Report on rethinking stakeholder boundaries

DELIVERABLE 5.2

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1 INTRODUCTION

The uniting characteristic of nutrient governance within the EU is its dependence on the sectorally bounded EU directives. They have generally performed poorly in fostering collective action within their specific sectoral domain, let alone in terms of intractable issues such as water quality and climate change which transcend the boundary conditions defined by sectors and national borders. Some progress has been made in improving the management of water quality and hydrological flows at regional scales under policy directives such as the Nitrates Directive (ND), the Water Framework Directive (WFD), and connected to the planning for the new Marine Strategy Framework Directive (MSFD) (Powell et al. 2012). However, implementation ability remains very poor, with one third of all EU infringement cases related to a lack of compliance on environmental directives (Coffey and Richartz 2003). Coercive measures, including risks of financial penalties (see Box 1), continues to motivate European states to prioritise national targets, often at the expense of transboundary collaboration of water resources, e.g. as manifest with regards to transboundary cooperation on water pollution and the resistance to even simple data sharing across catchments (Powell et al. 2012).

Box 1. Nutrient Governance by coercion

Water: Commission refers GERMANY to the Court of Justice of the EU over water pollution caused by nitrates *Brussels, 28 April 2016:*

The European Commission is referring Germany to the Court of Justice of the EU for failing to take stronger measures to combat water pollution caused by nitrates. Germany has not taken sufficient additional measures to effectively address nitrates pollution and revise its relevant legislation to comply with the EU rules on nitrates (Council Directive 91/676/EEC). Since the Commission considers that the water pollution by nitrates is also not sufficiently addressed in the framework of the ongoing revision of the national action programme, it has decided to refer Germany to the Court of Justice of the EU.

Source: European Commission 2016a (http://europa.eu/rapid/press-release_IP-16-1453_en.htm)

The EU's poor track record can be readily translated into transnational conflicts of interest between nations and also at sub-national level between sectors and between different constellations of stakeholders. Farmers for example, are on one hand considered as crucial producers, ensuring national food security, renewable energy production and the cornerstone of vibrant rural development. On the other hand, according to the narrative of the ND, the farmer is considered a polluter (see Box 2).

Box 2. Ambiguous representations of the farmer across the EU directives

Nitrate emissions from the farmer's damages freshwaters and the marine environment by promoting algae growth, leads to the loss of biodiversity, and to health impacts particularly on pregnant women and children.

Source: European Commission 2016b (http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm)

Within the Baltic Sea Region (BSR), nutrient governance has been key environmental policy agenda for decades. Agriculture has been attributed as the greatest contributor to nutrient enrichment via emissions into water from diffuse sources (HELCOM 2011; HELCOM 2004). At the same time, the agricultural sector is considered as an important an economic power house instanced by the fact that the common agricultural policy is the EU's most expensive policy program. Agriculture is also regarded as a crucial vehicle to ensure the BSR can address the global sustainable development goals linked to food security, renewable energy and other eco-system services. Regional outlooks pointing at a substantial human migration into the BSR, manifest as an increasing demand for food and bio-energy and thus an increase nutrient emissions. Moreover, projections of climate change suggest that at a general level, temperatures will increase within the BSR, leading to longer growing seasons, and an increase in areas suitable for farmland, winter storms and floods with increased frequency and magnitude, and thus a substantial increase in nutrient emissions (Graham and Powell 2012).

Despite the overall gloomy picture, these projections are shrouded in a great deal of uncertainty. The BSR landscape is rapidly changing and the consensus generated after COP21 has revived the discussion pertaining to carbon markets and more specifically those promoting actions connected to carbon capture and storage (CCS) and CO2 positive energy. According to projections linked to the upscaling of eco-technological innovations, nutrient enriched contexts can serve as an eco-system service by the provisioning carbon positive energy and carbon capture; and long storage times as high a value commercial product that does not reintroduce carbon back into the life cycle (CarboNext 2016).

2 BACKGROUND

Underpinning many of the endeavours towards better nutrient governance in the BSR is nutrients last port of call, the Baltic Sea, and the ensuing issues emerging because of eutrophication. Prior to implementation of the MSFD, efforts to foster coordinated and integrated collective action could only be facilitated via the Baltic Sea Action Plan (BSAP) and in a partial sense by the ND. The agreed national targets for phosphorous and nitrogen load reductions within the BSAP are not legally binding and the plan was mediated by HELCOM, a platform that represents both the EU and non EU riparian states. Moreover, the causal links to eutrophication from nutrient enrichment are non-linear and multifaceted. For instance, nutrient enrichment may or may not result in algae blooms and anaerobic conditions in the bottom sediment, and they involve complex interactions between both phosphorous and nitrogen. Prior to the full enactment of the WFD the reductionist legislation offered to the EU-BSR riparians drew on their commitments under the ND to satisfy the BSAP and little attention was paid to phosphorous, despite the strength of its gradient as a determinant of eutrophication. In short, the legacy of nutrient governance in the BSR, was a reflection of the pre-existing normative structures: the ND, the prioritised agro-environmental measures within national rural development plans, the nutrient models applied to assess impact and the evaluation schemes continue to reproduce a nitrogen centred focus in terms of governance praxis.

As a response to the substantial scholarship pointing at the inadequacies of this proceduralist approach to governance of water resources, a new generation of policy was crafted and enacted in the new programming period beginning in 2002. Most of the new policy initiatives now set out to include so-called participatory and stakeholder based approaches as means of overcoming the weaknesses of the sectoral and norm laden approaches to problem solving. This shift is particularly evident in the design of the WFD as an attempt to transcend a “fragmented” environmental legislative approach, through the introduction of context specific, and stakeholder defined targets, manifest as “good ecological status” and “good chemical status”. Similarly, the EU’s cohesion policy has been framed as a non-coercive policy instrument designed to enable integrated outcomes across sectors and stakeholders, e.g. through national facilitators on action areas such as nutrient pollution and water dependent livelihoods such as fisheries.

Recognising the need for transition towards the enactment of more systemic and deliberative policy processes, for instance the WFD, a number of large six framework EU research projects were supported with expectation to begin to fill these knowledge gaps (SLIM 2004; HarmoniCOP 2002). It was during the same period that social learning gained substantial attention as a governance approach capable of facilitating change in the wicked[1] situations that demand integrated water management approaches.

