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D3.6 Impediments to barrier planning and stakeholder conflict resolution.

This is the 1.0 version of the Impediments to barrier planning and stakeholder conflict resolution. This document is a deliverable of the AMBER project, which has received funding from the European Union's Horizon 2020 Programme for under Grant Agreement (GA) #689682.

Author(s):
Kinga Krauze (ERCE), Sergio Vallesi (Durham University Business School).

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Executive summary

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Barriers on rivers often raise emotions among river users that originate from competing desires to maintain fluvial connectivity and numerous services related to river corridor and valley on the one hand, and strong economic motivations coming from energy sector and flood protection requirements. Very strong parties in the discussion are also farmers and residents of cities and villages. Throughout Europe there are numerous examples where stakeholders are at an impass, with the EU regulations being in the middle of political debate. Water Framework Directive often requires substantial compromises over needs for renewable energy, while both interfere with consequences of common market, which supports industrial food production and therefore leads to deterioration of water quality and overuse of water resources, as well as higher demand for energy.
In hereby report we gathered well documented cases of stakeholder interactions over barrier construction, reconstruction or removal, with an aim to produce the first overview of factors which may lead to heightening the conflicts or alleviate them. The analysis was based on the conceptual model developed in a collaborative way between WP2, WP3 and WP4, through analysis of AMBER case studies, demo-sites based survey on ecosystem services and their beneficiaries and literature review.
The report is foreseen as a basis for IF publication after more extensive data maining.

CONTENT

1 INTRODUCTION

Globally we observe an increasing need for water resources, food and energy. Inevitably delivery of all those resources is interconnected, what already created a land-energy-water nexus[1]. For example, by 2050, 70 percent more food will be required to be produced in order to feed the world[2]. Simultaneously the World Energy Council (WEC) projects a 100 per cent increase in energy supply[3]. Total global water withdrawals for irrigation are projected to increase by 10 percent by 2050[2]. The importance of cross-sectoral links for increasing overall resource use efficiency applies at all levels, from local to national and global[4]. Additionally there is a pressure to take action towards the Sustainable Development Goals[5] and reduce CO_2 emission, reinforced by the Paris Agreement. That gives a special role to hydroelectricity, being considered as the most economical of all renewable energies: competitive without costly subsidies, and without posing problems of storage or intermittent supply for electricity network operators. Potentially it can also increase water supply based on reservoir construction, which additionally serve irrigation needs. However, freshwater became limited in many regions of the world and is poorly distributed. It becomes more and more difficult to sustain its fair share considering nature as one of the key stakeholders. Thus complying with Water Framework Directive, Habitat and Bird Directive becomes particularly difficult.

European Environmental Outlook (2010)[6] already proved that during last decades, the substantial progress has been achieved in the area of climate change regarding greenhouse gas emission, and in the area of the use of natural resource regarding the waste recycling and decoupling economic growth from resource use. Much lass has been achieved for meeting nature and biodiversity targets. The conservation status of valuable habitats has been maintained unchanged, however Member Countries failed with pressures control , e.g. eutrophication, urbanization, and with preventing biodiversity decrease in all three domains of ecosystems: terrestrial, freshwater and marines. Focusing on water systems, the Water Blueprint[7] initiative pointed out that after over 10 years of implementation of WFD, still the most severe pressures are changes in hydromorphology (which affect 50% of water bodies) resulting in altered habitats, and diffused pollution (affecting almost 40% of water bodies) that impacts water trophy. EEA (2009)[8] mentioned also the water stress as an additional and significant stressor. According to estimates 26 European river basins are under permanent water stress, while another 43 experience it seasonally. According to projections the

[1] OECD (2017), The Land-Water-Energy Nexus: Biophysical and Economic Consequences, OECD Publishing, Paris.
[2] FAO (2011): the State of the World's Land and Water Resources for Food and Agriculture (SOLAW)-Managing Systems at Risk, Earthscan, London.
[3] WEC (2007): Deciding the future: Energy Policy Scenarios to 2050, Executive Summary, World energy Council, London, UK.
[4] Hoff H. (2011): Understanding the nexus. Background Paper for the Bonn 2011 Conference: the Water, Energy and Food Security Nexus, SEI, Stockholm.
[5] https://www.un.org/sustainabledevelopment/sustainable-development-goals/
[6] EEA 2011. Annual report 2010 and Environmental statement 2011. EEA, Copenhagen
[7] EEA, 2012. Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of The Regions. A Blueprint to Safeguard Europe's Water Resources. COM(2012) 673 final
[8] EEA, 2009. Water resources across Europe — confronting water scarcity and drought. EEA Report No 2/2009.

numbers are going to increase by about 30% by 2030 and impact will extend to the Northern rivers.

The awareness related to loss of quality rivers does not follow the reality. The Report of EEA (2015)[9] indicates that over 70% of rivers offer unfavourable conditions to animal and plant species, however less than 30% of the European population is concerned with shortage of drinking water or species extinction[10]. Nevertheless the number of people raising voice on behalf of nature is increasing.

