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COMPANION MODELLING WITHIN THE PROJECT “A STAKEHOLDER DRIVEN PROCESS TO DEVELOP A CATCHMENT MANAGEMENT PLAN FOR THE KAT RIVER VALLEY”

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Terminology and Acronyms

AWARE	Action research and Watershed Analyses for Resource and Economic Sustainability
CMP	Catchment Management Plan
ComMod	Companion Modelling
DWAF	Department of Water Affairs and Forestry of SA
KRWUA	Kat River Water Users Association
MAS	Multi-Agent System
RPG	Role-Playing Game
WRC	Water Research Commission
WUA	Water Users Association

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1. INTRODUCTION

The main objective of the project “A Stakeholder driven process to develop a Catchment Management Plan (CMP) for the Kat River Valley” (the Kat Project hereafter) was to assist the Kat River Water Users Association (KRWUA) in the development of a CMP in which water is allocated and provided to the various users for the present and future requirements of these users and the Reserve (O’Keefe et al., 2004). An important aspect in the development of a CMP is represented by the negotiation and common decision-making process that must take place among the different water users nominated in the KRWUA board.

In response to the development of AWARE (Farolfi and Hassan, 2004), a simulation model and water management support tool, representatives of the Kat Project, based at Rhodes University, contacted in July 2003 the developers at Cirad¹ and Ceepa² at University of Pretoria. AWARE (Action research and Watershed Analyses for Resource and Economic sustainability) is a simulation tool specifically designed for modelling system dynamics of catchment level water management. The model evaluates alternative action scenarios representing potential water management strategies for economic efficiency, environmental sustainability, and social desirability. The core emphasis of simulated water strategies is on allocation of priorities among competing groups of water users.

Originally it was planned to simply calibrate the existing model, AWARE, to the Kat River Valley situation, and to use the resulting scenarios as the basis for discussion and negotiation within the KRWUA. However, in the beginning of the Kat Project and after one trip to Grahamstown and the Kat River Valley by a Cirad researcher, it was agreed by the project coordinators that instead of adapting the existing AWARE model to the Kat reality, a radically new model should be constructed, developed within the Companion Modelling (ComMod) process.

ComMod is a process where “modelling deals with the dialectic among the researcher, the model and the field. Simulation accompanies an iterative research process, which

¹ Cirad is the French Agricultural Research Centre for International Development.

² Ceepa is the Centre for Environmental Economics and Policy in Africa.

is specific to each situation. The endless following cycle ‘field work- modelling - simulation - field work again, etc.’ corresponds to this concept. This leads to the acceptance of a diversity of models and methods, each contributing to a new kind of relationship between the simulation, the research itinerary, and the decision-making process” (ComMod Group, 2003, 4.1).

Another important characteristic of ComMod is the joint use of Role-Playing Games (RPG) and models, particularly Multi-Agent Systems (MAS). “The association of an RPG with a MAS ... seems to provide a good way to explain the content of a model in order to validate it and to communicate upon its basis” (Barreteau et al., 2001, 5.9). Following the ComMod methodology, a MAS (KatAWARE) and a related RPG were developed to contribute to the process of building the capacity of stakeholders to actively participate in designing a platform and context for their negotiation process and to select decision-making criteria for their catchment (Farolfi and Rowntree, 2005).

After having briefly presented the composition of the team involved in this action research process (2), the text that follows summarizes the ComMod process in the Kat (3) referring to the reports that explain each step and used tools in details. A discussion on the successes and shortcomings of the ComMod process in the Kat is then proposed (4) and final remarks and suggestions for the possible future adoption of this research methodology in the South African context are provided (5).

2. THE RESEARCH TEAM

To conduct the ComMod process in the Kat River Valley, a task force composed of two Cirad researchers (Modelling team) and two Rhodes researchers (Social team) was formed. A South African MSc student was involved full-time in the process, a French MSc student worked on the modelling component during six months, whereas several South African and international students contributed to the facilitation and data-collection tasks during their internships at Rhodes University. A South African facilitator-translator was also part of the team.

3. THE PROCESS³

In *October 2004* the first workshop with the KRWUA was held in Fort Beaufort with the aim of presenting the ComMod approach to the local stakeholders and establishing their buy-in for the process, and opinions on it. Several surveys were then conducted from November 2004 in the Kat River Valley in order to collect information and data to construct a first prototype Multi-Agent Model called KatAWARE (Farolfi and Jacobs, 2005; Farolfi and Abrams, 2005).

