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ABSTRACT

Peru is one of the first countries in the world to introduce a specific law for the promotion and regulation of Payments for Ecosystem Services (PES). This ‘Law on Compensation and Reward Mechanisms for Ecosystem Services’ (MRSE-Law) mainly aims to protect and restore ecosystems that provide critical services to the Peruvian population, including hydrological services for year round water provisioning. Since many of the water-related services are produced and affected by poor communities in the uplands of critical watersheds, the PES-arrangements under the MRSE-Law are also held to contribute to reduce poverty and exclusion of and within these communities. Through a case-study of an innovative water management initiative in the village of Huamantanga, which could potentially benefit from the new mechanisms under the MRSE-Law, this paper adopts a pathways perspective to study the risks and opportunities of a water-related PES-arrangement in line with the MRSE-Law. It shows how such an arrangement is inevitably articulated with and embedded within the on-going power-laden institutional bricolage that generates the currently dominant ‘alfalfa-cattle market pathway’, which tends to undermine peasant community control and increases privatization and social differentiation. This raises concerns about the ultimate impact of the proposed MRSE-project, which might end up dispossessing poorer local farmers from their access to the mountain pastures without providing adequate alternatives. However, the participatory and peasant-community based features of the incubating process and the flexible MRSE-legal provisions provide some opportunities to counterbalance this emerging risk.

1. INTRODUCTION

Water is an increasingly critical natural resource as well as a key item on the agenda of social development and human rights. From an neo-classical economic science vantage-point, the water conundrum reflects a textbook externality problem: under pressure from population growth and exponentially rising productive use, the previously abundant resource transforms into a scarce good, thus increasingly becoming subject of intensified competition and overexploitation. From this perspective, the logical policy prescription for avoiding excessive and irrational water use, and instead safeguarding critical hydrological services, is to promote a more conscious, careful management of the water system. In the same line, such an improved management would imply the specification and enforcement of clearer (private or collective) property rights and a more stringent control over the use of the water resource as well as the (eco)systems that generate it. Today the introduction of (price) signals about the costs and benefits of the previously unpriced hydrological services are also increasingly held to be part of the solution. In particular, the introduction of water-related payments for ecosystem services (PES) would allow to internalize at least some of the previously unpaid externalities in economic decision-making of the parties involved (Engel et al., 2008; 2013; Muñoz-Piña et al. 2008).

This particular framing of water problems and the interconnected proposals for possible solutions is also held to apply to the context of Peru, and in particular to water scarcity problems in the catchments that provide water for the capital, Lima. Lima is the world’s second largest desert city with more than nine millions of inhabitants, suffering from severe water service problems, while being dependent for its water supply on three watersheds that all have their origin in the surrounding Andean mountains. In the context of increased water scarcity and the related new ‘market-based’ ideas about improved water (and environmental) governance, in 2014 Peru introduced a Law on Compensation and Reward Mechanisms for Ecosystem

Services (Ley de Mecanismos de Retribución por Servicios Ecosistémicos: MRSE-Law). Together with provisions of the general Water Law (2009) and the Law for the Modernization of Sanitation Services (2013), this sets the stage for the creation of new institutional arrangements between downstream water users and upstream suppliers of hydrological services. Practically, it implies that public water utilities and their national regulating agency SUNASS¹ are legally mandated to invest in their catchment areas and include specific levies in their tariff structure to fund them.

The MRSE law is still quite recent and only in its initial phase of implementation such that many uncertainties and doubts remain around this potentially crucial instrument for ecosystem service (ES) management. Our aim is therefore to try to constructively contribute to the debate about its opportunities and possible pitfalls. We will do so through a research of an explorative study for improved hydrological services governance in the upstream Andean community of Huamantanga². Within this project, CONDESAN³ and its partners promote an experimental research program for improving upstream ecosystem governance, partially building on and reviving age-old local practices of mamanteo water management as well as additional measures including the exclusion of certain upstream areas from grazing in order to increase hydrological services in terms of water yield and regular flow over the year (Gil, et al., 2015; Hommes, 2015). This primary aim of the project was to generate knowledge for improved local water governance, initially mainly focused on water for enhanced production in the communities of Huamantanga. Reflections about contributing to water for the capital Lima and the potential to benefit from the opportunities of the MRSE Law only appeared later, and in particular the latter remain hypothetical. It is in this perspective, that we use the initiative in Huamantanga as a case-study to analyze the opportunities and limitations of a possible connection with the compensation/reward mechanism under the MRSE law, aiming to improve upstream water management, while at the same time contributing to poverty alleviation.

Our case-study of the pilot project in Huamantanga, first of all, relied on insights and data that were obtained as part of the on-going action-research of CONDESAN, which had a regular field presence in the municipality since 2015. Although the main focus of their research was the water governance problem, it also involved an effort to gather basic socio-economic data in the municipality as well as to contribute to the municipal development plan. During the course of their presence in Huamantanga, CONDESAN was also recognized as a potential technical partner for organizations aiming to define ES-arrangements within the MRSE-Law at the national level. This induced the attempt of this paper to look at the case-study of Huamantanga as a potential site for an ES-agreement under the MRSE-Law (although the Chillón water catchment is not yet a part of the priority geographical area of the MRSE-Law). Except for a positive a priori in terms of the potential contribution of the MRSE-Law, this had no immediately influence on the more detailed analysis of the potential proposal in Huamantanga.

In view of our specific research objectives, this primary information, as generated

[1] *Superintendencia Nacional de Servicios de Saneamiento*: National Superintendence of Sanitation Services

[2] Our research is linked to a DFID/ESPA-financed project 'Adaptive governance of mountain ecosystem services for poverty alleviation enabled by environmental virtual observatories', involving a series of international partners with expertise in (mountain) hydrology as well as social (development) science, in particular also the Peruvian organization CONDESAN, specialized in catchment and ecosystem management in the Andean Region.

[3] *Consorcio para el Desarrollo Sostenible de la Ecorregión Andina*: Consortium for Sustainable Development of the Andean Ecoregion. It links nearly 100 institutions from 17 Latin American countries, with a focus on applied research, information exchange and policy development; committed to sustainable management of natural resources contributing to overcome poverty in the Andes region. For this purpose, it generates and shares information and knowledge on the environment and Andean rural societies. Since it was founded in 1993, CONDESAN has consolidated its position as an important Andean platform for issues related to natural resource management and sustainable development, particularly in water and watershed management. (see www.condesan.org)

and perceived by CONDESAN, was complemented with two rounds of data gathering by one of the authors (Velarde) in July and December 2015, facilitated by, but organized independently from CONDESAN. This included a total of 53 in-depth semi-structured interviews among the local inhabitants and local authorities, chosen from a purposive sample that aimed to capture the diversity of village stakeholders in terms of the two neighborhoods of the peasant community, gender, age, economic activity, livestock ownership, connection with the capital. This field research was complemented with semi-structured interviews with representatives of relevant national and Lima stakeholders, including CONDESAN itself (as a national level partner within the MRSE-Law), the Ministry of the Environment, the National Superintendence of Sanitation Services SUNASS and the NGO SPDA (Peruvian Society of Environmental Law).