All those create a global context for often very local crisis situations related to construction or rebuilding of river barriers, especially dams. The controversies involve diversity of opinions and value conflicts, particularily when the pure economic calculations are to be counterbalanced with non-monetary values or clearly the sustainability perspective clashes with short-term view and individual benefits. The highly utilitarian approach claims for reduction of all values to the same metrics so that decision-making system can keep conditions of rationality[11]. The rational approach is often directly translated into Environmental Impact Assessment scheme, which weighs trade-offs and tries to economize choices. This oposes the pluralistic view perspective, which accepts that all the values are in fact "values in action" – highly context dependent, reacting to altrernative options[11]. Acceptance of the pluralistic view should change uniform value assessment into a deliberative public process, where actors are willing to change opinions or even remake their aims in the light of new facts[12], what releases energy for collective and innovative actions[13].

The deliberative process and boiling the large scale problems down to managable, local scales is proposed as an approach to the wicked environmental problems, which issue of river damming fits very well. Their key features are:1. Being driven by conflicting views and value systems, 2. They end when the consensus is achieved as final solution doesn't exist, 3. They have many interdependencies and are often multi-causal, 4. They don't sit within the responsibility of any one organisation, 5. They raise over constraint resources, time, and thus don't allow for error and trial approach.

With this report we analyse 21 European cases of barrier construction or rebuilding, tracing the features of the conflicts which range from low and stable to high and accelerating.

2 CONCEPTUAL MODEL

The model of analyzing the conflict situation (Fig.1.) has been developed based on the analysis of AMBER case studies participating in the ecosystem service survey (T.2.6), and in particular the Włocławek Dam on the Vistula River, Eden in UK and Neckar in Germany. We reflected also OpenNESS approach and findings focused on analysis of the stakeholder interactions and ecosystem service pay-offs[14,15,16,17,18].

[9] EEA, 2015, The European environment — state and outlook 2015: synthesis report, European. Environment Agency, Copenhagen.

[10] EU, 2014. Special Eurobarometer 416 "Attitudes of European citizens towards the environment"

[11] Costa, A. et al. 2016. The building of a dam: value conficts in public decision-making. Environemntal Values 25: 215-234

[12] Richardson, H., 2000. **The Stupidity of the Cost-Benefit Standard.** The Journal of Legal Studies 29:S2, 971-1003

[13] Norton B.G., 2005. Sustainability: A philosophy of Adaptive ecosystem management. The University of Chicago Press

[14] Vane-Wright, R.I., Humphries, C., Williams, P., 1991. What to protect?—Systematics and the agony of choice. Biol. Conserv. 55 (3), 235–254.

It focuses on identification of stakeholders involved in the discurse and the values they identify in terms of ecosystem goods and services. The winners / beneficiaries/ losers groups reflect the position of each stakeholder in the benefits sharing hierarchy. We hypothetized that there are stakeholders who gain benefits at very low costs or coincidentally, so they win the main prize. There are also stakeholders who benefit from the project however they need to invest a prior – beneficiaries. There are also stakeholders who gain nothing out of the project or they situation even deteriorates.

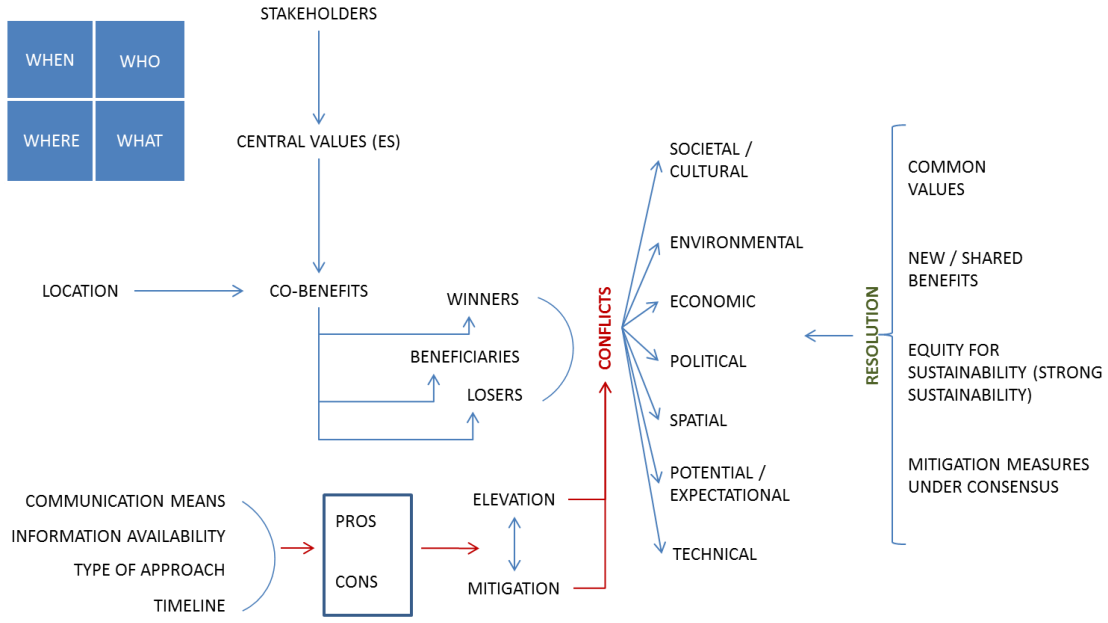

Fig. 1. Conceptual model for the societal conflict analysis.

