Research Outline

Working group ‘Development’

Work Package E3

“Irrigated mountain agriculture and rural transformation across the Alai – Pamir – Karakoram – trans-Himalaya: conceptualising development issues through a mobility and post-area studies lens”

April 2012 – update in January 2013

Investigator: Dr. Joe Hill
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1 Introduction

Despite significant broadening of the overall livelihood portfolio of households residing in high altitude mountain valleys, climatic constraints ensure that irrigation remains central for the continued viability of mountain communities and their settlements, and for the fulfilment of a majority of households’ subsistence needs. Gravity-flow hill irrigation systems – the majority offtake/diversion systems sourcing water from glacial or snow-field melt-water, springs and/or directly from river flows – are found at elevations exceeding 2000 metres across the high mountain valleys of the Alai – Pamir – Karakorum – trans-Himalaya. While there is no dearth of literature on irrigated agriculture for the Himalaya and Karakorum mountains, studies are sparse for the region extending from the Pamir to the Alai. This relates to the history of this vast mountainous region: in 1893 and then 1895 borders were created by British India and Tsarist Russia, creating the Wakhan Corridor of north-eastern Afghanistan. Thereafter, until the collapse of the Soviet Union in 1991, the region was divided in two, its people and their irrigated farming practices subjected to vastly different forms of state rule and agrarian conditions. For reasons relating to both geo-political history and the nature of traditional area studies, few hill irrigation studies undertaken in the former USSR are readily accessible, and little if any comparative work has been done to examine the similarities and differences in hill irrigation across the afore-stated divide, especially for the contemporary period. Similarities can be found in the more recent Pakistan-India ‘Line of Control’ which divides the Karakorum and trans-Himalaya regions.

This research takes an interest in the development of hill irrigation systems¹ and the communities depending upon them; development being defined as both long-term processes of social change and deliberate efforts aimed at improvement (Gardner and Lewis, 2000; Thomas, 2000). The relevance of the research lies in the fact that the way of life of mountainous village communities are – contrary to the popular image of their being static and timeless – subject to a wide-range of pressures in the contemporary neoliberal/globalising era, which has profoundly changed the past institutional arrangements that sustained hill irrigation systems; for example, water rights and rules, related administrative structures, collective objectives of water users. Spatial mobility, in the form of migratory nonfarm employment, but also more generally movement to urban centres for education, work and ultimately to relocate, is ubiquitous across the specified region. Spatial mobility impacts upon irrigation in a profound way, altering figurations of water users as well as the positionality of water users in relation to one another as pertaining to their value systems and livelihood preferences including choice of crops. Spatial mobility thus alters canal maintenance and water distribution practices, based as they are upon legally pluralistic water rights, rules and obligations. Historic and contemporary processes of state rule, and related conceptions of place and of scale, affect how state and non-state actors engage with local communities and irrigation, and vice versa, how local water-users mobilise themselves to access resources from state and non-state actors, for example, to fund repairs of their canal infrastructure, or to protect their established water rights. Such mobilisation necessarily relates to the historical and contemporary figurations of actors extant in localities and in specific territories, and to the networks that may or may not exist between

¹ Vincent states that the term ‘hill irrigation’ can be used in two ways, as a general term for irrigation in hill and mountain regions, or specifically for systems crossing sloping terrain (1995: vi). Like Vincent, I use the former definition. In particular I focus on gravity-flow canal irrigation, often referred to as offtake systems or diversion systems, developed to utilise river flow or tap melt-water from glaciers or snow-fields directly (ibid.: 36).
individual water users and state and non-state actors. Emergent inequalities in for example, access to water, fulfilment of maintenance obligations, or access to agency funds for canal repair work, are indicative of the ongoing viability of hill irrigation systems, and of the village-based life and livelihoods they sustain.

2 Objectives of the research
This research has several objectives. Firstly, it aims to generate knowledge and publish material related to hill irrigation in the modern-day territories of Kyrgyzstan and Tajikistan, because irrigation studies from the Pamir and Alai mountain regions are largely absent from the hill irrigation literature. It aims to conceptualise how spatial mobility and mobilisation processes interact with irrigation across the trans-Himalaya – Karakorum – Pamir – Alai, thus testing a post-area studies approach to hill irrigation, and demonstrating the need for context-specific irrigation-related policies as opposed to the more standardised ones being applied by non-state actors. Attempts will be made to develop institutional relationships with Tajik, Kyrgyz, Pakistani and/or Indian research institutes and/or individual scholars interested in hill irrigation, spatial mobility and more generally, the Crossroads Asia research programme.

The research aims to apply a post-area studies approach to the study of hill irrigation in mountain agriculture. On the one hand irrigation practices are inherently localised, infrastructure immobile, with the state providing much of the institutional framework for irrigation management. For this reason, and given the perhaps irreconcilable gulf between the ecologies, agrarian histories and present-day contexts of the mountain valleys stretching from the Alai to the trans-Himalaya, straightforward comparison could be problematic. On the other hand however, water-users are themselves increasingly mobile, as are the flows of ideas and resources brought to bear on irrigated agriculture via the international water discourse and non-state development actors. That the two major regions under investigation (deemed South Asia and Central Asia in the traditional area studies literature) were previously closed to one another invites the comparison of irrigation practices across the (former) divide. Moreover, the approach will aid the development of conceptualisations of space-time and of sociospatial relations in agrarian and particularly irrigation-related scientific research.