In what follows, we first clarify our theoretical perspectives and then introduce the new MRSE-Law and the innovative water management initiatives in Huamantanga. Then, we present a detailed analysis of the development pathways in the village and describe the water management-local development project of CONDESAN in detail. In a final section, we present our analysis of this initiative from our powerladen institutional bricolage pathway perspective.

2. HYBRID PES ARRANGEMENTS AS POWER-LADEN INSTITUTIONAL BRICOLAGE

Currently, PES and other market-based initiatives inspire international policies of environmental governance (Wunder, 2015). Essential in this policy paradigm is the idea that natural ecosystems, usually co-produced through human intervention, provide a series of ecosystem services for the benefit of human beings. But as these services are considered as externalities (for which no prices nor markets are existent), they suffer from a mismatch between their provisioning (by ES-suppliers) and their utilization for production or consumption (by ES-users) (Wunder, 2005). The envisaged solution to this mismatch on which PES is based, is that resource users could be encouraged to adopt environmentally-sound practices that secure ecosystem conservation and/or restoration through conditional economic incentives from ES beneficiaries (e.g. urban water users, carbon-constrained electricity companies) (Engel et al. 2008; Wunder 2015). These conditional payments would both compensate ES-suppliers for the opportunity costs of the measures and investments needed to improve the provisioning of the ES by charging the additional costs of these ES-preserving actions or investments to the end-users. Inspired by a specific interpretation of the Coase theorem (1960), it is held that institutionally-simple direct incentives through conditional contracts will lead to expanded private conservation funding and to a more efficient allocation of scarce conservation resources (Ferraro & Simpson 2002). In its original theoretical specification, PES was viewed and proposed as a pure market-based transaction between individual willing ES-buyers and willing ES-sellers (Wunder, 2005). In the case of a water-related PES arrangement this usually implies an additional fee levied on the water bill of downstream water users which is then used to compensate upstream inhabitants of critical catchment areas for conservation of watershed ecosystems and/or for other management practices which are held to improve water supply (yield, regularity, sustainability) (Kosoy et al., 2007; Ortega-Pacheco et al., 2009; Southgate and Wunder, 2009; Van Hecken et al., 2012).

Wunder (2005:3) defined PES as “a voluntary transaction where a well-defined ES (or a land-use likely to secure that service) is ‘bought’ by an ES buyer from an ES provider if and only if the ES provider secures ES provision”. This approach to PES builds on a popular interpretation of the Coase theorem, which predicts that, if transaction costs are sufficiently low and property rights clearly defined and enforced, individual and voluntary bargaining will lead to the most efficient allocation of efforts to internalize externalities (Coase, 1960). By many, it was

interpreted as an argument to create and amplify decentralized markets in specific ES, replacing the deliberate top-down management of natural resources by market forces which would send more adequate signals to individual providers and users of ES (Gómez-Baggethun et al., 2010). A decade later, after substantial criticism of this original interpretation based on ample theoretical and empirical argument (e.g. Büscher et al., 2012; Muradian et al., 2010, 2013), Wunder replaced his original formulation with an adjusted, more general definition that describes PES as “voluntary transactions between service users and service providers that are conditional on agreed rules of natural resource management for generating offsite services” (Wunder, 2015:8). This new definition no longer speaks about transactions around particular ES, but rather about “agreed rules of natural resource management for generating offsite services”, thereby also explicitly eliminating the confusion due to the “inadequate market association” of the terms ES-buyers and ES-suppliers (Wunder, 2015:8). For many, this appended definition still does not sufficiently capture the findings of a range of empirical studies indicating that the real-world application of PES-principles practically always ends up with localized hybrid institutional arrangements, generated through inevitable processes of institutional bricolage of pre-existing as well as new authoritative guiding ideas, rules of the game and socio-organizational practices, and aiming to address both the original environmental and other social or political objectives (Van Hecken, et al, 2015:33-36). Clearly, today a broad consensus exists that the implementation of PES is not about the ‘simple’ creation of new markets in ES, but rather about the negotiation of particular institutional arrangements that contain an element of conditional payments by recognized beneficiaries to recognized service providers in case of compliance with agreed upon activities in view of desirable outcomes in terms of natural resources management. Despite widespread lip-service to the price-incentive market-based PES rhetoric, in actual practice these arrangements are not confined to free markets where nature and ES are commoditized, priced and traded. The use of a market narrative often reflects a pragmatic argumentative strategy rather than a genuine belief in market environmentalism (Sandbrook et al. 2013; Van Hecken et al. 2015a). The real world PES-arrangements in the end become a messy all-in-one-does-not-neatly-fit-anything arrangement, not unlike many integrated community development programs for which PES was originally assumed to be the more effective and efficient alternative. It thus seems to be a dangerous illusion to think that it is possible to propose a ‘simple’ top-down institutional crafting (to create an ‘ES-market’) to the messy socially embedded processes of interaction and mutual learning.

These ideas and reflections also bear on the recent Peruvian MRSE Law that aims to institute innovative arrangements between ES-providers and ES-receivers in order to improve environmental and water governance (see below). The identification and implementation of the new socio-institutional arrangements envisaged by the Law is not a straightforward exercise and needs to address many inter-related issues, inter alia:

- the specification of some underlying ‘model’ for the water/ecosystem management problem that one (cl)aims to address and how it can be improved (partially a technical-scientific matter, but also involving more tricky social boundary setting issues⁴, e.g. where to draw the borders of the relevant micro-catchment or how to define and distinguish between ES providers and ES users);
- the elaboration of an accompanying socio-institutional arrangement to sup-

[4] Boundary setting involves the definition of the conceptual lines (boundaries) that will demarcate the inside from the outside of the ‘system’, i.e. determine what is relevant or irrelevant (in our case for the water management problem) (Blackmore and Ison, 1998:41) .

port the improved ecosystem management (e.g. clarification, exclusion or limitation of use rights);

- the organization of additional labor activities;
- the specification of the baseline and the additionality in the ES service delivery (nature of entitlement; activities beyond the normal ‘duty of care’);
- the definition of the modalities for compensations and rewards (individual/collective, in kind/monetary, value, way of payment, etc.).

