

# Integrating Watershed Management: Stakeholders, their Dynamics and Institutions

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**Abstract:** *The importance challenge for the future in institutional research lies in going beyond emphasising the importance of institutions towards explaining how institutional matters in managing natural resources, like water. Institutions have been called to realign along the regional boundaries of watersheds or river basins for integrated management for ecologically consistent human development. Though such regional units are physical in nature, institutions understood as patterned social behaviour evolved over time that are essential for their management do not strictly follow their physical boundaries. Institutions interact in diverse action arenas to facilitate or constrain actors involved in managing watershed. These arenas may be location-specific or generic, formal or informal, and naturally evolved or deliberately created. Diverse institutions operate and interact in these action arenas where all decisions related to the use and management of the resources in the watershed. This paper aims to examine how watershed institutions can be integrated by exploiting the interactive nature of institutions across action arenas and the interlinked nature of actors' actions.*

*The paper has four objectives to address the research gap. First, identify the role of various stakeholders from the perception of people affected from a particular problem. Second, understand how interactive institutions across various arenas influence management of water resources at hamlet<sup>2</sup> level, and its linkage with poverty. Third, analyse the actions of actors who are directly affected by a particular problem in accessing different action arenas. Finally, examine the interactive nature of diverse institutional rules in facilitating and constraining decisions at action arenas in managing water resources. These objectives are attempted with an empirical application of the 'agent-actor-crowd' model to a core water-related issue applicable in each of the four socio-economically and hydrologically distinct hamlets selected from two watersheds in Himachal Pradesh, India. The data are collected from samples of stakeholders in different action arenas using a combination of participatory methods, semi-structured interviews, and intuitive observation.*

*The study reveals the complexity of institutions in facilitating resource crisis. Second, it illustrates the dynamic nature of stakeholders, who depending on their endowments, prevailing institutional rules and resources in context take part in water related decisions, as 'actors' and as 'agents'. Third, unlike the contemporary approach emphasising on collaborative model, the study traces the prevalence of agents who play an important role in integrating institutions and negotiating diverse concerns within and between action arenas. Facilitating these agents, offers options for participatory dialogue process among actors, provide channel for information dissemination and evolve cost effective options for institutional change. The study though a piecemeal attempt to examine the role of institutions, emphasis the need to strengthen sectoral approach of managing natural resources and identifies issues for devolving powers to various institutions for polycentric governance.*

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<sup>2</sup> Hamlet is cluster of houses in a village. A village is the lowest administrative unit having a clear boundary and socio-economic information.

## 1. Introduction

Watersheds or river basins are an appropriate unit for integrated management of natural resources for ecologically consistent human development. Integrated management of watershed/ river basin is largely assumed to integrate relevant sectoral institutions at state, district or at village level.<sup>3</sup> Such attempts are assumed to identify and bring together various stakeholders at one level or the other to negotiate their diverse concerns in managing watershed. Though such attempts have made impacts on economic and social fronts (Chopra, 1999; GoI, 1999:xv; Ninnan, 1997), sustainability of these attempts have come under scrutiny in recent years (Saravanan, 2002). First, external institutions attempt to bring about change by directly involving the stakeholders and their behaviour pattern. Such an approach not only creates new stakeholders groups, but also authorises existing resource use, when they are highly dynamic depending on the context (Mosse, 1997; Saravanan, 1998). Second, such an approach is expensive, requires specialised skills and knowledge cannot in any way assure that the sensitivity of the people and their livelihood will not be affected. Third, the approach assumes that stakeholders are easy to identify and their unequal capability can be negotiated when brought into a common forum. What makes this approach significant is the emphasis on interactive function of stakeholders, but if this is supplemented with indirect approaches, it can play a significant role in bringing about institutional change.

In real world scenario, stakeholders do not always stake their claim over resources, rather depending on endowments they possess, the characteristics of resources at that particular period of time and institutional rules in a particular 'strategic context', act to make claims that is why these stakeholders are considered in this paper as 'actors'. These actors participate in managing watershed using diverse actions by integrating different institutional rules to manage water. Here integration of institutions takes place not at various administrative (state/district/village) or physical (watershed/river basin) jurisdictions rather at various action arenas in a strategic context, where actors share a common understanding of an issue and shared vision to overcome. Here the actors use diverse forms of participation - ranging from passive submission to debate and negotiation. These arenas are location-specific or generic, formal or informal, and naturally evolved or deliberately created. Though various factors shape the decisions in this arena, institutions remain the crosscutting influencing actors. Diverse institutional rules and actors operate and interact in these action arenas where all decisions related to the use and management of the resources in the watershed. This paper aims to examine how watershed institutions can be integrated by exploiting the interactive nature of institutions across action arenas and the interlinked nature of actors' strategies. The paper has four objectives to address the research gap. First, identify the role of various stakeholders from the perception of local level stakeholders. Second, understand how interactive institutions across various arenas influence management of water resources at hamlet<sup>4</sup> level, and its linkage with poverty. Third, analyse the actions of actors who are directly affected by a particular problem in accessing different action arenas. Finally, examine the interactive nature of diverse institutional rules in facilitating and constraining decisions at action arenas in managing water resources. These objectives are examined with an empirical application of the 'agent-actor-crowd' model to a core water related issue applicable in each of the four socio-economically and hydrologically distinct hamlets selected from two watersheds in Himachal Pradesh, India. The information regarding the interactive nature was collected using diverse research methods (participatory methods, structured interviews, semi-structured interviews, and intuitive observation) to capture the complexity.

The paper is organised into eight sections. The following section provides conceptual background and methodology adopted to capture the complexity of water resource management. The third section provides an overview of the study area. The fourth section identifies the stakeholders involved in resource management. The fifth section depicts the complexity and messiness of institutions interacting in influencing resources management, where there

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<sup>3</sup> Attempts to integrate institutions at state level have been witnessed in the past by formation of Water Resource Organisations (WRO) under the influence of World Bank, at district level through formation of Watershed Development Programme, such as in Doon Valley and Indo-Changer projects, and at village level watershed development committee.

<sup>4</sup> Hamlet is cluster of houses in a village. A village is the lowest administrative unit having a clear boundary and socio-economic information.

are stakeholders entering the arena. The sixth section unravels the institutions interacting in influencing water management, by examining its role in creating 'virtual' scarcity, in creating water distributional problems and in affecting the capability of people to access. The seventh section, examines the options available for actors in addressing water resource management at local level. Different decision-making arenas up to district levels are examined to understand the interactive nature of institutions and their role in facilitating and constraining the agents. The final section concludes by identifying key insights for institutional change and opportunities for decomposing the institutions in the arena to predict models of institutional change.

## 2. Conceptual Background & Methodology

Institutions and stakeholders interact among each other in taking decisions related to water management. Such interactions have been recognised in action arena<sup>5</sup> (hereafter as arena) (Ostrom et al, 1994). Arena represents a complex system (refer, special issue of Ecological Modelling, 2002; Railsback, 2001) that characterises openness, diversity of actors, non-linear fashion of interaction and heterogeneity. In spite, these arenas characterise emergent properties, multi-scale interactions, unexpected behaviours and self-organisation capacity, which makes them a 'complex adaptive system'. Though a number of factors (physical, social and cultural) influences the arena, institution understood as a patterned behaviour of social group over a period of time, constitute a crosscutting factor and a particular driving force in the decision-making process (Young, 1999) (Fig.1).

Action arena is a social practice ordered across space and time (Giddens, 1984), may be location-specific or generic, formal or informal, and naturally evolved or deliberately created in a strategic context. These arenas have stakeholders who are 'actors' and involved in performing diverse actions; broadly they may be strategic or communicative (Alexander, 2001). The former represents actions taken for the realisation of particular self-interested goals (coercive power), while the latter aims at achieving collective decisions through communicative action (enabling power). Though these two actions combine in complex forms in a 'strategic context'<sup>6</sup> of the action arena, it is the capability of few actors, who act as 'agents' in accessing other action arenas by drawing upon the modalities of existing institutions in the reproduction of systems of interactions, by the same token reconstituting their properties (Giddens, 1984:2). Using social network approach of following 'agents' the interactive nature of institutions are explored. Though institutions are complex and diverse, they often overlap among number of forces to constrain and facilitate the management of water resources in diverse action arena (Dorsey, 1986).