3 Background of the research
Taking a post-area studies approach to the study of hill irrigation, this research is premised on the understanding that the conventional geographical regions and areas into which the world was divided post-Second World War and during the Cold War were to a large extent politically inspired (Prewitt, 2002). Regional or area studies used geographical metaphors to legitimate the production of specific geographically-structured and disciplinary-based knowledge (Van Schendel, 2002). In recent years traditional area studies’ approaches have been critiqued for a variety of reasons; for their US-/Euro-centricity in their conceptualisation of projects and research agendas, i.e. failing to study other societies on their own terms, and imposing upon them their own agendas; for their outdated concern for a world that no longer exists, due to globalisation processes and resultant increased flows of people, goods and ideas; for their statist nature and tendency to overlook borderlands and privilege heartlands; and for their arbitrariness, one example being Afghanistan variously included in and omitted from traditional South Asian, Central Asian and Western Asian (Middle Eastern) studies, to name but a few (Prewitt, 2002; Szanton, 2004; Van Schendel, 2002).
Crossroads Asia, as spatially delineated, in many ways qualifies as a physical academic space\(^2\), for its populace share to some degree language affinities, and religious and cultural commonalities. However it has failed to qualify as an institutional academic space for several reasons (Van Schendel, 2002). Firstly, it straddled the communist and capitalist spheres of interest during the Cold War period. Two decades on from the collapse of the Soviet Union the effects of this partition continue to be felt; for example, in academic circles Tajikistan continues to be considered a member of the ‘Central Asian’ states, regardless of its affinities to neighbouring geographical regions. Secondly, Crossroads Asia (as spatially delineated) did not cover states considered important, or as heartlands, by world powers. Further, some of its parts are or have been politically marginal regions within states, and thus scholars have faced restricted access or physical danger, reducing research efforts. Finally, and not in part due to the above reasons, Crossroads Asia has received insufficient scholarly clout. Thus it has not been considered a symbolic academic space, nor qualified as an institutional academic space.\(^3\)

Taking a post-area studies approach in this research thus entails an analysis of contemporary hill irrigation practices across the mountain ranges of the Alai, Pamir, Karakorum and Himalaya, taking the populace’s concerns into account, while attempting to disregard the traditional area studies categories of ‘South Asia’ and ‘Central Asia’. Though the vastly differing histories of these two areas cannot be negated – and they are not – one can attempt to look upon contemporary hill irrigation practices through a post-area studies lens, to explore how water users manage irrigation systems given their shared experiences of, for example, high levels of out-migration, and exposure to non-government agencies and state entities intervening in irrigation matters, often under the direction or influence of international funding agencies and discourses.

Initial plans to compare and contrast pre-existing studies of hill irrigation are under re-consideration due to a lack of material generated in (or accessible from) the former Soviet republics of Tajikistan and Kyrgyzstan. In his 1994 review of small-scale surface irrigation in Asia, Ambler includes among the areas worthy of note Yemen, northern Pakistan, northern India, much of Nepal and Bhutan, northern Thailand, parts of Burma and China, the Korean peninsula, Japan and large parts of Indonesia and the Philippines; but neglects to mention Tajikistan or Kyrgyzstan (Ambler, 1994). Vincent’s 1995 book Hill irrigation includes a bibliography of 588 texts, not one of which includes a case study from Tajikistan or Kyrgyzstan: at least 77 of the cases are from the Nepalese Himalaya, 24 from the north-western Indian Himalaya, and 23 from the northern Pakistan Karakorum, and a great many more are from Bhutan, Thailand and Indonesia, Iran, Iraq, Yemen and Baluchistan, and from African countries and Latin American Andean countries (Vincent, 1995). Admittedly these studies were undertaken shortly after the 1991 independence of the former Soviet republics, and draw heavily on the Anglo-American literature; but from the review of studies undertaken thus far in this research, it would seem likely that were such a review to be undertaken in the present-day, there

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\(^2\) Van Schendel identifies three principal ways of understanding an academic area: as a place (physical space), as a site of knowledge production (symbolic space), and as a career machine (institutional space) (2002: 649).

\(^3\) A clear example of the way areas bi- or trifurcate Crossroads Asia can be seen on the Ooska News website, see [http://www.ooskanews.com](http://www.ooskanews.com) (accessed February 2012). The geographical focus of the Crossroads Asia project falls into three of the four constructed regions – Eastern Europe and former Soviet Union, Southern and Eastern Asia, and Middle East and Africa.
would still be no cases proffered from the Pamir or Alai and adjoining mountain ranges. Kreutzmann’s 2000 edited volume *Sharing water* contains one historical chapter on irrigation north of the Hindu Kush; however Fourniau’s contribution only alludes to hill irrigation in several paragraphs and mainly concentrates on lower elevation irrigation (Fourniau, 2000; Kreutzmann, 2000). Studies of (hill) irrigation aside, an article mapper on the Mountain Research and Development website\(^4\) showing the location of articles published by the journal between 1991 and 2008, provides a telling testament to the research deficit in the former Soviet republics.

Yet hill irrigation is very much practised in the high and low mountain valleys of the Pamir and Alai ranges. For the Pamir some good quality material exists. Bliss’s (2006: 129) historical ethnography of Tajikistan’s Gorno-Badakhshan includes reference to and some important insights into hill irrigation, although he claims “Practically nothing is known about the traditional organisation of irrigation, the building and upkeep of the canals, as well as the water laws”. Bossenbroek (2011) undertook her Masters’ thesis research on canal irrigation in two villages in the Pamir in 2010, focussing on land and water rights through a gender lens. A study by Wood et al. (2009) provides some general information on hill irrigation along the Tajik side of the Pyandsh valley, the study concentrating on a GIS mapping tool to address contemporary water scarcity. Mukhiddinov (1975) focuses on land management and hill irrigation in the Pamir in his doctoral research, the fieldwork for which was undertaken in 1969. His study provides some interesting historical insights, from the 19th century to the early 20\(^{th}\) century, for Wakhan and Ishkashim. This study’s existence suggests further material may be available from the Soviet period, though archival research will be necessary to unearth it. For elsewhere in Tajikistan and southern Kyrgyzstan, little material appears to exist on hill irrigation.