Even when there is no need for a fully worked out and empirically validated scientific model, the minimum challenge is to produce a plausible interpretative story that is convincing to the relevant stakeholders in order to secure engagement in the arrangement. Also, the specific socio-institutional arrangement can never be simply piloted from the outside into the local communities; it will inevitably be and need to become embedded into the existing socio-institutional arrangements (Kolinjivadi et al., 2017; McElwee, 2012; Shapiro-Garza, 2013; Van Hecken et al., 2015a). As already indicated above, the straightforward social engineering of a single purpose socio-institutional arrangement just for the water problem is far from being straightforward, as it will unavoidably give rise to a complex, interactive and (explicit or implicit) process of institutional ‘bricolage’ in which different relevant stakeholders piece together justifying principles and other authoritative resources, informing evolving local rules-in-use as well as social and individual practices in the local context (Clever, 2002, 2012).

In this way, the arrangements promoted under the Peruvian MRSE law will become an embedded instituted chunk of the broader local socio-institutional context, thereby either contributing to positive or to negative overall institutional change. Although poverty reduction is not a declared objective of the Peruvian MRSE Law, in the general ecosystem debate it is often implied that the arrangements generate win-win outcomes and therefore also contribute to reduce poverty as the poor (e.g. upland farmers in the Andes) are often the potential providers of ES (Pagiola, et al., 2005). If –as is the case in the program in Huamantanga (see below)- it is one’s concern for these arrangements to become the envisaged win-win solution in terms of both improved ES service delivery as well as reduced poverty and social inclusion this process of institutional bricolage becomes an even more critical issue. As indicated by Shapiro-Garza (2013), PES policies are often reworked on the ground –precisely through the process of institutional bricolage- to accommodate more social objectives beyond the initial market-based environmental agendas. However, there is nothing automatic about the positive outcome of the process of institutional bricolage as the mediating power dynamics can turn out to be poverty enhancing rather than reducing (Clever, 2005). Societal characteristics, like poverty, inequity and social exclusion should indeed not be treated as a residual problem, where some people almost by accident have a lack of income or end up being marginalized. Rather, they should be seen as the fundamental outcomes of locally grounded relational processes in which people’s capabilities to shape the life that they value (Sen, 1999) are both enabled and constrained by socio-institutional arrangements that determine their access to resources and their ways to valorize them (Bastiaensen, et al., 2015a:13; Johnson, 2012). Here, the critical issue is that the impoverished, excluded people who live in poverty “are those human beings who, for one reason or another, almost systematically end up at the losing end of the multiple bargains that are struck around available resources and opportunities” (Bastiaensen, et al, 2005:981). More generally, we can say that the distribution of human capabilities, and more particularly their ‘rela-

tive deprivation' in certain social groups is intimately related to the nature of the distribution of bargaining power in the institutional context in which these groups are immersed, enabling or constraining them to put into effect the adjustments they might desire for their livelihood trajectories. The power-laden process of institutional bricolage, when attempting to introduce new institutional arrangements for water management, precisely implies explicit and implicit negotiations between a variety of actors with significant differences in relative practical and discursive power, thereby automatically affecting the distribution of human capabilities.

As we have elaborated elsewhere (Bastiaensen, et al., 2015a, b), the possible livelihood trajectories of rural inhabitants critically depend upon the emergent crystallization of particular development pathways that condition the opportunities for different groups of people. Such a pathway can be understood as a “set of shared ideas that inspire the actions of the actors, their organizations and their social networks, and rules of the game that govern the interactions among the actors around certain economic activities”, which “generates and expands opportunities for certain types of individual development trajectories, and dynamically incorporates feedback from those trajectories that reproduce their ideas, networks, organizations and rules of the game.” (Bastiaensen, et al., 2015:31) As argued by De Haan and Zoomers (2005:40), the pathway concept adequately contextualizes individual decision-making and opportunities as an at least partially collective and not always fully conscious process. They indicate that individual livelihood strategies are connected to shared livelihood styles, i.e. “a specific cultural repertoire composed of shared experiences, knowledge, insights, interests, prospects and interpretations of the context; an integrated set of practices and artefacts (crop varieties, instruments, cattle); a specific ordering of the interrelations with the markets, technology and institutions, and responses to policies.” The structural conditions that shape these pathways and associated livelihood styles, both in terms of its cognitive content and social, economic and technological practices, are precisely the outcome of the above mentioned power-laden process of institutional bricolage to which the proposed ES-arrangements are inevitably articulated. It is therefore from this perspective of power-laden bricolage and its effects on the emerging development pathways, opening or closing opportunities for particular groups, that we will analyze our case study in Huamantanga.

3. THE PERUVIAN MRSE LAW AND THE WATER PROJECT IN HUAMANTANGA.

The MRSE-Law in Peru is an innovative legal initiative, inspired by the broader movement for Payments for Ecosystem Services, which generates the possibility to create management agreements and compensation and reward mechanisms between ES-users and ES-providers with the aim to improve ES governance. Interestingly, the Peruvian Law does not adopt a strict market-based perspective. There is no use of the terminology of ‘payments’, which would suggest a monetary transfer for an agreed service delivery (in line with the market-idea), but rather of the broader term ‘compensation and reward mechanisms: (mecanismos de retribución)’, i.e. “schemes, tools, instruments and incentives to generate, canalize, transfer and invest (financial and non-financial) economic resources, in the framework of an arrangement between contributors and users of an ecosystem service, oriented at the conservation, restoration and sustainable use of the source of the ecosystem services.” (MRSE-Law, art.3.c., own translation⁵). This formulation is open to both ‘compensations’ (related to the opportunity

[5] **Mecanismos de retribución por servicios ecosistémicos.** Son los esquemas, herramientas, instrumentos e incentivos para generar, canalizar, transferir e invertir recursos económicos, *fi* nancieros y *no fi* nancieros, donde se establece un acuerdo entre contribuyentes y retribuyentes al servicio ecosistémico, orientado

costs of not exercising one's entitlements) and 'rewards' (related to additional efforts not currently done), and also implies that the transfer needs not to be in monetary form. According to the law, the ES-receivers can be natural or legal persons, public or private organizations, that voluntarily decide to enter into an agreement with and compensate the providers of certain ES in view of their perception of a derived economic, social or environmental benefit. In the same vein, the ES-providers can be natural or legal persons, public or private organizations that freely agree to contribute to the arrangement with actions oriented to the conservation, recovery and/or sustainable use of the ES-producing ecosystems. It is worth noting that the compensation or reward is targeted at actions for the action with a perceived ES impact and not at for the actual delivery of the ES; the receivers will monitor and compensate/reward the providers based on ex ante agreed upon the type of activities. Also government institutions can contribute to the financing of such mechanisms, be it only through a project under the national public investment system, implemented and monitored by local or regional governments. Direct payments to individuals or even communities are not allowed from public institutions, but indirect collective compensations or rewards in the form of green or other public investment projects are possible.