Despite the benefits share, conflicts can also emerge from the initial settings of the project, such as: unproper communication means, lack of proper information, the way stakeholders are approached by the project operator (e.g. discussions are inclusive, they co-design the project) or even a timeline – too short, making proper understanding of the project settings impossible or too long, what results in delayed compensation or feelings of being neglected. The conflicts can be of different character, they may tackle societal or cultural issues (e.g. attachment to place), environmental (e.g. violation of Natura 2000, WFD), economic (e.g. people are not compensated for their loss or costs of getting chosen ecosystem services are too high comparying to gains), political (when decision are taken outside the area, or are purely driven by aspirations of individuals), spatial (e.g. when the location / extend of the project causes conflict over values), potential / expectational (expectations of stakeholders are not met in the end), and technical (dam structure or operation impose risk to values). Finally we also intended to derive from the case studies information about the ways conflicts

[15] Muradian, R., et al., 2013. Payments for ecosystem services and the fatal attraction of win-win solutions. Conserv. Lett. 6, 274–279.

[16] Turkelboom, F., 2018. When we cannot have it all: Ecosystem services trade-offs in the context of spatial planning. Ecosystem Services 29: 566–578

[17] Dunford, R., et al. 2018. Integrating methods for ecosystem service assessment: Experiences from real world situations. Ecosystem Services 29: 499–514

[18] Dick, J., et al., 2018. Stakeholders' perspectives on the operationalisation of the ecosystem service concept: Results from 27 case studies. Ecosystem Services 29: 552–565

were resolved if at all. Some of the possibilities here involve: consensus over common values, creation of new benefits or fair share, including nature as key stakeholder in order to achieve sustainable use of resources, and mitigation measures.

3 METHODOLOGY

The study aimed at gathering comparable information from a number of dam construction/rebuilding/deconstruction cases with clear focus on Europe. For that reason first the scientific literature review have been conducted based on the Web of Science, for years 1970-2018, using combination of searching phrases: “dam”, “barrier”, “impact”, “conflict”. As there were only few European cases available and the publications were not inclusive enough to fit the plural-view approach, in the second step we decided to use Hydropower Sustainability Assessment Protocols[19] of the International Hydropower Association (accredited by World Bank and the Nature Conservancy) and the Riverwatch[20] reports complemented with general internet search for the cases to avoid bias in viewing the situation.
We found 23 cases fitting the complex assessment protocol based on the conceptual model (Tab.1, please see: Comparison of the 21 case studies according to the conceptual model.xls).
The analysis brought into the analysis new ways of conflict resolution, like: communication, organizational measures, monitoring of the system and planning measures.
Finally the PCA has been conducted in order to identify the commonalities among the cases helpful in defining the key factors driving conflicts or alleviating them.

4 RESULTS

4.1 Context of the conflicts

Among the 21 cases there were six with low conflict level, where in fact stakeholders only expressed concerns about future delivery of services (Tab.2). In other six cases the level of conflict was assessed as medium, when stakeholders complained about the impact of the construction on their benefits and daily life. In nine cases the level of conflict was assessed as high, and in some cases as accelerating. Interestingly in all those cases the project of barrier building or reconstruction came from external players, namely national policy makers (e.g. Alqueva Dam, Włocławek), or international companies or funding sources (e.g. Balkan barrages). The lowest conflict level refers to the cases where the barriers were present a prior the new project and the investment was targeted at decommissioning of old infrastructure and its supplementing with a new one (e.g. Semla IV). Those cases are also examples of good communication involving diversity of stakeholders and communication methods, e.g. permanent multi-stakeholder platforms, numerous consultation meetings and project co-design opportunities, intense information campainges before setting the frame of the project, and open possibilities to direct contact project leaders with the concerns or questions. Limited access to information and documentation, and reluctance to discuss environmental risks was usually a first step towards suspicion and tensions over the project, e.g. Kaunertal Expansion Project, Austria.
Important was also attachment of the project leader to the area. This was not only a trust-building factor, but enabled better understanding of local problems, needs but also values associated with particular services or places. The most dramatic cases of lack of such knowledge and sensitivity were represented by cases from Macedonia and Albania. Despite the dams building violated national and international regulations related to protection of

[19] http://www.hydrosustainability.org
[20] https://riverwatch.eu/en/balkanrivers/news/bankwatch-study-broken-rivers

environment, including rare species and habitats, the communities of land owners and users were deprived of compensatory payments for the land and properties, as well as lost assets, because residents lack the bank accounts or documents confirming land ownership, etc. The situation raised international protests and moved the conflict from the local to international scale.

Table 2. The comparison of the case studies with reference to the trigger and driver of a conflict and conflict trend.

Case	Aim of dam	Trigger of conflict	Driver of conflict	Trend	Source of intervention
Ilam dam, Iran	Drinking water, irrigation, flood control, ecosystem quality	Climate	Water diversion, low flows	High, accelerating	External – regional policy
Kárahnjúkar Hydropower Project, Iceland	Hydropower	Construction	Fear of economic loss	Low, stable	Internal – local stakeholders
Devoll Hydropower Project, Albania	Hydropower	Construction	No communication, no impact monitoring, ineuqity & neglecting cultural features, compensation with no compliance with local cultural & administrative bottlenecks	High, accelerating	External – regional and international authorities and funders
Kaunertal Expansion Project, Austria	Water supply, flood protection; ecosystem quality; aesthetic, cultural & recreational value, hydropower	Construction, no transparency, no dialogue	No transparency, no access to documentation, frequent project changes, impact on river flows	High, stable	External company / Internal authorities
Semla IV, Sweden	Hydropower, recreation	Partial replacement of old power plants with the new one	Question about cultural heritage & risk management	Low, decreasing	Internal
Program Sava, Croatia	Flood protection; replenishment of groundwater; riverbed stabilization, hydropower, urban regeneration; transport; irrigation	Little cohesion between the plans and local policies, only grey & conventional solutions taken into account	Limited compensation, not considered: loss or change of livelihood, loss of or restricted access to informal recreation, impacts to vulnerable groups	Medium, stable	External – national / regional policy