One reason for this absence of studies of hill irrigation might be the preoccupation of researchers with lower elevation irrigation serving larger proportions of the respective countries’ populations, and with irrigation systems that have been subjected to relatively recent state-led reforms. Sehring (2009: 70), citing other authors, states that by 2004 59% of Kyrgyzstan’s irrigated land was managed by 353 water user associations, and that by 2005 an estimated 20% of Tajikistan’s irrigated land was managed by about 100 water user associations. These water user associations were established for the most part by international donor agencies within the mandate of agricultural development projects (ibid.). In her 2006 paper on the politics of irrigation reform in Tajikistan, Sehring presents a case study from Aini Rayon (district) located in the Zerafshan valley, which indicates the presence of hill irrigation in Tajikistan but does not explore it further. In southern Kyrgyzstan’s Alai mountain ranges hill irrigation is extant, though no literature on these systems has been identified to date. A report for a climate change adaptation project submitted to the Aga Khan Foundation’s Mountain Societies Development Support Programme (MSDSP), leaves the impression that hill irrigation is extant in the upper reaches (1700-2500m) of Kara Kulja district (Ashley and Ershova, 2011); however the contains no mention of hill irrigation systems. From such insights it can be concluded that many hill irrigation systems exist across Tajikistan and Kyrgyzstan\(^5\), but that few if any studies of these systems have been conducted or are readily accessible.

\(^4\) See [http://www.mrd-journal.org/map/](http://www.mrd-journal.org/map/) (accessed February 2012) and note the density of studies undertaken in the Himalaya and Karakorum, and by contrast the absence of studies conducted across the Pamir and Alai.

\(^5\) Through the National Centre of Competence in Research (NCCR) North-South a number of scholars undertook research in the Sokuluk River Basin, Chui Valley, in northern Kyrgyzstan and in the catchment of the
4 Conceptual framework

The research programme conceptualises Crossroads Asia not as a new area or region but as a sphere of interaction with complex interdependencies constituted by the interactions of its inhabitants across spatial, cultural and social boundaries. The concept of figurations, as put forward by Nobert Elias (1970), is central to the programme’s dominant conceptual idea which is that changes taking place at one location within a figuration affect the entire ensemble (for example the collapse of the Soviet Union at a macro level, land reforms at a meso level, or migratory practices at a micro level). The term figuration is used to generically represent the ‘web of interdependencies formed among human beings and which connects them, i.e. a structure of mutually orientated and dependent persons’ (Quintaneiro, 2006). Figurations can either be evident, i.e. visible, or not directly visible, i.e. intangible, according to their formation and degree of complexity, such that they can either be explored deductively or through more explorative investigation. Elias shows how what we call ‘figuration’ with reference to the constituent parts is the same as what we call ‘structure’ with reference to the composite unit. Thus if we speak of the structure of societies, and of the figuration or pattern of bonding, i.e. networks, of the individuals who form these societies, we are in fact speaking of the same thing but seen from different angles (Elias 1970: 176). Elias thus sought to overcome the individual-society dichotomy, which subsequent work by scholars such as Bourdieu (1977) and Latour (2005) have also addressed.

The Crossroads Asia research programme also chooses to privilege mobility as the lens through which each individual project, this one included, will investigate the complex interdependencies extant among people in our chosen research areas. Following Leitner et al. (2008) and Jessop et al. (2008) this research project E3.2 considers a privileging of the sociospatial concept mobility to be overly one-dimensional and therefore unsatisfactory, especially given its thematic concern, i.e. hill irrigation. Jessop et al. (ibid.: 389) criticise one-dimensionalism for its tendencies for theoretical amnesia and exaggerated claims to conceptual innovation, use of chaotic concepts rather than rational abstractions, over-extension of concepts and their imprecise application, amongst others. Both sets of authors put forward proposals for the simultaneous usage of several sociospatial concepts, including territory, place, scale and networks (Jessop et al.), and positionality, mobility, place, scale and network (Leitner et al.), all of which are relevant to a study of irrigation-society.

As will be elaborated below, the research problem appears to be that of the necessity for mountain communities to collectively maintain their hill irrigation systems, even though individually (at the household level) there is a tendency for community members to strategise to move away from irrigated agriculture, even to urbanise, for many see little opportunity and future in irrigated agriculture given its limited potential in mountain areas. The research thus engages with value-laden questions, such as where are ‘mountain communities’ going, is this desirable, who gains and who loses and by which mechanisms of power, and what if anything should be done? It is in this way that this project engages with the ‘development’ research field.