Critically important in this context is also that the public water utilities (in our case: SEDAPAL⁶) and their regulating agency SUNASS are legally motivated to develop and execute investments in their catchment areas and to finance them from additional levies in their tariff structure. Under the regulation and supervision of SUNASS, water utilities are in particular incited to invest resources oriented to improve natural ("green") infrastructure as well as actions aimed at the conservation, recovery and sustainable use of the catchments that are assumed to contribute to the provisioning of hydrological services critical for the water supply coming from the catchment. As for the additional levies, since 2015 Lima's water utility SEDAPAL is applying an additional 1% in the current water bill that aims to finance investments in improved management practices in water catchments that supply water to the capital. An additional 4% levy is included for interventions in the context of the adaptation to climate change. According to (SUNASS, 2015), this will generate an estimated 35.8 million soles (about 21,2 Million USD) over a five year period. In other words, funds are available, but up to now no investments have been realized since concrete projects are still in the preparation phase.

4. DEVELOPMENT PATHWAYS AND WATER IN HUAMANTANGA

Huamantanga is located in the Lima Region of Peru and has about 600 inhabitants. It consists of an urban center at 3400 m above sea level, surrounded by an area of approximately 98.5 km² of natural pastures and cultivated land (Perez and De Brièvre, 2015). Land is in principle communally owned and has a large altitudinal range from 1600m to 4600m. In the lower altitudes, land is used to grow crops such as corn as well as fruit trees such as apple, avocado and lemon. In the mid and higher altitudes, staple food crops such as potato, wheat and barley as well as fodder (mainly alfalfa⁷) are grown. Cheese production from bovine cattle has gradually become the most important productive activity. In the higher altitudes, the land consists mostly of non-cultivated land to graze cattle (see also below). Alternatives for non-farm employment are limited. Besides the dominant peasant group, there are no more than thirty habitants that own local small businesses, such as restaurants, small groceries, and buses that daily carry passengers to Lima. This small group is most concerned with the promotion of tourism, related to

a la conservación, recuperación y uso sostenible de las fuentes de los servicios ecosistémicos.

[6] Servicio de Agua Potable y Alcantarillado de Lima: service for drinking water and sanitation of Lima

[7] Alfalfa or lucerne is a perennial pea plant (same family as clover) which is mainly used as a fodder crop.

the religious celebrations of the local Saint and the presence of pre-inca ruins, which are also a part of the communal highland.

Formally, Huamatanga is a historic peasant community, which according to the General Law of Peasant Communities, is represented and ruled by a President and a Communal Assembly. The community is divided in two neighborhoods: Anduy (76 comuneros) and Shigual (52 comuneros). In principle, the comuneros are male household heads who assume community membership in representation of their family and only men attend the meetings. Widows can substitute for their deceased husbands, and exceptionally also single mothers are accepted, but this cannot avoid to create a serious patriarchal gender bias in communal decision making, leaving women without direct capacity of opinion or decision, in particular concerning productive-economic issues. Each of the neighborhoods defines and implements land and water policies, which apply to the comuneros whose access to communal water, land and pastures is conditional upon the active membership of the community. Comuneros participate and vote in the communal assemblies as well as in the (rotative) management tasks and collective activities that are decided within the assembly, including the active partaking in the yearly catholic patronal fiestas which are a quite costly endeavor.

Local peasants have the possibility to buy or rent private land and it has gradually become more important as a share of total land. As private landownership contradicts the historical logic of the peasant community, one can observe a certain lack of transparency about the topic. As a consequence, we registered quite varied estimates about the share of private land in total available land, ranging between 15% and 50% (40% according to the Community President). Yet, about half of the local farmers would not have access to any land and for most members access to the communal territory managed and distributed by the communal assemblies of each neighborhood remains the most important. In this context, the assemblies manage three types of land: 'land of reparto' (distribution) and 'land of possession' in the medium and lower areas, and 'communal land' mainly in the mountainous uplands. 'Land of reparto' refers to plots and parcels that are distributed every year to grow annual (mainly food) crops in Anduy and Shigual; 'land of possession' is allocated to each peasant for ten years in Anduy and for lifetime in Shigual⁸. Extensive parts of the communal downstream land are not exploited due to the scarcity of water and the distance from the community. As fodder (alfalfa) is a semi-permanent crop that lasts approximately 5 years, it is not sown in the communal nor the reparto land, but only in private or possession land. 'Communal land' is used by the peasants to feed their bovine cattle. Every year during the rainy season, upland grazing areas are closed to cattle for a period of two to three months (January-March) in order to allow for the regeneration of the pastures.

Since ancient times, water has been a critical resource for the irrigation of agricultural and/or fodder production in this dry mountain area. Each neighborhood manages its own local water basin, administered by an internal Irrigation Board, which captures water from different hydric sources located in the community's upper land. Recently there is increased concern about rising water shortage related to changes in local productive practices as well as climate change. Farmers explain how the rainy seasons historically used to start in October, but how in recent years the rain arrived until the end of December or beginning of January.

"I remember that when I was a child it was already heavily raining in this period (December), pasture were green, but today December is ending and it not raining at all (...) this affects cattle and agriculture since there is no pasture and one cannot sow (...) I do not sow since there is no water;

[8] The family needs to return the plots to the neighborhood once both comuneros (wife and husband) have passed away.

if I were to sow two or three chacras: how would I irrigate them afterwards? Just to let them dry?”
 (Peasant woman, interview, July 2015).

Not only agricultural crops, but also cattle suffer from water shortages. During dry seasons, a considerable percentage of animals are often in jeopardy and must be sold under distress because of insufficient water and pastures caused by the delay of rainfalls. The only way for peasants to avoid this negative outcome is to buy animal feed in Lima, affecting the profitability of cattle raising and therefore usually only done to maintain expensive improved cattle (see below).