Case	Aim of dam	Trigger of conflict	Driver of conflict	Trend	Source of intervention
Rapuni 1 & 2, Albania	Hydropower, irrigation	Violation of international and national environmental protection law, corruption	No recognition of local needs, construction determined according to return on investment and not the ecological and hydrological assessment	High, accelerating	External investors, regional policy makers
Ternove. Albania	Hydropower	Violation of water rights and land ownership	Little scrutiny about potential impacts	High, accelerating	External investors, regional policy makers
Ilovac, Croatia	Hydropower	Incomplete and manipulated EIA, no cumulative dam impact assessment	No recognition of endemic spp habitats, construction determined according to return on investment	High, accelerating	External investors, regional policy makers
Brajcinska reka 1, Macedonia	Hydropower	Violance of EIA methodology and the 2008 Environmental and Social Policy of the EBRD	Continued envirionmental devastation and ignoring the impact	Medium, accelerating	External investors, regional policy makers
Brajcinska reka 2, Macedonia	Hydropower	Violation of international and national environmental protection law, corruption	Continued envirionmental devastation and ignoring the impact	Medium, accelerating	External investors, regional policy makers
Tresonecka reka, Macedonia	Hydropower	Violation of international and national environmental protection law, corruption	Continued envirionmental devastation and ignoring the impact	Medium, accelerating	External investors, regional policy makers
Blanda Power Station, Iceland	Hydropower	Climate, erosion	Reservoir shoreline erosion which is of general concern to the local community due to the created dust	Low, stable	Internal

			& the impact on grazing		
Case	**Aim of dam**	**Trigger of conflict**	**Driver of conflict**	**Trend**	**Source of intervention**
Romanche-Gavet, France	Hydropower	Absence of processes to manage risks and opportunities issues	Not address emerging opportunities to improve environmental issues, to combat improve erosion and sedimentation	Low, decreasing	Internal
Hvammur, Iceland	Hydropower	Lack of independent review; issue of feasibility and socio-environmental suitability	Loss of agricultural land, wind-blown dust and a lack of satisfactory attention to certain social aspects; lack of communication	Medium, stable	External / Internal – regional authorities involved
Jostedal, Norway	Hydropower, summer flood prevention (from snowmelt)	Impact on migratory fish & big mammals, erosion of banks, increased flood risk due to sedimentation	Timeliness of feedback; the further lowering of the water in fish ponds and slow reaction to the problem; Conflicting priorities - flood prevention vs fish spawning areas	Medium, stable	External / Internal – regional authorities involved
Walchenseekraftwerk, Germany	Hydropower	Lake erosion, very slow response to environmental damage	Bank erosion affecting buildings, fish stock decline; long time for feedback	Low, stable	Internal
The Alqueva Multi-Purpose Dam (EFMA), Portugal	Hydropower, supply of water; irrigation; tourism	Location and the size of investment, no dialogue	No application of mitigation measures; economic crisis which hampered promised investments; unequally distributed compensation	High, stable	External – national programme, political issues
Włocławek Dam & the 2nd step in Siarzewo, Poland	Hydropower, flood control	Top-down political pressures, ignoring legislation & manipulating facts	Poor information, conflict zones with other values, hanpering alternatives	High, accelerating	External – political programme

Case	Aim of dam	Trigger of conflict	Driver of conflict	Trend	Source of intervention
The Tua dam, Portugal	Hydropower, strategic water reserve	Neglecting non-monetary values, e.g. UNESCO heritage not considered in EIA; information mismatches	Incomplete & manipulated risk assessment, disregarding negative opinions, construction started a prior recommendations of UNESCO, alleged infringement of European directives regarding water quality and biodiversity, population's attachment to its heritage and territory	High, accelerating	External – political programme
Ritort and Can Buixó dams, Ter, Spain	Hydropower dam deconstruction	The top down decision by Parliament, external company requiring the closure of the dam	Doubts about cultural and environmental viability of decommissioning, costs of loss of opportunity,	Low, stable	External

4.2 Winners, loosers and beneficiaries

The analysis of losing and winning parties (Tab.3) indicates, that in all cases, despite the good practices applied, nature is the only stakeholder always losing the benefits. The ultimate winners are energy and financial sectors and investors, although their role depends mostly on political will to diminish the negative consequences of dam construction and carry socially responsible business. The best practices e.g. of the Blanda Power Station construction invested in a number of compensatory measures:

- extensive revegetation efforts to compensate for the loss of grazing area;
- the reconstruction of roads and some minor buildings in the reservoir area,
- additional fencing in the highlands to contain sheep;
- construction of three new huts in the highlands which generate income for the municipality from tourism;
- stables for sheep and horses in the highlands;
- an airstrip to the south of the reservoir; the establishment of new grazing land, though with lower species diversity;
- one off payments to farmers who lost grazing and payments to farmers whose land was impacted by the project or the transmission line.

Additionally the project offered new benefits to residents, including:

- the planting of trees in the area around the power station,
- sorting and recycling of waste,
- experimentation with an electric car;
- a fishing lodge for visiting anglers;
- maintenance of a fish ladder to benefit the angling association;
- funding for ‘job creation project’;
- salmon museum and research centre;
- supporting an artist to work on the production of paintings reflecting local cultural heritage;
- enabling power station facilities to communities; and finally
- facilitating two new industries, one manufacturing rock wool and the other aluminium foil.

