aiming at creating an **International Forum, Platform and Alliance** for Co-operation and Exchange. GOUTTE of WATER will be a self-governing multi-modal vertical network, parity based and assistance oriented, stimulating education, training, research and innovation. It will act as a forum, platform and alliance for information and communication, for sustaining collaboration and exchange programmes, for extending geographical limited partnerships and facilitating new partnerships.

Its initial concept was presented by J.Bogardi at the *International Symposium “ The Learning Society and the Water-Environment”* in June 1999.

GOUTTE of WATER is a project of Theme 5 “**Water – Education – Training (W-E-T)**” of the International Hydrological Programme (IHP) Phase VI (2002-2007) of UNESCO and is conceived to provide a coherent approach for UNESCO’s IHP in the area of partnerships in the broad area of water-related capacity building. It follows the W-E-T Vision, presented at the 2nd World Water Forum in 2000, centred around four key-elements:

- Education and Research go always together
- Collaborative Clusters
- “Quality first”
- Public Awareness

6.1 Mission

The mission of GOUTTE of WATER is the mandate of UNESCO applied to this particular field of environment-water.

- Translating UNESCO’s permanent mandate to build peace in human mind, and promoting water-environment ethics as a basic concept of professional education and training and general public awareness raising.
- Under scribing UNESCO’s Position Paper « Enhancing Global Sustainability » for the World Summit on Sustainable Development 2002 and supporting its Implementation Plan.
- Fostering intellectual co-operation and the spirit of academic, scientific and professional solidarity in the domain of water-environment.
- Linking and strengthening existing networks and facilitating new networks as the most effective way to fulfill this mission.

6.2 Objectives

- To promote international and inter-institutional co-operation in both bottom-up and top-down approaches with a parity-based and assistance-oriented spirit.
- To liaise with the UNITWIN/UNESCO- CHAIRS Programme.
- To promote the Research and Education Network of Ethics for Water (RENEW) of the Subcommittee for the Ethics of Freshwater Use of the World Commission on the Ethics of Science and Technology (COMEST).
- To foster institutional development for higher education, training and research within a perspective of lifelong learning for sustainable use, sharing and protection of water and other natural resources.
- To promote regional co-operation for pooling of expertise and creating critical mass for better higher education, training and research.
- To foster the transfer of knowledge, skills, the enhancement of competencies and general capacity building.
- To promote the articulation of education and training needs and the matching between services and demands.
- To help creating a learning environment and alleviating obstacles for effective transfer of knowledge, skills and technology.
- To foster alliances among stakeholders of education, training and research.
- To serve as a long-term forum to exchange ideas, to find partners for networking and co-operation and to critically review all matters related to education, training and ethics of water.
- To help and guide participants of the GOUTTE of WATER FORUM, PLATFORM and ALLIANCE in their co-operation schemes and networking activities and to help them finding support from donor agencies and service providers.

6.3 Activities proposed

Each of the activities listed below could be considered as “*projects*”. It is not necessary that all projects are developed and operational in this order or at the same time.

- Providing a useful classification of co-operation and networking activities through definitions and general outlines.
- Providing recommendations for efficiency and quality assurance of co-operation schemes and networks.

- Organizing bi-annually an open FORUM with lectures, workshops, posters, seminars and a « network market ».
- Organizing a permanent VIRTUAL FORUM for GOUTTE of WATER » participants.
- Offering **observer** status of GOUTTE of WATER to all those who have interest in networking for water and who subscribe to the mission of GOUTTE of WATER .
 - Offering **associate** status of GOUTTE of WATER to those networks, which apply quality assurance procedures.
 - Facilitating mutual assistance among associate- and observer-members.
- Helping to set up expert teams for education and training needs analysis upon request of donor agencies and beneficiaries.

6.4 Structure, Culture and Management

With reference to the typology of networks, GOUTTE of WATER can be considered as a bottom-up and low-intensity network. It is an “observatory” which implies observation and follow-up of the networking activities of the actors in GOUTTE of WATER.

Considering the list of objectives and activities proposed, it is a network of the FORUM-, PLATFORM- AND ALLIANCE-type. It is also a vertical network with actors of different nature, i.e. not all are universities, but all actors in the education, training, research and professional domain and funding agencies are targeted. It is partly an inclusive network for the OBSERVERS and partly an exclusive network for the ASSOCIATES. The type of actor is:

- individual for the OBSERVERS
- institutional for the ASSOCIATES.

Among the targeted OBSERVERS are all those individuals with interest in active participation in networking, willing to join an existing network or preparing a new network and seeking actors to join and advice of best practice.

Among the targeted ASSOCIATES are the institutions with interest in the domain of environment-water and for instance active in the UNITWIN/UNESCO Chairs Programme as well as the institutions acting in the RENEW networks. Other targeted ASSOCIATES are the many networks in the environment-water domain, e.g. Cap-Net, ETNET, TECHWARE, etc.

The code of conduct of GOUTTE of WATER is essentially similar to those applied in the UNITWIN/UNESCO Chairs Programme and the RENEW Project. Given the low-intensity network, not much more is needed for GOUTTE of WATER because GOUTTE of WATER is not a CLUSTER nor a CONSORTIUM or PARTNERSHIP.

The proposed activities of GOUTTE of WATER need to be implemented through an appropriate management. The **implementation strategy** should follow:

- the FORUM-philosophy for the bi-annual meetings and the *virtual forum*: an “agora” where OBSERVERS and ASSOCIATES exchange information and communicate to each other, discuss matters of common interest, exchange ideas which could lead to new projects among some actors, seek new partners, obtain advice and meet donors;
- the PLATFORM-philosophy where coalitions of actors, including funding agencies, possibly emerging from the FORUM, are preparing new programmes/projects or supporting on-going programmes/projects;
- the ALLIANCE-philosophy where existing networks, sharing the same objectives, help each other and e.g. extend their partnership.

The **implementation mechanism** is by:

- promoting and making visible GOUTTE of WATER;
- identifying actors as potential OBSERVERS or ASSOCIATES;
- preparing and organizing the FORUM activities (both its bi-annual meeting and the *virtual forum*) as a first step;
- inviting all actors, including funding agencies, to attend the FORUM activities;
- inviting actors to contribute to the other activities.

Among these other activities (projects) the first two:

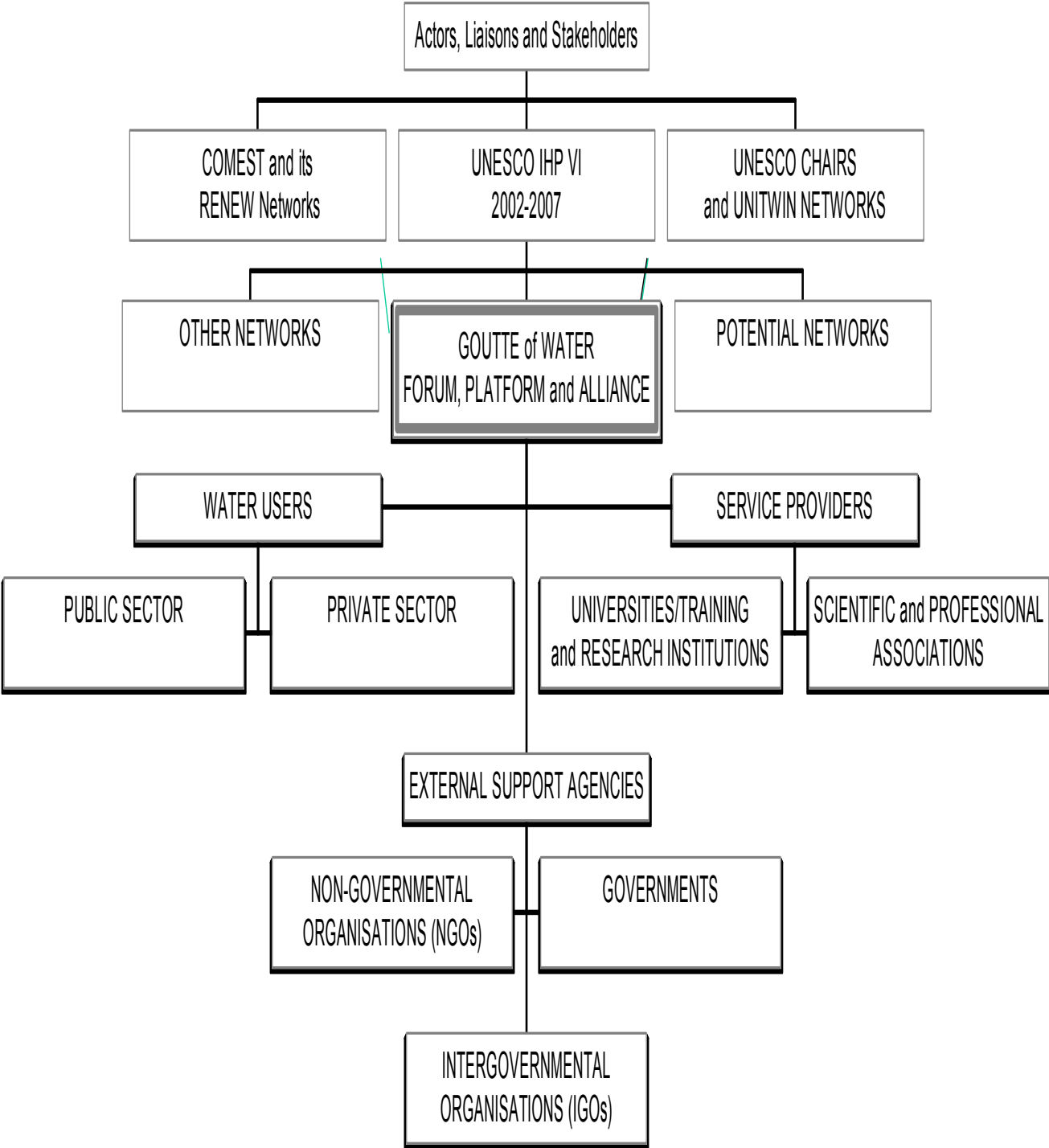
- *Providing a useful classification of co-operation and networking activities through definitions and general outlines;*
- *Providing recommendations for efficiency and quality assurance of co-operation schemes and networks*

will need the input of many experienced actors.

A **facilitator**, supported by the Secretariat of the International Hydrological Programme, will be responsible for the implementation mechanism but the implementation strategy is largely the responsibility of the actors themselves: therefore GOUTTE of WATER is a “self-governing” network and especially its PLATFORM and ALLIANCE mode of operation is their activity.

Financial implications for the management of GOUTTE of WATER are to be determined project-wise, i.e. for each activity a budget must be proposed and funds made available.

6.5 Actors, Liaisons and Stakeholders



7. Suggestions for Best Practice

The aim is not to impose the ultimate guidelines for a network, but to enlighten the concepts explained in this report and to exploit the lessons learned from the survey on networks.

When creating a network

About the typology of the network:

- **Define the type of network depending on the network-intensity.**
 - *A. a **FORUM** (market-place, agora): a regularly organised meeting where information and ideas are exchanged and discussion can be freely engaged; nowadays this forum-type of interaction among actors is often complemented by a “virtual forum” through Internet.*
 - *B. a **PLATFORM**: a group of actors that supports an existing programme/project or plan a new programme/project; such an interaction could be the outcome of a forum.*
 - *C. an **ALLIANCE**: a more or less diffuse link between actors or between several networks, whatever their type, with common objectives.*
 - *D. a **CLUSTER**: a group of actors or partnerships which shares common support structures and seeks to exploit complementary characteristics of the group or results of projects.*
 - *E. a **PARTNERSHIP** or **CONSORTIUM**: a group of actors executing a project of limited duration.*
- **Define the network as “multi-modal” (e.g. types A+B+E) or “uni-modal”(e.g. type D only).**
- **Does the network follow a bottom-up or a top-down approach or a combined approach?**

About the structure of the network:

- **Define the target group of actors and the objectives of the network.**
- **Is it a horizontal or a vertical network?**
- **Is it an inclusive or an exclusive network?**
- **Are the actors representatives of bodies or individual persons? Or are both accepted?**

About the culture of the network:

- What are the initial expectations of the actors?
- What is the initial strategy to achieve the objectives of the network?
- Write a code of conduct.
- Write statutes and byelaws if there is a need for it and register if appropriate.

About the management of the network:

- Conduct a feasibility study about the management model, given confirmed and expected resources.
- Define the role, profile and selection procedure of the facilitator or coordinator of the network.
- Define appropriate management infrastructure and other resources.

When developing and operating a network

About effectiveness:

- Describe the factors of actors' satisfaction.
- Organise regularly a self-assessment procedure among the actors.
- Adapt initial objectives and strategy.

About efficiency:

- Develop and apply management rules but avoid bureaucracy.
- Define and list all projects of the network.
- List output criteria of projects and apply.
- Develop and apply performance indicators.
- Conduct cost-benefit analysis where possible.

About survival and termination:

- **Balance carefully the “own resources” (actors’ support to the network) and the input resources (project funding and other income) with the output costs (management and project costs).**
- **Inform all actors as much as possible about effectiveness, efficiency and budget issues.**
- **Terminate the network if the quality of the management of the network decreases due to an imbalance of the budget.**

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10. ANNEXES

10.1 The survey outline and questionnaire

Survey on Networks

supported by Case Studies

AIM of the SURVEY

Experience suggests that “Networking” is a buzzword and that many people may expect different outcomes and benefits of networks, sometimes contradictory with respect to the objectives of networks and the resources generally allocated to networks. The aim of this survey is an assessment of the general perception about networks, compared to the reality of existing networks. Although the survey is organized within the framework of water-related projects (see below), participants of networks in other fields are encouraged to submit the QUESTIONNAIRE : their judgement will enhance considerably the scope of the assessment and the results of the survey may be useful for a wider public.

EXPECTED RESULTS

The survey results will form part of a blueprint for starting up the UNESCO International Hydrological Programme IHP-VI (2002-2007) project “**GOUTTE of WATER**” . This “meta-network” will be a self-powering forum activity, parity-based and assistance-oriented, stimulating education, training, research and innovation. It will act as a forum for collaboration among stake-holders, sustaining exchange programmes and extending geographical limited partnerships.

The SURVEY

The survey comprises two approaches:

- A field survey through case studies and interviews with guidance of a questionnaire
- The questionnaire attached and available on the website which can be filled in and submitted.

The questionnaire itself has two parts:

- 1) A THEORETICAL PART exploring the perception of the participants concerning networks (definitions, characteristics, objectives, expected outcomes and benefits, resources needed).
- 2) An APPLIED PART (optional) where the participant identifies a past or on-going network and fills in a series of similar questions adapted for and applied to the identified network. This APPLIED PART may be filled in for several identified networks by the same participant if he/she was/is a member of several networks.

Submit before to : Prof.A. Van der Beken, Co-ordinator of ETNET21

Department of Hydrology and Hydraulic Engineering, Faculty of Applied Sciences, Free University Brussels, Pleinlaan 2, B-1050 Brussels, Belgium .Tel:+32 (0)2 6293021 or -3015; Fax:+32 (0)2 6293022 ;

Email:avdbeken@vub.ac.be Editor of website: <http://keywater.vub.ac.be>

Further details about MOTIVATION and OUTLINE of the STUDY , see the specific website

<http://etnetsurvey.vub.ac.be>.

SURVEY on NETWORKS is a project within the framework of

1. European Thematic Network of Education and Training "ETNET21

ENVIRONMENT-WATER" of the SOCRATES Programme of the European Commission

<http://etnet.vub.ac.be/>

2. “GOUTTE of WATER”, project of UNESCO International Hydrological Programme (IHP- VI)

<http://www.unesco.org/water/ihp/publications/ihp6.pdf>

3. “NETWORKING for W-E-T”, cluster of the International Symposium on Human Capacity Building in the Water Sector through innovation and collaboration, organised by IHE, UNU-INWEH, UNDP, UNESCO and WB, Delft (NL), 28-30 November 2001, aiming at a Water-Education-Training (W-E-T) Strategy, to be presented at the Third World Water Forum, 2003.