Development as a concept has manifold meanings which relate to the positionality of the concept’s users. Positionality frames people’s ontological and epistemological stance, their starting point for Tien Shan range (e.g. Erikkson, 2006; Lindberg, 2007). Lindberg’s research undertaken for her diploma thesis investigates access to water from several types of irrigation system, including farmer-managed hill irrigation.
action, because differently positioned people have distinct identities, experiences and perspectives, shaping their understanding of and engagement with the world (cf. Haraway, 1998, in Leitner et al., 2008). Thomas (2000) and Gardner and Lewis (2000) broadly conceptualise development in three ways, as being, 1) a discourse or vision (ideology), 2) a series of events or historical process of social change, and 3) a series of actions (practice) or deliberate efforts aimed at improvement\(^6\). All three meanings are invoked in a study of hill irrigation, for hill irrigation systems were mostly developed by mountain communities themselves, and their management has subsequently been affected in a multitude of ways by changing figurations of the actors involved, for example, by processes of long-term change in community demographics, or state and non-state interventions in irrigation; both of which continually invoke visions and discourses about how ‘development’ should proceed.

This project’s starting point is its conceptualisation of irrigation, irrigation systems, and irrigation management or governance arrangements, a necessary precondition for an engagement with the deeper issues that are to be investigated. The purpose of irrigation is to supply water for crop growth, providing a variety of needs such as essential carbohydrates, fruits and vegetables, herbs and shrubs for food and cash. In mountain agriculture irrigation also supplies water for trees for use as food, wood, fodder and cash, as well as for fodder crops for animals.\(^7\) Besides supplementing crop water requirements, irrigation protects against frost and low temperatures, and assists early planting in relation to climatic conditions (ibid.: 15-31). An irrigation system is defined as “the entire body of works involved in the practice of irrigation – the water extraction technology, conveyance canals, control structures and local distribution technology. The term encompasses both the physical infrastructure of works and also the social infrastructure of rules and procedures that ensures the operation of technology and the delivery of water” (ibid.: 34).

Vincent delineates eight basic types of hill irrigation system, based on their water source and mobilisation technology. Of concern to this research are offtake systems, probably the commonest form of irrigation system in mountain areas, and often referred to by authors as diversion systems. Offtake systems abstract water flows over sustained periods of time delivering regular irrigation across a cropping season. They mostly use river flows, though some tap melt-water from glaciers or snow-fields directly, and others tap permanent springs. Maintenance demands tend to be lower in systems utilising melt-waters and springs as compared with those with headworks in rivers with more extreme flow regimes (ibid.: 36). A four-fold typology developed by Ambler (1989; in Vincent 1995: 36) pits ease/difficulty of conveyance (primarily a function of the distance between offtake and command area, and the terrain the water must cross) against adequacy/scarcity of water supply at key times of the cropping season or year. These two factors, conveyance and water supply, are useful for explaining the necessity of different water management activities, presence of functionaries, and use of certain technologies.

An irrigation system is a complex set-up to control water. Four inter-relating elements combine to make irrigation systems work: a) physical elements – the water source, flows of water and places

\(^6\) These coincide with development’s dictionary meaning as an adjective, noun and verb.

\(^7\) ‘Combined mountain agriculture’ is a term coined to describe the livelihoods of populations residing in mountain systems in which irrigated agriculture and animal husbandry form a mixed farming strategy (Ehlers and Kreutzmann, 2000).
where it is applied, and the infrastructure/technology to catch, conduct and distribute it, b) agro-productive elements – soils, crops, technology, capital, labour force, and the capacities/knowledge of the art of irrigation, c) organisational elements – the human organisation to govern, operate and sustain the system, and d) normative elements – the rules, rights and obligations related with access to water and other necessary resources (Beccar et al., 2002: 2-3). The contextual circumstances that enable or restrain the conduct of irrigation practices, as conceptualised by Mollinga (2003), are a) the agro-ecological system and technical infrastructure, including climate, weather, vegetation, soil, topography, technologies other than the irrigation system itself, b) the agrarian structure, including markets for labour, land, technology, credit, inputs and outputs, and social relations such as class, gender, ethnicity, religion, caste and kinship at various social levels, i.e. household, community, and societal, and c) the state and institutions of civil society, such as government line agencies, the legal system, policy making institutions, development NGOs, social movements, education and training institutes, international donor and lending agencies, local government institutions.

Three conceptual models have been influential in explaining the structure of irrigation management arrangements (Vincent, 1995), namely irrigation management activities (Uphoff et al., 1991), property rights and hydraulic tenure (Coward, 1986a, b, 1990), and governance in irrigation systems (e.g. Ostrom, 1990, 1992). Uphoff et al. provide a comprehensive description of irrigation activities, distinguishing three types, relating to water, infrastructure and human organisation (1991: 54). Coward’s hydraulic tenure model provides the insight that the organisational arrangements of many irrigation systems is a reflection of the underlying property grid, formed during initial construction. Water rights from this view are seen to relate to investments in the construction, and be reproduced in the maintenance of systems. Local irrigation institutions control the rights to procure, direct and gain benefits from the landesque capital of the developed infrastructure and the water sources it mobilises. Vincent notes that while all three models have contributed enormously to understanding irrigation management, they have also attracted general criticism for not explicitly incorporating the objective of institutions/regimes formed (e.g. collective security, not just increased agricultural output), and for the assumptions they make about water users and rule makers (e.g. assuming consensus of interest in crafting rules, unlikely in areas where there has been major colonisation and land reform) (Vincent, 1995: 95-96). Vincent’s insight suggests that the perspectives and priorities of local water-users are important to take into account.

Following Beccar et al. (2002: 14), it is useful to focus on the following irrigation tasks, from users’ viewpoints: a) tasks of internal organisation: e.g. definition of objectives, collective decision-making, activities co-ordination and planning, monitoring of implementation, conflict resolution, ensuring members’ participation, b) tasks of regulation and authorisation: formulation, discussion, authorisation, dissemination and acceptance of constitutional rules, as water rights, including procedures, obligations and penalties, c) tasks of operational water management: implementing water rights through scheduling, distribution and surveillance of irrigation sessions, operation of hydraulic works, control over infrastructure maintenance, d) tasks of (re)constructing infrastructure: design and construction, repair and modification of hydraulic works and the irrigation distribution.