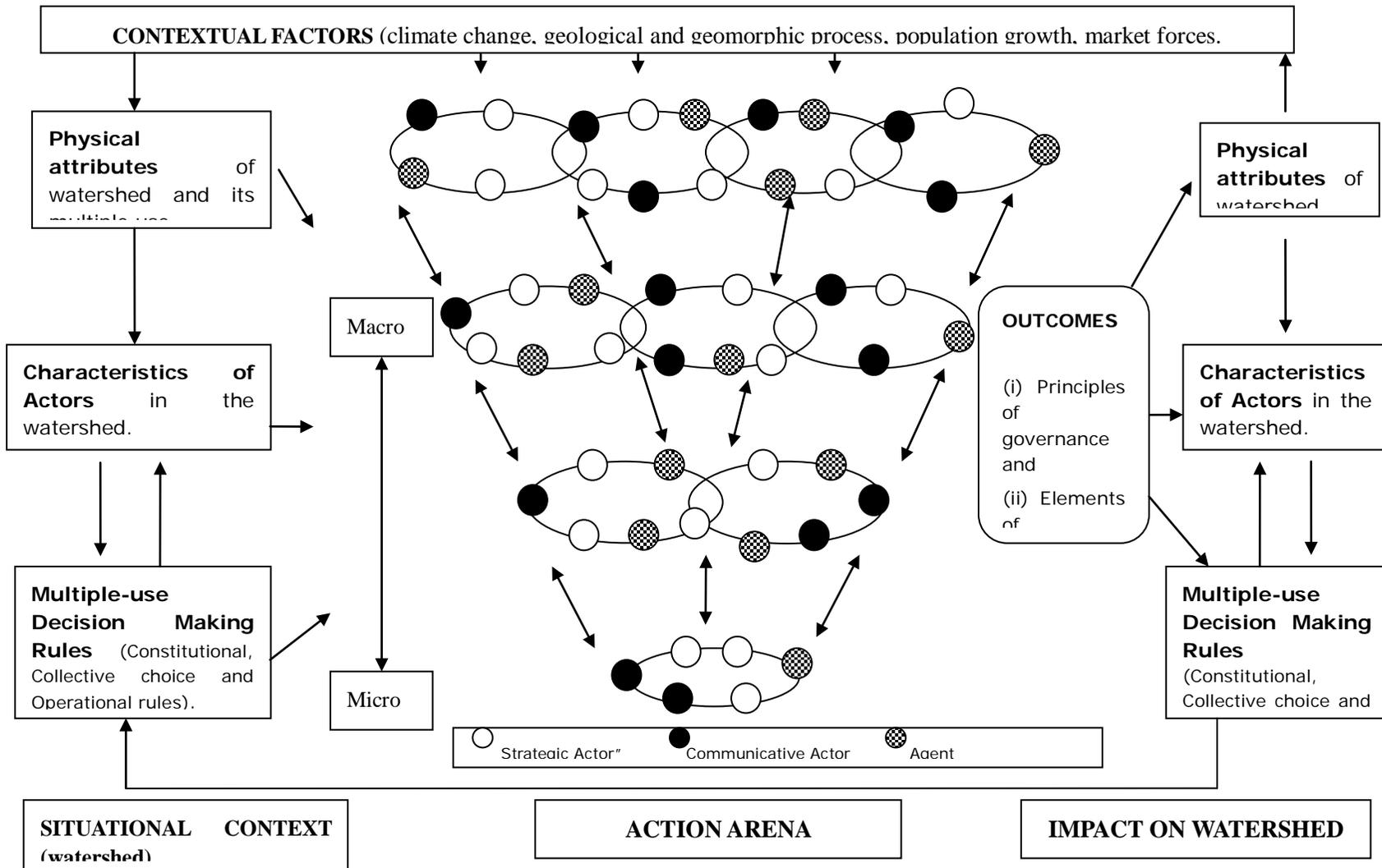
The institutional arrangements in action arenas are institutional structures, institutional components and institutional rules (Fig. 2). The institutional structures consists of public, private and user groups (Meinzen-Dick and Rosegrant, 1997, cited in Bruns and Meinzen-Dick, 2003). Each of these institutional structures have three components (Saleth & Dinar, 2000); policy, administrative and legal components. These components have various institutional rules, broadly they relate to Ostrom's et al (1994) seven types of rules. Very little is known about the complexity of interaction, and consequently, the mixture of rules and principles involved in action arena (Cars, et al, 2002; Lubell, 2003; Mehta, 2002; Ostrom, 2001; Pahl-Wostl, 2002; Pradhan et al., 1997:2). To analyse the complexity of interaction among institutions controlling individuals' access to water, a case study approach is important (Neuman, 2003), as it enables to capture the complexities and the relationship between human and environment (Young, 1999). This provides insights for understanding contextual factors influencing institutional phenomenon in a selected watershed, where micro level or the actions of individual people connects the macro level or large scale social structure and processes (Neuman, 2003:33).

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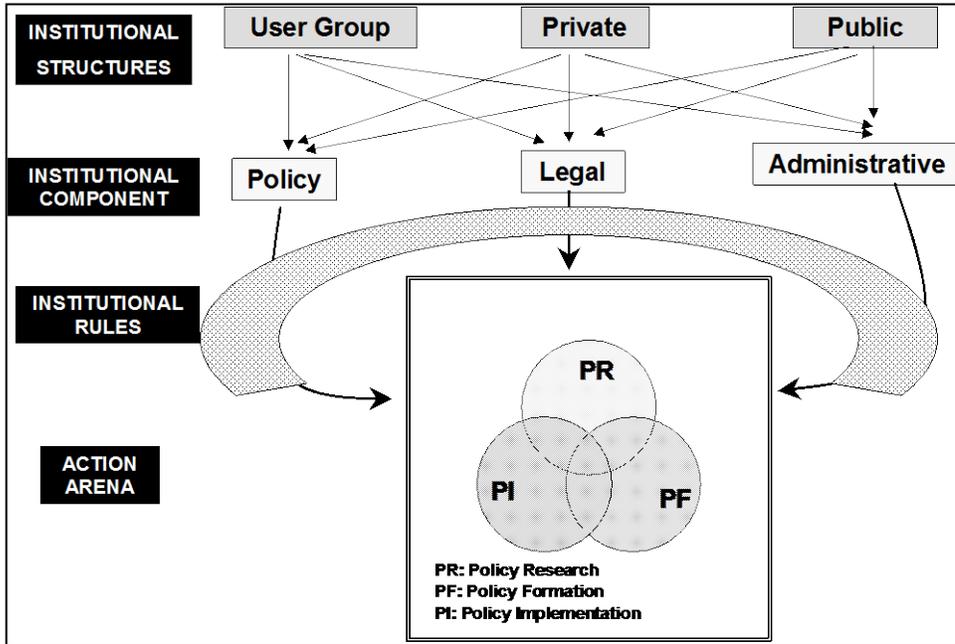
<sup>5</sup> Few term this as 'forums' (Meinzen-Dick and Bruns, 2000; Moench, et al., 2003) or 'platforms' (Chamala, 1995; Steins and Edwards, 1999). However, action arenas are appropriate as it describes action.

<sup>6</sup> The strategic context considers wide spectrum of issues, involves a wide range of actors having a shared vision and understanding in making well-informed strategic choices that shapes their future, and more importantly, ability of these actors to administer and enforce these decisions.

**Fig. 1 FRAMEWORK FOR ANALYSING INSTITUTIONAL INTEGRATION FOR WATERSHED MANAGEMENT**



**Fig. 2 INSTITUTIONAL ARRANGEMENTS IN ACTION ARENA**



To examine the research objectives, a combination of research methods has been used (Table. 1) in order to remain exploratory in describing the role of institutions, the relationship among them and the interaction process in order to capture the complexities of interaction process (Young, 1999). Diversity of methods becomes utmost importance in examining complex and interactive nature of water resource institutions, as it helps to build-on the advantages of different methods and overcome disadvantages of each method. In addition, helps in validation and also opportunities for cross-fertilisation of information and in providing a balanced qualitative and quantitative data that is contextually relevant. More important, is its ability to build on creativity and compromise (Abbot and Guijit, 1997). A combination of both quantitative and qualitative research methods in a continuous and integrated fashion has been adopted. The fieldwork currently in progress, involves staying in the hamlets and carrying out the study using the following methods: (i) Documentary research, (ii) workshops, (iii) Participatory research methods (iv) Structured Interviews, (v) Semi-structured Interviews, (vi) Focus Group Discussions, and (vii) Participant observation.

### 3. Research Setting

The paper examines the objectives in the state of Himachal Pradesh, India. The state represents an intricate mosaic of hills, valleys, fast flowing and turbulent rivers and soaring high mountains covered with snow with significant tensions among competing discourses of capital-intensive forms of economic development, environmental conservation and participatory forms of eco-development (Coward, 2003; Baker and Saberwal, 2003). Taking a case of most backward district Sirmaur in the southern part of the state (Ref. Annexure 1), four socio-economically and hydrologically distinct hamlets were selected from two watersheds representing different agro-climatic conditions. The district is an ideal candidate to examine the actions of actors in accessing water due to presence of diverse agro-climatic conditions within the district (suitable for comparability), scarce availability of water, socio-economic backwardness and existence of diverse irrigation system.

Two watersheds were selected one each from low hills sub-tropical (Shivalik) zone and mid-hills sub-humid zone, the former is located in low altitude zone (between 600-1000 msl), easily accessible to plains and well-off, while the latter in mid hills (between 1000 to 2000 msl) is relatively remote and backward (Table. 2). The two watersheds were selected based on: (1) competing claims over water resources in the region. This is identified by an irrigation

source benefiting more number of hamlets/ villages, number of overlapping irrigation sources (such as *Khuls*, canals and wells), different cropping patterns and any conflicts over water use; (2) ecological characteristics of vulnerability, (3) willingness of the people to support for the proposed research study, and (4) access to transportation facilities (as the researcher has to coordinate the research work in two watershed at different agro-ecological regions). The hamlets in each watershed were selected through discussion with gatekeepers and village leaders on its location in watershed (upstream and downstream), economic backwardness of the hamlet, and scarce availability of water (for irrigation).

The two hamlets selected out of 10 hamlets in Khairi-Ka-Kala watershed in the low hills sub-tropical zone (hereafter referred to as low hills) are relatively (compared to other hamlets) backward in the watershed. The first hamlet, Khairwala, is located in upstream of the watershed and has Muslim Gujjars (scheduled tribal) and less numbers of Rajputs (forward caste). These people though agriculturist, supplement their livelihood through selling milk and labour employment outside the hamlet. They are remotely located from the main group of hamlets, due to their occupation and backwardness. The hamlet has irrigation facility through lift from the nearby river Markhanda, through which they grow maize, wheat and fodder grasses. While the people of Pipalwala hamlet though agriculturist, depend on employment (formal and informal) from near by towns in Himachal and in Haryana for their living. The *Khul* (diversion-based) irrigation systems that draw water through gravity from the river Markhanda is the only source of irrigation. This enables to cultivate maize, wheat, fodder grass and vegetables for home consumption.