<http://www.ihe.nl/news/wet/index.htm>

with the financial support of the Vrije Universiteit Brussel (VUB).

Survey on Networks supported by Case Studies

QUESTIONNAIRE

Preamble

This questionnaire applies to all types of knowledge networks, regardless their specific objectives (education, training, professional development, research, technological development, innovation, dissemination, information and communication, etc).

For the sake of simplicity we do not make a distinction with respect to the typology of networks which may be described by many similar words: partnership, consortium, co-operative organisation, federation, cluster, alliance, platform, etc.... **Scientific and professional associations are also addressed.**

The questionnaire is split up into a THEORETICAL PART (A) and an APPLIED PART (B)

In PART A, we explore your opinion about networks in general without any specific application in mind. It comprises 5 GROUPS of questions:

- 1) Principles
- 2) Characteristics
- 3) Objectives
- 4) Expected outcomes and benefits
- 5) Resources needed

In PART B you are asked to identify an existing or past network in which you are/ were a member. You can make copies of this part if you wish to identify more than one network in which you are/ were active. This part comprises 7 GROUPS of questions:

- 1) Identification
- 2) Principles and characteristics
- 3) Objectives
- 4) Outcomes and benefits
- 5) Resources used
- 6) Obstacles encountered
- 7) General remarks, observations, suggestions

Your name, affiliation and address is OPTIONAL, but can help us if you would agree that we contact you for personal interview with the aim of clarifying your opinion and judgement. The analysis of the survey, however, will be fully ANONYMOUS and your name will NOT APPEAR in the report. If you fill in your name and address you will receive the results of the survey.

I AGREE WITH A PERSONAL INTERVIEW

- Yes
 No

Your NAME: _____.

Your AFFILIATION: _____.

Your ADDRESS: _____.

_____.

Tel/ Fax/ Email: _____.

DATE: _____ **SIGNED:** _____.

A. THEORETICAL PART

In this part we explore your opinion about networks in general, without any specific application in mind.

GROUP A 1: Principles of Networks

Do you agree with the following definitions or descriptions?

A1.1) A Network is a system in which network-members are connected to each other in a structured way.

- Yes
- No

If NO please give your own description or comment:

A1.2) Network-members are BODIES (institutions, not individuals), represented by at least one person committed to the network.

- Yes
- No

If NO please give your own description or comment:

A1.3) Network-members are RESOURCE-PERSONS, i.e. individuals, acting independently.

- Yes
- No

If NO please give your own description or comment:

A1.4) Selection-criteria to become a network-member should be transparent and well known.

- Yes
- No

If NO please give your own description or comment:

A1.5) A network should have long-term objectives or a strategy beyond the usual project-life time (of e.g. 3 years)

- Yes
- No

If NO please give your own description or comment:

GROUP A2: Characteristics of Networks

Do you agree with the following characteristics of a network?

A2.1) A network should be organised bottom-up by motivated members.

- Yes

- No

If NO please give your own description or comment:

A2.2) A network should be developed on a voluntary basis in an inclusive (non-exclusive) way.

- Yes
- No

If NO please give your own description or comment:

A2.3) A network should be non-hierarchical (all members are alike and have the same rights/ plights) and should have a decentralised structure.

- Yes
- No

If NO please give your own description or comment:

A2.4) A network should present clear offerings of each member and offer full internal and external comprehensibility.

- Yes
- No

If NO please give your own description or comment:

A2.5) There should be mutual trust among the network members.

- Yes
- No

If NO please give your own description or comment:

GROUP A3: Objectives of Networks

For each objective and level of action given below, fill in the number in each column that best fits your opinion on the importance of the objective and the level of action. Use the following scale to match your opinion:

1.	Not important at all
2.	Somewhat unimportant
3.	No opinion either way
4.	Somewhat important
5.	Extremely important

Objective	Level of Action		
	PROMOTE (Stimulate)	ENHANCE (Increase)	EXECUTE (Perform)
A3.1 Information flow and communication, discussion and exchange of ideas			
A3.2 Transfer of knowledge, skills and improving competencies			
A3.3 Dissemination, validation and exploitation of methods, techniques, research results and best practices			
A3.4 Synergy and pooling of expertise			
A3.5 Creating "critical mass"			
A3.6 Mobility of students/ staff			
A3.7 Add other objectives if you wish			

GROUP A4: Expected Outcomes or Benefits of Networks

For each outcome or benefit cross the column to the right that best fits your opinion about the importance of the outcome or benefit. Use the scale below to match your opinion:

1.	Not important at all
2.	Somewhat unimportant
3.	No opinion either way
4.	Somewhat important
5.	Extremely important

Outcome or Benefit	Importance				
	1	2	3	4	5
A4.1 Joint development of projects and activities among members					
A4.2 Evaluation and assessment of activities and policies					
A4.3 Studies and surveys for the benefit of members					
A4.4 Increase of financial resources for members					
A4.5 Optimisation and quality assurance of means, methods and tools used by members					
A4.6 Innovation					
A4.7 Internationalisation					
A4.8 Cultural and socio-economic integration					
A4.9 Add other outcomes/ benefits of your opinion					

GROUP A5: Resources Needed for Running Networks

For each resource needed, cross the column to the right that best fits your opinion about the importance of the resources needed. Try to be consistent with your opinion given in GROUP 3. Objectives and GROUP 4 Outcomes and benefits.

Match your opinion:

1.	Not important at all
2.	Somewhat unimportant
3.	No opinion either way
4.	Somewhat important
5.	Extremely important

Resources Needed	Importance				
	1	2	3	4	5
A5.1 Operational structure and management (i.e. secretariat, staff, rules of operation, etc)					
A5.2 Registered status with statutes					
A5.3 Funding by members					
A5.4 Structural funding by sponsors					
A5.5 Project-wise funding by sponsors					
A5.6 Overheads from projects generated by the network					
A5.7 Funding generated by selling products, expertise, services etc,					
A5.8 Add other resources if you wish					

B. APPLIED PART

In this APPLIED PART of the questionnaire the participant of the survey is asked to identify one or more networks in which he/she is (or was) a member.

Please fill in this part as many times as you wish for different identified networks.

GROUP B1: Identified Network

B1.1) NAME of the Network

Full Name: _____

Acronym: _____

Website: _____

B1.2) General OBJECTIVE : _____

B1.3) Period of Operation: _____

B1.4) CO-ORDINATOR

Name: _____

Institution: _____

Address: _____

Tel/Fax/Email: _____

B1.5) Registered Status Yes No Unknown

B1.6) Number and type of members: _____

_____ % education/training institutions _____ % enterprises

_____ % public organisations _____ % professional associations

B1.7) Number of countries represented: _____

B1.8) Number of continents represented: _____

B1.8) Turnover in Euro/ year: _____

B1.9) Funding by members :

Yes No

B1.11) Structural (long-term) funding:

Yes No Unknown

B1.12) Funding by project (short-term)

Yes No Unknown

B1.13) Major sponsor (donor): _____

GROUP B2: Principles and Characteristics of the Identified Network

Mark the column, which matches your opinion for the following principles and characteristics:

Principles and Characteristics	Yes	No	Unknown
B2.1) Network-members are bodies (not individuals), represented by at least one person			
B2.2) Network-members are individual resource-persons			
B2.3) Network is established bottom-up by motivated members			
B2.4) Selection-criteria to be a network-member are transparent and well-known			
B2.5) Network is INCLUSIVE on a voluntary basis (if your answer is NO, the network is EXCLUSIVE and number of members is limited)			
B2.6) Network is non-hierarchical and decentralised			
B2.7) Network presents clear offerings and is comprehensible internally and externally			
B2.8) Network has long-term objectives and is NOT limited to a project			
B2.9) Add your own description if you wish			

GROUP B3: Objectives of the Identified Network

For each objective and level of action, fill in two columns: one for the actual importance given by the network according to your opinion (which may differ from the “official” objectives of the network) and one for the actual quality of action according to your judgement.