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8 Kreutzmann’s (2000) schematic showing relevant interrelationships in irrigation systems in high mountain regions contains these four inter-relating elements and three sets of contextual circumstances.
network, e) tasks of mobilising\(^9\) and administering resources: both members’ and outside institutions’ resources, e.g. economic capital, material resources, labour, agricultural resources, information including technical assistance. It is also useful to move away from conceptualising organisation for the fulfilment of tasks in terms of collective action, a perspective that can be seen to mask social difference (Agrawal and Gibson, 1999; Boelens et al., 2005; Mehta et al., 1999). Nuijten (2003: 11) suggests that to understand the logic of organising practices in specific socio-political and cultural contexts, we should not define organising in terms of collective action, because the objective is not to isolate organising actions, strategies and performances. Rather it is preferable to consider that people follow fragmented organising strategies, working with one set of actors and another, developing strategies and changing them in the course of action (ibid.).

Explicitly concerned with state and non-state (NGO) development interventions in irrigation, Vincent (1995: 96-99) develops a schematic model for the study of local water institutions/regimes. Local irrigation institutions/regimes have a number of characteristic properties, including a) the form of water rights (usufruct and ownership, ascribed or acquired), b) the constitutional principle of group association and collective rights (affinity via clan or community, or based upon individual investment contributions), c) the tenure principles and reinforcing action that legitimise group action (e.g. under hydraulic tenure, costs and actions may be allocated more freely in affinity-based than individual investment groups; interventions that create conferred tenure from the state leave uncertainty over rights and responsibilities, etc), d) the administrative structure used for governance and management (specific irrigation entities, more broad based community roles, embedded in a general civil administration), and e) the objectives of irrigation development (collective food security, colonisation of land and claiming of land and water rights, individual gain from increased output). These various institutional forms and their range of characteristics cannot in any way be considered static: a spectrum of sets of rights coexists in irrigation systems, for different groups of water users, and for different conditions of water availability, and these arrangements change over time, even independently of each other.

State-led or donor-driven external interventions often seek to amend institutional arrangements, for example, a) through the introduction of volumetric water shares, b) by making rights conditional to registration and fee payment, c) by considering irrigators as beneficiaries of state assistance or as clients of services or users of public services, or d) by attempting to increase output and improve water efficiency, without considering water-users’ existing preferences for water allocation, which may support groups, or take into consideration horticulture and livestock needs (ibid.: 98). Vincent’s schematic connects ‘local irrigation institutions’ with ‘external interventions’, labelling the result ‘modified institutions’. Besides specific interventions that target individual irrigation systems, the effects of more general, longer term processes of agrarian change must be considered for their influence upon irrigation institutions. Modern (and ‘pre-modern’) states have invested in irrigation as a broad national development tool, while hill irrigation systems in mountainous regions incorporated within larger states have often been subjected to laws and regulations that were developed for lowland, larger scale irrigation systems; as was the case in Himachal Pradesh in the 1960s and 1970s, as shown by Manzardo (2000: 207). Vincent (1995: 123) highlights how distinctions

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\(^9\) Etzioni (1968: 243) defines mobilisation as “a process in which a social unit gains relatively rapidly in control of resources it previously did not control”.
have been made between interventions having development objectives (focussed more purely on economic transformation) and those having reformist objectives (related to the emergence of the nation-state and state agencies to direct social change). Alternatively a distinction regarding the processes of transformation can be made, between monetarist-type agricultural reform policies (e.g. credit services, new technologies etc) and structuralist policies of agrarian reform (which promote new agrarian conditions).

The above conceptualisations are inter-related with the sociospatial concepts mentioned earlier, namely of place, territory, mobility, networks, scale, and positionality. Context matters, as do issues of power and politics. Focussing on ‘the spatialities of contentious politics’, Leitner et al. (2008: 157) define ‘contentious politics’ as “the phenomenon of organised social resistance to hegemonic norms”. In this sub-project, ‘organised social resistance’ can be envisioned to be the struggle underway by resident mountain valley community members to maintain and improve their irrigation systems, to bring water to their homesteads and farmland. ‘Hegemonic norms’ can be a variety of processes, practices, and ideologies, including: demographic changes induced by migratory livelihood strategies that change local figurations of actors (related to place, mobility, networks); the current global political economy and related interventions by state and non-state actors (according to figurations related to territory, scale and place), and changing value systems relating to globalisation processes that tend to steer households to favour individual livelihood strategies as opposed to the more collective strategies that characterised mountain societies/communities in the past, and which tend to exacerbate inequalities in access to resource (related to positionality, networks, place and territory). The phenomenon of such ‘organised social resistance to hegemonic norms’ is dependent upon the positionality of different water users; and their context, for example, their irrigation system’s length and water supply source, the spatial location of their village/community, networks that they may or may not have with the state and non-state actors, and so on.

5 Problem definition

A review of the literature on hill irrigation, and in particular the institutional arrangements for hill irrigation system management, across the Alai – Pamir – Karakorum – trans-Himalaya reveals that very little research has been undertaken, or is readily accessible, for those systems falling within the former Soviet sphere of interest, e.g. within the territories of Tajikistan and Kyrgyzstan. It is clear

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10 Context, power and politics are addressed in the works of Boelens, Zwarteven and associates, who have greatly contributed to the conceptualisation of small-scale irrigation systems, much of their work undertaken in the Andes (Boelens, 2008; Boelens and Davila, 1998; Boelens and Hoogendam, 2002; Roth et al., 2005).