The KatAWARE prototype (Farolfi and Bonté, 2005) was developed on the basis of secondary and primary data, individual surveys and interviews with local stakeholders, discussions with, and inputs from, the Social team at Rhodes University. The prototype was presented and discussed during a workshop held in Fort Beaufort in *June 2005* (Burt et al, 2005a) during which the stakeholders appeared to reach a consensus on the validity of the representation of water flows, water uses and current allocations in their catchment. During the workshop, local stakeholders raised several doubts and criticisms on specific issues of the model and its outcomes. From these comments and criticisms a new version (V1) of the KatAware model was developed (Farolfi-Bonté, 2006) and later presented to the stakeholders at another workshop held in *September 2005* (Burt et al., 2005b).

This new version of the model was much more precise in terms of hydrology, spatial distribution of water users and their characteristics, management of the Kat River Dam and private water stock facilities. During the September 2005 workshop, KRWUA members began to construct water allocation scenarios using KatAWARE, and then later discussed these scenarios in groups.

Concurrent with the development of the model, was the development of a Role-Playing Game (RPG) (Farolfi, 2006). The RPG was based on the same conceptual model backing KatAWARE V1, but in order to make it playable, the reality was “reduced” to three sub catchments, roughly corresponding to the three voting areas of the Kat River Valley (upper, middle and lower Kat). The number of players

³ A synthetic scheme representing the chronological sequence of the ComMod workshops involving the KRWUA is illustrated in table 3.1.

corresponded to the number of KRWUA members that usually attended the WUA meetings (an ave. of 8). This resulted in a RPG playfield composed of: three sub-catchments each one with different rainfall, two smallholding irrigation schemes (in the upper Kat), three large-scale citrus farms (two in the middle Kat and one in the lower Kat), three villages (one in each sub-catchment) and a dam in the upper Kat.

The game was played for the first time in *November 2005*, and based on players suggestions was revised and re-tested in *March 2006* (Fox et al., 2005 and 2006). The main objectives of the game were: a) to facilitate the understanding of the KatAWARE model from which the RPG was derived; and b) to provide researchers with further information on stakeholders' individual and collective strategies regarding water use and water management in the catchment. Information gathered from the observation of players' behaviour and the strategies they adopted during the two RPG sessions further enabled researchers to improve KatAWARE V1 - particularly in terms of agents' behaviour.

The new version of KatAWARE (V2) consisted of two new improvements, based on the gathered information and stakeholder responses:

- Specification of the agents' individual strategies;
- A simplified spatial representation, similar to the RPG.

Version 2 (V2) was supposed to be implemented in a new multi-agent platform called "Mimosa" (Müller 2004, Müller & al. 2005), which was being developed by a researcher of the Cirad team concurrently to the development of KatAWARE. However, "Mimosa" was only operational in 2007, too late to cope with the deadlines of the Kat Project that expected V2 to be ready by end 2006. In addition, no modeller from the modelling team was available or able to implement V2 in another multi-agent platform. Consequently, V2 remained a conceptual model, and the last 2 workshops with the KRWUA were conducted using a slightly modified version of V1.

The first workshop to discuss scenarios produced by the KatAWARE model after the RPG sessions took place in Fort Beaufort in *October 2006*. It was attended by several WUA members, a DWAF representative, a representative of the Nkonkobe Municipality, the Research Team from Rhodes University and the Cirad modellers

(Farolfi, 2007a). The relatively good participation and enthusiasm shown by local stakeholders during the two RPG sessions allowed a certain optimism in the researchers with respect to the capacity of the KRWUA to interpret scenarios and figures produced by the KatAWARE model and to discuss them as a basis for the development of the CMP. Consequently, the model was used “live” within the workshop: simulations were run and scenarios were produced directly out of the computer during the session attended by the local stakeholders. However, the model proved to be still too complex and the figures and charts produced during the workshop too abstract to allow real participation and negotiation on alternative strategies of water allocation by all participants (Brown, 2007).

The Social team conducted some separate workshops in *February 2007* (vision workshops in table 1) with different groups of water users in order to reach a limited number of alternative scenarios agreed by them. Four scenarios (including the status quo) emerged from these workshops and were then elaborated by the Cirad team using KatAWARE in terms of socio-economic and environmental outcomes. The figures produced by the model were then re-elaborated by the Rhodes researchers and presented in a more user-friendly way to the KRWUA during a 2-day workshop held in Fort Beaufort in *March 2007* (Burt et al, 2007).