Use the following scales to match your opinion and judgement:

Scale	Importance	Scale	Quality
1	Not important at all	1	Poor
2	Somewhat unimportant	2	Fair
3	No opinion either way	3	Satisfactory
4	Somewhat important	4	Good
5	Extremely important	5	Excellent

Objective	Promote (Stimulate)		ENHANCE (Increase)		EXECUTE (Perform)	
	Importance	Quality	Importance	Quality	Importance	Quality
B3.1) Information flow and communication discussions with exchange of ideas						
B3.2) Transfer of knowledge, skills and improving competencies						
B3.3) Dissemination, validation and exploration of methods, techniques, research results, best practices						
B3.4) Synergy and pooling of expertise						
B3.5) Creating “critical mass”						
B3.6) Mobility of students/ staff						
B3.7) Add your own objectives if you wish						

GROUP B4: Outcomes and Benefits of the Identified Network

For each outcome or benefit, give your opinion about the actual importance offered by the identified network and the actual quality according to your judgement.

Use the following scales to match your opinion and judgement:

Scale	Importance	Scale	Quality
1	Not important at all	1	Poor
2	Somewhat unimportant	2	Fair
3	No opinion either way	3	Satisfactory
4	Somewhat important	4	Good
5	Extremely important	5	Excellent

Outcome or Benefit	Importance	Quality
B4.1) Joint development of project and activities among members		
B4.2) Evaluation and assessment of activities and policies		
B4.3) Studies and surveys for the benefit of members		
B4.4) Increase of financial resources for members		
B4.5) Optimisation and quality assurance of means, methods and tools used by members		
B4.6) Innovation		
B4.7) Internationalisation		
B4.8) Cultural and socio-economic integration		
B4.9) Add other outcomes/ benefits if you wish		

GROUP B5: Resources of the Identified Network

For each resource used by the identified network, give your opinion about the actual importance of the resources and give your judgement about the quality (effectiveness) of the actual use of the resource by the identified network.

Use the following scales to match your opinion and judgement:

Scale	Importance	Scale	Quality
1	Not important at all	1	Poor
2	Somewhat unimportant	2	Fair
3	No opinion either way	3	Satisfactory
4	Somewhat important	4	Good
5	Extremely important	5	Excellent

Resource	Importance	Quality
B5.1) Operational structure and management (i.e. secretariat, staff, rules of operation, etc.)		
B5.2) Registered with statutes		
B5.3) Funding by members		
B5.4) Structural funding by sponsors		
B5.5) Project-wise funding by sponsors		
B5.6) Overheads from projects generated by the networks		
B5.7) Funding generated by selling products, expertise, services, etc.		
B5.8) Add other resources you feel are important		

GROUP B6: Obstacles Encountered

Give your opinion about the list of obstacles below, which the identified network may have encountered in achieving its objectives, conducting its activities and producing outcomes/ benefits.

Use the following scale for matching your opinion:

Scale	Importance
1	Not important at all
2	Somewhat unimportant
3	No opinion either way
4	Somewhat important
5	Extremely important

Obstacles encountered	Importance
B6.1) Lack of comprehensibility internally (among members)	
B6.2) Lack of comprehensibility externally (in outside world)	
B6.3) Lack of transparency in operation and activities	
B6.4) Duplication of activities with other organisations	
B6.5) Complicated operational rules (bureaucracy)	
B6.6) Lack of motivation from members	
B6.7) Lack of motivation from (potential) sponsors	
B6.8) Lack of structural funding by members (fees)	
B6.9) Lack of structural funding by sponsors	
B6.10) Lack of project-funding	
B6.11) Lack of professionalism in operation and quality assurance	
B6.12) Obstacles due to diversity of socio-economic and professional context	
B6.13) Cultural-linguistic obstacles	
B6.14) Add any more obstacles you feel are missing	

GROUP B7 : General Remarks, Observations, Suggestions

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10. ANNEXES

10.2 Detailed results of the survey

THEORETICAL PART A

Results

Twenty-four questionnaires filled in for part A were received. All questions were not always answered, thus the number of the scores is not necessarily 24. All individual comments and “other” items proposed in Tables 3,4 and 5 are listed, without summarising at this stage, thus some are repetitions.

In this part we explore your opinion about networks in general, without any specific application in mind.

GROUP A 1: Principles of Networks

Do you agree with the following definitions or descriptions?

A1.1) A Network is a system in which network-members are connected to each other in a structured way.

Yes = 21

No = 3

Comments:

- 1. The connection among members may be not structured, depending on the type of connection and its purpose.*
- 2. Networks should not be structured and seen as “market places”.*
- 3. Participation is voluntary, responding to needs and interest, changing over time.*

A1.2) Network-members are BODIES (institutions, not individuals), represented by at least one person committed to the network.

Yes = 18

No = 6

Comments:

- 1. Subject to the objectives and operational aspects of the network, well qualified individuals may play an even more important role than representatives of institutions.*
- 2. It depends on the type of network : a mixture of member-bodies and individuals can be better.*
- 3. A problem is the information stream from the network to the interested individuals of the member-body.*
- 4. Consultants should be included.*
- 5. Networks appear more flexible and responsive if individuals constitute the network.*

A1.3) Network-members are RESOURCE-PERSONS, i.e. individuals, acting independently.

Yes = 17

No = 6

Comments:

- 1. Yes, but the institution of the individual must be duly informed.*
- 2. It is preferable that the institutions are represented by a person committed to the network. Individuals should also be allowed.*
- 3. The members are offering or requesting information : they are “interlocuteurs” who act independently.*
- 4. No, see A.1.2 above.*
- 5. The network can be a mixed one.*
- 6. Individuals CAN be member.*
- 7. Should be an exception: networks should be mainly based on “bodies”.*
- 8. The best is a combination of bodies and individuals.*

A1.4) Selection-criteria to become a network-member should be transparent and well known.

Yes = 22

No = 2

Comments:

- 1. There can be a selection through invitation.*
- 2. Generally, networks seems to operate well if membership is not restricted.*

A1.5 A network should have long -term objectives or a strategy beyond the usual project-life time (of e.g. 3 years)

Yes = 21

No = 3

Comments:

1. *The objectives of a network will determine the duration.*
2. *A network should preferably have long-term objectives, but this is not obligatory.*
3. *It is recommended to have long-term objectives, but networks can also be created for short-term purposes and be one-project oriented.*
4. *A network is a living organisation and must be flexible.*
5. *It depends on the nature of the network and the members' interest.*

GROUP A2: Characteristics of Networks

Do you agree with the following characteristics of a network?

A2.1) A network should be organised bottom-up by motivated members.

Yes = 20

No = 3

Comments:

1. *Yes in principle, but a network may be stimulated by an international conference, an agency or a programme.*
2. *A top-down extension of the network (clustering of several networks) on agreement of all partners and aimed at realising common objectives, must be possible.*
3. *A network can also be created on the initiative of one or more motivated members who invite(s) others to join.*
4. *There should be also a small top-down management.*
5. *Someone should always take the leadership.*
6. *A top-down approach can be accepted if it is done in a democratic way.*
7. *A network may be organised top-down by an elected committee.*

A2.2) A network should be developed on a voluntary basis in an inclusive (non-exclusive) way.

Yes = 21

No = 2

Comments:

1. *There must exist a group of members, motivated and competent with respect to the objectives of the network.*
2. *"Voluntary" should not mean that the workload is on "voluntary persons" only. A network must be developed/managed by professionals and thus financial resources are needed.*
3. *Membership may be limited in number.*

A2.3) A network should be non-hierarchical (all members are alike and have the same rights/ plights) and should have a decentralised structure.