Compared to its counterpart, the hamlets in Rajana Watershed located in the mid-hills sub-humid zone (hereafter referred to as mid-hills) are agriculturist (with limited employment opportunities) and economically backward due to remoteness. Here there are two major caste-the Rajputs (forward caste) and Kohli (scheduled caste), with Brahmans and *Chamars* (another class of Scheduled Caste) being minor. Further these hamlets being close-by have the same socio-cultural characteristics. However, being apart from each other by about 100 metres in altitude makes a great difference in their agriculture pattern. While the hamlet Uppala Rajana (located upstream) grows tomato and ginger (also have potential to grow other vegetables) in rainfed conditions (with limited irrigation in May) and organically. It also has a very good soil condition. In contrast, hamlet Nichala Rajana (downstream) is unable to grow tomato and in large scale ginger successfully due to problems of pests and unsuitable soil conditions, in spite of having *Khul* based irrigation facilities. Examining water resource management in these diverse settings offers a range of insights for understanding the management and the options.

**Table. 2 Physiography and Socio-Economic Background of the Case Study Hamlets**

Revenue Village	Khairi-Ka-Kala Watershed		Rajana Watershed	
	Bikram Bagh	Pipalwala	Rajana	Rajana
CASE STUDY HAMLET	KHAIRWALA	PIPALWALA	UPPALA RAJANA	NICHALA RAJANA
Agro-climatic zone	Low hills sub-tropical (Shivalik) zone		Mid Hills sub-humid zone	
Physiography	Moderate steep to steep low hills of Shivaliks.		Steep to very steep high hills of Lesser Himalayas.	
Altitudinal location (in metres)	400-600		1000-1200	
Rainfall	About 1000		About 1200-1500	
Intensity of soil Erosion	Severe		Moderate	
Slope	Moderate		Steep	
Soil type	Loamy	Sandy to loamy	Loamy to clayey	Sandy to loamy
Location in watershed	Upstream	Downstream	Upstream	Downstream
Population (as on 2002)	307 (Muslim Gujjars- Scheduled)	270 (Forward caste) 101 (Scheduled)	357 (Kohli-Scheduled Caste)	393 (Kohli-Scheduled Caste)

	<b>Khairi-Ka-Kala Watershed</b>		<b>Rajana Watershed</b>	
<b>Revenue Village</b>	<b>Bikram Bagh</b>	<b>Pipalwala</b>	<b>Rajana</b>	<b>Rajana</b>
CASE STUDY HAMLET	KHAIRWALA	PIPALWALA	UPPALA RAJANA	NICHALA RAJANA
(Households)	Tribe) 96 (Rajputs-Forward Caste) (57)	Caste) 11 (Scheduled Tribe) (64)	247 (Rajputs & Brahmins- Forward Caste) (75)	250 (Rajputs-Forward Caste) (80)
Average Household size	7	6	8	8
Caste	Muslim Gujjars (scheduled tribe) and Rajputs	Multi-caste	Rajputs, Brahmin and Kohli (Scheduled Caste)	Rajputs and Kohli (Scheduled caste)
Main source of drinking Water Facilities	Handpump	Handpump	<i>Bavdi</i> (stored spring water)	Spring
No. of households having access to toilet facilities at home (% of total pop.)	None	10 (23%)	None	3 (9%)
Dominant Economy	Labourers, regular employment (formal) and marketing of milk.	Regular employment in formal institutions, labourers and from marketing of milk.	Agriculturist and regular employment (formal).	Regular employment (formal) and agriculture.
Irrigation Type	Lift Irrigation System	<i>Khul</i> Irrigation System	Rainfed	<i>Khul</i> Irrigation system
Major Food crops	Maize and Wheat	Maize and Wheat	Maize and Wheat	Maize and Wheat
Other crops (including cash crops)	Fodder grass	fodder grass, mangoes (only large landowners) and minor vegetables.	Ginger, tomato and vegetables	Ginger and vegetables.
Average annual income (both cash and non-cash) (in Indian <sup>7</sup> Rs.) of Household	48199	70393	50906	46078
<b>Social Class (main indicators from wealth ranking)</b>				
Rich	Land holdings more than 2 acres, concrete house and good number of cattles.	Households supplementing their agriculture with pension from defense or government departments	Landholdings more than 2 acres.	Landholdings more than 5 acres
Upper Middle	-	-	Landholding size between 1 to 2 acre and regularly employed in Mining industries.	Landholdings between 3-5 acres
Middle	Good agriculture land and regular employment in formal and informal	Households supplementing their agriculture with regular income from	Landholding size between 0.4 to 1 acre.	-

<sup>7</sup> The conversion rate of Indian Currency to one \$ US is 45.00.

	<b>Khairi-Ka-Kala Watershed</b>		<b>Rajana Watershed</b>	
<b>Revenue Village</b>	<b>Bikram Bagh</b>	<b>Pipalwala</b>	<b>Rajana</b>	<b>Rajana</b>
CASE STUDY HAMLET	KHAIRWALA	PIPALWALA	UPPALA RAJANA	NICHALA RAJANA
	institutions	formal and informal.		
Lower Middle	-	-	Landholding size between 0.2 to 0.4.	Landholdings between 1-3 acres
Poor	Landholding of less than an acre and working as labourer.	Households supplementing their agriculture with income from labour employment.	Landholding size less than 0.2 acre and employed as labour (mainly from SC community). They have landholding in tail-end location.	Landholdings less than 1 acre
Very Poor	6 households (having unirrigated land uphill.	2 Households having unirrigated land.	-	-

Source: Field survey, 2004.

#### **4. Stakeholder Mapping: Water Resource and the Poor**

To understand the strategic context in which institutions and stakeholders interact, various problems faced in the hamlet were identified through semi-structured interviews with key persons in the hamlets. Of various problems, core water related problem was taken into account and various actors and their roles were identified using stakeholder mapping. Examining problems across the case study hamlet helps in identifying the perceived problems by the respondents, and also identify the core water related problem in the hamlet. In 3 (out of 4) hamlets 'distribution of water' was a problem, which is normally told to outsiders as problem of 'less water more land to irrigate'. While in 4<sup>th</sup> hamlet, the problem was non-availability of any irrigation facilities. To identify the role of various stakeholders in addressing the problem, a 'workshop' was organised. The participants in the workshop were identified through interviews with people directly affected by the problem and the officials in related departments. Half-a-day workshop helped to identify various stakeholders and notionally classify (less, medium and high) them in terms of their interest and power in addressing the strategic problem.

Placing these stakeholders on a grid enables to see their perceived role (Fig. 3). The poor and middle class groups are largely placed in the bottom of the grid, showing less to medium interest and also power. In contrast and understandably the rich are placed in high interest and power category, except in Pipalwala where the rich are placed in medium category. Interestingly, in Khairi-Ka-Kala watershed governments departments seems to show less interest to the problem, but have high power to make changes. In contrast, government departments seem to show some concern in Rajana watershed.

#### **5. Water Resource Management & Institutions**

Managing water resources in the case study hamlets require understanding the history of the hamlet, their management pattern and the role of current institutional arrangements affecting water resources. Semi-structure interviews were conducted with people directly affected by this particular problem and with key officials in relevant departments on the role of institutions in influencing water management. Broadly, it could be illustrated in terms of their role in perceiving water availability, the way it is distributed and in building the capability of actors in accessing water. In each of these categories institutions (both micro and macro) coalesce in diverse arenas at various time period in shaping management of water resources. It also reveals how poor are being marginalised.

#### **Constructing Virtual Scarcity**

Availability of water is often considered to be infinite and naturally available (through rain). In recent decades, the finite nature is only understood in relevance to surface and ground water, and therefore emphasis on harvesting rainwater (which is assumed to be infinite). The study demonstrates how external institutions perceive water availability and in the process has constructed virtual scarcity (Fig. 1).

Early settlers (as in the case of Khairi-Ka-Kala Watershed) - the princely rulers of Sirmaur district, King Shamsheer Singh, constructed *Khul* (a diversion based irrigation system) from the river Markhanda to cultivate his orchards about 3 Kilometre downstream. The Princely Ruler solely managed it, as it was a private property. Later, the ruler due to close acquaintance with the people of Daduwala (upstream hamlet) extended irrigation rights. After Independence, the Public Works Department of the then Union Territory of Himachal Pradesh, which took over the maintenance and management of *Khul* from the Princely rulers extended irrigation rights to the downstream hamlets (one of them being Pipalwala) during 1960's on the perception of increasing irrigated area. Again it was extended during 1990, when the department of Irrigation and Public Health (DoIPH) lined the *Khul* in the name of on-farm development. The lining though might have improved efficiency of water; it did create scarcity in two ways. First, it had to comply the directive of the Government of Himachal, which states that if *Khuls* are lined, the irrigated area has to be increased<sup>8</sup>. This led to extending irrigated area beyond its capacity from 123 acres in 1880's to 306 acres in 2003. Second, the lining created a permanent structure in a very temporary physical landscape<sup>9</sup> thus demanding regular desilting and channelising. The unregulated extension of irrigated area only provides superficial hopes to the people rather than assured and certainty in availability of water. These developments did not have major impact on the poor in the hamlet Pipalwala. First, about 60 percent (25/44) of the poor in Pipalwala hamlet have landholding less than an acre. Second, due to less landholding and uncertainty associated with *Khul* irrigation, these people depend on employment and marketing of milk for their livelihood (Table. 3). Finally, dependence on agriculture land is only for food grain requirements that grow even in rainfed conditions. It is clear from the Table. 3 that the economic returns from agriculture are very meagre especially to the middle and poor class group of people.