Concerns about water have contributed to the maintenance of the pre-Inca practice of mamanteo which consists in the deliberate canalization of rainy season water in upstream areas to enhance its infiltration into the mountain soil in order to keep and make it available during the dry season when it seeps back through numerous wells. Despite the critical importance of water for irrigation and human consumption (and the local awareness of this), collective action problems in the context of labor shortages as well as lack of knowledge make these practices imperfect and erode some of these ancient practices (e.g. abandonment of existing infiltration canals). This view is also shared by the President of the community:

“A number of persons appointed by each neighborhood go up to look after the water: to do mamanteo so that the water does not run off through the gullies. But nevertheless, much water is running off through the gullies (...) this water runs to the Chillón and this water ends in the sea and is lost.”
 (President of the community, interview, July 2015)⁹

According to inherited cultural principles, also expressed in the General Law of Peasant Communities (art. 7,8,11) access to communal land and water is governed according to strict equality principles. A common right to land is attributed to the comuneros and plots are distributed through a lottery system. All community members also have the right to receive the same amount of water, i.e. currently one turn of six hours every two weeks through a collective gravity-fed water system. Although the community statutes formally prohibit the sale of water turns, in practice it has however become socially acceptable and quite common. This is associated with an increasing penetration of market logics due to better connectivity (all weather road, communication technology) and access to product markets. This caused a gradual drop in local agricultural production for subsistence and an increasing specialization in cheese production for the market, thus transforming the historical pathway. The erosion of the egalitarian values and practices of the historical peasant community is also thoroughly affected by the widespread and massive out-migration of young people, contributing to labor scarcity in many families. Today 41% of households are composed of the married couple only, without any children left under the roof, as the younger population migrates to the city of Lima for studies or for employment (Perez and De Brièvre, 2015). As expressed in the following citation, they tend not to return to the village: “Of those who are going lately, not even one returns. 10 leaves, 10 don’t come back. Before, few were those who left, but nowadays everything is Lima” (Local inhabitant, June 2015)¹⁰.

[9] Note also that the president does not seem to realize (or to recognize) that most of the ‘run-off water’ is actually used for water consumption downstream.

[10] Nevertheless, there is a fluent communication with those who have left the community. In general, they return for the religious feast, holidays or sport competitions, and some of the adults who live in Lima send money to their elder parents or for the communal parties. Most of the cases, however, locals used to co-finance the studies and/or living expenses of their children in the city, supporting them with money and crops as potatoes. When some of the young migrants visit Huamantanga for holidays or short periods, they help with the daily activities in agriculture, cattle or domestic work. Migrants also bring to Huamantanga modern items from the capital, as toys to their younger siblings. With few exceptions, migrants are not involved in the political management of the community, or in the economic support for livelihood activities in the town.

Despite the strong egalitarian peasant ethos, we should however not assume that internal relationships in general and decision-making process within the community assemblies in particular are always an expression of horizontal and egalitarian democratic relationships. Differences in communication skills and outside connectivity as well as increasing economic inequality and deepening dependency of poorer to richer farmers clearly affect the relative power and influence of the different comuneros, which might lead to social biases in decisions taken, and as we already indicated above women are excluded from this decision-making altogether.

Turning now, more explicitly at the conceptual lens that we introduced above, we observe an emerging shift in terms of local development pathways. Historically, we can discern a dominant and widely shared '**peasant subsistence pathway**' based upon the combination of local subsistence agriculture in the lower/mid-high areas and traditional subsistence-oriented cattle raising with so-called chusco cattle. The latter is taken to graze in the upland communal pastures in the mountains for several months per year, while depending on agricultural stubble on post-harvest reparto land and pastures in lower level possession and private land during the rest of the year. This low productivity and hardly commoditized pathway, based on the equal distribution of land and water to largely similar peasant families, resulted in quite egalitarian economic outcomes. This historical pathway gradually gives way to an emergent '**alfalfa-cattle market pathway**'. Nowadays, comuneros are prioritizing cattle, and market-oriented cheese production, over the agriculture as their main source of livelihood due to its relatively higher profitability, lower physical effort and labor requirements as well as the advantage that it produces a continuous income stream spread over the entire year. Based on our fieldwork findings and the social diagnosis of CONDESAN (Perez and De Brièvre, 2015), today around 40% of the peasants within the community still raise local chusco cattle. This cattle is adapted to the high altitude and can be fed with natural grass, requiring only small portions of food, but at the same time produces low amounts of milk (3-5Lt/day). The other 40% raise cattle of mixed race (Holstein or Brown Suisse mixed with chusco). This cattle produces more milk (5-8Lt/day) and can survive high altitude, but also requires better quality and quantity of additional (produced) fodder. The remaining 20% possesses improved cattle, mostly of a relatively pure Holstein breed. This is characterized by the highest milk production (10-14 Lt/day), but these animals need a high quantity of fodder grass and are not able to live in the highlands. In the strategy to improve the quality of livestock, having access to a high quality and quantity of pastures and/or fodder thus becomes an essential condition to translate the higher expected profitability into reality. For instance, if the improved cattle consumes only dry pastures its milk production is reduced by half (4-5Lt/day). (see table 1)

Table 1: Estimates for average daily milk yield in HUAMATANGA under different feed regimes.

Breed	Fodder	Green pastures	Dry pastures
Improved cattle	10-14 Lts	8-10 Lts	4-5 Lts
Mixed cattle	7-8 Lts	5-6 Lts	3-5 Lts
Chusco cattle	4-5 lts	4-5 lts	2- 4 Lts

Source: Estimates obtained during field work, and Perez and De Brièvre, 2015.

The improvement of the cattle is also closely related with age and the available labour force. Active producers around 30 or 50 years old are more inclined to invest in improved animals, due to their longer pay-off, more openness to innovation and family support (wife and children). Conversely, older adults often live alone and need to hire farm workers in order to cultivate their land and take care of their animals. In consequence, the latter generally only possess a few chusco animals and sow only small plots often for self-consumption to complement the food they get from other sources. Nevertheless, poorer farmers in both neighborhoods still critically depend on traditional cattle and intensive use of the upland common pastures. Chuscos require low effort and caring, making them relatively more convenient for older peasants. Moreover, they do not need to rent or possess private land since this cattle stays in communal highlands during months, in combination with the communal farmyards downstream.

These evolutions also go together with an overall erosion of inherited (equality) values and practices within the peasant communities. In general, villagers without land or insufficient labor to cultivate sell their turns to the peasants that, mostly, are inside the emergent pathway. Additionally, some cattle breeders are looking to create associations outside the community. Their ultimate purpose is to divide the still free communal land between members (with lifelong access) to grow fodder. Furthermore, they are looking for alternative water sources besides their communal water turns, especially for their private lands. These tendencies are linked with critiques regarding the inefficient organization of the neighborhoods and with the erosion of the communal governance structure under the pressure of non-peasant values, which is interacting with the emerging cattle pathway:

“We need the community in order to be an agriculturalist, but not for being a cattle breeder since you can breed the cattle inside stables or private land” (comunero from Shigual, 2015).