During this workshop, the KRWUA members worked in two groups and reached a general consensus on a scenario that increases moderately the irrigated hectares in all three sub-catchments (up to 800 Ha the upper Kat (50% citrus and 50% annual crops); up to 650 Ha the middle and lower Kat (90% citrus and 10% annual crops)). Those users previously scheduled under the old water act (Act 56, 1954), raised the issue of whether or not lower Kat farmers, who were not previously scheduled and therefore, did not contribute to the maintenance of the dam, or restricted in their growth, should now be given the same assurance of supply as those who did pay and were restricted by their scheduling commitments. Another proposal set forth the suggestion of getting a hydrological model developed, in order to provide citrus producers of the middle and lower Kat with information on dam operation scenarios, relative to water availability and varying levels of assurance, to investigate the implications to both previously scheduled and previously nonscheduled users.

These proposals from the KRWUA have been included in the first draft of the CMP produced by the Rhodes team and that will be discussed in a final project workshop with the KRWUA.

Table 3.1 Sequence of ComMod Workshops in the Kat

Date	October 2004	May 2005	June 2005	September 2005	November 2005	March 2006	October 2006	February 2007	March 2007
Event	Introductory workshop	Preparatory workshops with different WUA groups	KatAware Prototype Model Workshop	KatAware Version 1 Model Workshop	RPG Session 1	RPG Session 2	Scenarios Workshop 1	Vision Workshops	Scenarios Workshop 2
Participants	ST, WUA, MT	ST, WUA	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT	ST, WUA, MT

ST = Social Team; WUA=Water Users Association; MT=Modelling Team

4. DISCUSSION

The ComMod experience in the Kat River Valley was an attempt to support the local WUA in developing those negotiation and decision-making skills that are needed in order to develop a CMP. The main objectives of the ComMod process are (ComMod Group, 2003): **a**) producing knowledge (for the researcher and for the local stakeholders) in terms of an improved comprehension of system interactions; and **b**) supporting the negotiation process that aims at modifying the interactions with the resource (water here) as well as among socio-economic entities. The process uses modelling and simulation tools to build-up a common representation of the studied system, understand its dynamics, and provide a support for the analysis of scenarios. It seems useful at this stage to discuss how these objectives were matched (or not) through the adoption of the ComMod approach in the Kat. ComMod supposes finally a positioning of the researcher in the process, which is also important to discuss in the Kat case.

4.1. Producing Knowledge about a Complex System

A river basin is certainly a complex system made, among others, of hydrological, social, ecological, cultural, and economic components, all interrelated. The system is dynamic and, therefore, subject to changes overtime. Every group of water users in the basin has a different perception of this complexity and interacts with water in a different way. Furthermore, every user has a different knowledge regarding the hydrological and ecological functioning of the catchment due to his/her experiences and educational level.

The different phases of construction of the KatAWARE model (prototype and V1) and its discussion with the KRWUA offered stakeholders, working as a group, an opportunity to confront the complexity of their system through a simulated representation. This opportunity provided a common platform to learn and adjust the model based on their local knowledge of the system. The passage from the prototype of KatAware to V1 and then the sessions of the derived RPG were a sort of co-construction of knowledge, as it happened through the (uneven) contribution of all

participants⁴. This uneven participation by different groups of stakeholders will be discussed in the following paragraph.

Stakeholders appeared to grasp well certain components of the system, such as the spatial distribution of users and their different influence on the system (upstream-downstream effect); the dynamic and seasonal cycles that characterize water availability and use; the quantitative representation of water consumption (and the relative weights of various groups of users in the catchment); the importance of storage facilities and their use (both the Kat River Dam and the private weirs).

A more in depth study aimed at gauging to what extent and how collective learning took place, during the ComMod process in the Kat, is currently underway (Gumede, 2007 forthcoming). In addition, an evaluation of the ComMod process's effects on local stakeholders was conducted in 2006-07 and the results will be published by the end of 2007. Nevertheless, surveys and partial evaluations conducted so far (Burt et al., 2005 a and b; Fox et al., 2005 and 2006; Brown, 2007) indicate that common learning did take place, but for the mentioned reasons and socio-cultural dynamics of the post-apartheid South Africa, this common learning was uneven and took place at a different speeds among the various groups of stakeholders.