Yes = 17

No = 7

Comments:

1. *All members should have access and interact in an egalitarian way, i.e. the network should be a horizontal one.*
2. *There maybe members with different rights/plights (regional nodes, observers, contributors in cash, contributors in kind, leaders of activities, partners in activities, etc...). A decentralised structure of a network is an essential characteristic of any network.*
3. *Members can have different responsibilities and rights/plights.*
4. *For a good organisation, implementation of activities, etc... there should be a leader and main co-ordinator or general board.*
5. *A network should be based on the principles of solidarity and freedom.*
6. *A network needs at least a co-ordinator.*
7. *The problem is how to motivate the members. Activities of the network must be attractive.*
8. *Some kind of hierarchical structure is necessary. As in any other organisation, some people must assume more responsibilities: who more invests should have more rights.*
9. *It is very important to have an active and informed convenor.*
10. *The rights of individual members can be different.*

A2.4) A network should present clear offerings of each member and offer full internal and external comprehensibility.

Yes = 24

Comments:

1. *Yes, but it should not constrain variable offers with time and development of the network.*
2. *A network should be multi-disciplinarian.*
3. *The strategy of a network should not be disclosed to everybody, but the network should organise “open meetings”.*

A2.5 There should be mutual trust among the network members.

Yes = 22

No = 2

Comments:

1. *“Agreed confidential matters” among members must be respected.*
2. *There should be a mutual interest. If this is present, mutual trust will be automatically taken care of.*
3. *Ideally there is mutual trust among network members.*

GROUP A3: Objectives of Networks

For each objective and level of action given below, fill in the number in each column that best fits your opinion on the importance of the objective and the level of action. Use the following scale to match your opinion:

1.	Not important at all
2.	Somewhat unimportant
3.	No opinion either way
4.	Somewhat important
5.	Extremely important

The maximum score possible in each column was: $24 \times 5 = 120$. The results given below are normalised to 100. The individual scores for “other” objectives are given between brackets.

Objective	Level of Action		
	PROMOTE (Stimulate)	ENHANCE (Increase)	EXECUTE (Perform)
A3.1 Information flow and communication, discussion and exchange of ideas	83	81	84
A3.2 Transfer of knowledge, skills and improving competencies	74	80	80
A3.3 Dissemination, validation and exploitation of methods, techniques, research results and best practices	75	75	90
A3.4 Synergy and pooling of expertise	77	82	76
A3.5 Creating “critical mass”	74	69	61
A3.6 Mobility of students/staff	66	61	77
A3.7 Add other objectives if you wish	(4)		

Identification of needs/ demands and elaboration of diagnostics	(5)		(4)
Seminars, workshops, summer-schools, publications	(3)	(3)	(5)
Regular meetings			(5)
A.3.2 for partners belonging to developing countries	(5)	(4)	(1)

GROUP A4: Expected Outcomes or Benefits of Networks

For each outcome or benefit cross the column to the right that best fits your opinion about the importance of the outcome or benefit. Use the scale below to match your opinion:

1.	Not important at all
2.	Somewhat unimportant
3.	No opinion either way
4.	Somewhat important
5.	Extremely important

The results are presented in two ways:

1. The overall score, calculated as the sum of the individual scores (maximum is $24 \times 5 = 120$) in each row, is normalised to 100;
2. In the “importance” columns are given the number of answers for the given score. For the added “other” outcomes the individual scores are given between brackets.

Outcome or Benefit	Importance				
	1	2	3	4	5
A4.1 Joint development of projects and activities among members 91				6	17
A4.2 Evaluation and assessment of activities and policies 74		2	1	13	6
A4.3 Studies and surveys for the benefit of members 88			5	10	10
A4.4 Increase of financial resources for members 65	1	3	1	12	4
A4.5 Optimisation and quality assurance of means, methods and tools used by members 80	1	2		9	11
A4.6 Innovation 91		1	3	2	16
A4.7 Internationalisation 90			1	5	17
A4.8 Cultural and socio-economic integration 85			1	6	15
A4.9 Add other outcomes/ benefits of your opinion					

Dissemination of results from members (1)

Status, credibility, international recognition, added value, widening dimension, benchmarking, social responsibility, global view (1)

Networks as a tool for peace (1)

GROUP A5: Resources Needed for Running Networks

For each resource needed, cross the column to the right that best fits your opinion about the importance of the resources needed. Try to be consistent with your opinion given in GROUP 3. Objectives and GROUP 4 Outcomes and benefits.
Match your opinion:

1.	Not important at all
2.	Somewhat unimportant
3.	No opinion either way
4.	Somewhat important
5.	Extremely important

The results are presented in two ways:

- The overall score, calculated as the sum of the individual scores in each row (maximum is $24 \times 5 = 120$), is normalised to 100.
- In the “importance” columns are given the number of answers for the given score. For the “other” outcomes the individual scores are given between brackets.

Resources Needed	Importance				
	1	2	3	4	5
A5.1 Operational structure and management (i.e. secretariat, staff, rules of operation, etc) 80		1	1	9	11
A5.2 Registered status with statutes 62	2	2	7	8	3
A5.3 Funding by members 70		1	7	9	5
A5.4 Structural funding by sponsors 79			3	9	10
A5.5 Project-wise funding by sponsors 81			3	7	12
A5.6 Overheads from projects generated by the network 68		2	5	7	7
A5.7 Funding generated by selling products, expertise, services etc, 56	3	4	4	6	5
A5.8 Add other resources if you wish					

Contributions in kind for operational (1)

Management and performance of activities

Registered premises with office and communication equipment (1)

Comments on some resources:

A5.3 Crucial to avoid excluding members on the basis of ability to pay.

A5.4 Difficult, very seldom.

A5.6 Unrealistic.

A5.7 Difficult. People expect services without paying for it.

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PART B: IDENTIFIED NETWORKS

Full anonymity was guaranteed to the participants and is therefore also applied in the analysis/appraisal of Part B of identified networks

GROUP B1: Identified Networks

Table B1.1 General information about the identified networks

<i>1.Survey/ Network number</i>	<i>2. Identified by</i>	<i>3. Website</i>	<i>4. Registered status</i>	<i>5. Period of operation</i>	<i>6. Expected duration in years</i>
1/1	member	yes	yes	2000-2002	3-5
2/2	member	yes	unknown	1994-	10
3/3	member	yes	yes	1996-2003	N/A
4/3	member	yes	yes	1996-2003	>10
5/4	member	no	unknown	2000-	3-5
6/5	co-ordinator	yes	no	1999-	N/A
7/6	co-ordinator	yes	yes	1999-	>10
8/7	co-ordinator	yes	yes	1987-	N/A
9/8	co-ordinator	no	no	1990-	>10
10/9	member	yes	yes	?	N/A
11/10	member	yes	unknown	1995-	N/A
12/11	co-ordinator	yes	yes	?-	N/A
13/12	co-ordinator	yes	yes	1690-	N/A
14/13	co-ordinator	yes	yes	1971-	N/A
15/14	member	yes	unknown	1998-2003	N/A
16/15	member	yes	no	2001-2004	N/A
17/11	member	yes	unknown	1998-	N/A
18/16	member	yes	yes	1990-	15
19/3	co-ordinator	yes	no	1996-2003	10

Table B.1.2 General objectives of the identified networks

<i>1.Survey/ Network number</i>	<i>2. General objectives as presented by respondents</i>	<i>3. Network is mainly</i>	<i>4. Network was established</i>
1/1	Operational solutions for the management of inundation risks using Information and Communication Technologies (ICT).	vertical	top-down
2/2	Community organizing.	vertical	bottom-up
3/3	Education and training in the water field.	horizontal	top-down
4/3	Teaching resources, distance learning opportunities, virtual laboratories, platform for doctoral students and young scientists, quality assurance.	horizontal	bottom-up
5/4	Bringing together all stakeholders in engineering education and running jointly projects on the relation engineering institutions and industry.	vertical	top-down
6/5	Sustainable development of water resources and peace through facilitating international co-operation.	N/A	N/A