Another major institutions creating virtual scarcity is the market. The hamlets in Rajana watershed have been witnessing infrastructure development since 1980's, with roads, educational institutions, health facilities and phone facilities. This has resulted in people selling products in market at the same time buying consumer products from market, especially after 1990's. Also conducive climatic conditions has led the department of agriculture, government of Himachal Pradesh to place emphasis on growing cash crops, especially of vegetables and fruits for markets in the plains. These have led farmers to increase from small-scale home-based production of vegetables to large-scale commercial market needs. Now in addition to major food crops (maize and wheat), farmers cultivate ginger (one of their traditional crops), tomato and in the last two years *Shimla mirchi* and chilly for market needs. Most of these crops when grown in large-scale are water intensive and therefore require irrigation during dry months. The agriculture economy that was primarily subsistence in the past is responding to needs of market for commercial agricultural economy. Government and the people are too early to realise the need to regulate the market before transforming the village economy into market oriented agriculture economy. The gloomy picture portrayed by media and governments programme on growing water scarcity, has led people to perceive that their inability to respond to market is due to inadequacy of irrigation facilities, therefore demand for water harvesting schemes (through watershed programme). However, without their knowledge they are attempting to regulate the market as well (this is explained in the latter section).

### **Institutions Affecting Water Distribution**

Distribution of water though a local phenomenon, is influenced by the size and distribution of land holdings, the role played by external agencies (in facilitating and constraining) and knowledge of users (Fig. 2). Distribution of landholdings and its size is primarily influenced by historical institutional evolution in the hamlets. For instance, the Rajputs (early settlers) who occupied lands in Rajana watershed took control and ownership of all lands. In order to meet their labour requirements the Rajputs community brought in Kohli (Scheduled Caste) community to work as

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<sup>8</sup> Personal Communication from Mr. Suresh Kumar, Sub-Divisional Officer, Nahan Division, Department of Irrigation and Public Health (DoIPH), Government of Himachal Pradesh, 15<sup>th</sup> October 2004.

<sup>9</sup> The *Khul* in the study is channeled along the mountain ranges, which due to unconsolidated landscape has a high erosion. This often leads to silt accumulation in the *Khul*, thus reducing its capacity. This calls for desilting the *Khul* very often sometimes thrice a year, which people are unable to do along the 3 kilometre belt.

tenant cultivators on their land. It was the Land Reforms Act of government of India in 1960's that gave ownership rights to these tenant cultivators. Unfortunately, the decision to part away the land rested with the Rajputs, who often gave away poor quality and tail end located lands. Being early settlers and landlords, they had the right to decide (even today) on matters pertaining to village administration. Water distributions in *Khul*-irrigated areas were not an exception. Being large landholders and head farmers, the distribution was tailored- as land-based distribution- to benefit the Rajputs than the Kohlis. Though the inadequacies of such distribution was shared in private to the researcher by the Kohli community, none of them were able to openly question this to the Rajputs, due to cultural bond of subordination that exists. However, few Kohli community members do break these norms independently using strategic actions - take water directly from *Khul* channels through tubes or pipes. Being categorised as a 'private *Khul*'<sup>10</sup> by government of Himachal Pradesh, the department of irrigation and public health (DoIPH), rarely supervise the inefficiency of the irrigation practice, in a way facilitating the inefficiency of water distribution.

**Table. 3 Different Sources of Income of Sampled Households**

INCOME CLASS	AGRICULTURE		DIARY		INCOME FROM EMPLOYMENT (formal and informal) (in %)	Annual Average household Income (Indian Rs.)
	% of Cash Income	% of Non-Cash Income	% of Cash Income	% of Cash Income		
<b>Pipalwala Hamlet</b>						
Rich	5	24	9	10	52	67553
Middle	1	10	16	14	59	100615
Poor	1	15	15	14	56	45556
<b>Khairwala Hamlet</b>						
Rich	5	28	17	8	42	56839
Middle	0	22	20	13	45	42892
Poor	0	9	11	1	80	50173
<b>Uppala Rajana</b>						
Rich	43	19	0	17	20	95920
Upper Middle	19	23	0	33	25	55735
Middle	36	17	0	39	8	51767
Lower Middle	18	6	0	54	23	29532
Poor	9	15	0	32	45	25738
<b>Nichala Rajana</b>						
Rich	43	5	0	46	6	52840
Upper Middle	21	6	2	54	17	35464
Lower Middle	4	2	0	21	72	112110
Poor	7	2	4	37	50	36829

Source: Field Survey, 2004

<sup>10</sup> *Khul* irrigation systems are classified in revenue records as private (when it is managed and maintained by people) and government (if it is maintained and managed by DoIPH).

In contrast to water distribution in Rajana watershed where external institutions influenced local distribution practice, in Pipalwala hamlet the water distribution is totally influenced by external institutions on the assumption that people are knowledgeable and efficient in distributing water. The distribution of *Khul* irrigation in Pipalwala hamlet was in the past carried out by the people appointed by the Princely Ruler, who distributed water first to the rulers orchards and then to the people. The distribution was primarily based on first-come-first-serve basis irrespective of the location of field in the command area. After Independence, the water bodies were taken over by the public works department (PWD) and later by the department of irrigation and public health (DoIPH). The DoIPH employed water distributor, though there was no major change in distribution pattern. It was in 2001 that a Supreme Court directive made DoIPH to regularise all daily waged employs with various other benefits. This led to increasing financial burden on the department, leading DoIPH to transfer of *Khul* maintenance and management to the user group, who did not have any previous experience nor were given any training. Initially these users followed the pattern of distributing water as done by the department staffs, but unfortunately due to social bonds of preferential treatment for some and impartiality for others, the distribution has gone awry. Now the distribution is primarily through 'might is right' principle, leading of wastage of water.

### **Institutions Affecting The Capability Of Actors To Access Water**

Capability of actors to access or utilise water depends on various endowments each households have. Some of the prominent among them is the type of land available for cultivation, household size and gender differentials within households. Type of land available for cultivation is one of the factors influencing household's capability to access water. The landholding size matters the most in all the hamlets. With 30-50 percent (varying across caste studies) of the sampled households having less than an acre of cultivable land (either in *Khul* command area or in unirrigated land), the returns from this is not significant for the poor to invest time and energy in accessing water. In Rajana watershed, in addition to landholding size, the location and quality matters for enhancing or constraining actors access to water. More than 90 percent of the land owned by the scheduled Caste Kohli community is located in the tail-end. Due to inefficient distribution of water and also distance factor to monitor wild animals encroaching the lands (for unirrigated lands in Uppala Rajana), dependence on this particular land becomes expensive and meaningless. In contrast, the rich people in Rajana watershed (the Rajput community) have better access to irrigation facilities and also ability to monitor the land from wild animals, which contributes more than 40 percent of their annual income. The uncertainty in availability of water, inefficient distribution and less returns from cultivable land led the poor and middle class households to depend on employment (formal and informal) that contributes 50-70 per cent of their income (Table. 3).

Household size matters for getting adequate returns from cultivating the land, especially in the Rajana Watershed. Being remotely located the households have to depend on their family labours for cultivating their lands. It is notable (Table. 4) that the poorer the family there is decrease in family size.