4.2. Accompanying a Common Decision-Making Process

The objective of ComMod in the Kat River Valley went beyond the sole purpose of producing common knowledge: it more explicitly sought to support the local WUA in their negotiation and decision-making process for the generation of a CMP. This objective could be considered as a continuation of the previous phase of collective learning. The companion process is positioned upstream of the technical decision

⁴ The deep differences existing among various groups of stakeholders in the same catchment are a peculiar characteristic of South Africa. The recent history of segregation has left a heavy legacy consisting of neighbouring areas characterized by very different levels of socio-economic development, infrastructure, educational levels, etc. The Kat River Valley is not an exception, as up to 1994 the upper Kat and a portion of the Middle Kat were part of the Ciskei Homeland, whereas the remaining section of the Middle Kat and the Lower Kat were included in the Republic of South Africa. The KRWUA represents today all main groups of stakeholders in the Kat (small scale farmers, large scale farmers, domestic users and the Municipality), but clearly some stakeholders enjoy better socio-economic conditions and higher educational levels, which provide them a great advantage in terms of skills required for participation and contribution to the collective learning process.

(preparation of the CMP) and provides the stakeholders with some possible (alternative) roads to engage a social process of matching the identified problem (water allocation among multiple users to foster socio-economic development and preserve the environment) to system variables.

In the Kat, this companion phase passed through three sub-phases: communication, interpretation and analysis of scenarios, and selection of scenarios.

4.2.1. Communication among Stakeholders

During the first workshops dedicated to the construction and discussion of the KatAWARE model, only a few members of the WUA, and always the same, felt free to speak. Most participants kept silent either because they did not grasp the complex and sometimes abstract nature of the model or because they did not “dare” to contradict or even comment on the opinions of other participants. Also when split in smaller groups, some “leaders” conducted the discussions and left no or few space for the others. There was, therefore, little communication during the construction phase of the model.

Conversely, the two sessions of the RPG allowed discussions and exchange of viewpoints among all players, even if the classical social pattern characterized by some stakeholders having a “dominant” position and, therefore, trying to monopolize the discussions emerged clearly during the RPG sessions. During the simulated WUA meetings to allocate the water from the dam, every player was allowed to express his/her needs and propose a strategy that had to be considered for the annual water allocation by the WUA. There was, therefore, a turning point in terms of communication among stakeholders between the construction of the model and playing of the RPG.

The RPG sessions offered a platform for confrontation of strategies and needs; stimulated discussions about the individual/collective interests; and, likely, facilitated the comprehension of several aspects of the system to those participants who only marginally understood it during the construction phase of the model. This observation forces researchers to consider the actual success of the learning process in the construction of the model. If only a few participants really understood the model

before the RPG, then it is likely that the final version of the model is based only on the consensus and input of the more dominant members of the WUA. Additionally, the functioning and complexity of the model was only really understood within the context of the RPG. If this observation is correct, then the additional learning which occurs within the RPG, and the more global vocalisation of opinion within its context, expands the range of consensus related to the model's accuracy; but this consensus is still based only on those members that actively participated not only in the RPG but also the workshops leading up to it.

4.2.2. Interpretation of, and Discussion about, Scenarios

The phase of discussion and interpretation of scenarios produced by the KatAWARE model was supposed to start after the two sessions of the RPG had been played. V2 of the model was supposed to have been completed within time to facilitate this discussion on scenarios. This version would have had a more simplified interface, similar to the three sub-catchments played in the RPG. V2 should include also some behavioural components observed during the two RPG sessions. However, because of the above-mentioned technical reasons, V2 was not ready at the time scheduled for the scenarios workshops (end 2006), and, therefore, a slightly modified version of V1 was adopted to represent the selected water allocation scenarios and discuss them with the WUA.

The October 2006 workshop was not well attended and, therefore, from a participatory point of view inconclusive in regards to discussions around water allocation. The model was still perceived too complex by some participants, while most of them considered it as a tool to “prescribe what to do” in the Kat, instead of a platform to reflect together on the possible consequences of their future actions.

The “realism” of KatAWARE V1 was certainly a misleading aspect as it lead to the perception that KatAWARE was a decision support tool in the classical meaning, and not a tool to facilitate preparatory discussions for the future decision making process. Following the lesson of the October 2006 workshop, the research group decided not to use the model “in vivo” with the stakeholders, but rather to run through it scenarios

previously discussed with the stakeholders and present these scenarios in a more user-friendly way during the following meeting.