5. INCREASING WATER PRODUCTION IN HUAMANTANGA

Within this evolving context, there is an on-going experimental intervention cum participative research program: “The Regional Initiative of Hydrological Monitoring in Andean Ecosystems (IMHEA)”, locally coordinated by the Consortium for the Sustainable Development of Andean Ecoregion (CONDESAN), which is currently generating knowledge about the influence of land use practices on the hydrology dynamics in different places (countries) of the Andean region. In the case of Huamantanga, more specifically, the research is focused on the strengthening, restoration and improvement of existing mamanteo practices as well as the impact of a reduction in overgrazing which should lead to a better conservation of natural land cover (natural pasture) in the uplands and thereby to an improvement of the infiltration and the regulation of water flows seeping through the mountains over the year. For the local communities, the project implies additional work on mamanteo and –a more revolutionary proposal- to close off part of the upstream pasture land in order to avoid overgrazing and trampling of the land by the cattle. The intervention is inspired by ideas about endogenous adaptive governance, including the need to empower local actors to become co-generators of knowledge and conservation actions (Karpouzoglou, et al., 2016). Therefore, CONDESAN tried to adopt a participatory citizens science methodology (Buytaert, et al., 2014) of co-learning with the two neighborhoods, Shigual and Anduy, and to articulate its water research project to support for a renewed local development agenda. For sure, this process was not without its deficiencies and pitfalls, as resources and time did not abound to optimally facilitate the local processes. They also require the necessary time to allow for building mutual trust and convince people of the real prospects

and the legitimacy of the proposed processes and projects. Especially, in the first phase of the intervention, complaints about a lack of transparency and even rumors about collusion between CONDESAN and SEDAPAL at the detriment of the local community could be heard, like in the following quote reported from an interview in June 2015.

“They don’t inform, we don’t know the benefits (...) exactly what they are looking for. Not just ‘close the highland because, if the cattle don’t entry, pastures retain better the water’. But, how much more water? Which are their personal, political benefits? from where to where you want to close? The lack of information implies that we don’t know how it is going to be, nor why” (Farmer woman, interview, June 2015).

The initial research set-up included the identification of two small catchments on the highlands of about 1 square kilometer, one next to the other; the installation of rainfall and river flow sensors in each of them; and the avoidance of cattle entrance to one of the catchments such as to have a counterfactual for the ‘closure of the highland for grazing’ treatment. However, in July 2015 during an extra-ordinary joint community assembly after one year of the installation of the water flow measurement instruments, some of the more vocal comuneros argued that protecting only one catchment would undeservedly favor a particular neighborhood and therefore could not be justified. It was therefore decided that both of the catchments would be closed and the effect of the measures evaluated through a comparison with the historical baseline data. Afterwards, several interviews revealed that this decision was not unanimous supported and off-the-record strongly contested, in particular by several comuneros of the Shigual neighborhood who were more dependent on chusco cattle. In practice, adjustments therefore had to be made as some cattle was still allowed in the uplands in both catchments under monitoring, due to the effect of insufficient rainfall and an excessive reduction in the availability of lowland pastures. Of course, these adjustments, which in themselves are an illustration of the inevitable institutional bricolage that occurs when trying to introduce new logics and arrangements in a living social context, somewhat seem to disturb the neatness of the initial scientific research design. Yet, they might also offer a higher probability of appropriation and local legitimacy, at least if there generate more broadly shared support, which in our case-study seemed to apply more to Anduy than Shigual. This can be derived from the participation of the comuneros of Anduy in the collective work to delimit the protected zone (with painted stones as markers) and the lack of it in Shigual. Also, it needs to be stressed that the ‘closure of the highland for grazing’ treatment in the initial experimental set-up does not really fully capture what is at stake: the conservation intervention needed is indeed not a complete stop of upland grazing, but rather a reduction in destructive overgrazing which allows for a restoration of the upland vegetation cover^[12]. At the same time, it is precisely also the active involvement of the comuneros in the citizens science framework that has generated the necessary local support for a more intense improved practice of mamanteo. These improvements were informed by increased knowledge about the hydrological processes within the mountains obtained as a result of the joint review of these practices, mapping out water reservoirs and infiltration channels and residence time of the water in the soil, permitting to identify where most gains could be expected.

[11] Initial narratives, also used by CONDESAN, were speaking of the need for a more radical and complete closure of the uplands for grazing. As these were unacceptable for too many comuneros, they did not contribute to the negotiation of a viable and suitable arrangements and subsequently had to be changed.

[12] Other specific problems also imply the practical impossibility of imposing a complete stop on upland grazing. There are, for example, around 250 to 400 wild cattle that stay permanently in the upland; these *bravos* have an important community function as they provide for free meat during the annual *Fiestas Patronales*. Another problem is that the upland cannot really be fenced (for economic reasons) and some parts are shared with other communities.

During the course of these joint efforts to increase knowledge and strengthen practices of water management in Huamantanga, the idea (or possibly also the hope) arose that the innovative local arrangements could offer the prospect of a possible voluntary arrangement between the community and the public water utility, SEDAPAL, under the framework of the MRSE-Law. Since improved hydrological management in the upstream communities like Huamantanga should also generate an increased and seasonally more stable water flow for downstream consumers, including those from the capital Lima, there is –at least potentially– an underlying justification for a win-win agreements as envisaged under the Law. Currently, the inhabitants of the Chillón catchment, to which Huamantanga belongs, utilize an estimated 40% of its water, while the rest flows downstream where it is not lost to the sea (as the President of the Community seemed to think), but to a large extent used by SEDAPAL for water consumption in Lima. Also being a technical partner of the ‘Incubator for ES Reward Mechanisms’ under the MRSE-Law and even though Huamantanga is not yet included in the areas of the MRSE-LAW, CONDESAN has been reflecting on the possibility to develop a MRSE-proposal that would allow to articulate Huamantanga’s local development efforts with a financial contribution from SEDAPAL, while co-generating hydrological service benefits for Lima water users. Following the legal provisions, this could take the form of SEDAPAL funding for Huamantanga’s Public Investment Project, including both conservation and productive activities.

One of the issues that still needs clarification is how the new arrangement and the connected local development plan will not only affect the absolute levels of water, but also the relative distribution between the upstream communities and the downstream water consumers. The technological part of the local development project not only aims to stimulate production, but also to increase the efficiency of water use in irrigation, potentially contributing to lower local water demand, or at least not to increase it with growing production. Yet, a somewhat tricky political question about who ultimately has the legitimate use rights over these water resources looms behind this issue¹³.

Given the novelty of the kind of integrated efforts in Huamantanga (and its potential with the MRSE-Law), there is apparently quite some interest of relevant stakeholders, including SUNASS and the Ministry of the Environment, in this innovative experience which could generate insights and provide a model for replication at a broader scale. One important aspect of the current Law is that it leaves much of the details of the arrangements to the public and private parties involved and only provides for their very general principles. For some, this amounts to the neo-liberal state renouncing its responsibilities:

“Under this neoliberal logic, the main risk in Peru is accustoming the state to just establish the rules of the game, leaving third parties (providers and receivers) to make the agreements, doing nothing else”. (J. Capella. Environmental Lawyer of the Peruvian Society for Environmental Law,¹⁴ Interview, April 12016).