11 By contrast there a substantial literature, developed mostly since the 1990s, exists on hill irrigation in the Himalaya, trans-Himalaya and Karakorum mountain ranges. Many of these studies provide, from differing standpoints, rich and detailed accounts of contemporary and historic hill irrigation practices in specific villages or valleys. For example, chapters in edited volumes such as Kreutzmann’s (2000) Sharing water, and Dittmann’s (2000) Mountain societies in transition, and studies from Nepal published by the International Irrigation Management Institute (IIMI, now renamed IWMI), e.g. Martin and Yoder (1988) and Pradhan (1989). Some of these studies go further to develop substantive social theorisations about irrigation practices, for example, Baker’s (1997, 2003, 2005) work on the kuhl irrigation canals of Kangra valley, Himachal Pradesh, or Kreutzmann’s (1998, 1999, 2011) work on mountain irrigation in Hunza and the surrounding valleys of Gilgit-Baltistan.
that agrarian societies were and are very differently organised in the former Soviet Union and modern-day nation-states of Tajikistan and Kyrgyzstan, as compared to societies within the former British Empire and modern-day territories of India and Pakistan. What remains unknown and largely unexplored is how these greatly differing agrarian conditions have and do impact upon hill irrigation systems, in particular upon the organisational and normative elements to hill irrigation systems.

Migrants – mainly young and male – from the foothills and mountains of the Alai, Pamir, Karakorum and Himalaya travel long distances to seek employment which, for example, affects irrigated agriculture by creating labour shortages for maintenance tasks (e.g. Olimova, 2005), or by intensifying a change in value systems, e.g. to purchase grain, or to plan a shift to urban areas. In the trans-Himalayan region Ladakh, it appears that in-migration is more the issue at hand: Indian military, international and domestic tourists, and poor labourers from Indian states such as Uttarakhand, Bihar, or from Nepal. In general the effects of spatial mobility are under-conceptualised in the hill irrigation literature, so it is unclear how water users cope with such effects.

In the name of development, state and non-state actors intervene in hill irrigation and in the process impact upon localised institutional arrangements. What is unclear, especially for the Alai and Pamir, is how communities of water-users, state and non-state actors interact with one another (mobilisation processes), e.g. to improve irrigation systems, protect pre-existing water rights, etc. Are these changes sustainable or desirable, or piecemeal interventions having a detrimental effect?

This study proposes to bring together the above issues, to make a comparative analysis of hill irrigation in the Alai, Pamir, Karakorum, and trans-Himalaya, focusing especially upon the effects of spatial mobility, and of social mobilisation to access state and non-state funds, and the inequalities generated (in accessing water, controlling water, or in livelihood outcomes) by such processes and practices, both at the household and community levels.

The research problem can be seen to centre upon a paradox, that while it is necessary for mountain valley communities to continue to collectively maintain their hill irrigation systems, there is also a tendency for individual households to strategise to move away from irrigated agriculture, even to urbanise, for few see opportunities and a future in mountain agriculture given its limited potential.

6 Main research question, and sub-questions
The main research question can be framed as follows:

How has hill irrigation in the valleys of the Alai – Pamir – Karakorum – trans-Himalaya been differentially transformed over the past 150 years, particularly in the past two decades, in response to the incorporation of water-users in broad state and non-state development processes, e.g. nonfarm employment, irrigation development interventions, state contractions and expansions, and how have levels of equality/inequality between and among water-users been affected by these changes?

This main question can be disaggregated into the following sub-questions:

1) How is hill irrigation similarly, or differently, practised across the Alai – Pamir – Karakorum – trans-Himalaya; what are some of the key differences (e.g. equal or unequal division of maintenance tasks
depending on upstream or downstream position within an irrigation canal system); and for what reasons do these similarities or differences occur (e.g. religious-cultural, state-induced, ecological)?

2) How does spatial mobility, much of it migratory nonfarm employment, and the changing values and demographics that incur in the process, impact upon hill irrigation systems, in particular the organisational and normative elements of irrigation systems (e.g. role and authority of traditional water master, participation in canal maintenance parties)?

3) How are irrigators mobilising themselves (e.g. via formation of committees), and/or being mobilised by state and non-state actors involved in irrigation development or more general state-building interventions, to access resources to improve (e.g. funds for repair works) or maintain (e.g. to defend against external threats, including hegemonic norms) their hill irrigation systems and/or access to irrigation water?

4) How have historical processes of nation-state expansion (e.g. British land revenue settlements and documentation of water rights, Soviet collectivisation, India’s developmentalist socialist welfare state), nation-state contraction (e.g. collapse of empires, the entry of international non-government organisations to regions within territories, land redistribution, localised political reconfigurations), or state intervention (e.g. payment to contractors to undertake maintenance work), affected hill irrigation?

5) What inequalities (e.g. in access to water, maintenance contributions, control over water) exist in hill irrigation systems, how are these perceived locally (from an emic perspective) and by other concerned actors (etic perspective), and how and why have these changed over time?

6) How applicable is a post-area studies approach to the study of hill irrigation (given that hill irrigation is very much localised, decentralised, with little cross-border effects), and why?

