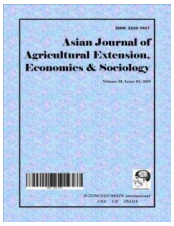

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Re-formulating Land and Resource Management Policies: Devolving Decision-making Power to Local Communities in China and Mongolia

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Authors' contributions

This study was carried out in collaboration with both authors. Author VRS wrote the first draft of the manuscript. Author HF managed literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

This is a brief overview of the issues surrounding the concept and application of devolution of decision-making in the context of rural peoples in two Asian countries. The mechanics of devolution (the how, why and what) are discussed as well as the instruments of devolution. Three case studies are presented to illustrate the experience of local people trying to deal with intense competition for limited resources. China provides two case studies, the first about village-level rangeland management in an environmentally sensitive catchment of a major tributary to the Yellow River in Qinghai and the second relates to experience with Water User Associations in the river basins of the Hexi Corridor in Gansu. Mongolia provides the third Case study. It deals with legislative reform for grassland and rangeland management and the role of Pasture User Groups in self-management of the precious grazing and water resources so vital to the herdsmen.

Keywords: Capacity; legislation; institutions; catchments; watersheds; livestock; bureau; common resources; village.

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1. INTRODUCTION

A number of Asian countries, or regions within a country, are managed under a common property regime. Common land resources (forage, water, food, fuel and medicinal plants) are the livelihood base of poor rural households [1]. Empowerment of rural land users is a major plank in the platform of those who advocate devolution of more decision-making power to local communities and organization. Different instruments are used by states to enhance the capacity of local institutions and communities to manage their resources and sustain their livelihood strategies.

Devolution of resource management aims at devising (in conjunction with local land users) new, efficient, equitable and sustainable resource management systems. Devolution could be defined as the shift of responsibility and authority for resource management from state to non-governmental bodies, which includes traditional institutions, the private sector, and other organizations of civil society such as herder/farmer associations or village communities. The devolution process is complex and requires a clear understanding of the implications of each devolution instrument. The objective of the devolution is to improve rural societies and overall community welfare through more efficient and sustainable utilization systems. Increased decentralization of government authority and devolution of control over resources with local user groups to be given legal authority and tenure rights so that they can assume the responsibilities relinquished by government.

The objective of the devolution is to promote rural societies and their livelihood strategies while improving the efficiency of land management and overall community welfare. All too often the devolution process may consist of transferring the management burden to these communities without clearly assessing their existing capacities and competencies, and a framework that enables local institutions to fill the vacuum and reclaim their traditional roles and rights.

Devolution is controversial because at this time many countries in Asia are facing serious environmental degradation, which endangers the natural production base. Devolution raises several concerns regarding whether states in developing economies and countries in transition (e.g. the former Soviet republics in Central Asia) are really convinced that local institutions are efficient resource management structures. Acute financial constraints are pushing many government agencies to relinquish their former stewardship roles. This shifts the burden to local institutions or user-groups e.g. pastoral-user groups of water-user groups. Dire shortages of funds to sustain development effort in rural resources are constraints too.

For many years, following the failure of many technical land management interventions in in Asia and elsewhere, the role of communities and local institutions in managing land and water resources has been disregarded in policy formulation. Many commentators argue that development projects fail because of the top-down technical approaches from remote centralized administrations to the exclusion of local institutions in the management of their resources. Recognition that, in many instances, the inadequacy of government institutions to promote sustainable practices provides an additional argument in favour of greater participation of local communities in managing land and water resources – particularly common property resources.

2. DEVOLUTION – TO BE OR NOT TO BE?

The process of devolution on resource management is, in many Asian countries, linked to decentralization programs which aim at improving the performance of government institutions by giving more authority to lower-level institutions and to civil society.