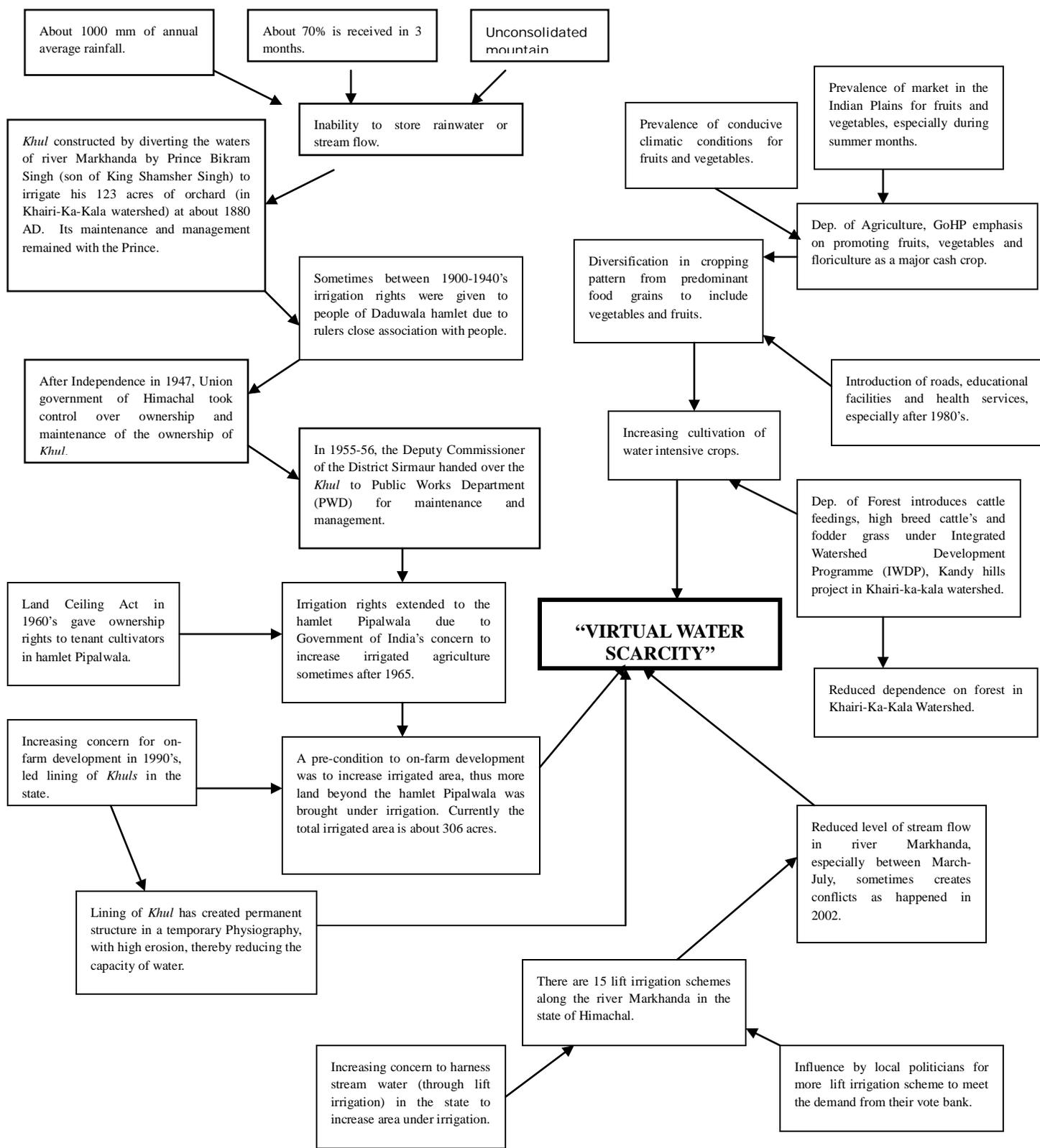


FIG. 1 INSTITUTIONS CONSTRUCTING WATER SCARCITY

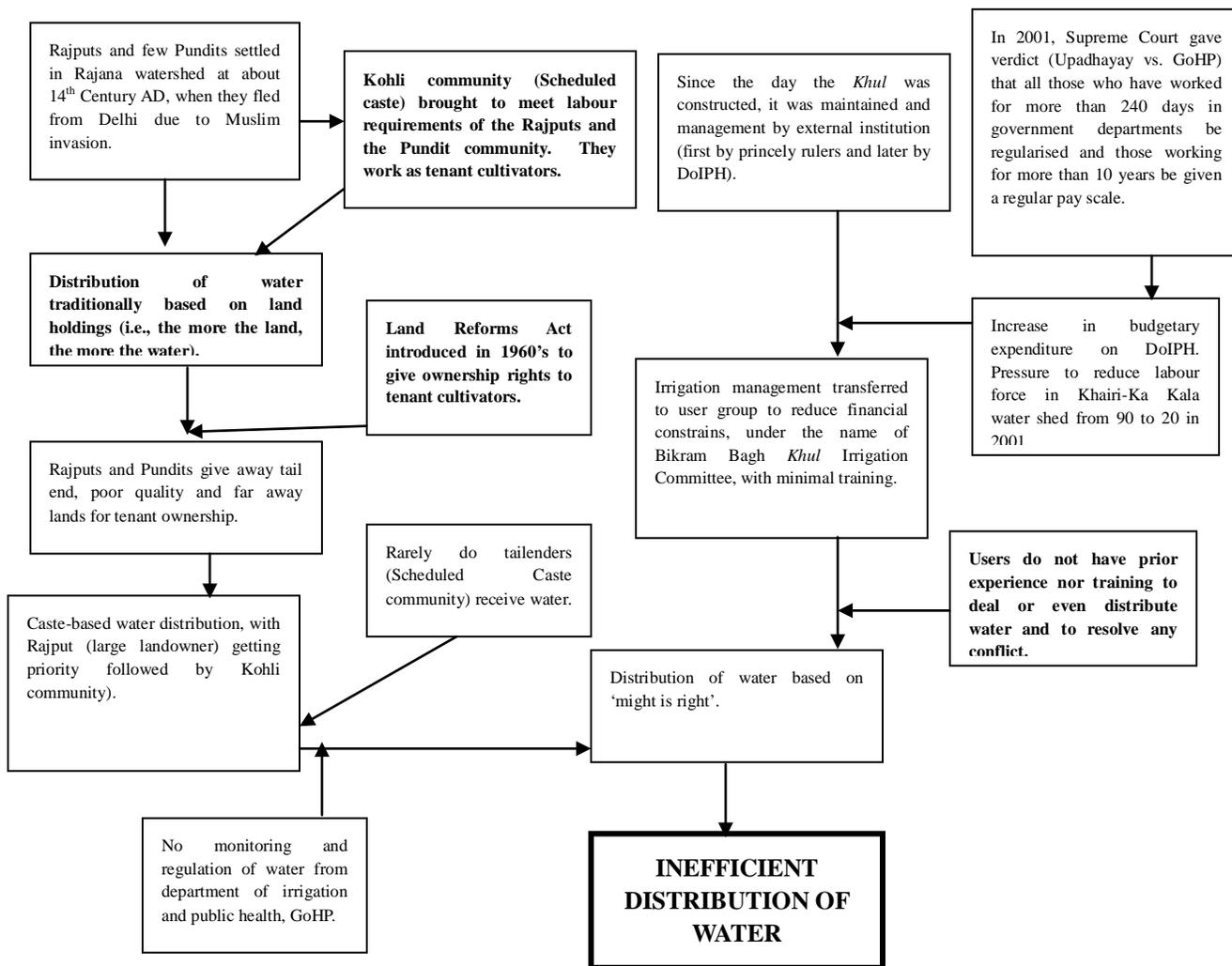


Fig. 2 INSTITUTIONS AFFECTING WATER DISTRIBUTION

Table. 4 Distribution of Household Size among Sampled Population (in%) - Rajana Watershed

SOCIAL CLASS	HOUSEHOLD SIZE				SEX RATIO
	Less 4	5-8	9-10	11 and above	
Uppala Rajana					
Rich	20	-	20	60	1760
Upper Middle	8	30	31	31	1133
Middle	30	70	-	-	889
Lower Middle	14	58	-	28	1000
Poor	38	62	-	-	1050
Nichala Rajana					
Rich	-	-	30	70	1000
Upper Middle	17	55	5	23	1278
Lower Middle	-	62	-	38	1375
Poor	28	44	-	28	952

Source: Field Survey, 2004

Sex ratio of these households also matters in utilising the productivity of the land. The richer the household, the higher the sex ratio (Table. 4). This is normally found among the Rajput family. It is also found that among these families, the female work more in fields, cattle yard and at home, while men spend time travelling to towns and also village works. Sample study of male and females in 4 families (2 from Nichala Rajana and 2 from Uppala Rajana) of Rajput community indicate that females spend about 17-18 hours a day working in fields, cattle yards and at home. Such differentials in work pattern also reflect the need for female children for family labour.

The inadequacy of existing institutional structure does not have any major impact on the poor. The cultivable land is amongst the lowest among the poor. Even if the land is available they generally have poor land quality that are located in tail end thereby getting less access to water. In addition, these households are less literate, disabled, have single member or large family. The inadequacy of getting adequate returns from agriculture, has led many of these poor families to depend on employment (formal or informal) from other sectors in and around the hamlets. It is these that contribute between 50-70 percent of their monthly income. Any effort at addressing the poor, requires a more comprehensive approach rather than sector specific ones.

Institutions influencing water resource management are diverse, ranging from micro-macro institutions that coalesce at diverse action arenas. Both external and internal institution though influences management of water resources, it is formal external institution that plays a major role in initiating change at micro level by portraying if the resource is scarce or surplus. It is interesting to note that compared to stakeholder mapping, we find new actors entering (like Supreme Court of India, market, District Rural Development Agencies, GOHP) the grid in making claims over resources. Stakeholders do not always remain stable or always making claims, rather they are dynamic 'actors' making claims depending on the characteristics of resources, characteristics of users and existing institutions in a 'strategic context'.

## **6. Actors, Their Actions and Arenas**

The inadequacy of existing institutions in managing water resources are recognised by each actor at hamlet level, who attempt diverse actions to modify the existing institutions, creating new ones or even accessing diverse other institutions. Broadly these actions are classified as strategic and communicative actions (Table 5) (Alexander, 2001). The former represents actions taken for the realisation of particular self-interested goals (coercive powers), while the latter aims at achieving collective decisions (enabling power). Though both these actions indicate the inadequacy of existing institutional structures in diverse forms of collective actions. It is the communicative actions that aim to strengthen or empower the existing institutional structure or attempts to overcome the inadequacy through democratic principals of consensus seeking. This does not mean that strategic actions are less important, as examining them will offer insights on ways to overcome. For the purpose of research (with limited time and cost factor) communicative actions are examined on their role in promoting water resource development for local development.

**Table. 5 Diverse Actions of Households to Access Water**

<b>Hamlets (interview question)</b>	<b>Strategic</b>	<b>Communicative</b>
<b>PIPALWALA</b>		
If you don't get water from Khul irrigation systems as per your turn, what do you do?	Wait, wait and wait... Take directly from Khul channel. Buy water from others. I do get if there is sufficient water. I use my might (fight) to get water. I don't depend on this Khul water for my income.	Inform President of the irrigation committee and get water. Get water by negotiating with the person irrigating at the moment. If I don't get water as per turn, I investigate and take water.
<b>KHAIRWALA</b>		
If you don't get water from lift irrigation systems as per your turn, what do you do?	Wait, wait and wait... If water is available I get them. I use my might (fight) to irrigate. I take water directly by opening the gate wall, as it is close to my field.	1. If I don't as per turn I inform the water operators of the DoIPH. 2. I try to solve the problem through negotiation, if I don't get water as per turn. 3. I investigate and take water. 4. Inform the President of the irrigation committee and irrigate the field.
<b>NICALA RAJANA</b>		
Whom do you contact to access water from Khul irrigation system?	I don't contact anyone to get water. I take water from Khul systems directly. I don't depend on this water for my income.	1. We contact the Rajputs to irrigate our field.
<b>UPPALA RAJANA</b>		
Who told you to cultivate tomato crop an why?	I don't have time to spend on cultivating tomato (as the persons are employed elsewhere). There are no enough labour force in family, so that we can cultivate tomato. As our fields are located near the forest it is difficult to cultivate tomato as wild animals destroy them.	The Village leader influenced me. I was influenced to cultivate by a schoolmaster. I decided to cultivate myself (by looking at others). The villagers started growing them, so also I.