7/6	To facilitate the exchange of information and expertise in the field of water and the environment in the transnational region and in other developing countries.	horizontal	bottom-up
		N/A	N/A
8/7	Promoting technical culture in urban hydrology.		
9/8	<p>1.Transfer of a postgraduate study programme.</p> <p>2.Cooperation methods on sustainable environmentally sound river basin administration</p> <p>3.Development of joint educational, training and mobility programme through student and staff mobility's and short intensive courses.</p> <p>4.Improvement of university education on environmental protection through updating of texts books, laboratory instructions, teaching programmes and stock of libraries.</p> <p>5.Restructuring the curricula at 8 universities including the creation of a 4-year Ph.D. course at University A and a postgraduate course at University B, both in the area of Environmental Protection and finally to develop a Geographical Information Systems training centre at University A.</p> <p>6.To incorporate environmental/ecological concepts in Civil and Agricultural Engineering courses at 8 universities and institutions of higher education; to set up new Ph.D. programmes in Engineering and Integrated Water Management.</p> <p>7.Creation of an new inter-faculty didactic institution in order to provide education in the field of 'Environmental Modelling and Impact Assessment', and the restructuring of the Agricultural Engineering and Civil Engineering study programmes, more specifically in the area of Sustainable Environmental Development, by including new topics dealing with 'Water and Agricultural Soils'. These newly restructured programmes will be provided through the new 'Inter-Faculty Institution' as well as through all the other partner universities.</p> <p>8.Development of 2 new subject areas (Land Use - Management and Soil Science) and introduction of these subjects in the Ph.D. programme at four universities with new educational methods (GIS, CAD, multimedia) and updated textbooks. Development of joint curricula leading to mutual recognition of periods of study and double degrees. Creation of a new educational centre at the lead University.</p> <p>9.To disseminate the results of previous joint projects in the field of Environment, Water and Agricultural Soils, and to establish a Regional Advisory Board to oversee curriculum development in this field.</p> <p>10. Feasibility study on interfaculty curriculum development in the field of environmental protection at the University, with a view to introducing flexible study programmes with a credit transfer system.</p> <p>11.To give recommendations for administrative management (international cooperation, development of teaching plans and materials, external cooperation with industry) at the recently created College of Horticulture and Landscape Engineering.</p>	horizontal	top-down/bottom-up

12. Introduction of new degree courses, at both Bachelor and Master level, at two partner universities: an interdisciplinary and inter-faculty study programme in 'Environmental Engineering and Management' at the lead University and an interdisciplinary study programme in 'Environmental Engineering' at the other University.

13. Development and introduction of a new study course at undergraduate and postgraduate levels entitled 'Law in Agriculture and Land Management' and of a new 1-year part-time continuing education course in the field of legislation with regard to Agriculture and Land Management at four participating universities. Creation at the lead University of Agriculture of an 'Agricultural Law Advisory Centre' for the benefit of other universities and outside organisations.

14. Feasibility study on the establishment of an educational centre for environmental management for local communities.

15. Modernization of the Department of International Cooperation at the University aimed at project formulation and management.

16. 1. Development and implementation of an internal quality assurance system; 2. Creation of the basis for the course credit transfer system.

17. Development of the training courses for governmental and local administration on regulations in the area of environmental protection and agriculture.

18. Development of training courses for central and local administration on regulation in the area of Land Management.

19. To develop a curriculum that will provide MSc students, with an in-depth effective using of Information and Communication Technologies, with achieving of holistic approach to sustainable development of Soil and Water Resources in the country and elsewhere and to create training and a teaching centre.

10/9	To make optimal use of existing capacity in the field of river engineering by connecting specialized institutes and experts working in the river basin countries.	N/A	N/A
11/10	Establishing horizontal relations and exchange of information between persons and entities, actors in water resources management	N/A	N/A
12/11	Improving conditions for the use and development of water resources and for Integrated Water Resources Management (IWRM) in the transnational river basin. Promoting a system of information, communication and co-operation among the members. Specific objectives are:	N/A	N/A

	<p>1.co-operation system for interaction of the human resources in the region;</p> <p>2.co-ordinating activities of the members with respect to programmes, projects and courses;</p> <p>3.standardisation of methods for monitoring and defining environmental indicators;</p> <p>4.promoting links with other networks and development of activities for capacity building, technology transfer and dissemination of information.</p>		
13/12	<p>Training and capacity building of graduates and post-graduates in different areas of knowledge. Promotion and implementation of a university policy aiming at professional and scientific competence of the students.</p>	N/A	N/A
14/13	<p>Integration of water resources professionals. Dissemination of advanced knowledge in the field of water resources. Collaboration for defining water policies in the country.</p>	N/A	N/A
15/14	<p>Strengthening co-operative research concerning climate variability and its socio-economic impacts.</p>	N/A	N/A
16/15	<p>To foster human resources development for Integrated Water Resources Management through strengthening or establishment of regional networks to deliver education and training.</p>	N/A	N/A
17/11	<p>Improving conditions for the use and development of water resources and for Integrated Water Resources Management (IWRM) in the transnational river basin. Promoting a system of information, communication and co-operation among the members, actors of planning, evaluation, research, technological development, administration, legal affairs, management and services.</p>	N/A	N/A
18/16	<p>University enterprise co-operation for education, training, research, innovation and dissemination of research results in the water sector.</p>	vertical	bottom-up
19/3	<p>Analysis and reflection on higher education issues of common interest in the field of environment-water. The relation between education and research within a perspective of lifelong learning in this field.</p>	horizontal	bottom-up

Table B.1.3 Membership of the identified networks

1.Survey/ Network number	2.Number of members	3. E+T organi- sations	4.Number of enter- prises	5.Number of public orga- nisations	6.Professio- nal organi- sations	7.Number of countries/ continents
1/1	9					5/1
2/2	>1000	50%	?	?	?	?
3/3	>100	?	?	?	?	26/1
4/3	71	60	0	11	0	18/1
5/4	20	8	1	2	9	9/1
6/5	38					22/4
7/6	50	35	5	10	0	10/1
8/7	14	9	2	3	0	1/1
9/8	123	68	13	38	4	23/3
10/9	100	50	0	0	50	10/1
11/10	unknown					26/1
12/11	26	13	3	8	2	4/1
13/12	100 000					1/1
14/13	200 (1)					1/1
15/14	N/A					5/1
16/15	? (2)					?/3
17/11	unknown					unknown/1
18/16	76	40	12	18	6	21/3
19/3	72	55	2	10	5	26/1

Notes: (1) Individual professionals and educators
(2) Network in development

Table B.1.4 Financing of the identified networks

1.Survey/ Network number	2.Annual turnover in Euro	3.Funding by members	4.Structural funding	5.Funding by project	6.Major sponsor
1/1	N/A	yes	unknown	yes	EC
2/2	unknown	no	unknown	no	university
3/3	289700	yes	yes	yes	N/A
4/3	115000	no	unknown	yes	EC
5/4	N/A	yes	yes	yes	government
6/5	N/A	no	no	yes	municipality
7/6	50000	no	no	yes	government
8/7	15000	yes	no	yes	none
9/8	544000	N/A	no	yes	EC
10/9	N/A	no	no	yes	donor
11/10	unknown	no	unknown	no	UN
12/11	20000	yes	no	yes	institution
13/12	4 Million	no	yes	yes	government
14/13	25000	yes	no	yes	government
15/14	unknown	no	unknown	yes	institution
16/15	1,2 Million	no	unknown	yes	UN
17/11	N/A	no	N/A	N/A	N/A
18/16	100000	yes	no	yes	EC
19/3	300000	yes	no	yes	EC

GROUP B2: Principles and Characteristics of the Identified Network

The results are given in percentage of total number of respondents.