So, the key issue is a debate on the difference between (good) governance and (good) government. Governance in this context is defined as the 'exercise of legitimate authority in transacting affairs and is broadly understood to refer to the maintenance of social order through endogenously evolved sets of rules or authority structures, or some combination of locally evolved and externally imposed rule sets' [2]. Government, by contrast, is the exercise of influence and control, through law and coercion, over a political community, constituted into a state within a defined territory. Regarding land and water resources, the government refers to *de jure* rules and regulations set out in statutory law and policy of the state [3]. On the other hand, the broader concept of governance refers to the sum of rules that apply *de facto*, including customary regulations or access options to other territory defined by a state and with enforcement

mechanisms or authority systems that are, as well, legitimized by land users themselves [4]. In the absence of government at lower levels, because of weak administrative capacities or because of a lack of legal framework, governance becomes mainly a question of endogenously evolved set of rules in the tradition of Hayek's concept of 'spontaneous order' [5].

The pressure to implement devolution is grounded on three main arguments: (i) the limited effectiveness of government institutions (in particular at township and village levels) to manage natural resources; (ii) the well adapted rules and regulations that enable local institutions to effectively manage land and water resources; (iii) devolution is more cost effective because it reduces transaction costs associated with the management of common resources. Most of the devolution programs so far implemented, seem to be based on the assumption (not always well founded) that user groups and local communities will easily take on roles which were formerly assigned to the state. This is such a simplistic view. The breakdown of many local institutions, and the erosion of local authorities' socioeconomic capital, which was the basis of their power, may impede choosing the appropriate devolution policy. This is especially so after many years of state manipulation. If it is true that local institutions have evolved to accommodate new demands and constraints the starting point then must not be those idealized local institutions but the actual status of such institutions with all their strengths and weaknesses to develop an appropriate devolution framework and enhance their effectiveness.

When state agencies decide, for whatever reasons, to give back the decision-making power to the users of land and water resources, the roles of the state during and after completing the devolution process have to be identified and documented. The re-allocation of decision-making to resource-users or local communities is also accompanied with an adjustment of both inter-communities and inter-user relationships. This aspect has far reaching implications and can de-rail any devolution effort if not properly considered. Generally, the state retains an important role in the development of resources in conjunction with an expanded role for users in management issues. Naive and simplistic approaches give the impression that the complete transfer of responsibilities to local users is desirable and feasible and government institutions should withdraw from any active role.

It is necessary to create a balance between the rights and roles that are going to be devolved to individual users, communities and states. The balance between local and state roles and responsibilities is a critical element in the devolution process because of its many implications for efficiency, equity and sustainability of land and water resources. It has been argued that rather than the state attempting to provide a framework down to the local level, the state would offer a broad framework and require local groups to negotiate access rights and resource management agreements among themselves while maintaining certain responsibilities for adjudication and arbitration. There is clear need for flexible and broad enabling frameworks based on the idea of subsidiary, which will not impose new rules but will offer principles and guidelines that would promote the use of local rulers and practices for resource management.

Devolution programs support the perception that 'induced forms of institutional change based on external impulses necessarily lead to an increase in efficiency in land and water resource management and welfare of local people'. This assertion relies on the economic theory of institutional change, in particular its 'efficiency' view, which postulates that institutional change is an evolutionary process that seeks to minimize transaction costs and enhance the collective benefit to society. Hence, traditional mechanisms, which include indigenous knowledge and resource-use practices are valued. Particular examples are risk-coping strategies of pastoralists/herders through opportunistic grazing behaviour and mobility. But these may not be sufficient to allow adaptation to a rapidly changing socioeconomic and natural environment brought on by globalization (market economy) and climate change. Moreover, if devolution leads, above all, to an increasing influence of a powerful and affluent segment of livestock keepers and skilled absentee herd owners or landlords, an overall increase in efficiency and welfare may be accompanied by an unequal distribution of productive assets and the emergence of a new poverty groups as has emerged in Tajikistan [6].

3. THE MECHANICS OF DEVOLUTION – THE 'HOW' AND THE 'WHAT'

The utility of devolution depends on answers to crucial questions (i) can it ensure correction of environmental and institutional inefficiencies in

resource use and how? (ii) what is its role in promotion of sustainable management of common resources and what are the mechanisms? (iii) can it transform local land users and their communities into stewards of the natural resource base and how would it do this? To achieve the stated objectives, many states in Asia have developed different strategies and policy instruments such as land reform, institutional innovations, and new forms of user-led organizations e.g Water User Associations, Herder Associations, Pasture User Groups.