In the last ComMod workshop held in the Kat (March 2007), four scenarios previously discussed and agreed by all stakeholders in a preparatory meeting were elaborated through KatAWARE and the results of the simulations in terms of socio-economic consequences and water preservation were presented to the participants through a slide-show based on maps and simple graphic symbols. Participants appreciated this approach and agreed to discuss in 2 groups (upper Kat and middle + lower Kat) the proposed scenarios.

4.2.3. Selection (preliminary) of Certain Scenarios

At the end of the March 2007 workshop, the two work groups of stakeholders selected 2 different scenarios of water allocation to be further detailed in the CMP draft and discussed. Those scenarios increase moderately the irrigated surfaces in all three sub-catchments. What emerged clearly from this session was the conflict between large-scale farmers of the middle and lower Kat over rights to the water in the dam. The relatively precise quantification of the amounts of water required for different development scenarios stimulated a confrontation among the largest water users in the catchment (i.e. citrus farmers) about an old and still unsolved problem: the transition from the old system of water rights linked to land ownership (scheduled land) to a new system of water licenses independent of land ownership. Large scale and emerging farmers in the middle-lower Kat want to preserve their priority deriving from the fact that they are scheduled users through a higher insurance of supply of the water from the dam, while large scale unscheduled farmers of the lower Kat ask for a licensing system that provide them water at the same level of insurance of supply.

Small-scale farmers, mainly situated in the upper Kat, and domestic users are not part of this conflict, as their requests in terms of water quantity would be satisfied by both chosen scenarios. Small-scale farmers and rural domestic users are more concerned about the infrastructure and investments that would allow them to have a better access to the resource: namely the rural domestic users look for more communal taps in those villages where they are obliged to fetch water from the river, and indwelling taps

where communal taps are available. Small-scale farmers stated from the beginning of the ComMod process that they “see the water flowing in the river, but they cannot use it when they need it”. They therefore ask for irrigation infrastructures and water storage facilities. It must be underlined that this choice of scenarios is only preliminary to the technical phase of decision making, which will take place on the basis of the first draft of the CMP and that should bring to an agreed document to be submitted to DWAF.

4.3. Positioning of the Researcher within the ComMod Process

The ComMod process was conducted in the Kat by a multidisciplinary group of researchers. Roughly, a “modelling team” and a “social team” may be identified. The modelling team, based at University of Pretoria and Montpellier (F), was responsible for the development of the artefacts (model and RPG), while the social team, based at Rhodes University, was responsible for the interactions with the WUA, the briefing-debriefing activities, the facilitation during the workshops and the RPG sessions. Of course, social team members contributed to the discussions related to the modelling component and vice versa.

Looking back at the complexity of the case and the social tensions resulting from an attempt to define a CMP within a newly established WUA in South Africa, the results show clearly that without the contribution of the social team to the whole process, the ComMod approach could not be implemented in the Kat.

The position of the researchers within the ComMod process is difficult to explain, because some members of the research team (the modellers) jumped into the Kat project only in 2004, whereas the social team had already a long tradition and experience of collaboration with the WUA members. The legitimacy itself of the proposed ComMod process for the WUA was largely provided by the fact that the social team approved it before it was presented to the KRWUA.

This heterogeneity in the composition of the research group is particularly important to consider when it comes to the analysis of the researcher implication in the ComMod process: the modellers were facilitated in keeping a certain “neutrality”

during the whole process and acting purely as knowledge providers at the same level of the other stakeholders; this neutrality probably did not apply to the social team.

A final mention should be made regarding the position of the researchers with respect to the dialogue and communication among local stakeholders during the ComMod process. According to the “system thinking” literature, two opposite postures exist: the “interpretative system approach” (Checkland, 1981; Roling, 1996), that gives priority to whatever communication among stakeholders is necessary to reach a consensus made of various and multiple points of view, and the “critical learning system” (Ulrich, 1987) that underlines the need to consider the power relations, to prepare less empowered groups to the discussions and negotiation sessions through preparatory workshops, and that accepts the non neutrality of the facilitator. In the ComMod process in the Kat, the modellers followed from the beginning the first posture, while the social team was adopting clearly the second approach, which as a matter of fact proved to be compulsory in a situation of socio-economic and educational differences as the one of the Kat River, which is representative of most small agricultural South African catchments.