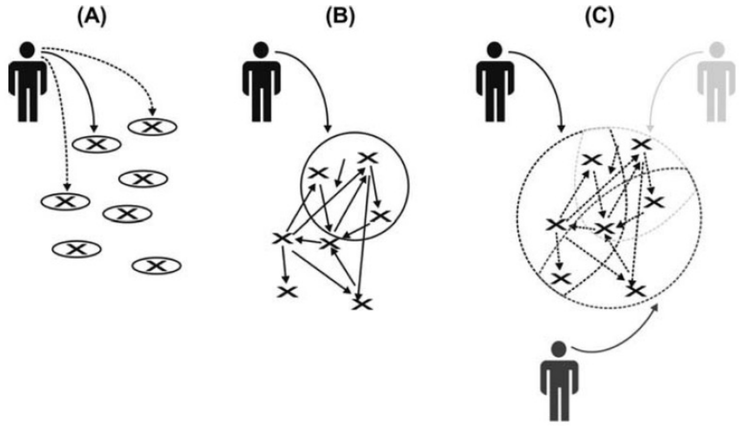

Figure 1. Diagrammatic representation making boundaries use to enact governance action. (A) Reductionist (analysis of components), found in enactment of nitrated directives. (B) Expert system ('hard' boundaries defining reference system), found in enactment of the WFD. (C) Interactionist (stake-holders' systems of interest[2]), found enactment of governance mediated by a systemic understanding that grows out of a social learning process (figure from Powell and Larsen 2013).

However, lessons learned from the implementation of the WFD during first period (2002-2009) suggest that the targets have been narrowly defined in the absence of sufficient stakeholder consultation, and limited access to multi-functional assessment methodologies and models (Coffey and Richartz 2003). The cohesion policy similarly suffers from disconnect with existing institutional structures and the impact of market forces, including a lack of targeted financing for implementing espoused stakeholder involvement. While there is a growing interest in innovations for post-normal governance initiatives, immense uncertainties and competence gaps remain among decision makers concerned with bringing about changes in governance institutions and practices, and the role of knowledge generation (Leeuwis and van den Ban 2004). Moreover, in the BSR the only limited advances have been made in reorientating the norms and structure underpinning nutrient governance from at nitrogen centred to a more nuanced approach that also acknowledges the important role of phosphorous – a fact that stakeholders have called for in both terrestrial and marine contexts for nearly a decade (Larsen and Powell 2013).

The enactment of environmental directives within the EU has grown from a notion that the ideal state of any system can be identified and bounded by expert scientific knowledge. In recognition of the multiple and conflicting interests associated with water governance, the

[1] Wicked situations are referred to as post normal in which "facts are uncertain, values in dispute, stakes high and decisions urgent" (Ravetz 1986: 422). Under such conditions prescriptive and coercive approaches to governance, shaped by pre-existing norms and structures to bring about change have proven dysfunctional.

[2] A system of interest is defined by the intended *purpose* a subject ascribes to the *environment*. Once articulated, the purpose will make it possible to distinguish the system of interest from the environment by ascribing a *boundary* (SLIM 2004a).

WFD recognized that an ideal system state was negotiable and reflective of a post-normal scientific tradition. Thus the WFD stipulates that the chemical and ecological status of water shall be defined by context-specific and stakeholder defined targets, thereby calling for the enactment of collaborative approaches in water governance, notably in the development and enactment of RBMP. The shift from administrative boundaries to physical boundaries of river basins was an ambitious and necessary step to be able to address the degrading water resources in Europe in general (Osbeck et al. 2013). After a substantial revision of the WFD over two programming periods, several performance reviews consider that its implementation has fallen short in terms of embracing the diversity of problems definitions held by the actors and clients of status within these basin contexts. Moreover, contrary to its deliberative aspirations, it has rather served to reproduce the present normative system by singling out a set of prioritized measures reflecting a world view that essentially is more of the same. In the case study catchments in MIRACLE, management of water resources remains a contested topic and the emerging findings indicate that the sectoral approach prevails.

The BSR presents itself as a wicked context for nutrient governance in which the current normative policy environment is incapable of fostering adaptive responses to systemic issues. Nation states as policy *owners*, the sub-national institutions as *actors* responsible for policy enactment, and the *clients* (beneficiaries or victims) of policy are all required to navigate an ambiguous set of normative environmental boundary conditions to address the issues that define their stakes in this highly controversial setting (Figure 2).

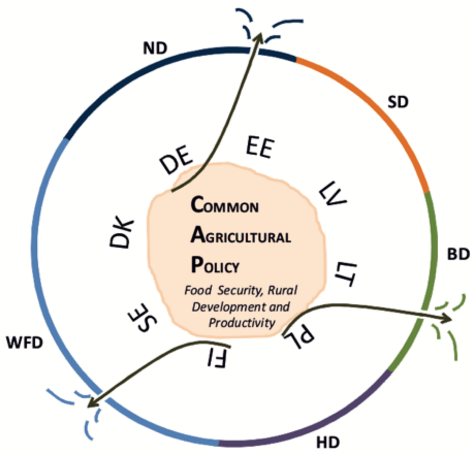

Figure 2. Boundary conditions for CAP implementation (source: Powell et al. 2012) Acronyms: Nitrate Directive (ND); Water Framework Directive (WFD); Habitats Directive (HD); Birds Directive (BD) and Soils Directive (SD). The arrows penetrating the environmental boundary suggest that it is problematic for Member States to comply with the directives whilst pursuing the objectives of CAP.

It was within this wicked problem context that MIRACLE was conceived; armed with a recognition that meaningful transformation of nutrient governance within the BSR cannot be achieved by reproducing the present situation by optimising the pre-existing reductionist policy environment (Figure 1, part A) and neither by focussing solely on nutrients. Rather the empirical insights in MIRACLE will be supported by the larger research question: How can sectoral and national boundaries that define the pre-existing enactment of nutrient governance be redefined to support a systemic nutrient governance regime?

In answering this question, the project views governance to transcend the conventional notion of policy whereby the process of boundary redefinition requires a deliberative process to engage new constellations of stakeholders; stakeholders who are presently not acknowledged by the existing public policy gatekeepers of nutrient governance, owing to shortcomings in governance praxis, i.e. the implementation of the river basin management planning (RBMP) process.

Osbeck et al. (2016)[3] present the results of the first phase of research in the project, which uncovers existing and new constellations of stakeholders of nutrient governance. The present report, D 5.2, presents the theory behind the methodological design and conceptual frames that can foster redefinition of stakeholder boundaries, which will be supported in MIRACLE´s four case study settings. The following section presents a brief overview of how social learning can support the process of stakeholder boundary re-definition and indeed the redefinition of the governance process. Thereafter, the findings emerging thus far will be drawn upon to support the choice of frameworks used to facilitate the implementation of task 5.2 – *Rethinking stakeholder boundaries and reconciling multiples demands.*

3 SOCIAL LEARNING AND RECONSTRUCTING SYSTEMS OF INTEREST

In contrast to the pre-existing normative governance situation outlined in the background, MIRACLE was specifically conceived to support governance transformations that address the "intractable" hazards and risk underpinning water quality. Here we view intractable hazards and risks to be both *overdetermined* and *irreducibly uncertain*. Overdetermined problems are differentiated from "normal" risks when an explanatory relationship can be established between cause and effect. In contrast, over-determined problems are defined by non-linear relationships in which causes are causative but not explanatory (e.g. Powell and Jiggins 2003). Irreducible uncertainty arises when there are contested versions of the "public good(s)" i.e. water. Under such conditions prescriptive approaches, shaped by pre-existing norms and structures to bring about change, have proven dysfunctional.