A very vexing question is how to identify institutional reform needs for building the capacity of local institutions and communities and the appropriate tenure and institutional reforms. Most examples we have seen have concentrated on legal interventions. It is worth noting that legal reforms, which in the past were used as instruments by the central state to dispossess local communities' rights over many land and water resources, are now perceived by some as a panacea for empowering local people and correcting resource misuses. Simply changing existing laws does not necessarily induce local institutions to take over their re-assigned roles and responsibilities. The main issue today is not the distinction between traditional and state management systems, but hybrid resource management systems and social behaviours that emerged from the past interventions of the state. In some cases, legal reforms remain an empty shell creating an institutional vacuum at lower levels and cementing an open access situation as in some former Soviet republics [7,8]. Others are in deadlock, whereas others (Mongolia and Kyrgyzstan) decided to bring in more participatory elements in the legislative process and slow down the process to avoid negative experiences.

The belief that legal reforms in favor of local communities would enable local institutions to become stewards over land and water resources has not yet been proven, especially in extensive, semi-arid rangelands [9]. Legal rights as a rule, enhance economic rights, but the former is neither necessary nor sufficient for the existence and performance of the latter [10]. Complementary policy interventions that would facilitate or enable an effective and successful devolution process need to defined for each situation.

Several assumptions are made when considering devolution (i) traditional local user organizations with their rules and regulations can, in fact, take over directly the role of the state in natural resource management at local level (ii) Local communities as primary beneficiaries of land and water resources, are willing to be responsible for their management and long run conservation. Often enough the resource base has been degraded by misuse and is in need of repair. Ecological restoration may require both labour and capital (for example) for reforestation, re-seeding, protection. These measures are important in arresting and reversing land degradation. Traditionally, local institutions did not conduct such activities. Their function was limited to assigning use rights, demarcating boundaries, settling disputes etc.

It is not contended that local institutions are not capable of assuming new responsibilities, but there are additional features of land and water management that need to be taken into consideration. It may be necessary to provide local institutions with additional or enhanced mechanisms and resources that would enable them to manage renewable resources sustainably. This is critical because most of the local authorities have been affected in their capacity to mobilize their traditional 'social capital' because of the breakdown of many of the social and economic security systems, which they once provided to their community members. Cooperation and networks among groups and social capital are no longer available or have to be reconstructed at high costs.

4. INSTRUMENTS FOR DEVOLUTION

There are four major instruments:

4.1 Strengthening Existing Local Institutions

Existing local institutions have many advantages – they are based on common interests, are derived from a democratic decision-making process and can apply enforceable sanctions. Moreover, they rely on a strong reinforcement of 'good' group behaviour by means of social norms including the high social costs of loss of reputation [2]. They are also able to manage the resources according to agreed objectives and plans [11,12,13]. for these reasons, existing institutions are often the first choice, albeit under new rules and regulations (some formal and some informal). The challenge is for these

institutions to be fully functional and have the strength and capacity to take over the newly assigned roles that comes with devolution.

4.2 Creation of New Institutions

The major fear for creating new institutions concerns the opposing logic and operational mechanisms and overlapping claims between the traditional and the new ones over how to manage land and water resources and about use rights and access. The exclusion of traditional institutions from newly created structures generates conflicts. Traditional institutions, which have legitimacy and potential social capital, and the newly created ones with government support, may be claiming control over the same resources. Conflicts over boundary demarcation, group-internal regulations to restrict access e.g. grazing bans or prohibition on cutting living plants for fuel wood, to allow ecological restoration are likely to be common. Such a situation negatively impacts the success of the devolution program. To avoid such circumstances, it is critical to involve traditional local institutions at the beginning of the process to reduce potential conflicts.