7 Research methodology

Though development research can be an interdisciplinary endeavour, this research is principally a qualitative, social science venture. In the social sciences there is an ongoing tendency for scholars to attempt to emulate the natural sciences in their construction of theories. Such an approach is arguably futile, as illustrated by Flyvbjerg (2001: 3–4) drawing upon the forgotten work of Aristotle:

Aristotle, in arguing that natural and social sciences are and should be different ventures, discusses the three intellectual virtues, episteme, techne, and phronesis. Whereas episteme is found in the modern words “epistemology” and “epistemic,” and techne in “technology” and “technical,” it is indicative of the degree to which thinking in the social sciences has allowed itself to be colonized by natural and technical science that we today do not even have a word for the one intellectual virtue, phronesis, which Aristotle saw ... as the necessary basis for social and political inquiry, ...”.

Arguing for a phronetic social science, Flyvbjerg considers such research “a pragmatically governed interpretation of the studied practices”, and “an analytical project, but not a [strictly] theoretical or methodological one” (ibid: 140). This relates to the nature of human practices: while theories are supposed to be explicit, universal, abstract, discrete, systematic, complete and predictive, i.e. context independent and having rules (ibid: 39), human practice is contested according to actors’ positionality, and place- and context-dependent requiring concrete examples, thus cannot be reduced to rules nor predicted. Using concrete examples (case studies) this sub-project will explore
historical circumstances and current practices to clarify and deliberate upon the problems faced by mountain communities; but with an understanding that the ultimate answers will not be found (especially for such an ambitious project as this, undertaken as it is by a sole researcher).

Flyvbjerg’s guidelines for such research include a focus on values (e.g. where are we/mountain communities going?), the placement of power at the core of analysis (e.g. who gains and who loses?, is it desirable?), on getting close to reality throughout the research process including the sharing of results to generate feedback, on placing emphasise on small things (e.g. asking little questions), by analysing practices and thus disciplining discourses, and by studying cases and contexts (through the use of concrete examples). Selection of cases is so far guided by the review of literature undertaken, and by field visits undertaken to the Pamir, Alai and trans-Himalaya. Four cases are selected for study, each including a cluster of villages or settlements (see figure 1, and table 1, for details).

<table>
<thead>
<tr>
<th>Research site</th>
<th>Alai (Alaiku)</th>
<th>Pamir</th>
<th>Karakorum</th>
<th>Trans-Himalaya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of valley</td>
<td>Tar valley</td>
<td>Shokhdara valley</td>
<td>Shigar valley, upper Braldo</td>
<td>Zanskar valley</td>
</tr>
<tr>
<td>Name of village(s) studied/discussed</td>
<td>Kuiotash, Terek</td>
<td>Shokhirizm</td>
<td>Dassu and others</td>
<td>Karsha and others</td>
</tr>
<tr>
<td>Name of lowest political unit</td>
<td>Kyzyl Zhar Ayl Okmotu</td>
<td>Barvoz Jamoat</td>
<td>Dassu Union Council</td>
<td>Karsha Gram Panchayat (new)</td>
</tr>
<tr>
<td>Population of AO/Jamoat</td>
<td>6968</td>
<td>2647</td>
<td>2322 (1981 census)</td>
<td>...</td>
</tr>
<tr>
<td>District</td>
<td>Kara Kulja</td>
<td>Roshtqala</td>
<td>Skardu</td>
<td>Kargil</td>
</tr>
<tr>
<td>Province</td>
<td>Osh</td>
<td>Gorno-Badakhshan</td>
<td>Gilgit-Baltistan</td>
<td>Jammu &amp; Kashmir (Ladakh)</td>
</tr>
<tr>
<td>Nation-state</td>
<td>Kyrgyzstan</td>
<td>Tajikistan</td>
<td>Pakistan</td>
<td>India</td>
</tr>
<tr>
<td>Mountain range</td>
<td>Alai: Alaikuu, Ferghana range</td>
<td>Pamir: Shugnan and Shokhdara ranges</td>
<td>Karakoram</td>
<td>Zanskar range</td>
</tr>
<tr>
<td>Water source for canal</td>
<td>Glacial stream-fed river</td>
<td>Glacial stream and snowmelt</td>
<td>Glacial stream and snowmelt</td>
<td>Glacial stream and snowmelt</td>
</tr>
<tr>
<td>Elevation of primary research villages</td>
<td>2200-2400m</td>
<td>2900-3000m</td>
<td>2700-3000m</td>
<td>3500m</td>
</tr>
<tr>
<td>Local name for canal</td>
<td>Aryk</td>
<td>Wedh</td>
<td>Hrkong, Hrka</td>
<td>(Majyur (kuhl))</td>
</tr>
<tr>
<td>Elevation of canal headworks</td>
<td>2250-2600m</td>
<td>3600-3800m</td>
<td>...</td>
<td>3600-3800m</td>
</tr>
<tr>
<td>Estimated valley-bottom precipitation</td>
<td>570-900mm</td>
<td>250-300mm</td>
<td>&lt;150mm</td>
<td>200-250mm</td>
</tr>
<tr>
<td>Number of cropping seasons</td>
<td>One, starting May</td>
<td>One, starting May</td>
<td>One, starting May</td>
<td>One, starting May</td>
</tr>
<tr>
<td>Dominant cropping system</td>
<td>Barley, fodder, wheat</td>
<td>Barley, fodder, wheat</td>
<td>Wheat, barley, buckwheat, millet (fodder)</td>
<td>Barley, wheat, peas</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Kyrgyz (‘Mongolian’ identity?)</td>
<td>Pamiri (Iranian identity?)</td>
<td>Balti</td>
<td>Tibetan (‘Mongolian’ identity?)</td>
</tr>
<tr>
<td>Religion</td>
<td>Islam – Sunni</td>
<td>Islam – mainly Shia (Ismaili)</td>
<td>Islam – Shia (mostly twelve Shia and some Nurbakhshi)</td>
<td>Buddhist</td>
</tr>
<tr>
<td>Language spoken</td>
<td>Kyrgyz, Russian</td>
<td>Shugni, Tajik, Russian</td>
<td>Balti</td>
<td>Ladakhi (a dialect of Tibetan)</td>
</tr>
<tr>
<td>Authors drawn upon</td>
<td>GoK, fieldwork</td>
<td>Bliss, Bossenbroek, fieldwork</td>
<td>Schmidt</td>
<td>Gutschow, Labbal, fieldwork</td>
</tr>
</tbody>
</table>
Table 1: Details of four research sites (cases). Note: this table is incomplete, and data drawn from different sources is not fully referenced.