3.1 Social Learning as a Post-Normal Governance Instrument

Despite the intractable nature character of water resources, they have conventionally been managed with two underlying approaches in mind (Figure 3). One, where the basin is understood primarily as just a bio-physical system and hence problems are addressed through "instrumental" interventions such as water engineering or bio-monitoring in isolation from their social context and secondly; the "strategic" interventionist approach, which is applied when a change in behaviour (selfish behaviour) of stakeholders is required. This intervention is typically manifested as fiscal policies and regulatory measures. Institutions charged with implementing water resource management tend to be staffed by people from the technical school such as hydrologists, water engineers, drainage specialists, etc. and/or economists. Hence the indicators used to operationalise the regulatory framework setup to foster "sustainable water management" are often measures such as "cubic metres per second", or "levels of nitrates in milligram per liter", etc. Coupled with this is the fact that many economists use normative models in which the notion of rational behaviour shapes the form and function of regulatory measures. Thus, the mandate of these institutions, and indeed the policy climate in general, tends to be strictly governed by the "state of the water and water resources" and

[3] MIRACLE Deliverable 5.1 "Report on surfacing issues from the perspective of stakeholders and understanding measures to address those issues"

how optimal rational behaviour can be fostered, rather than the messy stakeholder processes that actually determine what happens on the ground (SLIM 2004).

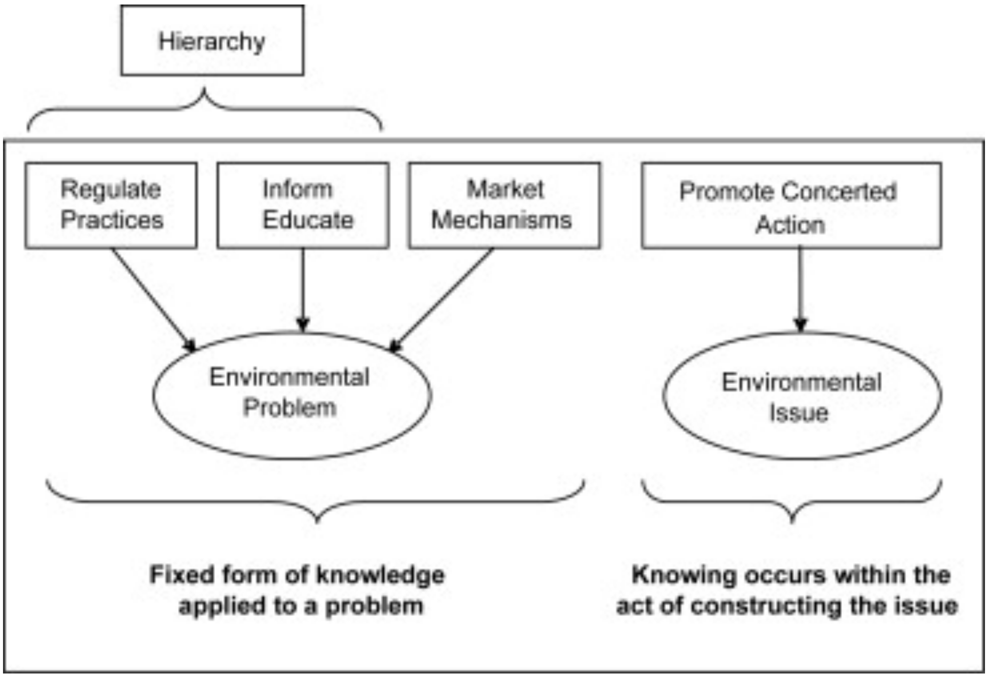

Figure 3. Conventional prescriptive policy instruments (part 1) vs social learning as alternative mode to foster adaptive and systemic governance (Ison et. al. 2007)

The interactionist approach is a response to the frequent failure of instrumental and strategic reasoning in leading to the sustainable management of water resources. In this approach, appropriate actions emerge out as *interactions* (sharing problem definitions and monitoring, negotiation, conflict resolution, learning, agreement, concerted action) between multiple, inter-dependent stakeholders at different management scales within the basin. Underlying the interactionist reasoning is communicative processes characterised by dialogues. In line with this thinking, sustainable action at different scales is seen to occur when communication recurs in multiple feedback loops to produce a shared system of beliefs, explanations and values. This common context of meaning (platform) is fostered by ongoing dialogue and learning considered fundamental to the collective action. This process has been coined as social learning. Supporting these platforms are partnerships which are forged at different scales - area, country and region - and cross-sectoral and between different constellations of stakeholders.

3.2 The role of the researcher in applied and or policy orientated research

Figure 4 depicts an action learning process, a process that serves as the foundation for action research. Here, action research is about “learning by doing”. By specifically designing a change process in a series of iterative cycles - plan, act, observe and reflect - the action researcher is engaged in an ongoing process of formulation, reformulation and problem understanding. Within this approach, the action researcher takes on the role as both an observer and a participant, and in so doing, becomes an explicit “agent of change”. In contrast, conventional research bases its understanding and/or explanation of a problem by situating the researcher as an objective “observer” of the agents of change.

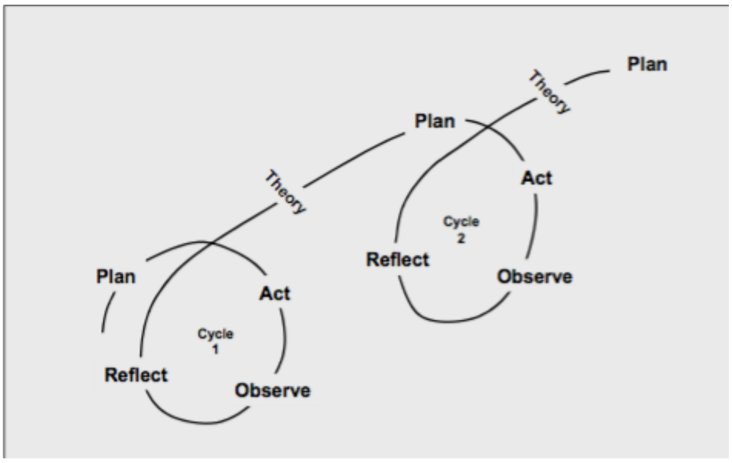

Figure 4. Iterative learning cycles. Adapted from Kolb (1984) and King (2000).