4.3 Property Rights Reform

Land reforms, especially property right reforms, are laws that are intended, and likely, to cut poverty by raising the poor's share of land rights. Classic reforms directly transfer land from rich to poor. However, much else has been marketed as land reform: the restriction of tenancy, but also its de-restriction; collectivisation, but also de-collectivisation; land consolidation, but also land division. That then, raises questions about property and issues of efficiency and fairness that dominate policy throughout Asia. In the evolution of property rights, the distinction between public and private is not crucial in differentiating the key arrangements; instead, a more finely differentiated set of gradations from "public" to "private" may apply. Property reform is the most essential issue in the reform of rural societies, and first of all, the reform must adapt to the level of the rural economy in each region.

The multiplication and severity of conflicts between different users requires a new management approach where rights and liabilities of users are well defined. Increased decentralization of government authority and devolution of control over resources with local user groups given legal authority and tenure rights over land water resources (or some part of the suite of resources). It is necessary to create a balance between the rights and roles that are going to be devolved to individual users, communities, and states. The balance between local and state roles and responsibilities is a critical element in the devolution process because of its many implications on efficiency, equity (including intergenerational equity) and sustainability of land and water resources.

4.4 Confirmation of Traditional Property Rights

There are several main sorts of property right (i) common property system where a tribe, family unit or village have exclusive use rights to land and water resources; (ii) private property systems of various types. Traditional land management institutions in Asia have been stressed by an increasing human population and related forces, including private enclosure of grazing land; government-sponsored privatization; and the increasing prevalence of violent conflicts and livestock theft. Important considerations are individual and social welfare under the traditional system to individual and social welfare under a private property system and a common property system. Whether the traditional system is preferred over private property depends on whether the value of mobility, as defined by the traditional system, is more valuable than the right of exclusion inherent in private property. Under some conditions the imprecision which characterizes traditional rights can result in higher social returns than a common property regime characterized by complete symmetric rights across all members of the user group and complete exclusion of non-members.

5. CASE STUDIES

In this section we present examples of devolution of decision making in practice. The three case studies presented here are from Asia and cover diverse aspects from pasture management (Case study 1 and 3) to water management by user associations (Case Study 2).

5.1 Case Study 1 Community-Based Land Management Huangshui River Basin, Qinghai, China

Milner [11,12] describes the experience of working with communities that were wanting to arrest and reverse land degradation in rangelands and pasturelands. Households from

four counties within the Huangshui catchment in eastern Qinghai Province, in Western China were involved. Responsibility for grazing control associated with government-initiated grazing bans was devolved to local communities of land users. The focus of the Case Study is in eastern Qinghai. Huangshui is a river of Qinghai, China. It is the largest tributary of the Yellow river and it has a total length of 374 kilometres and a basin area of 3,200 square kilometres.

Fig. 1. Map of China and Qinghai province (in red)

5.1.1 Context

A major national directive on grazing ban protection (released in Qinghai in 2001) specified ten land types/land uses that should be protected by grazing bans. The specifications of these ten land types are drawn from several national laws and have implications for overall land use planning. The Forestry Bureau was assigned responsibility for implementing a grazing ban in areas of "forestry land" and the Agriculture and Animal Husbandry Bureau for implementation in areas of "grassland[1]". Meanwhile, the Water and Soil Conservation Bureau was assigned responsibility for watershed (or catchment) planning under the Water and Soil Conservation Law. Little guidance appeared to have been given by the provincial forestry and animal husbandry agencies to preparing county level regulations or to coordinating implementation of grazing control. There are no laws at county level relating to grassland management in the four counties within the catchment area.

[1] *Grassland in China includes true grassland, steppes, savannas, alpine meadows and grazed desert lands.*

The national laws and Qinghai province policies consistent with the national laws apply but are general in nature. Following the directive on grazing ban protection issued by the Qinghai Government in 2001 two of the counties issued their own county directive.

In grassland areas *(see footnote)* implementation of grazing management is further complicated by the recognition of twozones: pastoral and agricultural.An important distinction is made between these pastoral and the agricultural zones:

* Pastoral zone. In these areas livestock production is the main source of income. In recent years Use Rights to the grassland have been allocated to individual households or groups of households. When grazing bans have been imposed there is a compensation paid to the herder [11].