What appeared to be critically important, the compensation and new benefits were distributed in just way among all the residents of the area and municipalities being affected by the project.

The worst practices were applied to the Balkan investments (Fig.2), where compensations were offered only to directly impacted households, the mechanisms of compensation were not transparent and not well communicated to the locals. No mitigation measures were applied and even the EIA was not conducted correctly, therefore many cultural, environmental and social values were not considered.

Table.3. Comparison of the groups of stakeholders with respect of gaining benefits, for each case study; scoring: -1-losing (assets, household or land); 0,5- benefiting (investing and gaining), 1-winning (gaining profits with limited or no investment), 0- not considered in the case study.

	Farmers	Villagers / city inhabitants (for the cities/villages located only within the area impacted by the construction)	SME directly dependent on local water source, e.g. water companies	other SME	Anglers	Nature conservation	Energy sector	Tourism	Fishery	Forestry	Local authorities	Third parties (e.g. banks, investors)	Downstream communities	Property owners not directly impacted	
Ilam, Iran	1	0,5	1	0,5	0	-1	0,5	0	0	0	0,5	0	0,5	0	**3,5**
Kárahnjúkar Hydropower Proje	0,5	1	0,5	0,5	0	-1	0,5	1	0	0	0,5	0	-1	0,5	**3**
Devoll Hydropower Project, Al	0,5	1	0,5	0	0	-1	0,5	0	0	0	1	1	-1	-1	**1,5**
Kaunertal Expansion Project, A	0,5	-1	1	0	0	-1	1	1	0,5	0	0,5	0	0	0,5	**3**
Semla IV, Sweden	0,5	0,5	-1	0,5	1	0	0,5	0,5	-1	0	0	0	0	0,5	**2**
Program Sava, Croatia	0,5	-1	0,5	0	0	-1	0,5	0,5	0	0	0,5	1	1	0	**2,5**
Rapuni 1 & 2, Albania	-1	-1	-1	0	-1	-1	1	-1	0	0	0,5	1	-1	-1	**-5,5**
Ternove. Albania	-1	0,5	-1	0	0	-1	1	-1	0	0	0,5	1	-1	-1	**-3**
Ilovac, Croatia	0	0	0	0	-1	-1	1	-1	0	0	-1	1	-1	-1	**-4**
Brajcinska reka 1, Macedonia	0	0	0	0	0	-1	1	-1	0	0	-1	1	-1	0	**-2**
Brajcinska reka 2, Macedonia	0	0	0	0	0	-1	1	-1	0	0	-1	1	-1	0	**-2**
Tresonecka reka, Macedonia	-1	0,5	0	0	0	-1	1	-1	0	-1	-1	1	-1	0	**-3,5**
Blanda Power Station, Iceland	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0	0	0,5	0	0,5	0,5	**5,5**
Romanche-Gavet, France	0,5	0,5	0,5	0,5	0,5	-1	0,5	1	0	0	0,5	0	0,5	0,5	**4,5**
Hvammur, Iceland	0,5	1	0	0	-1	-1	0,5	1	0	0	0,5	0	0,5	-1	**1**
Jostedal, Norway	0,5	0,5	0,5	0,5	-1	-1	0,5	0,5	0	-1	0,5	0	0,5	0,5	**1,5**
Walchenseekraftwerk, Germa	0,5	-1	0,5	0	0,5	-1	0,5	0,5	0,5	1	0,5	0	0	0,5	**3**
The Alqueva Multi-Purpose Da	0,5	-1	0,5	0,5	0	-1	1	0,5	0	-1	0,5	1	0,5	-1	**1**
Włocławek Dam & the 2nd ste	0	0,5	0,5	0	0,5	-1	0,5	0,5	0,5	0	0,5	0	0,5	0,5	**3,5**
The Tua dam, Portugal	-1	0,5	0,5	0	0	-1	1	-1	0	0	0,5	1	0	0	**0,5**
Ritort and Can Buixó dams, Ter	0	0	0	0	-1	1	-1	0	0	0	0,5	0	0,5	0,5	**0,5**
	2,5	**2,5**	**4**	**3,5**	**-2**	**-16,5**	**13,5**	**0,5**	**0,5**	**-2**	**4,5**	**10**	**-3**	**-1,5**	