In critiquing the evolution of action research, Ison and Russel (2000) make a distinction between *first order* and *second order* change. In so doing they write in first person as action researchers:

> “Am I apart from the universe? That is whenever I look, am I looking through a peephole upon an unfolding universe (first-order tradition). Or: Am I part of the universe? That is whenever I act, I am changing myself and the universe as well (second-order tradition).”

What Ison and Russell allude to by making this distinction is a means for evaluating the “relevance of change” triggered by action learning. Although action research, by design, leads to change; the nature of change is ‘more of the same’, the type of changes that may eventually emerge after a conventional research process. Change shaped by an outside expert’s perception of the problem.

The second-order tradition diverges from conventional action research and is referred to either as systemic action research (SAR) or participatory action research (PAR). In action research it is common practice for those subjects who are part of the problem to participate in the plan, act and observe parts of the action learning cycle but to never be part of the reflection, for example in farmer field trials. To do so would undermine the positivist rigor of the research. Mutual reflection with those who are part of the problem, the clients of research, distinguishes the second order tradition from the first. In so doing, problems are no longer viewed as objectively knowable, but rather social constructions dependent on those perceiving the problems. A problem cannot be explained; it can only be better understood, through better understanding the problem from the perspectives of others. The action researcher is demoted to one – of a community of co-researchers – that is those who are part of the problem. Hence in theory, action research conducted in line with the second-order tradition, will lead to a change that is more aligned to the client’s perception of the problem.

Within the positivist research tradition, it is easy to shrug off the scrutiny prompted by questions of participation, democracy or ethics. It is part and parcel of the epistemology to assume an objective position, to do otherwise would be unscientific. In the first-order tradition, the reflection phase is the exclusive territory of the researcher; the reflection that will later lead to theory building or models to ultimately support recommended actions, measures or governance innovations. In the second-order tradition, the reflection phase is co-reflective with those who conceived and formulated the problem. To be reflective in an inter-subjective sense, as the second order tradition suggests, calls for a research process design that nurtures dialogue and learning between stakeholders and researchers. Hence the second-order tradition will, by its very nature, lead to the plurality that calls for more critical collaborative processes and equity.

Implicit within positivist science's quest for objectivity, is the requirement of acquiring knowledge by rigorous means. Experimentation is considered to be the foundation of rigorous enquiry on the assumption that there is a real world, a world which can be known through testing. Experimentation is seen as the principal means of generating knowledge that has integrity, knowledge that can be reproduced under similar conditions through time. The production of reproducible knowledge involves observing the rules of experimentation, such as implementing an identical methodology under identical conditions on repeated occasions to demonstrate that the same outcome emerges each time. Reproducibility in this sense can be equated to truth and objectivity.

Positivism has been questioned as a sufficient basis for the knowledge with respect to the indeterminate factors that ultimately colour a scientist's interpretation. According to Abram (1996:30), despite science's quest to be objective, the subjective/objective dichotomy is a meaningless divide as even the most supposedly determinate of experimentation cannot produce "value free" results owing to the inevitably production of indeterminate processes behind the actual act of experimentation. Phenomenologists for over 50 years have also been questioning objective science. According to Merleau-Ponty (1962:7-9), a French phenomenologist, "all his knowledge of the world, even his scientific knowledge is gained from his own particular point of view". According to the latter view, every individual interpretation is the result of a range of subjective experience. It was this observation that left a vacuum, in the understanding of the foundations of knowledge, a vacuum that came to be filled by the concept of inter-subjectivity.

Abram (1996:37) describes inter-subjectivity as "multiple subjectivities". If several subjects each endowed with their range of interpretative filters, arrive at a similar interpretation of a particular phenomenon or problem, then the interpretation should be legitimate in the eyes of the larger community. In fact, the quest for greater consensus amongst a multiplicity of subjects is what Husserl (1989:421) considers as real objectivity.

In this sense Social learning may be seen as a process that fosters inter-subjectivity, and that can deliver both the rigor demanded by the scientific, development and policy communities.

4 ISSUE FRAMING AND INTRACTABLE SITUATIONS

4.1 The Wickedness of the MIRACLE's Case Study Basins

Water resource issues, like many other global challenges, is characterized by complexity, uncertainty and high decision stakes (see e.g. Funtowicz and Ravetz 1993). They are nested in complex systems that are dynamic and exhibit non-linear properties, as demonstrated by the extremes of droughts and floods. Similarly, issues in water resource contexts are often systemic, reflecting broader system contexts and complex interdependencies between the biophysical and socio-economic domains. Interdependency compounds and moves problems between: upstream and downstream, green and blue waters, sectors, gender, class, ethnicity, nationality, etc.

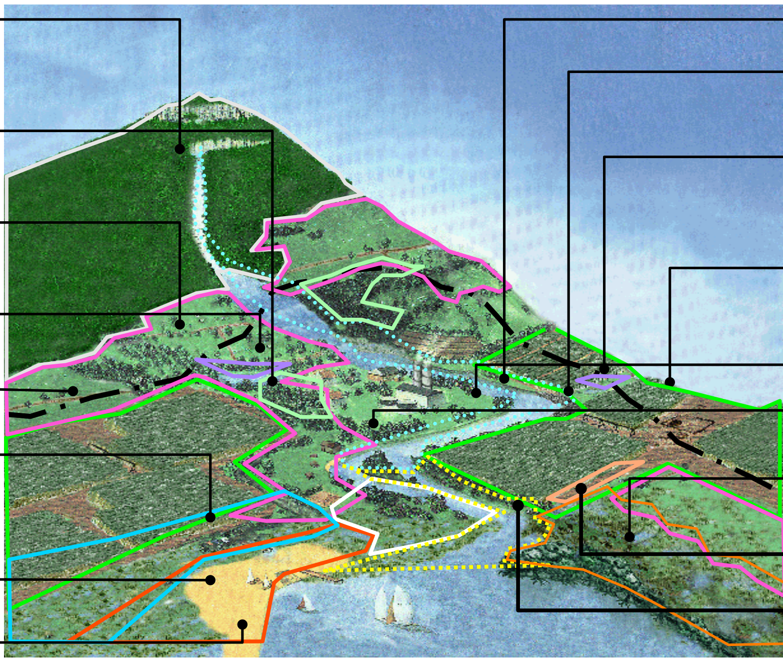

Figure 5. "Multiple Issues, conflicting interests and actions"- Rich pictures emerging from issue framing depicting overlapping conflicting systems of interest, which in turn lead to multiple representations of what constitutes good water status. Black text represents problem definitions from stakeholders, red text represents policies and green text represents desired status of the basin. Source: Adapted from Jenny Bellamy.