Whether or not there is a need for more stringent state regulation in this context is a debate in itself, which we do not engage with in the present analysis, but what is quite clear is

[13] In general, the local stakeholders usually do not have much influence in the political arenas where powerful governmental and other outsiders decide such issues. In an extreme scenario, the government could indeed even have the legal opportunity to sequester local water rights, arguing that the human consumption is than irrigation or agriculture purposes. (interview at Ministry of the Environment, March 2016) However, for the moment this is still an unlikely hypothetical script, and the intervention of CONDESAN towards an MRSE-arrangement with SEDAPAL actually aims to level the playing field with the powerful outsiders and would de facto legitimate the communities’ property rights.

[14] *Sociedad Peruana de Derecho Ambiental (SPDA)*

that at this moment there is first of all a need for more real world experiences and locally contextualized research in order to generate better knowledge about what kind of arrangements would be beneficial and –if necessary- what kind of practices and regulations would have to be promoted by different stakeholders, including the state. This is precisely the aim of the analysis of the Huamantanga case that we present here.

6. PERSPECTIVES FOR THE IMPLEMENTATION OF THE MRSE LAW IN A WATER CONTEXT: DISCUSSION

In this final part of the article, we now briefly analyze and further discuss this attempt to develop and implement a proposal for enhanced water management cum local inclusive development in Huamantanga, mobilizing also the conceptual perspective about development pathways and institutional bricolage in PES-initiatives that we introduced above.

A first important observation is that CONDESAN from the very beginning of the ESPA-funded project has developed this experience with the explicit objective to realize a win-win for both the ‘environment’ and ‘local development’. The purpose was never just to identify and propose measures to enhance water management, but always also to connect these improvements with gains in terms of local well-being and participation for all inhabitants, and in particular also the more vulnerable. The key building blocks to achieve this were the promotion of a collective agreement and participative adaptive governance-citizens science process at the level of the peasant community and the elaboration and implementation of an inclusive local development project that is aimed to be connected to a Public Investment Project, which might potentially also be (co)financed by SEDAPAL under an MRSE-arrangement.

In view of the social objectives, the initial phase of the intervention consisted of an ample social diagnostic, which generated much of the basic information and insights with which we have been able to inform our pathways’ interpretation presented above. This diagnostic also informed the joint definition of the envisaged local development strategy cum Public Investment Project. Given the on-going dynamics of privatization and partial erosion of the values of the peasant community, connected to the emergence of the ‘cattle modernization-alfalfa’ pathway, one evident risk is that the proposed measures could further deepen the emerging social differentiation, making it even more difficult for more vulnerable producers, today with mainly chusco or mixed cattle, to survive. The intervention could end up putting even more pressure on these to renounce access to communal land and sell their water turns (with now enhanced water flow) to relatively richer farmers with improved cattle allowing them to expand their herds and alfalfa-production on ever more privatized land. We believe such a scenario would be undesirable from a social inclusion and poverty-reduction perspective, and could also undermine current and future support for the collective action of a sufficient majority of the community, necessary to sustain improved mamanteo and compliance with the closure of the uplands. An exclusive focus on the hydrological problems and an unaccompanied decision to close the uplands in order to generate ‘more water for the community and SEDAPAL’ would have unacceptable distributional consequences and –in fact- amount to the dispossession of part of the community from access to natural resources which they have been entitled to for generations. A first lesson to be learned from the Huamantanga experience is therefore clearly that with the implementation of the MRSE-Law, it is key not to lose sight of such (possibly unintended and easily invisible) distributional implications of the committed conservation actions. In the case of Huamantanga, the sensitivity and (differential) importance of the costs imposed by the closure of or even the

reduction of grazing in the uplands is clearly demonstrated, first in the opposition to the initial comparative counterfactual research design which would favor one community over the other, and second in the resistance to fully comply with the agreed closure in the face of drought.

Trying to take into account of distributional sensitivities as well as its the intrinsic objectives to achieve the conservation-development win-win, CONDESAN opted to build upon (and possibly reviving/strengthening) local practices of cooperation (in particular also, but not limited to mamanteo and other water management tasks). As already indicated above for the water management component, the integrated local water management cum development strategy (and the associated public investment project) is the result of an attempt at joint knowledge generation, where CONDESAN, bringing in its technical expertise and informed by the results of its social diagnostic, an additional survey as well as consultation and joint reflection with selected stakeholders, took responsibility to systematize and connect the knowledge with the proposed development initiatives in the potential MRSE-proposal¹⁵. The result is a development strategy which attempts to avoid imposing a too radical and quick change, nor to side exclusively with the emergent cattle-alfalfa market pathway, -at least in theory- leaving other (organic) agricultural options for the comuneros, which does however not impede that most of proposed actions to promote better livelihoods at lower altitude focus on improved grazing and irrigation technology (also for alfalfa). The strategy recognizes the existence and right to support of different types of producers, with most of them indeed increasingly focused on cattle and cheese production (be it not necessarily wanting or able to jump to improved cattle), but many still interested in complementary agricultural activities –in particular the expansion of ‘newer’ activities such as fruit production. Instead of promoting the production of alfalfa and other fodder crops, the emphasis is also on training, new technology and organization for more effective irrigation, improvement and better (rotational) management of pastures on possession land. Furthermore, the strategy also acknowledges that some of the envisaged measures, in particular the closure of the uplands, cannot be implemented and imposed without concern for the immediate survival needs of local producers, at the risk of undermining legitimacy and support for the proposed changes. A transition period and temporal exceptions needed to be allowed for, evidently without eroding the option for a continuing reduction of the current overgrazing practices. Up to now, the result seems to be a sufficiently broad support and adequate local legitimacy for the overall package of conservation and water management measures as well as the envisaged, diversified local productive strategies, already implemented (with initial CONDESAN funding), but in need of future support which should come in the form of a jointly elaborated Public Investment Project funded under a possible MRSE-agreement with SEDAPAL.