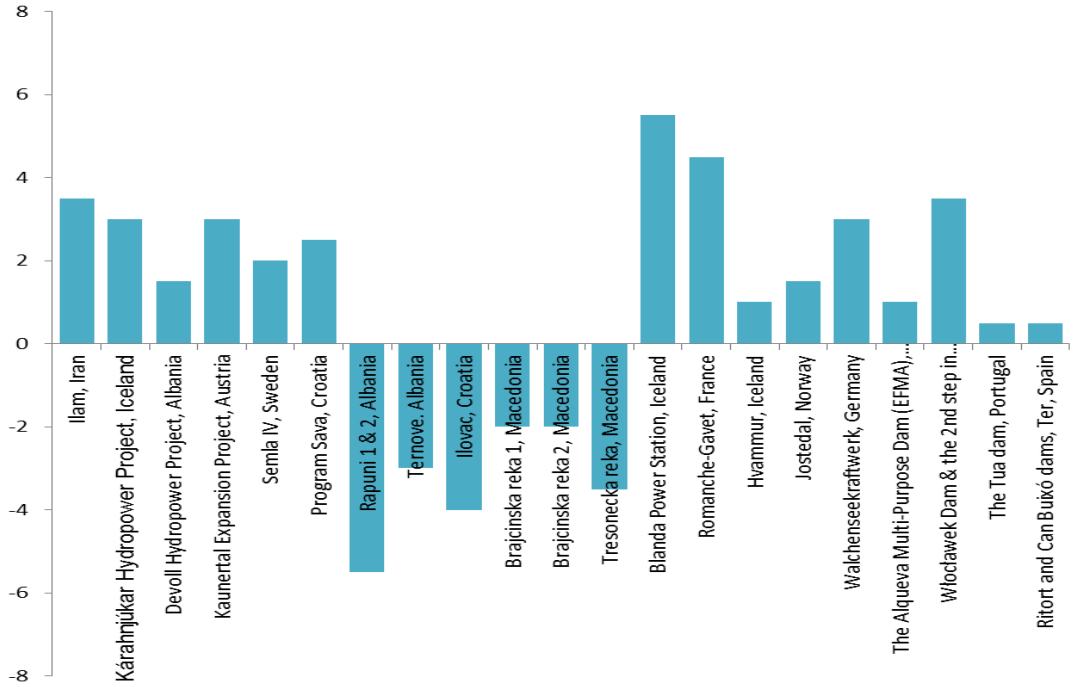

Fig.2. The summary of scoring for all the types of beneficiaries for each of the case study reflecting the level of societal and ecological responsibility in business.

4.3 Ecosystem services at the stake

Surprizingly to general negative perception of river barriers, in majority of case studies the number of services declared as delivered by the barrier was higher than the number of disservices (services lost or negatively affecting community and ecosystems, e.g. flood control which causes water shortages downstream). Disservices dominated mostly in the Balkan cases, where however no attention was given to compensatory or mitigation measures, neither the proper impact monitoring was conducted.
In cases of Albania, Portugalia, or Spain some target services were not delivered although were complemented with a range of the others, e.g. the quality of water in the Alqueva Dam made it unuseful for drinking purposes, however the reservoir contribute to microclimate regulation.

Table 4. Services and disservices caused by dam construction / rebuilding, in red squares mark discrepancies between target services and their actual delivery (not delivered or on contrary in decline), the classification of ecosystem services was based on CICES v4.2. (please see: Ecosystem services and disservices.xls).

5 THE GENERAL TRENDS

The PCA analysis explained only 56% of variability, however still presented interesting trends. On the one side it grouped together the case studies where dam construction (and

decommissioning) was driven by political processes, and which characterized with relatively high conflict level e.g. Włocławek Dam. At the other end there are projects being launch in more business driven model. The horizontal axis devides cases according to the societal and environmental responsibility, thus on the left there are projects which didn't comply with EIA standards and raised a lot of controversy worldwide, on the left projects offering numerous compensatory and mitigation measures. Neither "return on investment" approach nor political "flagship" actions enable conflict management and allevation.