Figure 1: Map showing the mountainous area stretching across the Alai, Pamir, Karakorum, and trans-Himalaya. The four research sites, highlighted, are from the top located in (a) Kara-Kulja valley,
Osh province, Kyrgyzstan, (b) Shokhdara valley, Gorno-Badakhshan province, Tajikistan, (c) Shigar valley, Gilgit-Baltistan, Pakistan, and (d) Zangskar valley, Ladakh, Jammu and Kashmir state, India.

The research employs a range of methods including literature review. Archival research will be attempted although there is little provision for this in terms of time and money. Especially problematic is the identification and interpretation of literature in the Russian language. A visit will likely be made to the British Library in London. During field research a combination of (participant) observation, mapping, informal interview and group discussion will be used. Interviews with regional and macro-level actors will be undertaken as possible given the limited field work time. A schedule of the ‘plan of work’ is included below in section 8.

The post-area studies approach determines the nature of the research design, namely comparative, multiple, case studies. Methodological guidelines for undertaking an analysis of the material that will be generated are found in Flyvbjerg (2001, 2006) and in Latour (2005), both of which discuss social science and qualitative research, the case study, and a whole range of pertinent issues. Data collection and analysis (hopefully using Atlas.ti) will proceed simultaneously in an iterative process. As discussed earlier, conceptualisations developed in the Himalaya, Karakorum and globally will be applied to the cases in the Tajik Pamir and Kyrgyz Alai, testing their applicability and/or developing conceptualisations further to address the research questions. Using this approach, conceptualisations of irrigation – often static and centring upon the locale of interest – will be linked with conceptualisations of mobility and other geographical lexicon, e.g. networks, scale and territoriality.

8 Plan of work

<table>
<thead>
<tr>
<th>Plan</th>
<th>Fieldwork/work</th>
<th>Outputs for Crossroads Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 2012</td>
<td>Review literature / prepare research questions</td>
<td>1) 1st Public lecture and 1st working paper (review of literature), 2) Research outline for E3.2, 3) Development concept paper</td>
</tr>
<tr>
<td>Mar</td>
<td>Pakistan GCU-ZEF collaboration (4 weeks)</td>
<td></td>
</tr>
<tr>
<td>Mid Apr-Mid Jun</td>
<td>Field: Tajikistan and Kyrgyzstan</td>
<td>Field research in Pamir (4 weeks) and Alai (4 weeks)</td>
</tr>
<tr>
<td>Mid Jun-Sep</td>
<td>Analysis of field data</td>
<td>1) Analyse field data, 2) Draft working paper</td>
</tr>
<tr>
<td>Mid Oct</td>
<td>Field research: India</td>
<td>Field research in trans-Himalaya (2 weeks)</td>
</tr>
<tr>
<td>Nov-Dec</td>
<td>Analysis includes India/Pakistan</td>
<td>1) Submit 1st article to peer-reviewed journal, 2) Figurations conference in Nov</td>
</tr>
<tr>
<td>Jan-mid Mar 2013</td>
<td>Continue analysis</td>
<td>2nd public lecture and 2nd working paper (looking at ‘South Asia’ and ‘Central Asia’)</td>
</tr>
<tr>
<td>Mid Mar-mid Apr</td>
<td>Pakistan GCU-ZEF collaboration (4 weeks)</td>
<td></td>
</tr>
<tr>
<td>Mid Apr-May</td>
<td>Field research: Pak</td>
<td>Field research in Karakoram (6 weeks)</td>
</tr>
<tr>
<td>Jun-Mid Jul</td>
<td>Field research: India</td>
<td>Field research in trans-Himalaya (6 weeks)</td>
</tr>
<tr>
<td>Mid Jul-Mid Aug</td>
<td>-</td>
<td>Annual leave</td>
</tr>
<tr>
<td>Mid Aug-Mid Oct</td>
<td>Fieldwork</td>
<td>Revisits: Field research in Pamir (6 weeks) and Alai (2 weeks)</td>
</tr>
<tr>
<td>Mid Oct-Dec</td>
<td>Analysis</td>
<td>Analysis</td>
</tr>
<tr>
<td>Jan 2014</td>
<td>Analysis</td>
<td>3rd public seminar and 3rd working paper</td>
</tr>
<tr>
<td>Feb</td>
<td>Analysis</td>
<td>1) Prepare 2nd paper for submission, and submit. 2) Submit contribution to volume of essays</td>
</tr>
<tr>
<td>Mar – Feb 2015</td>
<td>Analysis</td>
<td>Articles, book chapters, presentations</td>
</tr>
</tbody>
</table>
9 Bibliography


Quintaneiro, T. 2006: The concept of figuration or configuration in Norbert Elias’ sociological theory. Teoria & Sociedade 2.