A simplistic analysis (Table. 6) of the actions adopted diverse households indicates that it is mostly the middle class households who adopt communicative actions, except from the hamlet Pipalwala. The poor and rich households mainly adopt strategic actions. It is interesting to note that rich households steal water and use their might to access water, while the poor use the action of wait and watch, and depend on employments. In communicative actions, actors communicate with others for collective decisions. In this arena at hamlet level, not all actors take a lead role as 'agent'. It is only those who have capability to draw upon the modalities of existing institutions in modifying or reconstituting their properties by accessing supra-arenas.

**Table. 6 Percentage of Households Using Diverse Actions to Access Water**

SOCIAL CLASS	ACTIONS	
	Strategic Actions	Communicative Actions
Pipalwala Hamlet		
Rich	5	7
Middle	23	16
Poor	14	35
Khairwala Hamlet		
Rich	14	11
Middle	16	34
Poor	16	9
Uppala Rajana		
Rich	7	11
Upper Middle	15	19
Middle	3	5
Lower Middle	3	17
Poor	14	5
Nichala Rajana		
Rich	0	9
Upper Middle	2	52
Lower Middle	12	3
Poor	12	10

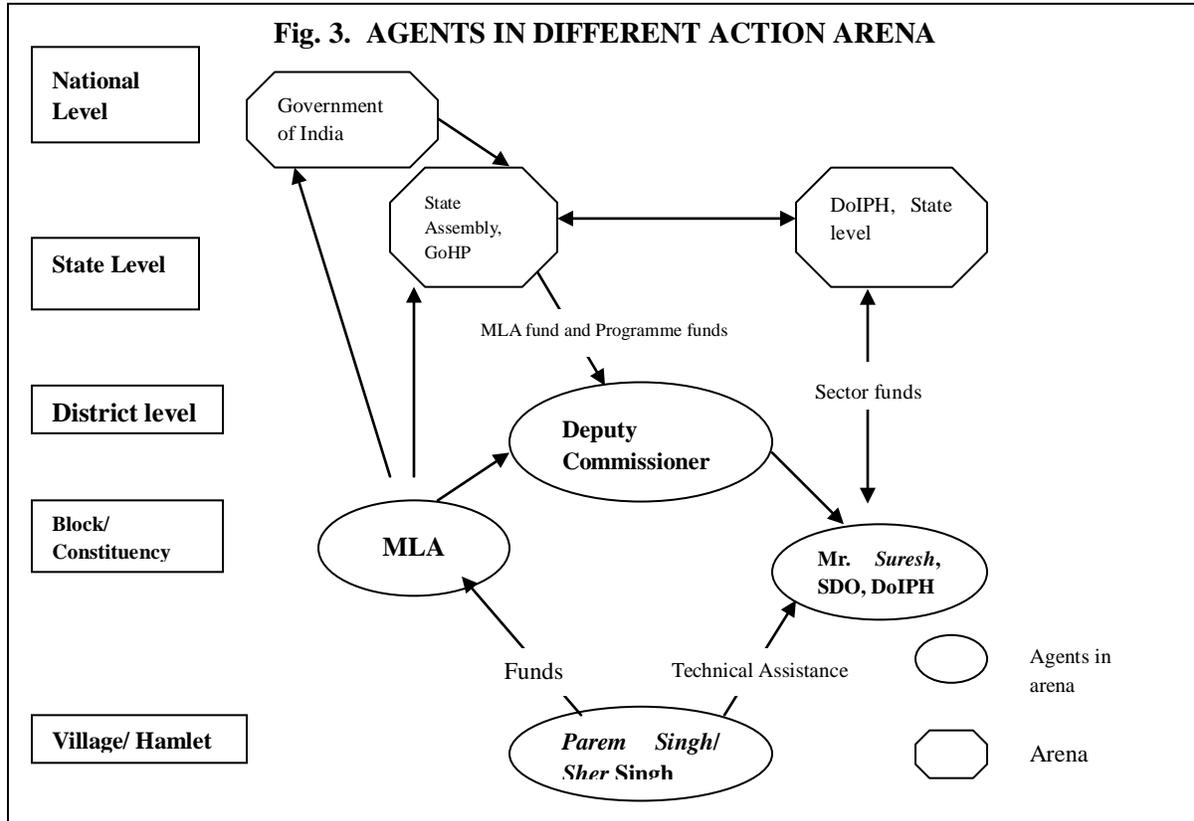
Source: Field Survey, 2004

### Options for Water Resource Management

There are diverse options available for hamlet-level agents to address the inadequacy of existing institutional arrangements (Table. 7). Broadly, they approach the relevant government department (here it is the Department of Irrigation and Public-DoIPH), the political representatives and the market. Each of these arenas is accessed for some specific reasons. It is clear for these agents that for technical problems, it is the role of the department (like in case of Khairwala). But in case they require new irrigation schemes, they access both DoIPH for technical clearance and to member of legislative assembly (MLA) for seeking additional funds (like in case of Pipalwala) (Fig. 3).

**Table. 7 Different Action Arenas Accessed by Agents**

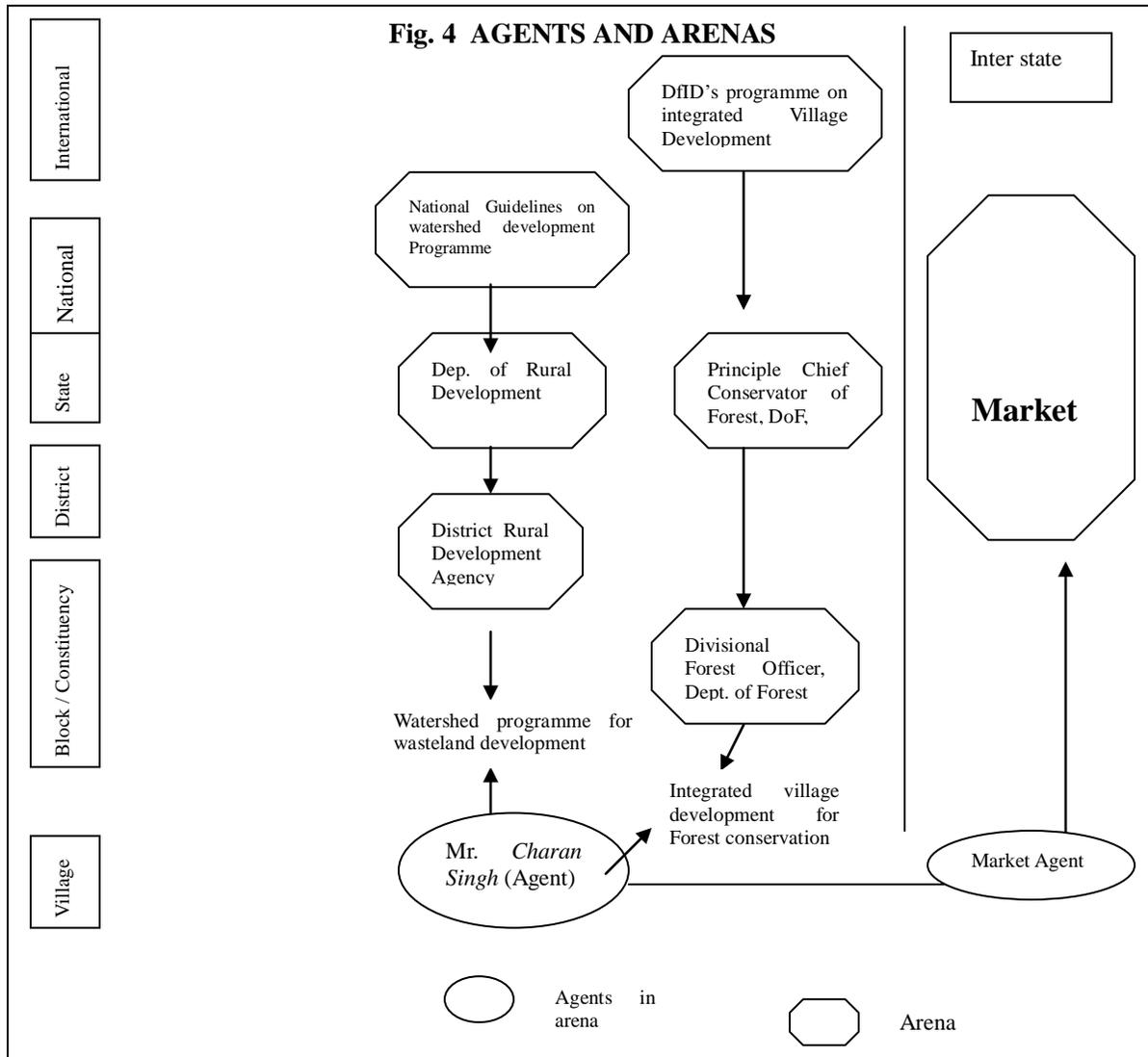
Watershed	Khairi-Ka-Kala Watershed			Rajana Watershed	
	Khairwala		Pipalwala	Nichala Rajana	Uppala Rajana
Agents	Mr. <i>Nazim Ali</i> , President of LIS;	Mr. <i>Sundar Das</i> , Member in LIS	Mr. <i>Parem Singh</i> , President of KIC; Mr. <i>Sher</i> , Vice-President, KIC	Mr. <i>Charan Singh</i> , Village leader, Chairman of WDC	
Problems Perceived by Agents	Inadequacy of Water	Problem of Water distribution	Inadequacy of water	Inadequacy of water	Problem in getting better price for products
Arenas Accessed	DoIPH	DoIPH	MLA, DoIPH	DRDA, DoF	Market
Purpose of Accessing these Arenas	Seeking additional lift irrigation scheme	For DoIPH to take over distribution	For a new lift irrigation scheme	Enhance water availability (harvesting measures) through watershed development	Improve infrastructure for marketing of ginger and tomato



Though the DoIPH can also mobilise additional funds through sectoral allocations every year, there is greater dependence on the political representatives as they had committed and also are easily accessible to people. While in Rajana watershed, the agent proposes to address through two different options (Fig. 4): (i) increase availability of water through various water harvesting measures (as he has been told during watershed training programme) and (ii) improve infrastructure (transporting and seeking better markets in plains) facilities for marketing their cash crops- ginger and tomato.