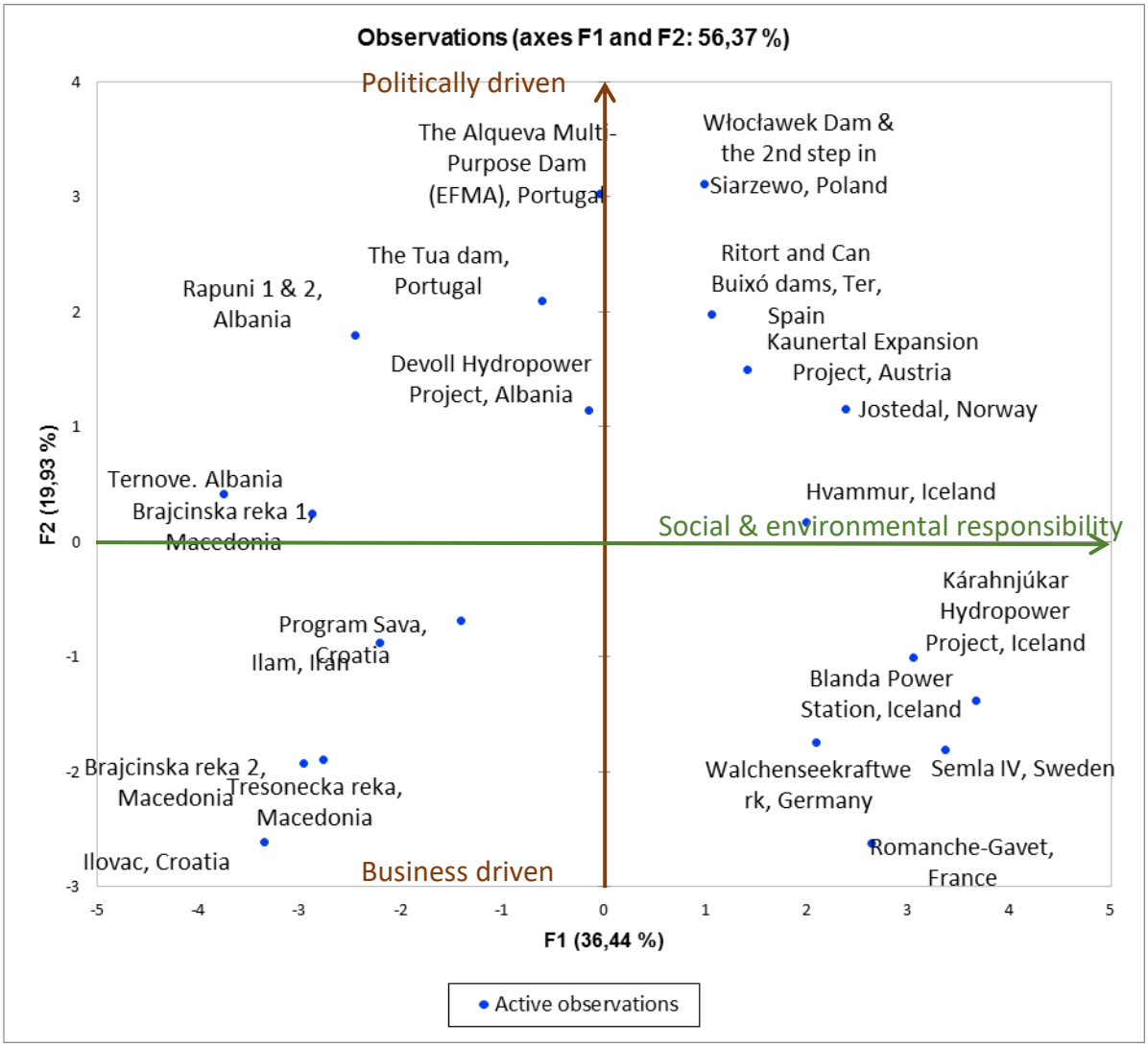

Fig. 3. The F2 reflects the level of politicization of the projects vs profit driven investments, F1 characterizes level of social and ecological responsibility.

The analysis of the cumulative information about a number of impact areas (socio-cultural, environmental, economic, spatial, political, and technical), conflict trends, and compensation measures including number of new shared benefits, compensation to natural capital and equity in distribution of compensation among stakeholders (Fig.4), shows that variety of impact increases with expectational, socio-cultural and technical ones, while environmental impact is the most common and appears in all the cases. Simultaneously however this is environmental impact with is mitigated with broadest number of measures, and usually associated with equity. In the cases of strong third parties interests and interventions the most common conflicts emerge over the location of investments, which usually contradict sustainable use of resources and equity and often lead to conflict acceleration over time.

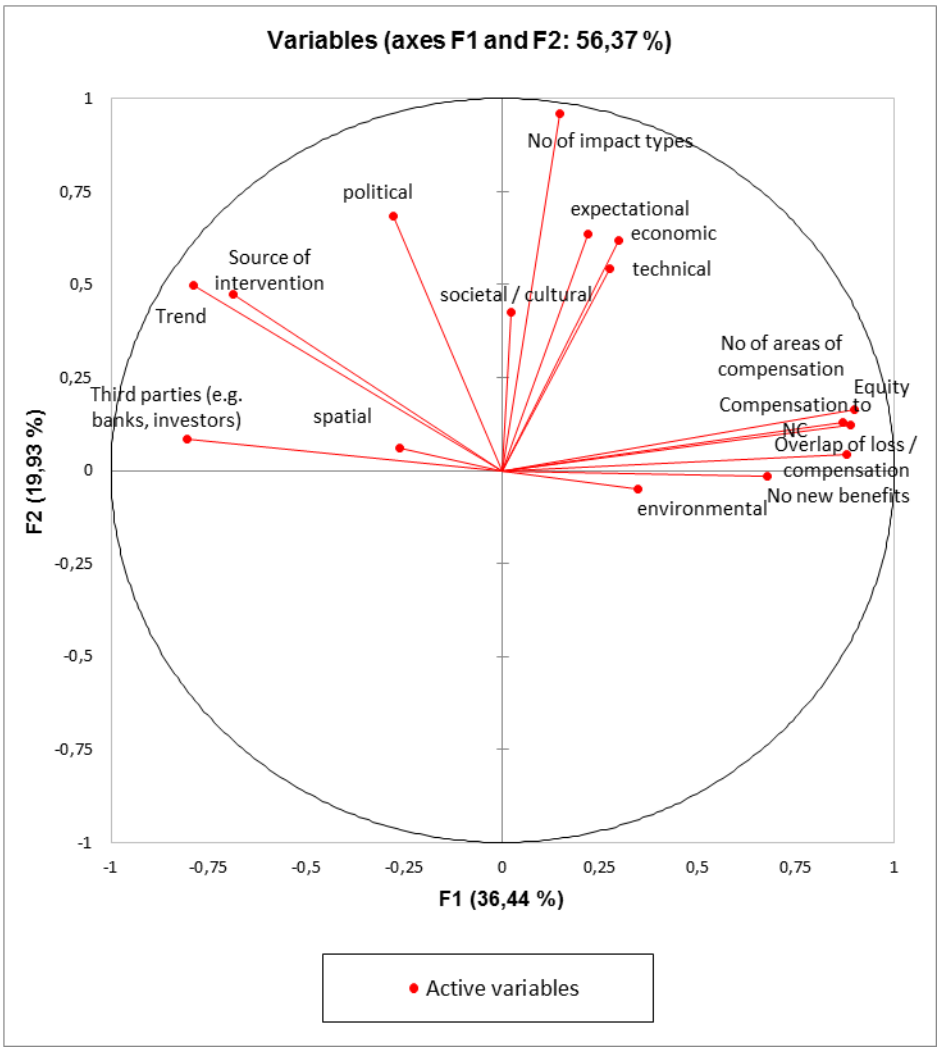

Fig.4. The analysis brings together information about the number of impact areas (socio-cultural, environmental, economic, spatial, political, and technical) and conflict trend, and compensation measures including number of new shared benefits, compensation to natural capital and equity in distribution of compensation among stakeholders.