Principles and Characteristics	Yes	No	Unknown or no answer
B2.1) Network-members are bodies (not individuals), represented by at least one person	63	32	5
B2.2) Network-members are individual resource-persons	42	37	21
B2.3) Network is established bottom-up by motivated members	90	5	5
B2.4) Selection-criteria to be a network-member are transparent and well-known	84		16
B2.5) Network is INCLUSIVE on a voluntary basis (if your answer is NO, the network is EXCLUSIVE and number of members is limited)	74	26	
B2.6) Network is non-hierarchical and decentralised	58	37	5
B2.7) Network presents clear offerings and is comprehensible internally and externally	90	5	5
B2.8) Network has long-term objectives and is NOT limited to a project	84	11	5
B2.9) Add your own description if you wish * One network-member in each country acts as a focal point for national sub-networks * Comment on B.2.5: network-members should be co-opted by selection, otherwise nobody is interested to join the network.			

GROUP B3: Objectives of the Identified Network

The participants were asked: "for each objective and level of action, fill in two columns: one for the actual importance given by the network according to your opinion (which may differ from the "official" objectives of the network) and one for the actual quality of action according to your judgement". However, most of them filled in all columns, probably not recognising that the identified network could operate best at a given level of action.

The following rating scales were used, but the results in the table below are expressed in percentage of the maximum scores possible : 19x5=95 overall and 8x5=40 for the co-ordinators (second figure).

Scale	Importance	Scale	Quality
1 (0-20)	Not important at all	1 (0-20)	Poor
2 (20-40)	Somewhat unimportant	2 (20-40)	Fair
3 (40-60)	No opinion either way	3 (40-60)	Satisfactory
4 (60-80)	Somewhat important	4 (60-80)	Good
5 (80-100)	Extremely important	5 (80-100)	Excellent

Objective	Promote (Stimulate)		ENHANCE (Increase)		EXECUTE (Perform)	
	Importance	Quality	Importance	Quality	Importance	Quality
B3.1) Information flow and communication discussions with exchange of ideas	82/83	49/43	60/43	47/40	82/87	55/60
B3.2) Transfer of knowledge, skills and improving competencies	78/96	50/51	72/47	49/33	63/69	43/43
B3.3) Dissemination, validation and exploration of methods, techniques, research results, best practices	75/80	49/43	82/43	54/37	76/67	52/43
B3.4 Synergy and pooling of expertise	64/63	42/33	78/80	52/40	68/67	43/43
B3.5 Creating "critical mass"	60/50	32/23	62/83	32/30	59/50	30/13
B3.6 Mobility of students/ staff	62/73	25/30	52/37	25/7	52/57	27/20
B3.7 Add your own objectives if you wish *To learn from other similar organisations of better organised countries *Creation of a professional community						

GROUP B4: Outcomes and Benefits of the Identified Network

The participants were asked: “For each outcome or benefit, give your opinion about the actual importance offered by the identified network and the actual quality according to your judgement”.

The following rating scales were used, but the results in the table below are expressed in percentage of the maximum scores possible : 19x5=95 overall and 8x5=40 for the co-ordinators (second figure).

Scale	Importance	Scale	Quality
1 (0-20)	Not important at all	1 (0-20)	Poor
2 (20-40)	Somewhat unimportant	2 (20-40)	Fair
3 (40-60)	No opinion either way	3 (40-60)	Satisfactory
4 (60-80)	Somewhat important	4 (60-80)	Good
5 (80-100)	Extremely important	5 (80-100)	Excellent

Outcome or Benefit	Importance	Quality
B4.1) Joint development of project and activities among members	84/91	62/57
B4.2) Evaluation and assessment of activities and policies	78/80	62/60
B4.3) Studies and surveys for the benefit of members	68/71	54/48
B4.4) Increase of financial resources for members	60/60	41/40
B4.5) Optimisation and quality assurance of means, methods and tools used by members	74/80	57/54
B4.6) Innovation	75/80	61/60
B4.7) Internationalisation	83/94	74/83
B4.8) Cultural and socio-economic integration	84/94	61/83
B4.9) Add other outcomes/ benefits if you wish		
• A website and newsletter	(5)	(4)
• Dissemination of other results of members	(5)	(4)
• Annual meeting where the “themes” of the network are chosen	(5)	
• Organisation of joint events and/or discussions	(5)	(5)

GROUP B5: Resources of the Identified Network

The participants were asked: “For each resource used by the identified network, give your opinion about the actual importance of the resources and give your judgement about the quality (effectiveness) of the actual use of the resource by the identified network”.

The following rating scales were used, but the results in the table below are expressed in percentage of the maximum scores possible : 19x5=95 overall and 8x5=40 for the co-ordinators (second figure).

Scale	Importance	Scale	Quality
1 (0-20)	Not important at all	1 (0-20)	Poor
2 (20-40)	Somewhat unimportant	2 (20-40)	Fair
3 (40-60)	No opinion either way	3 (40-60)	Satisfactory
4 (60-80)	Somewhat important	4 (60-80)	Good
5 (80-100)	Extremely important	5 (80-100)	Excellent

Resource	Importance	Quality
B5.1) Operational structure and management (i.e. secretariat, staff, rules of operation, etc.)	88/86	70/66
B5.2) Registered with statutes	66/60	53/46
B5.3) Funding by members	64/57	40/28
B5.4) Structural funding by sponsors	70/71	50/40
B5.5) Project-wise funding by sponsors	79/68	64/51
B5.6) Overheads from projects generated by the network	64/74	46/57
B5.7) Funding generated by selling products, expertise, services, etc.	45/51	32/26
B5.8) Add other resources you feel are important * Contributions in kind for operational management and execution of activities	(5)	(5)

GROUP B6: Obstacles Encountered

The participants were asked: “Give your opinion about the list of obstacles below, which the identified network may have encountered in achieving its objectives, conducting its activities and producing outcomes/ benefits”.

The following rating scales were used, but the results in the table below are expressed in percentage of the maximum scores possible : 19x5=95 overall and 8x5=40 for the co-ordinators (second figure).

Scale	Importance
1 (0-20)	Not important at all
2 (20-40)	Somewhat unimportant
3 (40-60)	No opinion either way
4 (60-80)	Somewhat important
5 (80-100)	Extremely important

Obstacles encountered	Importance
B6.1) Lack of comprehensibility internally (among members)	48/40
B6.2) Lack of comprehensibility externally (in outside world)	56/53
B6.3) Lack of transparency in operation and activities	42/43
B6.4) Duplication of activities with other organisations	50/50
B6.5) Complicated operational rules (bureaucracy)	48/57
B6.6) Lack of motivation from members	63/67
B6.7) Lack of motivation from (potential) sponsors	64/63
B6.8) Lack of structural funding by members (fees)	59/57
B6.9) Lack of structural funding by sponsors	65/67
B6.10) Lack of project-funding	60/63
B6.11) Lack of professionalism in operation and quality assurance	34/37
B6.12) Obstacles due to diversity of socio-economic and professional context	55/57
B6.13) Cultural-linguistic obstacles	37/37
B6.14) Add any more obstacles you feel are missing	

GROUP B7: General Remarks, Observations and Suggestions

- The network should be *unique, creative and identifiable* and not identical to other networks. A network should offer the “yeast” for projects, but should not “manage” projects.
- A network is a “living organism” with members leaving and new members adhering all the time.
- The key for success is a network with members who share similar problems and objectives. It is very difficult to co-operate with enthusiasm when members have different motivations. A network will have more possibilities of success if the scope of the objectives is very clear and well defined: the scope of the network should be narrow but ambitious.
- A preferred and successful mode of operation in global and inter-country programmes has been and still is partnerships in which the partners share common objectives, pool resources (financial and human) and undertake periodic reviews. A major success-factor has been that the partners know and trust each other, and welcome constructive criticisms.
- It may be useful to consider a categorisation of networking ranging from dissemination of information to exchange of information to e-learning and project implementation.
- A minimum structural funding is necessary because project-funding alone will not allow for a high-quality service to members; projects will seldom involve all network-members and thus motivation of members will soon decline if not supported by services offered through the network.
- The co-ordinator is the “machinist”: he/she must be competent with a vision, communicative with an open mind and unconnected as much as possible towards any network-member.
- The co-ordinator should know the specificity’s, the constraints, the ambitions and the objectives of the network-members.
- Based on participation in several networks, one key success factor is the professionalism and communication skills of the *facilitator*: he/she should be a strategic thinker, an articulate and encouraging communicator and able to communicate equally well with the community, government, corporate and academic sectors. He/she is very approachable, personable and, importantly, a recognised practitioner.