### 7. Institutional Integration in Arenas

Agents interact among each other to take decisions within and among diverse arenas. In each, institutions integrate in diverse and complex ways to facilitate and constrain agents' decisions. Understanding the institutions involved will enable to deconstruct the complexity and understand the interactions among institutions in arenas. Though different types of institutions interact in arena, they consist of three basic components that enable agents to take decisions: (i) Policy institutions that provide guidelines on who should enter the arena, what position they should hold and how the outcomes have to be. (ii) Legal institutions authorise agents to take decisions. (iii) Administrative institutions that enable the agents to transform their decision into actions and their actions into outcomes in cost effective manner.



Examining the institutional integration in arenas indicates how agents emerge and which are those institutions that facilitate their decisions (Annexure. 2 for details on institutional rules see Saravanan, 2004). In both the watershed under study, informal institutions set the policies for hamlet level agents (Table. 8). Of these, the role of social network plays an important role. Though this makes them eligible, the legal authority for taking decisions is provided by the external institutions (DoIPH, DRDA and DoF). This enables them to access administrative institutions to implement their decisions. Of the three agents at hamlet level, the agent at Rajana, Mr. *Charan Singh*, offers an example. He had been a village leader for past decade and also the *Nambardar* (village revenue collector), but it was only about three years that he is active as an agent. The credit goes to the watershed development programme implemented under the Integrated Wasteland Development Programme (IWDP) of District Rural Development Agency (DRDA). Under this programme, he had been appointed as the Chairman of the Watershed Development Committee. Being the Chairman, he gained opportunity to meet bureaucrats of various departments and also to know about their programmes. This also meets his self-interest need of earning a livelihood by taking these programmes to his villages. These agents play an important role in bringing development programmes to the village, but the challenge lies in monitoring and regulating these agents and their actions to address the concern of water

resource development for local development. In contrast, as the agents move higher-up the role of informal institutions in setting policies reduces. However, for all agents it is only the formal institutions that provide legal authority and administrative support in implementing their decisions.

**Table. 8 Types of Institutions Facilitating Agents**

Agents	Policy	Legal	Administrative
Hamlet Level	Village Institutions	DoIPH, IC 73 <sup>rd</sup> Amendment	DoIPH, Political parties
Block Level (MLA/ SDO)	Village Institutions & DoIPH	GoHP, DoIPH, Vote bank	DoIPH
District Level (PO)	DRD&PR	GoHP, DRD &PR	DRDA
Market Agent	Market & Village institutions	State Government	GoHP

Options to integrate institutions from other arenas are limited to government officials than political representatives. The demands made by people are mainly technical, managerial and financial. The line departments are able to address the technical and managerial, but not on the financial matters. Though they could forward such requests to the District Development Committee or to the Deputy Commissioners, the limitation imposed by the respective organisation hinders them to do so (sometimes, the officials also reject the demand). This makes the hamlet level agents to seek other arenas, such as the political representatives. These representatives have access to diverse sources of fund– the state legislative assembly for including the demand in sectoral allocation, the district development committee for programme funds and within his own MLA Funds (allocated Rs. 24 lakhs every year to MLA for development works in his constituency). Another advantage of seeking these representatives is easy accessibility- the language he speaks, anytime personal access, simplicity in outlook, and willingness to hear and overcome their worries. More important is the trust that this politician builds with the people. This makes lots of difference to the people, though he only forwards the plea made by agents to various departments. In fact, if one goes to meet him, his office functions like a helpline service centre. This is in contrast to Deputy Commissioner’s office or even the simple government department.

Agents’ decisions in the arena are influenced by the perception they have on the attributes of governance. These attributes help agents’ in pursuing their goals by integrating diverse institutions (Table. 9). Equity for hamlet agents is said to be *Khudrat ke diya* (given by God) and can only be managed. While the DoIPH, uses technical criteria to approve the water and irrigation schemes, MLA uses his vote banks for providing support and DRDA gives importance to ‘peoples’ plan’. Similar is the case with responsibility, coordination, participation and accountability. These differences illustrate the different conditions under which the agent exists and also provides opportunity for designing institutions in accordance.

## 8. Future Directions

The study reveals that management of water resources is influenced by diverse forces, but the institutional options available are divergent and do not match with the ground reality. External agencies (Department of International Development –DfID and government of India) impose various concepts in the forms of programmes by creating new institutions. Rarely do these funding agencies attempt to examine and modify the institutional failures of existing distributive governance. This gives less space to strengthen existing distributive governance or even flexibility in implementing these concepts. The poor who are caught between the macro (formal) and micro (informal) are being increasingly marginalised in the process. Addressing them requires effective role of various developments in addressing education, lack of income generating opportunities, overcoming the constrains imposed

by natural factors and importantly social factors (control and suppression from upper caste community) that has often led them to poverty. This calls for strengthening the distributive governance of existing sectoral departments.

**Table. 9 Attributes of Governance and Arena**

Agents		VILLAGE	BLOCK		DISTRICT	Market
		Hamlet Agents	SDO (DoIPH)	MLA	PO, DRDA	
Attributes						
Equity	Type	Inequity is given by God, it can only be managed.	Based on technical feasibility	More the vote bank, more the support	Better the user group, more the support	Better pricing
	Institutions Facilitating	Village institutions	DoIPH/ Village Institutions	Political party	DRDA-watershed Guidelines	Village institution/ Market
Responsibility	Type	Assumed/ Assigned	Assigned	Assumed	Assigned	Assumed
	Institutions Facilitating	Village institutions/ Government Department	Institution-based and Village institutions	Vote Bank	DLWDC/ DoRD	Market
Coordination	Type	Authority-based	Need-based	Authority-based	System-based	Authority-based
	Institutions Facilitating	Village institutions and Irrigation committee	DoIPH	Vote Bank	DRDA	Market/ Social network
Participation	Type	Authority-based	Rules & Regulation	Authority-based	Structure-based	Pricing based
	Institutions Facilitating	Village institution	DoIPH	Power	DRDA	Market/ Village institution
Accountability	Type	Authority-based	Rules & Regulation	No accountability	DRDA/ DLWDC/ User group	No-Accountability
	Institutions Facilitating	Village Institution	DoIPH	-		-

The paper provides opportunity for utilising agents in facilitating development programmes. Agents at hamlet level and block level emerge due to village level informal institutions. However, the legal authority to take decisions is provided by the external formal institutions. This offers opportunity to build on these agents by providing opportunities for existing agents to come forward and create opportunities for new agents at hamlet level. This does not require new institutions to emerge, rather calls for existing government departments or NGOs to be interactive with the micro level reality, share information about various on-going and future programmes and provide regular advisory support. This calls for existing line departments (specially field level officials) to be proactive, visit villages and discuss issues. This does not mean that government officials have to create user group in villages, rather try to interact with the people to understand the impact of contemporary programmes on people and their livelihood. This will offer opportunity to identify or create agents at micro level. Facilitating these agents can offer opportunities to bring in desired institutional change for water resources management.

Agents above hamlet level are largely from the formal institutions. However, unclear roles of these (political representatives and limited role of bureaucrats) seem to be of concern in the case study region. It is not clear to whom the political representative is responsible and accountable. Very often people are made to take up the burden (during election by voting a right candidate), but what mechanisms are in place to oversee their decisions respected and monitored. In contrast, bureaucrats have too much of accountability problem, but limited autonomy to take decisions, very often they seek their higher-ups for decision or have to bow-down to political interferences. These agents are constrained from taking independent decisions due to interferences from political or higher. Too much or too less constrains, makes these agents to have different perceptions in addressing the attributes of governance (equity, responsibility, coordination, participation and accountability). Examination of more of these attributes could

serve as major guidelines for policy and programme interventions for necessary institutional change for managing water resources.

The study is only a piecemeal attempt as part of the research programme. It offers opportunities on two fronts. First lies in further decomposing the institutions in each action arena. Some of the areas for examination lie in identifying different types of integration in place, examining the interaction between formal and informal rules and applying the design principles of Institutional and Analysis Development framework as a heuristic tool. On theoretical front, this will contribute in blending institutionalist approach, emerging from common property theories with planning theories to predict models of institutional arrangements. The second lies in moving forward with this small piece of preliminary research to examine the feasibility of providing guidelines for policies and programmes at district level.