6 IS IT POSSIBLE TO PREVENT CONFLICTS OVER RIVER BARRIERS?

The study proved that there is a number of pre-investment measures which significantly reduce the probability of conflicts:

1. AVAILABILITY OF INFORMATION: Well distributed, clear information about the project, its consequences, opportunities and risks; ability to co-design and discuss the project and easily contact with experts for ad hoc addressing the concerns;
2. COMMUNICATION MEANS: the information needs to be available to vulnerable goups, and all community members exposed to the risk, therefore it is compulsory to use variety of communication channels with frequent meetings being the positive drivers of the process;
3. TYPE OF APPROACH: The communication must be transparent, inclusive, and feedbacks provided without delays; the project team should get involved into activities of local communities and contribute to social learning and social capital building. Dam builders had to expand their criteria for assessing their projects, in

addition to the criteria of technical, economic and financial feasibility, dam projects must meet a criterion of their acceptance by the publics.

This is concordant with a literature arguing that tackling wicked policy problems has 'more to do with problem setting than with problem solving'[21].

Furthermore the most commonly conflicts emerge from societal and environmental impacts. Those can be mitigated already in planning phase by elimination of winners and losers groups, and making visible the benefits achievable to all community members. This perspective emphasizes the requirement of horizontal and vertical coordination and collaboration, and is linked to calls for more public participation as well as the need to address issues through networked or collaborative decision-making arrangement that devolves both policy authority and accountability to non-governmental actors[22,23]. The good examples of dealing with conflicts over dams demonstrate that as in case of nexus or wicked problems it is impossible to arrive at a definitive understanding of problem, because of the interdependencies between facts and values, and because often we have to deal with a cluster of interlocked problems with interdependent solutions' rather than a single identifiable problem[24], the way forward is often mediated dialogue, seeking to explore common ground about longer term goals and directions, and steps for moving forward together[25].

In low-level conflict case studies the solution was build upon discussions and the trust. The trustfull relationship was developed thank to fair compensation for lost assets, including non-monetary ones, like emblematic artifacts, landscapes, traditions, monuments of places of cultural value, and with creation of new, shared benefits, what is perceived as a sign of responsible management. Among all the mitigation measures those addressing nature appear to be the most universal and acted as a common attraction point for local communities. They also favoured equity in resource management and accessibility (Fig.5).

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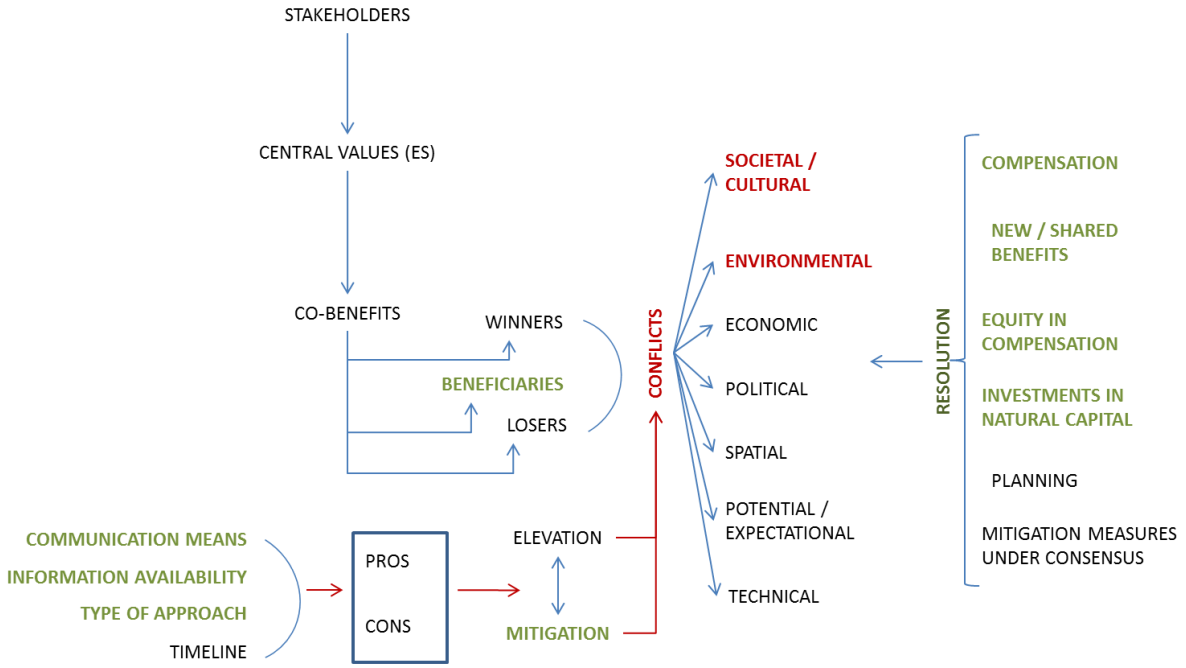

Fig.5. The path to prevent conflicts and enabling deliberative process independently of the values embraced by the community and variery of perceptions.