10. Annexes

10.3 Glossary of terms and list of abbreviations

Glossary of terms

Actor : A person who fulfils a particular function, intervenes effectively or represents with full authority. In this report: *a person who acts, either as an individual or as a representative of a body, within a network.*

Alliance : A union to promote common interests **syn** league, coalition, confederacy, federation. In this report: *a low-intensity network with a more or less diffuse link between actors or between several networks, whatever their type, with common objectives.*

Capacity Building : The sum of efforts to enhance and utilize the knowledge, skills and competencies of people and capabilities of institutions at local, national, regional and global levels, aimed at sustaining development

Club : A group of persons associated for a common purpose.

Cluster : A number of similar objects gathered together. In this report: *a group of actors or partnerships which share common support structures and seek to exploit complementary characteristics of the group or results of projects.*

Coalition : A temporary union for a common purpose. In this report: *specific ad-hoc connection among actors of the network. An “internal coalition” comprises only actors of a given network; an “external coalition” includes also actors from outside the network.*

Competency : The right balance between knowledge and skills in order to fulfil correctly a given job. Competency involves also many personal characteristics such as attitude, aptitude, behaviour, ethical perception, judgment, opinion, belief, etc.

Connection : A relationship of thought, belief, goal, business, etc. In this report: *interaction among the actors of a network.*

Consortium (Partnership) : An international business agreement or combination. In this report: *a high-intensity network of a group of actors executing a project of limited duration.*

Cooperation : To act jointly with another or others; willing to work with others; or relating to an organisation formed to enable its members to act to better advantage; a cooperative association.

Coordinator : Someone who brings parts (of a programme, a plan, etc.) into a common whole; someone who harmonizes activities. In this report: *someone who leads high-intensity networks.*

Culture : The social structure and intellectual manifestations that characterize a society. In this report: *the set of rules (code of conduct) for interaction among the actors of a network; it includes also the expectations of the actors and the strategy of the network.*

Education : Informal, formal and non-formal processes being associated with the transfer of knowledge to an individual. Any action leading to increasing one's knowledge. *Informal education*: family and socially directed learning. *Formal education*: regular school and university education which is carried out by, accredited private or public institutions (schools, universities, colleges, vocational education and training centres, etc.). Traditionally formal education relies on classroom teaching, tutorials, examinations, etc. along a fixed curriculum. Formal education and training, once successfully absolved, leads to acknowledged vocational and/or academic qualifications (diploma, academic degree, etc.). *Non-formal education*: conceived to respond to imminent or latent needs, focusing more on the transfer of necessary knowledge and skills than their formal accreditation. Non-formal education (and training) relies traditionally on ‘on-the-job training’, coaching, mentoring, in-house activities, etc. It includes also self-learning.

Facilitator : Someone who makes activities easier. In this report: *someone who leads low-intensity networks.*

Forum (agora): The marketplace or meeting place of an ancient greek/roman city; a medium (or publication) of open discussion; a court; a public assembly, lecture, or programme involving audience or panel discussion. In this report: *a low-intensity network organizing regularly a meeting where information and ideas are exchanged and discussion can be freely engaged; nowadays this forum-type of interaction among actors is often complemented by a "virtual forum" through Internet.*

Innovation : Introducing newly acquired knowledge and skills, introducing new ideas, methods, practices, etc.

Knowledge : The ability to understanding and critical, rational, scientific and strategic thinking. It involves reflection, selection, application and consolidation of all kinds of information. It is a universal and time-independent human ability that fulfils and satisfies the puzzle-solving mind of humankind and allows the individual to adapt more easily to a changing environment.

Learning : Learning is a biochemical process in the brain. Parts of the brain are used for short-term memorization, while other parts are used for long-term memorization. It is well recognized that learning to learn must start at a very early age. *Experimental learning* is learning-by-doing and self-directed learning.

Learning Society : Defined as the merging of the educational world and the economic world. A paradigm with various definitions, describing the broad social acceptance that the principle of lifelong learning should penetrate all walks of life. In a more focused sense, 'learning society' implies that companies, industries (the economic world), incorporate learning into their regular activity programme, thus abolishing the 'pejorative' duality of productive work and continuing education and training (CET). In more philosophical terms, 'learning society' assumes a general desire and proactive attitude to raise everybody's educational level. In the ideal case, the whole society participates in this learning process.

Lifelong learning : A concept acknowledging the increasing pace of knowledge renewal and additional skills to be acquired, thus rendering one's professional life to become a continuous process of formal education, continuing education and training (CET) and continuing professional development (CPD).

Network : A system of elements (as in lines or channels) that cross in the manner of threads in a net; a chain of radio or television stations. In this report : *a system of interdependent actors who interact with each other; subdivided in "low-intensity" and "high-intensity" networks, depending on the intensity of interaction among the actors.*

Objective : an aim or goal to be achieved and towards which actions are directed. In this report: *the well declared goals towards which the activities (projects)of the network are directed.*

Observatory : A place or institution equipped for observation of natural phenomena (as in astronomy). In this report: *observation and follow-up of networking among actors.*

Partnership (Consortium) : Two or more persons or institutions contractually associated. In this report: *: a high-intensity network of a group of actors executing a project of limited duration.*

Platform: A statement of aims and policies in a programme. In this report: *a low-intensity network of a group of actors that supports an existing programme/project or plan a new programme/project; such an interaction could be the outcome of a forum.*

Quality Assurance : System for ensuring quality of output involving evaluation, analysis and action to make required changes. Related terms are *Quality Assessment, Quality Control* and *Total Quality Management (TQM).*

Research : Is the act of a systematic search for a correct understanding of cause-effect relations, using the scientific methodology of observation, experimentation, measurement, analysis and synthesis. The driving force for research is the puzzle-solving and problem-solving mind of people.

Skills : Is the ability in mental and/ or physical performance of routine tasks. It is generally a local and time dependent characteristic and strongly linked to the technologies available in a given environment. It fulfils the problem solving-mind of humankind and is essential for the individual to operate efficiently in a given society.

Stakeholder : The general term to describe education, training and research “providers” (schools, universities, training centers, research institutes or departments) and “users” (public agencies, interest groups, companies, individuals, consumers and communities or representations thereof, taking part in education, training, research and innovation activities and thus forming the “learning society”).

Structure : The way in which constituent parts of an organism are joined together or arranged to give its peculiar nature or character. In this report: *the way in which actors interconnect for common objectives*.

Synergy (synergism) : Joint action of discrete agencies in which the total effect is greater than the sum of the effects when acting independently.

Training : Formal and non-formal learning process being associated with the transfer of abilities and skills to an individual. Any action leading to increasing one’s skills.

List of abbreviations

Cap-Net : Capacity Building Network for Integrated Water Resources Management

COMEST : World Commission on the Ethics of Scientific Knowledge and Technology

EC : European Commission

ERA : European Research Area

ETNET : European Thematic Network of Education and Training for Environment-Water

EU : European Union

GOUTTE of WATER : Global Observatory of Units for Teaching, Training and Ethics of WATER

ICP : Interuniversity Cooperation Programme

IHP : International Hydrological Programme

RENEW : Research and Education Network for Ethics of Water

UETP : University Enterprise Training Partnership

UN : United Nations

UNESCO : United Nations Educational, Scientific and Cultural Organisation

UNITWIN : University Twinning

W-E-T : Water-Education-Training

WSSD : World Summit for Sustainable Development

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