During the first phase of MIRACLE, various problem definitions connected to different stakeholders in the four case areas were identified that were indicative of these complex interdependencies (Figure 5). As shown in Osbeck et al. (2016), these problem definitions illustrate the complexities and interdependencies between the biophysical and socio-economic domains. For example, in the Helge river in Sweden, the issue of extensive historical drainage for agricultural purposes and establishment of dikes to enable effective drainage in the productive forest sector, which currently covers almost 70% of the land use in the catchment, are all linked to the systemic issue of brownification. The historical legacy of an intensive forest and agricultural production is partly responsible for degrading the ecological status of the river basin, which has led to disputes with emerging sectors such as tourism. The low water retention capacity of forest land, in turn, has led to intensified flows downstream in agricultural areas leading to flooding and intensive nutrient leaching. Moreover, in the Berze river, the systemic issue of functional diversity is connected to problems with excessive nutrient loading to surface waters from agricultural activities, from rural households, municipal wastewater treatment facilities and storm water discharges. In Reda on the other hand, where flooding was identified as the systemic issue, the problem of lack of sufficient control over the investments in flood vulnerable areas were discussed. Finally, in Selke river biodiversity was identified as the systemic issue and nutrient enrichment was perceived to lead to conflicts between agricultural interests and environmental/ecological interests.

All of the above lead to widely differing accounts of what can or should be done to improve the problem contexts. These contexts, in which multiple stakeholders with different interests make competing claims over the same resources, lead to controversy.

4.2 Changing water regimes: emerging insights from MIRACLE's case studies

The absence of systemic management practices has led to a detrimental impact on water quality in the four MIRACLE case areas. In recognition of the complex aquatic and terrestrial ecosystem interactions in the four catchments included in the project the experience of effective measures to prevent and control eutrophication have had mixed results.

The trend to address depleting water resources in the case areas have mainly been characterized by a combination of rules and regulations focusing on targeting management practices and the market. These types of problem defined processes have often focused on causal relationships linking farming practices and nutrient loads. As a result, measures have often been identified based on a sectoral manner without consideration of the basin as a whole. The sectoral approach to address water quality and quantity is shared between the four case areas and represents a major obstacle in the pursuit of appropriate measures to mitigate flood risk and reduce nutrient loads to the water.

The ability of stakeholders to participate in the design of RBMPs have had mixed results. For example, stakeholders engaged in the case area in Sweden shared concerns regarding the level of participation in the selection of measures. Representatives in the Water Board set up in the river basin as a result of the WFD were not actively involved in the design of the RBMP. In fact, the Water Board itself has an unclear mandate and lack both human and financial resources. When the MIRACLE staff presented the measures included in the RBMP for river Helge to members in the board at the first stakeholder meeting they reacted with surprise. The participants who represented forest, agriculture, environment sectors, including both public and private actors, agreed that the limited type of measures listed as planned and financed in the RBMP was of great concern and was different in comparison with the list of potential measures suggested by local representatives. In river Helge the list of approved and financed measures include three types of measures focused on adding lime (Figure 6). The list of suggested measures defined by local authorities include 46 different types of measures (Figure 7). This discrepancy is of great concern. In addition, the limited opportunity to engage and participate in the design of measures was expressed as a disappointment by members of the Water Board.

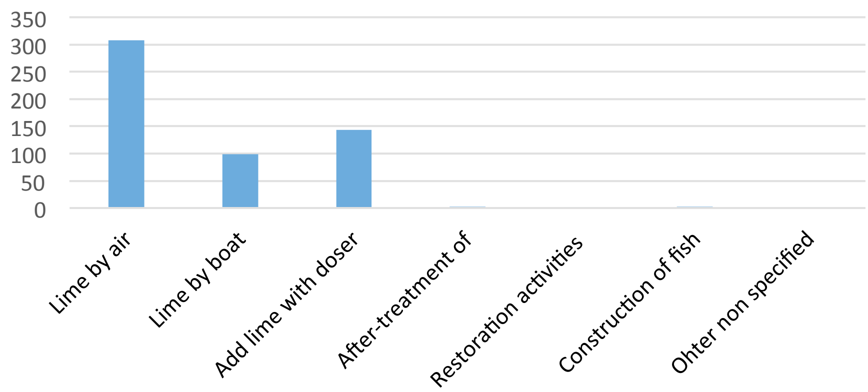

Figure 6. Approved and financed measures in RBMP for River Helge, Sweden. Source: Swedish water information system:VISS (2015).

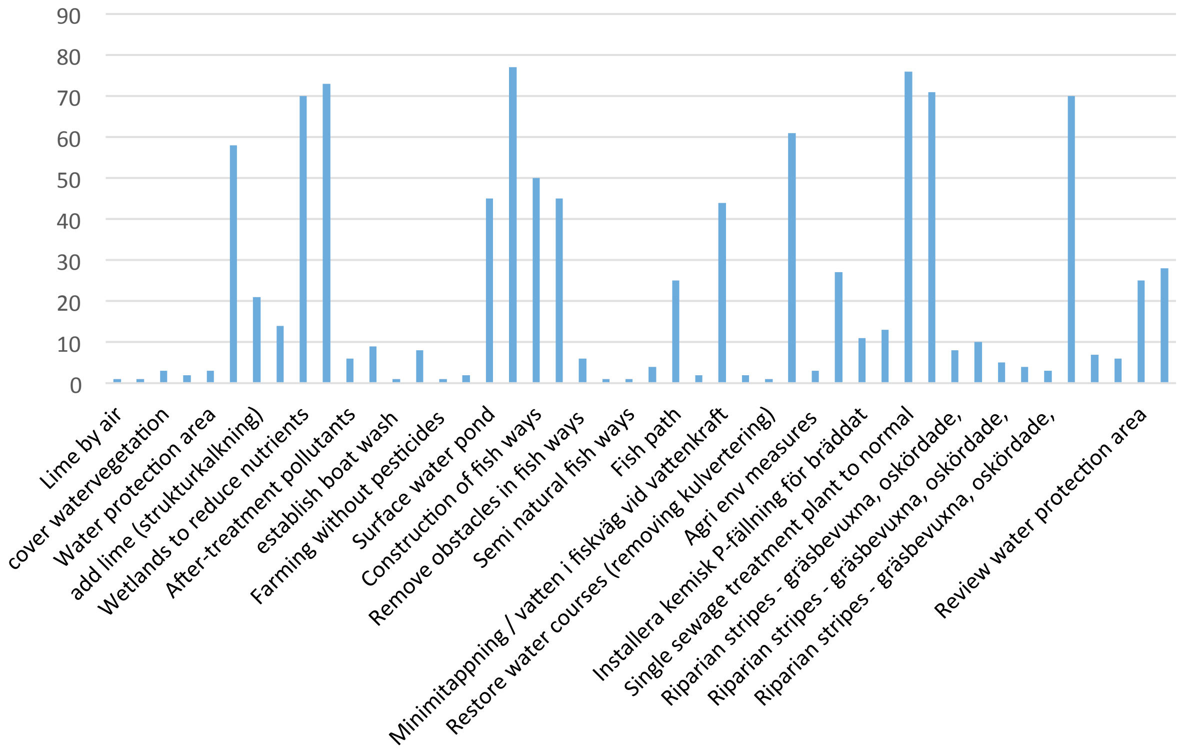

Figure 7. Suggested measures in RBMP for River Helge, Sweden. Source: Swedish water information system: VISS (2015); European Commission (2000)