* Agricultural zone. Most grassland within this zone is collectively owned and is common land. There has been no allocation of grassland title because grassland title is not clear and there are too many disputes between (and within) townships and villages. All grazing bans are year-round grazing bans in contrast to the pastoral areas where there are also seasonal grazing bans. If there is a grazing ban imposed, there is no compensation paid. All of the Huangshui River Basin is within the agricultural zone. This fact limits the scope of discussion with the local community on appropriate management regimes and limited development and implementation of policies to compensate for the imposition of the grazing ban. Effectiveness of the ban was thus threatened, as compliance was poor and policing difficult.

In China, the Land Resource Management Bureau (LRMB) at provincial prefecture and county level is responsible for preparing 15-year land classification plans. Land use categories (including those of cultivated land, forest and pasture) are recorded on maps showing an overall program of land use. The plans specify the land use that is sought at the end of the planning period. Land classification disputes are resolved by the LRMB. The agencies responsible for managing land resources are required to work within the overall program of land use. These

agencies include the Forestry Bureau, Agriculture Bureau, Animal Husbandry Bureau and Water and Soil Conservation Bureau and the Agricultural Engineering, Survey and Design Institute (ASDI) which undertakes soil surveys. There is, however, no coordinated work plan. The uncoordinated work programs cause inefficiency and conflict at the village level. These inefficiencies and conflicts reduce the benefit to farmers and limit local co-operation in implementing the plans and particularly in complying with control on grazing.

To test alternative planning and management processes to overcome these difficulties community- based planning, coordinated through strategic sub-catchment plans was trialled as a test of the outcome of devolution of responsibility to village-level. Sub-catchment plans comprised strategies and actions within economic, social and environmental spheres. Part of the sub-catchment plans specified the land use and the actions required to achieve sustainable land use including such issues as:

* Control of grazing, and preventing displacement of over-grazing problems into surrounding areas
* Reforestation of specific area with consideration of long-term outcomes of such action
* Reseeding of alpine pastures
* Protection of wetland and riparian areas
* Conversion of cropland to grassland and woodlands (including tree crops)

Economic and social strategies encouraged alternative income generation and employment opportunities to allow increases in wealth despite reductions in grazing. Income and employment opportunities were not limited to agricultural and animal husbandry, the traditional income sources near the villages. Vocational training was used to boost opportunities for villagers to obtain employment in urban centres. Training courses were chosen to meet expected job vacancies, as advised by the Employment Bureau. The trial during the project found that to implement catchment management at the local level, a number of conditions must be met.

* Assessment of the land use and degradation/recovery potentials
* Understanding, agreement and support for change from the community who use the land
* A predictive model of changed land use to test alternatives and which can also be used in monitoring the agreed plan
* A development plan consistent with more sustainable land use, which offers the community improved living standards
* Reliable funding source, technical and administrative support

All kinds of social actors need to be mobilized to take part in the action. Government took the lead in terms of establishing a new policy framework. It also provided working capital and technology to ensure that the project would be completed successfully.

5.1.2 Outcomes and overall conclusions

The trial in the four counties within the Huangshui basin achieved three goals. Firstly, the project was (ultimately) enthusiastically embraced by local communities. Restoring the land and water resources has become a matter of pride and has reinforced a sense of place [13]. This has had a positive impact on how local people use the land and has also had an impact on tourists and visitors. Secondly, the use of new technology has marked a turning point in the way local bureaus usually deal with grazing land, namely from blanket grazing bans and other prohibitions and other (often clumsy) solutions, to a wide range of complementary solutions including micro and small-scale interventions. More importantly perhaps is that the project has helped instill a culture and spirit of conservation and environmental protection for a wide range of stakeholders.

5.2 Case Study 2 Water User Associations in Gansu, China

This Case Study examines the experience in river basins in the inland drainage system of western Gansu Province where responsibility for irrigation water allocation, scheduling and system maintenance was devolved to voluntary Water User Associations. As China's economy grows, problems and issues in natural resource management have become apparent and acute in recent years. Given China's rural water use situation and pressure on the natural resource base, corresponding governmental policy and management system reforms that are aimed at promoting participatory irrigation management and development of Water User Associations (WUAs) have been welcomed by rural communities in recent years.