5. CONCLUDING REMARKS

Some aspects of the ComMod process in the Kat make this experience an important and unique case for the ComMod literature. The following characteristics can be underlined.

1. The Kat River Valley is a relatively large and populated area, if compared to most (if not all) applications of the ComMod approach so far.
2. Several groups of water users were involved in the process of developing a CMP, they have very different characteristics and perceptions of the water issue in the catchment;
3. ComMod was adopted within a larger project (the Kat Project), with wider research and development objectives;
4. The Kat River Valley has been the field for several participatory research projects for water management since 1994;
5. The research group was multidisciplinary and the tasks of modelling and facilitation were under the responsibility of two separate teams (the modelling team and the social team).

In the light of these characteristics and having discussed in the previous section the main achievements and shortcomings of the ComMod experience in the Kat, some final considerations can be drawn and a series of potential constraints for the adoption of ComMod in South Africa are here below listed.

Collective learning, communication among stakeholders, and common decision making took place undoubtedly during the ComMod process in the Kat, but it is difficult to separate the effects of ComMod from the effects of the many other projects and initiatives that took place in the Kat since 1994. And even if one can identify specific effects of the ComMod approach, would these effects be possible without the “field preparation” provided by the previous projects?

The research group felt from the beginning the absence of some crucial stakeholders, namely DWAF and the Municipality of Nkonkobe. Both stakeholders were repeatedly invited to all workshops, but attended only very few of them. This lack of participation by these important partners raises a question mark over the

representation issue within the ComMod process in the Kat. On the other side, this example illustrates how difficult is to involve public decision makers and institutions in long and time consuming participatory exercises.

ComMod in the Kat proved to be a long (2.5 years) and articulated process (9 workshops in Fort Beaufort plus several preparatory meetings). This heaviness determined a certain fatigue in the local stakeholders and made it difficult to have the same level of participation over the project's duration. Such a process is also expensive, particularly in terms of hours of expert work, and time consuming for the involved researchers.

These aspects must be considered when choosing between ComMod and other participatory approaches to facilitate learning and decision making around water management in South Africa. In addition, some skills required to implement the ComMod process (particularly the modelling one and the facilitation one) are rare, and difficult to combine into the same group of research as it happened in the Kat River, particularly in developing countries. Variants of ComMod could be envisaged in order to "slim" the process, such as using only RPGs, or only extremely simplified models. The problems derived from the realism of KatAWARE have already been mentioned.

Finally, the difficulty of involving public actors such as DWAF or the Municipality represents a potential constraint whether an adoption of ComMod is envisaged at a higher territorial and institutional scale (e.g. Catchment Management Agency or even central DWAF).

Among the numerous lessons provided by this experience, one seems to be particularly relevant for future applications of participatory approaches in similar contexts. In South Africa during the last years, a huge amount of projects have been implemented with the main goal of helping local stakeholders to express their "visions" or to elicit "mental models" about water uses, related problems and perspectives. Most of, if not all, these projects have produced interesting reports and literature that did not actually concretize into a real negotiation support for the involved stakeholders. In other terms, the "technical phase" of negotiation and

decision making process has always been neglected so far, with the emphasis being on the preparatory phase of “visioning”.

In the Kat project, which had as its explicit objective the development of CMP with the KRWUA, the ambition to go beyond “visioning” and move towards the real negotiation process bringing to the “technical decision making” phase was clear. The contribution of ComMod in this direction was instrumental, as the model first allowed quantifying and representing spatially the problems, and the RPG then facilitated the discussions and the debates around these problems. *During the Kat Project, the preparatory phases bringing to “visions” determined few if no conflicts among local stakeholders. The real conflicts emerged when alternative water allocation strategies expressed as m^3 of water to different groups of stakeholders were proposed and discussed. The quantified scenarios allowed by the model KatAWARE were the bottom line for these discussions.*

Even if the ComMod process and the consequent discussion and provisional choice of scenarios is only preliminary to the technical phase of common decision making, which should bring the KRWUA to the definition of the CMP, *the crucial step towards local negotiation and decision-making around water management was reached in the Kat.* Through the co-construction and discussion of quantitative scenarios, Companion Modelling proved a useful, though improvable, process to accompany the local WUA from the qualitative step of “visioning” and definition of priorities to the preparation of a negotiated CMP.

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