Westberg and Powell (2014) undertook research to understand why collaborative approaches within environmental management have had limited traction. Interviews were undertaken in six Swedish County administrative boards (CABS), those organizations responsible for developing and implementing RBMPs. Their findings showed that collaborative approaches have a lower status than normal[4] scientific approaches. Furthermore, the skills considered important for implementing collaborative approaches were coded as feminine by the prevailing norms and structures within CABs. Hence collaborative approaches are not considered a core activity. This has led to the reproduction of prevailing inequities within CABs, whereby the pre-existing power-holders, male natural scientists, have retained the agency in terms of enacting high level policy actions, such RBMP. Their study points at the importance of position within institutional structures and how power can serve to distort deliberative processes. The findings of this study and a host of other studies in other contexts pertaining to the dialectic between power and participation find fertile ground in the lack of correspondence between the RDPs and the key problems stakeholders in MIRACLE's four cases studies. A result that appears to reflect a trend across Europe more generally is the persistence of the normative status quo (EEA 2012)

As a response to the messy situations that characterize nutrient governance, MIRACLE's entry point into intractable systems is to initiate a social learning process capable of fostering governance configurations that would better enable clients of good water status to better co-exist in these messy situations. This contrasts from the role of normal science in policy processes which lead to: *Prescriptive actions that serve to coerce clients into redefining their*

[4] Normal scientific traditions are seen here as those with expertise in the hard sciences and in particular engineering and hydrology

system of interest and thereby collectively act upon the basin in a way deemed optimal by the scientific expert and enacted by the command and control economy. Within the social learning approach fostered by MIRACLE: *clients are invited to reflect on how they could enhance their present livelihoods by adapting their practices to also address a basin level issue they hold in common with many other clients and indeed actors in the basin system*

From this point on in the project, the Systemic issues will serve as the common *contexts of meaning* (platforms) to:

Mediate critical reflection and co-deliberation
between clients, actors and MIRACLE researchers in order to
support a re-definition of the client's systems of interest to enable the
self-organization of transformations in practice and thereby leading to
new promising governance configurations[5] and
the re-definition of the actor's systems of interest

In the original MIRACLE proposal, flooding was considered as a relevant systemic issue that could have profound impact on diverse set of representations of good water status as reflected by the different constellation of clients in the system. Moreover, flooding, and indeed projections of its increase in frequency and intensity attributed to climate change, will make it increasingly difficult for the actors to meet their policy goals; and in particular the goals that underpin nutrient governance. However, findings from the issue framing by actors and clients in the respective case areas suggest that flooding can only serve as a systemic issue in the Reda Basin, and other systemic issues were deemed more relevant in the others (in Berze river it was *functional diversity*, in Helge river it was *brownification* and in the Selke river it was *biodiversity;* see Osbeck et al. 2016 for full account). This was a surprising result for the consortium as the case studies had been pre-selected on the basis that flooding was an important issue in the respective basins. It was an important finding and a reminder of the importance of context, and of local knowledge in driving change processes. Further, from a research perspective it presented MIRACLE with an opportunity to examine the mediating capacity of different types of systemic issues, thereby enhancing the overall intersubjective rigor of the findings.

5 FACILITATING AND TRACKING THE SOCIAL LEARNING PROCESS

In this section, we outline the approach for the facilitation of a social learning process in MIRACLE and explain the key elements of how a process of social learning will be facilitated to reach an improve understanding of and between different stakeholder groups, but also in terms of how we will use social learning to facilitate coordination between WPs in the project.

The social learning process is envisioned to be complemented by ongoing analyses of the roles and values of individual stakeholders and the power dynamics among stakeholders (Checkland and Scholes 1990). The social learning process embedded in the broader implementation of MIRACLE is depicted in Figure 8. The process, inspired by the soft system methodology (SSM),

[5] Researchers from the MIRACLE's policy WP will support critical reflection in interactions with stakehollder by supporting an examination of different eco-system service innovations from other contexts.

includes a series of stakeholder consultations, interactions, focus group discussions and workshops. Understanding and findings emerging from the stakeholder interactions will support the adaptation of the content addressed as part of the other WPs in the project.

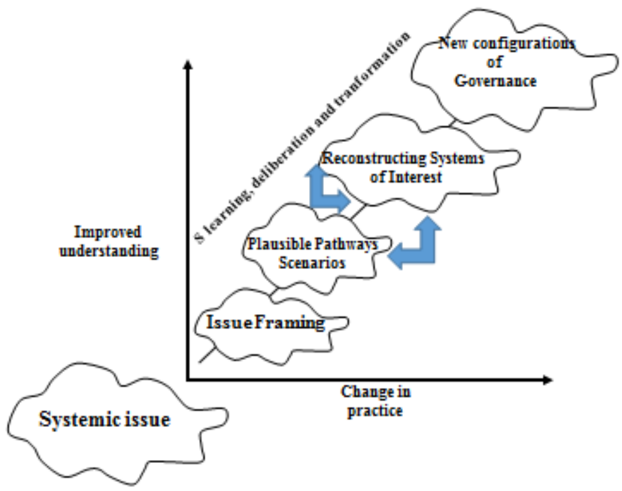

Figure 8. Process for a stakeholder driven implementation of MIRACLE in each case study area.

The description of the process above builds on the result of the first phase of the project (Osbeck et al. 2016), which describes the identification of a systemic issue in each of the four case areas. The chosen cases in the four countries are situated within contexts in which the historical legacy is characterized by conflicting interests in terms of the management, governance and use of water management, flood prevention measures and nutrient management. Using a systemic issue as an arena for the reconciliation of competing interests in the case study contexts will enable the project to develop a platform where (1) co-learning is possible which is grounded in practice or action, and (2) different interests can contest, deconstruct earlier, and reconstruct new common visions and plans (Powell and Toderi 2003).

In the series of stakeholder engagements and workshops (Figure 8) proposed as part of the MIRACLE project, stakeholders are provided with a platform to critically reflect upon the management, governance of nutrients and floods from both the stakeholder and the researcher's perspective. They are able to develop, contest, deconstruct, and reconstruct new common visions and plans through a phase of scenario development.