5.2.1 The concept of a water user association

Ideally, a WUA is a group of water users, such as irrigators, who pool their financial, technical, material, and human resources for the operation and maintenance of a water system. The objectives of WUA are to improve water delivery, increase crop production and provide the farmers with the chance to be involved in the process of irrigation management. A WUA usually elects leaders, handles disputes internally, collects fees, and implements maintenance. Membership of WUA provides benefits. Membership is open to irrigators who may apply to join but membership also includes government representatives and other non-irrigators. Establishment of water rights and water markets, promotion of participatory irrigation management, development of WUAs and construction of a water-saving society are the key ingredients in China's current water management reform.

Since the 1990s two major types of water management reforms can be observed in northern China, namely user-based, participatory management through water user associations (WUAs) and contracting out of irrigation canal management to individuals. It was estimated that by 2004 more than one-quarter of the villages in northern China had replaced traditional water resources management by either WUAs or contracting [14]. Their study further shows that water availability, length and complexity of the canal system and reform-promoting policies of local governments are the main drivers of water management reforms [15]. In subsequent research comparing the performance of the other management systems, Huang et al. [16] found that WUAs perform much better than traditional water resources management systems in terms of maintenance expenditures, timeliness of water delivery and rates of water fee collection. Management systems for water distribution infrastructure based on contracting to individuals also perform better than traditional systems, although not as well as WUA-based systems.

5.2.2 A participatory approach to manage water resources at grass-root level

Local community based participatory approach can generate more economic and social benefits as well as political influence. As an innovative form of the participatory approach, water user associations (WUAs) have rapidly developed in Shule River Basin and other inland river basins in Gansu's Hexi Corridor. The basin authority had plans for establish-ment of WUAs in the new resettlement areas at the time the re-settlers relocated and the local on-farm irrigation facilities were built. However, at the beginning some of the WUAs established were led by village chiefs or other local leaders, instead of being led by farmers, which is one of the basic principles for independent, democratic, sustainable WUAs. Eventually the WUAs all were converted to farmer leadership. Establishment of WUAs as a useful bottom-up approach should be advocated to encourage more and more local farmers to participate in water management. Xu et al. [17] discuss the role of water users' associations in the Heihe River Basin, China.

5.2.3 The relationship between government and WUA

In the past, the traditional management of water resources was mainly done through collective ownership arrangements. During that period, government and water resource administration management organizations played the most important role in water resources allocation. Naturally, they became the main body who could draft related policy, fix water price, and dictate the regulatory framework and so on. However, since WUAs were founded, government should not be the leader, but should play a role as a partner.

5.2.4 Barriers that hinder the development of WUAs

In the early days after WUAs were founded, the basic publicity and training were inadequate, villagers lacked enough enthusiasm to participate actively in this organization; (ii) In order to pursue completion rates of assignment, some irrigation areas blindly established a number of WUAs without any verification so that relevant regulations and procedures (including formal registration) cannot meet the original standard; (iii) According to formal requirement, each newly established WUA should register in the local civil department, then it can become a legitimate organization. But some WUAs were founded without registration in some places because of traditional notions or high registration fee. In some places, registry department charges a simple registration fee, which is mainly used for daily expense, such as paying for staff wages; (iv) Due to poor educational level and inexperience of members of village organizations

and water-users, the operation and management of some WUAs did not go well. Some WUAs are not separated from local village committee completely, so that the operation and management of WUAs cannot fully realize democratization. Irrigation engineering works are controlled by a WUA but owned by the government. Because WUAs have the right (and responsibility) to manage and use irrigation engineering structures but the ownership belongs to others (departments within the government) there is resistance to raising funds to support the routine work and maintenance of irrigation infrastructure. Lack of financial support may be the biggest barrier in the operation and management of WUAs. Shortage of funds makes it hard to provide for routine spending and payment for staff so that farmers' enthusiasm declines gradually. The WUA is a non-profit organization so it needs some funds to maintain daily expense but the only revenue comes from the water fee that is collected from water users and used for buying water from the government.