The second lesson from the Huamantanga experience is therefore that such sufficiently wide, participative, joint knowledge generation processes are a key condition for the viability and sustainability of MRSE-agreements. Therefore we think it is necessary to complement the conclusion of Quintero and Parejo (2017, own translation) that “once the legal aspects have been dealt with”, the MRSE agreements “are confronted with other bottlenecks mainly related to technical capacities, financial sustainability and the good governance of the schemes.” Indeed, these bottleneck are certainly also important, yet an exclusive focus on merely tech-

[15] Given the heterogeneous and unarticulated nature of communities like Huamantanga, and the limited time and resources of CONDESAN, this process of closure of the joint knowledge generation process is unavoidably problematic. It should therefore not come as a surprise that the outcome faces (at least some) local contestation, for example, for not taking into account the proposal to reintroduce vicuñas in order to replace the problematic bovine cattle which would have much less negative impact on soil erosion and trampling. (interview during second fieldwork) Take note that this would also represent in some ways a return to a kind of communal joint production which is not in line with current evolutions to more individual production and privatization.

nical operational issues of the MRSE-scheme itself overlooks the challenges of embedding and legitimating the MRSE-arrangements within the pre-existing socio-institutional environment. Such embedding can require conscious adaptation by outside institutional engineers (incubators), but more often is also the partially unplanned outcome of emerging institutional bricolage which can only be adequately dealt with in a flexible joint learning mode. Echoing crucial insights from other studies, a certain degree of local perceptions of fairness, i.e. the perception of a sufficiently large part of the stakeholders that the arrangement is in line with the basic principles of local justice, must also be achieved if one wants to avoid the breakdown of and subsequent non-compliance with the arrangement (see e.g. McDermott et al., 2013; Pascual et al., 2014). In order to achieve this it is wise to build upon entrenched egalitarian community values, but –due to emerging inequalities and power differences- a deliberate intervention of the incubator to level the playing field among local stakeholders, and between local and outside stakeholders is strongly advised. It is indeed a well-known paradox of participatory processes that they tend to reflect and impose the dominant views of the more influential community members, often colluding with outside interests (Mosse, 2001).

Finally, much of the above also confirms an arguably positive characteristic of the MRSE-Law: i.e. its institutional flexibility allowing for the kind of hybrid and bendable adaptive arrangement that has come out of the experimental consultative process in Huamantanga¹⁶. Even when the proposed MRSE-arrangement –if accepted- evidently contains an element of conditional payments, both rewards for ES-provisioning (mamanteo) and compensation for income forgone due to reduced grazing, there is no strict monetary transaction around ES provided and even less in terms of clearly measurable results in terms of improved water outcomes. First, this is because the law recognizes that it is always the ecosystem, only partially under the control and influence of human activities, which is the ultimate provider of the services, and therefore it can be quite difficult to attribute impact in terms of ecosystem service delivery to the envisaged changes in human activity. It does however not imply that the water utilities would ultimately not be interested in the ‘water yield’ associated with the improved ES-management; this is clearly their primary concern as well as the basis for a legitimate use of the extra levy in the water tariff for which they are monitored by SUNASS and the Ministry of the Environment (interview, June 26, 2015). There is however no need for a scientifically established a priori proof of a particular impact in exchange for which the MRSE-payment would be determined. In theory, this allows for an accommodation to a somewhat less rigorous citizens’ science research approach establishing plausible impact as well as to a more feasible gradual transition process rather than the imposition of radical (often exclusionary) measures.

A second dimension of hybridity is related to the institutional constraint, imposed on public actors (including water utilities like SEDAPAL), to only contribute to such arrangements in the form of a public investment project. The clearly disturbs a pure market logic –even when the investment project is viewed as compensation or reward for ES-provisioning- since it usually requires some form of collective concertation, tends to privilege investments in collective infrastructure and strategies, even when individual payments are not necessarily excluded, and seems to beg for a public partner on the other side: the peasant community in the case of Huamantanga. Even when this might not have been the explicit aim of the Law, this can be helpful to promote the kind of MRSE-arrangements that strengthen or revive peasant communities, as they become the logical partners of such arrangements. At the same time, however,

[16] In this sense, the MRSE-Law is in line with a broad consensus in the literature about PES, i.e. that these arrangements are –almost by definition- hybrid arrangements and outcomes of complex institutional bricolage.

because the organization of the peasant communities is quite weak and gradually eroded under the emergent alfalfa-cattle market pathway such a strengthening is far from automatic and collusion between the more powerful local and outside interest can also make them instrumental in the further deepening of inequality and even their own demise.

CONCLUSION

With the MRSE-law, Peru is one of the first countries in the world to introduce a specific law to promote and regulate compensations and rewards for ecosystem services, aiming to prevent irrational over-exploitation and destruction of scarce natural resources, including water. Given that the MRSE-law often affects poor communities, many also hope that by contributing to poverty reduction it can be turned into an additional policy tool to achieve a social-environmental win-win¹⁷. Through the case-study in Huamantanga, this paper demonstrates both the potential and the risks of the new PES-arrangements made possible under the Law. For the moment, the relative lack of specific, standardized provisions and regulation under the MRSE-Law can be judged positive, as it allows the flexibility for the creation of context-specific arrangements that address the complex specificities of each particular community. We have shown that the definition and introduction of a PES-arrangement inevitably implies a power-laden process of institutional bricolage, articulating and embedding the arrangement with on-going pathway dynamics. As a result, and despite its intended support for diversity and freedom of choice for the comuneros, the proposed project in Huamantanga ultimately risks siding with the exclusionary alfalfa-cattle market pathway, dispossessing part of the producers from access to the mountains without providing adequate alternatives. In order to avoid this, a more careful participative and power-sensitive reflection about possible, more peasant-based alternatives to the dominant emerging pathways is advised as well as the definition of the required collective conditions necessary to adequately support such alternatives. At the same time, the proposed PES-arrangement through its emphasis on community action for mamanteo and its communitarian contractual set-up might however also contribute to strengthen local community cohesion and collective action towards more inclusive and communitarian alternatives. The MRSE-Law, and the underlying urban interests in upstream water resources more in general, also contributes to strengthen the negotiating capacity of local communities by legally recognizing their rights over and their role in managing critical ecosystems, also in competition with other powerful actors in particular mining interests. It can –of course- not reasonably be expected from the MRSE PES-arrangements to become an all determinant policy tool that redresses the local power imbalances in local communities and contributes to inclusive institutional transformation. But efforts not to contribute in the wrong direction could be made, and the participatory component of the incubating process towards the MRSE-proposal is a key condition to achieve this. Here, MRSE-incubators should at least be aware of the pitfalls and shortcomings of all too superficial public consultation and decision-making in public realms, which will all too often tend to represent dominant ideas and interests, and cannot be expected to visualize and reflects on the always less easily discernable alternative pathways (like e.g. the largely ignored proposal to introduce vicuña as an alternative, less destructive way to exploit the mountain areas). Substantial efforts

[17] At the same time, an overall extractive and unsustainable water management logic remains in place for the moment. Indeed, the overall amount of funding generated by SEDAPAL is even insufficient to adequately cover those few areas in Lima's watersheds where most immediate gains in terms of water for the capital can be expected. In the meantime, SEDAPAL is investing substantial amounts in the installation of long distance pipelines (as the Mantaro pipeline) to bring water from other watersheds to the capital.

and resources are required for incubators to understand and manage local power imbalances in the face of the above risk to contribute to deepen exclusion of the poor producers and achieve the promised win-win outcome.

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