The legacy of interventions in the pilot site contexts has often been driven by single purpose definition whereby interactions across disciplines have been limited. The MIRACLE project allows researchers across disciplines to jointly explore issues defined by the stakeholders. The role of researchers is to both contribute with expert knowledge and facilitate learning processes that enable re-construction of systems of interests from the perspective of different stakeholders is envisioned to lead to the identification of new configurations of governance.

The documentation of the stakeholder interaction that led to the identification of a systemic issue in each case area demonstrates the relationships that need to be considered in trying to understand the context and defining the scope of work needed to improve the understanding. In MIRACLE the first phase of the stakeholder consultation illustrated the richness and complexity associated with nutrient and flood management and helped us as researchers to see relationships and connections that we might otherwise have missed.

Stating what the systemic issue is requires situational and problem analysis – comprehending the context of interests linked to different stakeholder groups. The initial stakeholder consultations were instrumental to develop the rich picture and define the systemic issue that guides the next steps in the stakeholder interactions. The adoption of the SSM assisted the exploration of different problem definitions to identify appropriate actions to address the systemic issue. Below (Figure 9) is a depiction of how that is facilitated as part of MIRACLE, based on the approach defined by Checkland (2000).

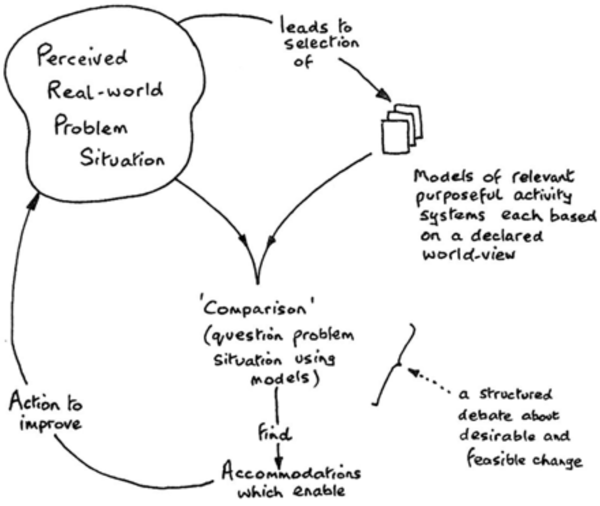

Figure 9. Facilitation of social learning processes through SSM. Source: Checkland (2000).

A key feature of SSM is to keep the project vague and wide for as long as possible – e.g. don't jump to conclusions, make assumptions, or ignore the current situation – by concentrating on idealized futures. Other aspects to take into consideration are that SSM is not a "how to build a system guidebook"; it is heuristic not algorithmic; how the problem is perceived will determine the nature of the solutions (Cordell 2008).

As described in Osbeck et al. (2016), the first project phase included the identification of key stakeholders in each of the four case areas in an identification process that considers a diverse set of interests including a consideration a gender, age and attachment to public, private and civil society sectors. This phase also included identification of the stakeholder associated problem definitions, based on this broader stakeholder definition which also captures the geographical scope of the basin. The systemic issue led to the identification of new stakeholders. In the case of Latvia and Sweden the hydropower sector has emerged as an important stakeholder to include in the social learning process. Another example is the tourism sector that has emerged as a key sector in Latvia, Sweden and Poland. In Sweden, the forest sector has been identified as one of the most important sectors in relation to the systemic issue of brownification.

Figure 8 depicts the second phase of stakeholder iterations where stakeholders have been invited to react, comment and discuss problem definitions linked to other stakeholders in the system. In MIRACLE that is referred to as the reconstructing systems of interest. In order to enable a reconstruction of interest the project had to deviate from the original plan to organize joint stakeholder workshops to allow for a flexible approach in terms of how the project facilitate stakeholder interactions. Targeted focus groups discussions were organized in the case areas to engage new emerging stakeholders, but also to enable reflections and discussions about specific problem definitions connected to the different stakeholder groups. In Sweden, the focus group discussion with the hydropower sector led to an improved understanding of the link between the systemic issue, i.e. brownification, and the hydropower plants operation. The process to facilitate a reconstruction of interests will include follow up discussions and meetings with the environmental sector on their associated complaints about hydropower. This process leads up to the third workshop, in which different stakeholder constellations will have an opportunity to develop a common plans/vision to support the adaptation of existing, and inclusion of new, practices within their respective systems of interest in order to reconcile the systemic issue.

5.1 Re-constructing systems of interest's

The stakeholder interactions are part of a novel conceptualization of change and social learning as an interactive re-construction of systems of interest's process. The workshops and focus group discussions are seen to be much more than a dissemination exercise that communicates project findings. Rather, they enable the co-production of questions and findings and joint learning and reflection about implications, lessons and future outlooks. This calls for highly interactive forms of knowledge generation where multiple stakeholders (including researchers) can engage in transdisciplinary joint knowledge production, dialogue and learning processes (see e.g. Hirsch Hadorn et al. 2008). Scientific research within the framework of the MIRACLE project has a critical role to play in generating scientific understanding, but researchers will also have to actively engage in interactive learning processes whereby their own and others' knowledge can be put to effective use and thereby support the work of the governance practitioners and other change agents. The learning process involves face to face interactions in stakeholder meetings and the use of an interactive tool to visualize scientific results.

5.1.1 An interpretative Framework to Understand the Role of Social Learning

Hurst (2002) writes that on the learning loop a manager, or in our project the case study facilitator, is analogous to a gardener: the gardener cannot make the plants grow, he or she can only create the optimum conditions under which a plants natural self-organising tendencies can function. Hurst and others in many branches and contexts have begun to adopt and adapt the earlier discussed Holling (1973) renewal cycle as a model to manage change for self-organisation in different systems. In its original form, the renewal cycle is depicted as a system having four different states, which it continuously moves between in order to retain the systemic flexibility, and plasticity, required to self-organise.

A forest system is often used as a simple metaphor to better understand how the different renewal phases operate. The conservation phase depicts the forest successions and the point of conservation when the forest reaches its climax (top right hand corner of Figure 10). In contrast to the conventional understanding of forest dynamics, the renewal model suggests that the system resilience is undermined if the forest remains in the conservation phase too long. Hence a creative disturbance (D in Figure 10) or *release* is needed to shift the forest from its climax state. Those subscribing to the renewal model argue that a system needs to regularly cycle between these different phases in order to retain its capacity to self-organise. Figure 10 depicts a learning system situated within a renewal cycle. This model can be operationalised in order to critically reflect upon learning systems, and their capacity to self-organise through social learning.