Notwithstanding these problems, governments at all levels within Gansu have placed high priority on the sustainable management of inland basins. Water User Associations (WUAs) are user-based and participatory ways to manage water resources. The objectives of WUAs are to improve water delivery, increase crop production and provide the farmers with the chance to be involved in the process of irrigation management.

WUAs should play a significant role in solving water scarcity and promoting water use efficiency among the households in irrigation districts. But in order to make them a success, the administrators believe that it is necessary for government to take effective measures to develop and improve the current operation and management of WUAs. Some measures that should be taken include: (i) Building long-term compensatory mechanisms (such as: settingup a special fund, credit policy, international loan). This is seen as a primary task for sustainable development of WUAs. When sufficient funds are provided the organization can maximise its function and members become more active participants in WUAs. (ii) Increasing publicity about WUAs and promote awareness raising among water-users. Lots of local villagers still retain traditional views and they lack knowledge about WUAs, so it is essential to publicize some relevant information and make water users understand the advantages of new irrigation systems. (iii) Relationship between irrigation management department and WUAs need to be clearly defined through better regulations and rules. Only in this way can WUAs avoid unnecessary conflict with some government departments. Keeping good relationships is conducive to the further development of participatory irrigation management. (iv) Establishing a monitoring and evaluation system. As an independent legal entity, the WUAs need to accept oversight from the village committees and water users. Generally speaking, it turns out that establishing WUAs in Irrigation districts (ID) can not only ensure water supply and improve water saving consciousness, but also it could reduce water use disputes. However, the WUAs in many parts of China are still in an early stage and there are really many problems that are difficult to solve. The government and irrigation management department should take efforts to promote reform to create and develop a more relaxed external environment for WUAs.

5.3 Case Study 3 Mongolian Rangelands

This Case Study reports on the emergence of Pasture User Groups (PUGs) by semi–nomadic and sedentary herders in Mongolia. There is devolution of responsibility to PUGs for management and stewardship of grazing lands.

5.3.1 Combating land degradation and improving livelihoods through participatory management

As reported by Dulamsuren and Dorjgotov [18] grazing lands in Mongolia have degraded considerably over recent decades. Productivity is lower and under the impact of global change (including climate change) land degradation will accelerate with a continuation of the present unsustainable management.There is general agreement that things cannot go on as before but there is uncertainty about how to reform the process and bring about a sustainable regime that ensures herder livelihoods, biodiversity conservation and land protection.Questions arise such as how to tackle the open access and free riding problem? Who are the free riders and how to engage with them? Some commentators think that individual, private people are more appropriate managers and that privatization of the pasture land would be best, others prefer Government management of pasturelands, still

others opt for community management and urge transfer of the property rights to theherder's community. If this was done it raises the question "What kind of institutions should be established in nomadic herding system?" We are still waiting for the answer. Organizing of sparsely distributed herders' households into community-based institutions is a key barrier for solving the difficult problems associated with nomadic livestock husbandry. It was never meant to be easy.

6. SELF-GOVERNING HERDER ORGANIZATIONS - THE WAY OF THE FUTURE?

The document "Government Policy on Herders" approved in 2009 was intended to support the development of the structure of civil society for herders' self-governing organizations and reflected the basis for creating a condition for establishing national system of herders' self-governing or self-helping institutions. It also sought to answer questions like 'How to establish the self-governing institution?' 'What are the basic principles for establishing herders communities?'