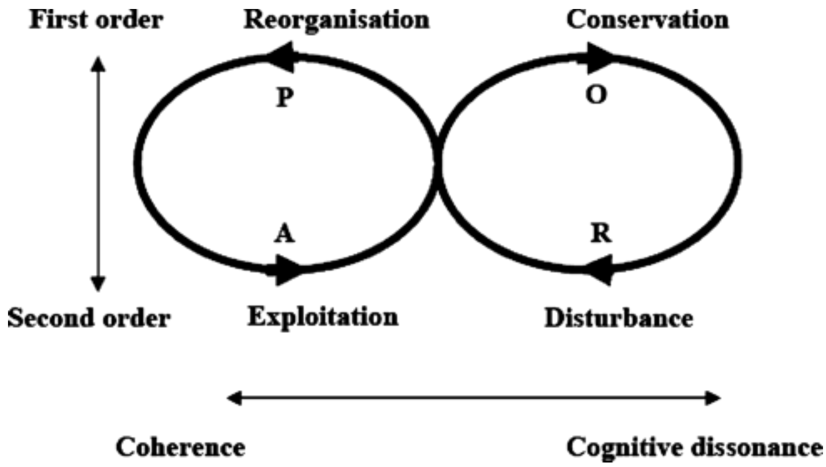

Figure 10. A renewal mode and action learning cycle, used to critically reflect upon the relevance of using scientific data operationalised through techno-dialogical tools to support a social learning process (Powell and Toderi 2003 and adapted again by Toderi et. al. 2007)

By way of brief introduction to the model, although the four phases of renewal C, D, R, and E are relevant to a learning system, action has been chosen as the organising principle of renewal for self-organisation. Indeed, Hurst (2002) aptly reflects that *action creates the context for action*. The four phases of an action learning cycle have been superimposed upon the renewal model as represented by observe, reflect, plan and act. Two additional interpretative dimensions have been included in the model. The first is connected to an earlier discussion about the nature of change triggered by first and second order processes; whereby the first order tradition is controlled by outside expert's perception of problems, and problems are articulated with the support of first order data. This is in contrast to second order tradition, where a change is self-organised through inter-subjective processes.

Finally, the model enables reflection over the level of coherence in perspective between the stakeholders (clients and actors) at different points in the process, in this case the stakeholder meetings. Figure 11 below below depicts the multiple iterations of interactions with actors leading up to a combined meeting with actor and clients. This is an example of how the social learning process and is designed and recorded in stakeholder meetings.

A series of bilateral stakeholder interactions have begun in the case areas. They have been set up in a way coherent with the approach described above to support the transformation towards identifying new and adapted practices and actions that could lead to an enhancement of their respective livelihoods and the reconciliation of the common systemic issue. Participants of these meeting are being offered findings from other bilateral meeting with clients in the case context to increase their awareness of how the livelihoods of other clients are impacted upon by the systemic issue and indeed their own actions. Introducing this cognizance into their reflection cycles was intended to minimize the mal-adaptions, and mal-practices (practices and actions that lead to unintended negative consequences on other clients). The *Robbing Peter to Pay Paul Framework* (RP3) will be used as a norm critical heuristic device to foster reflection upon the systemic consequences linked to implementing different actions.

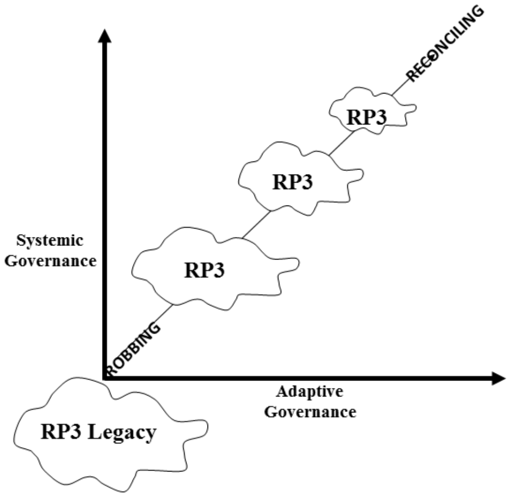

Figure 111. The transformation of a water dilemma from a condition of robbing to reconciling, whereby systemic governance fosters an understanding and societal awareness of different interests and positions. Adaptive governance in turn is the governance praxis underpinned by systemic awareness, a praxis embodied with the adaptive capacity to navigate mess and uncertainty without reproducing inequities and risks.

The origins of the idiom that underpins RP3 can be traced back to the period before the reformation and it refers to the dilemma faced by the Catholic Church during the 16th century. As the church of St Paul grew stronger in England it demanded taxes from its English constituency, the same taxes that were previously paid to the church of St Peter in Rome. Hence the notion of RP3 and thus its use thereafter as a verb: *to take away from or cause harm to one person in order to pay or confer something on another; to discharge one debt by incurring another (Oxford dictionary).* The harm inflicted or debt incurred can, for the purposes of MIRACLE, be interpreted to be either linked to an interest in a material asset/condition *or* to claims as to who has agency in the enactment of governance of good water status (i.e. clarifying that water dilemmas must be viewed with attention to its qualities as an *interest dilemma* as well as a *position dilemma*) (Table 1).

Table 1. The RP3S idiom (Powell et al. 2016).

Category of the idiom	**Interest dilemma**	**Position dilemma**
Robbing ***(R):***	The water measure/action/policy under scrutiny	
Peter ***(P¹):***	*The victims*; those whose interests are compromised	*The disempowered*; those whose agency is being constrained
To pay ***(P²):***	*The entitlement;* those harms/gains emerging from complying to the governance action, transferring material value from one system of interest to another	*The claim;* those discourses/ framings that determines – through institutionalization and enactment – who has legitimacy/authority to exert agency and (re)construct the dilemma
Paul ***(P³):***	*The beneficiaries*, those whose interests are being served	*The empowered*; those who experience a gain in agency

*The situation under review (**S**): The environment that is shaping the operationalization of the practice or governance action*

1. *The existing framing of nutrient governance*
2. *The institutional environment*
3. *The governance praxis*

5.2 Reconstructing systems of interests and social learning

A key insight emerging from the first phase of stakeholder consultation in MIRACLE supports the idea that using the systemic issue as an arena for reconciliation of competing interests in the case areas enables the project to develop a platform where (1) co-learning is possible which is grounded in practice or action, and (2) different interests can contest, deconstruct earlier, and reconstruct new common visions and plans (Powell and Toderi 2003).

In positivist research, agriculture and environment are often presented as sectors associated with conflicts. The social learning process in MIRACLE demonstrates the overlapping system boundaries between different stakeholders. The systemic issue is an important indicator of the potential multiple benefits connected to actions aimed to improve nutrient management and reduce flood risk. By exposing stakeholders with specific problem definitions connected to other stakeholders in the system, the social learning process has opened up for reflections beyond the system boundary of different stakeholders. In fact, the deliberations and reflections encouraged by the active interaction in the project have already begun to redefine systems of interests connected to different stakeholders. Moreover, it has allowed for broader stakeholder reflections on appropriate actions needed to accommodate change. It is envisioned that the theoretical framework presented in this report will contribute to the analysis of processes and information generated in the MIRACLE social learning process.

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