The establishment of boundaries of common resources and empowering the right for using a specific part(s) of pastureland [19,20] is difficult. Nomadic livestock husbandry is directly dependent on two main resources – forage and water for the livestock Mobile pastoralists are subject to potentially conflicting needs for secure resource tenure on the one hand and socially and spatially flexible patterns of resource use on the other hand [21]. Because seasonal and inter-annual mobility of herders remains essential in most ecological zones of Mongolia, the boundaries of these territories need to be permeable but in an organized way determined by the herder organisations. To define boundaries of common resources it is necessary to classify pastureland by its purpose of use and establish boundaries of its classification. It is necessary to define the reserve pasture areas and corridors under the Central and Local Government before establishing pasture parcel's boundaries of pastoral herders' community. It is providing security for herders to use pasture within the defined pasture parcels on the one hand, creating favourable condition for movement of herders (flexibility) from one place to another in disaster situation (drought, *dzud)*. The pastureland for pastoral nomadic husbandry at the *soum* level is defined after establishing boundaries of the above mentioned (reserve, corridors, intensified farming). All these are creating the better conditions for secure pastureland tenure for pastoral herders' community.

7. PASTURE USER GROUPS

Pasture User Groups (PUGs) are a primary unit of herders' communities in the rural area. They are groups of people living within the defined boundaries and collectively using common pool resources that allow them to protect their pasture land, as a source of livelihood, and regulate movements to adapt to natural and climate changes. Herders living within the boundaries, that they defined themselves, are to become members of a community (groups, sub-groups). The size of PUGs depends on the ecological conditions. The primary pasture use unit is a territory- based PUG. The PUGs are composed of *khot ails* (labor-production management units) and cooperatives, partnership (business-oriented groups). Herders, herder households or *khot ails* that form PUGs are fully responsible for their labor cooperation and production activities.

By organizing collective actions like pasture management issues, livestock breeding, veterinary services, livestock product marketing, PUGs can create favourable condition for business activities of individuals and will exert direct influence upon herders' interest in growing livestock and increasing their productivity. Organizing all these economic and business activities in line with protection of nature, ecology and pasture land will create favorable condition for sustainable livelihood of herders. Territory-based pasture user groups (PUGs), and their boundaries can be defined by herders themselves, with the support of professional institutions and the backing of the local government.

8. OVERALL SUMMARY AND CONCLUSIONS: DEVOLUTION -- A DREAM OR AN ECONOMIC AND ECOLOGICAL IMPERATIVE

There are reasons why governments in Asia want to transition to devolution of decision-making to local people.

Box 1. Examples of modernization of local rural economy

Water saving agriculture Improved irrigation technology Better housing for livestock, Better animal nutrition Artificial Insemination to quickly improve genetics No-till and minimum till cultivation	Biogas generators Solar panels Solar kettles Wind power Small-scale hydroelectricity Temperature and humidity controlled greenhouses

1. Currently, many countries in Asia are facing a situation where their natural resource base and environment generally are seriously deteriorating. Almost one-third (higher on some places) of agricultural land are either degraded or under serious threat of being so with huge areas of potentially arable land lost to other land uses or abandoned. Fresh water is in critical supply in many places and not all regions have a sustainable water resource policy.
2. Inefficient use of resources such irrigation water, forest and wood products, and irrational land use are serious problems that undermine efforts at improving livelihoods. There are huge economic losses incurred as an outcome of lower land productivity resulting in social consequences for the local rural population. There are vast profit losses resulting from inefficient management of natural resources.
3. Environmental contamination has a great negative impact on human health. For example, dust and sand storms plague Central Asia, Mongolia, China, Korea and Japan. Dust and other airborne particulates are a threat to human health [22]. Heavy metals pose a threat to other communities and the ravages of mining (much of it artisanal and illegal) takes its toll [23].

Properly implemented, devolution can be expected to lead to an improvement of resource productivity, more responsible use (stewardship) of resources, modernization of the local economy using the most efficient technologies and integrated closed-loop production systems (Box 1).

Prioritization of profitable measures by adopting initiatives that not only improve the environmental situation but also result in improved livelihoods and local economic benefits which will make it possible to diversify the local economy as the principles of comparative advantage are applied. For example, specialist feedlots to 'finish' livestock to market weight might replace the household level that tries to fatten 1-2 animals, other specialties could be irrigated alfalfa or production of fodder maize, and construction of silage pits etc or farm machinery contracting for plowing, sowing and harvesting. The social aspects of the transitioning toward full devolution should flow as efficiencies are realised and employment opportunities are created (aided of course by training and education).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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