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**Annexure 1**

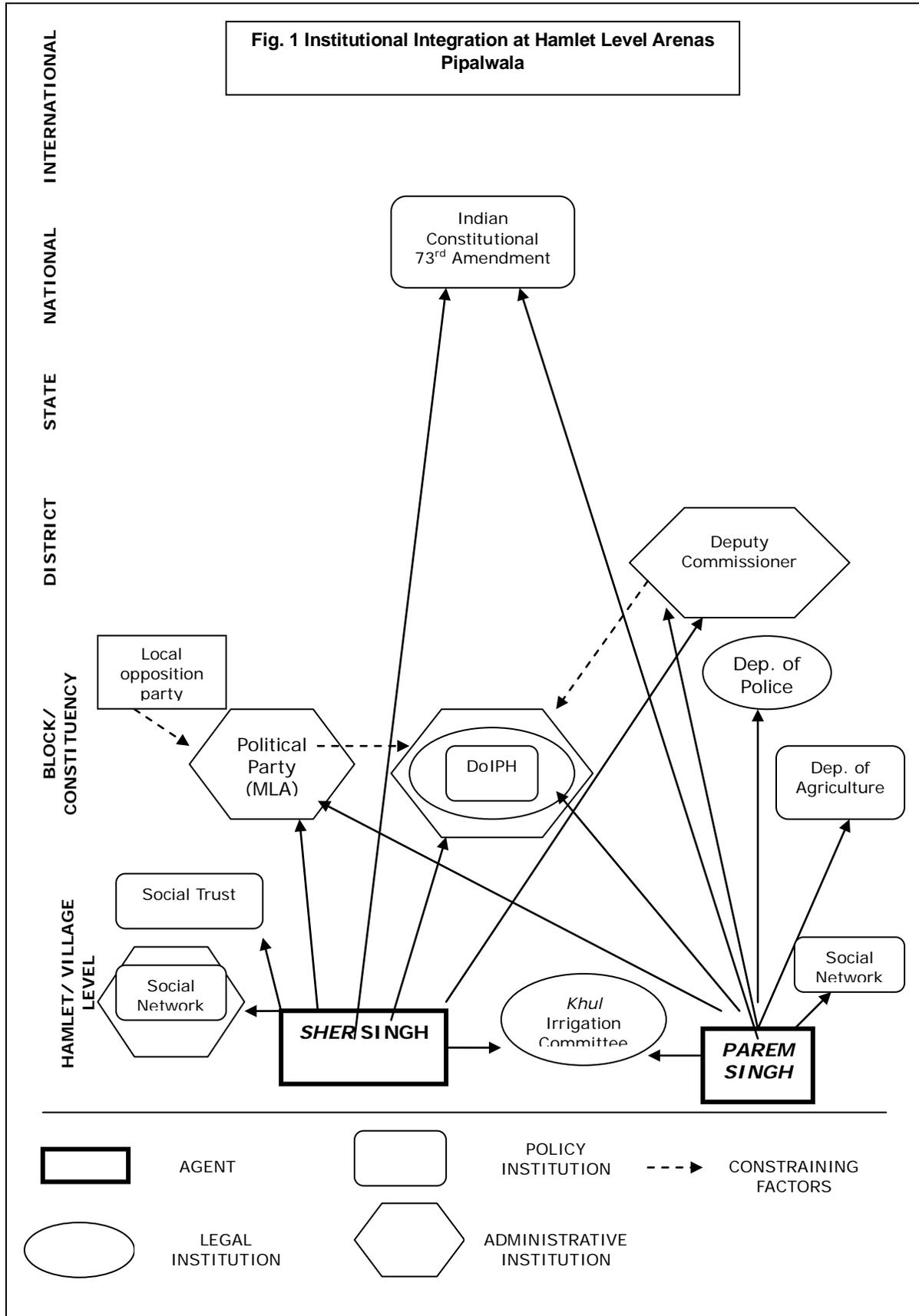
**Table. 1 District-wise Selected Indicators of Development – Himachal Pradesh**

District	Area (in sq. km)	Population (2001)	Decadal Growth Rate (1991-2001)	Sex Ratio	CBR 1991	IMR 1991	% of Habitation with safe drinking water	Metalled Roads per Sq. km.	Per Capita income (1999-2000) at 1990-91 prices	% of Rural Population below poverty level	Literacy 2001
Chamba	6528	4,60,499	17	961	35	104	98	7	6058	62	64
Kinnuar	6401	83,950	18	851	31	123	100	4	7930	27	NA
Kullu	5503	3,79,865	26	928	33	102	98	7	6098	19	73
Lahaul & Spiti	13835	33,224	6	804	28	59	100	2	12559	38	73
Shimla	5131	7,21,745	17	898	29	104	92	20	8304	34	80
Sirmaur	2825	4,58,351	21	901	34	94	89	2	5650	23	71
Mandi	3950	9,00,987	16	1014	30	69	98	25	5313	-	76
Bilaspur	1167	3,40,375	15	992	28	71	100	47	7547	27	79
Hamirpur	1118	4,12,009	12	1102	25	65	100	47	4243	24	83
Kangra	5739	13,38,536	14	1027	28	77	97	32	5736	24	81
Solan	1936	4,99,380	31	853	30	84	96	36	11231	27	77
Una	1540	4,47,967	18	997	29	82	100	47	4480	19	81
Himachal Pradesh	55673	60,77,248	18	970							

Source: GoHP. (2002) Himachal Pradesh Human Development Report –2002. Planning Commission, GoHP, Shimla.

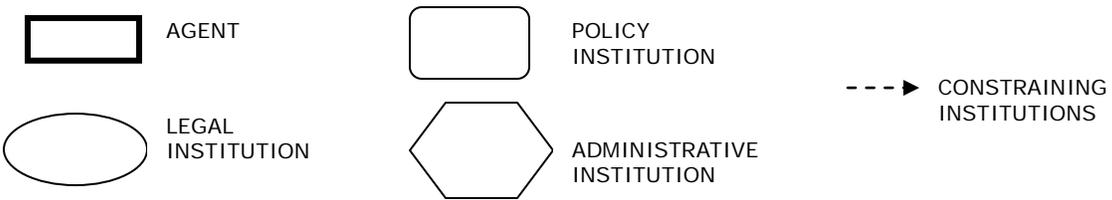
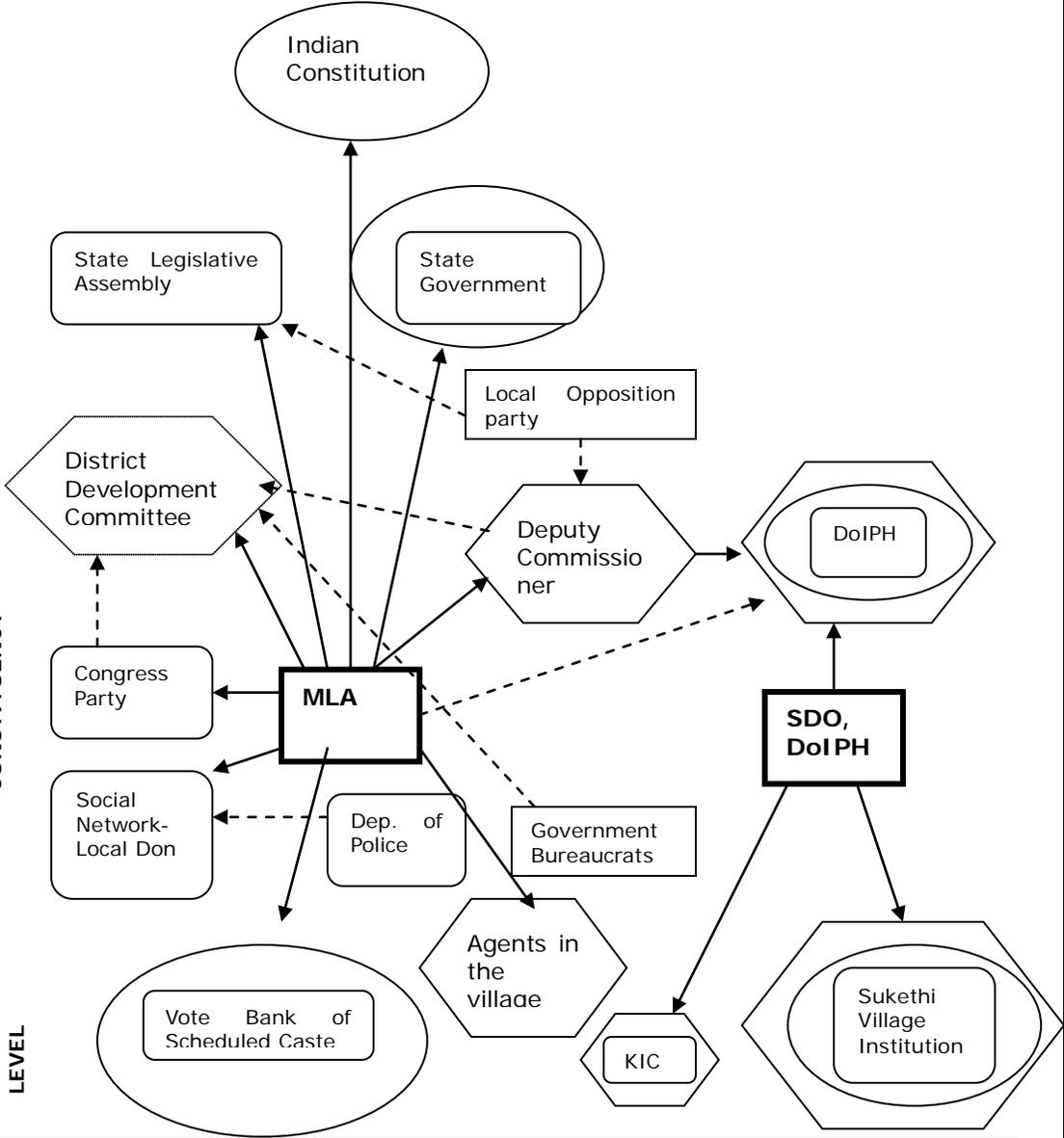
Annexure 2

INSTITUTIONS INTEGRATION IN ARENAS

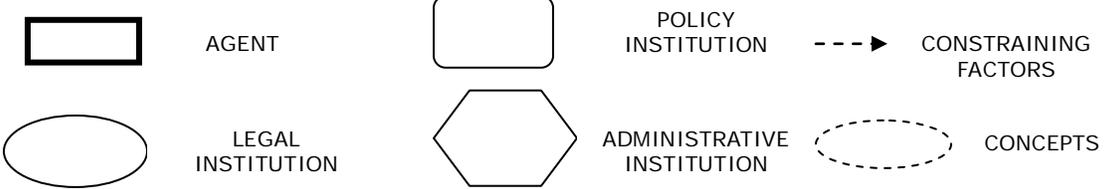
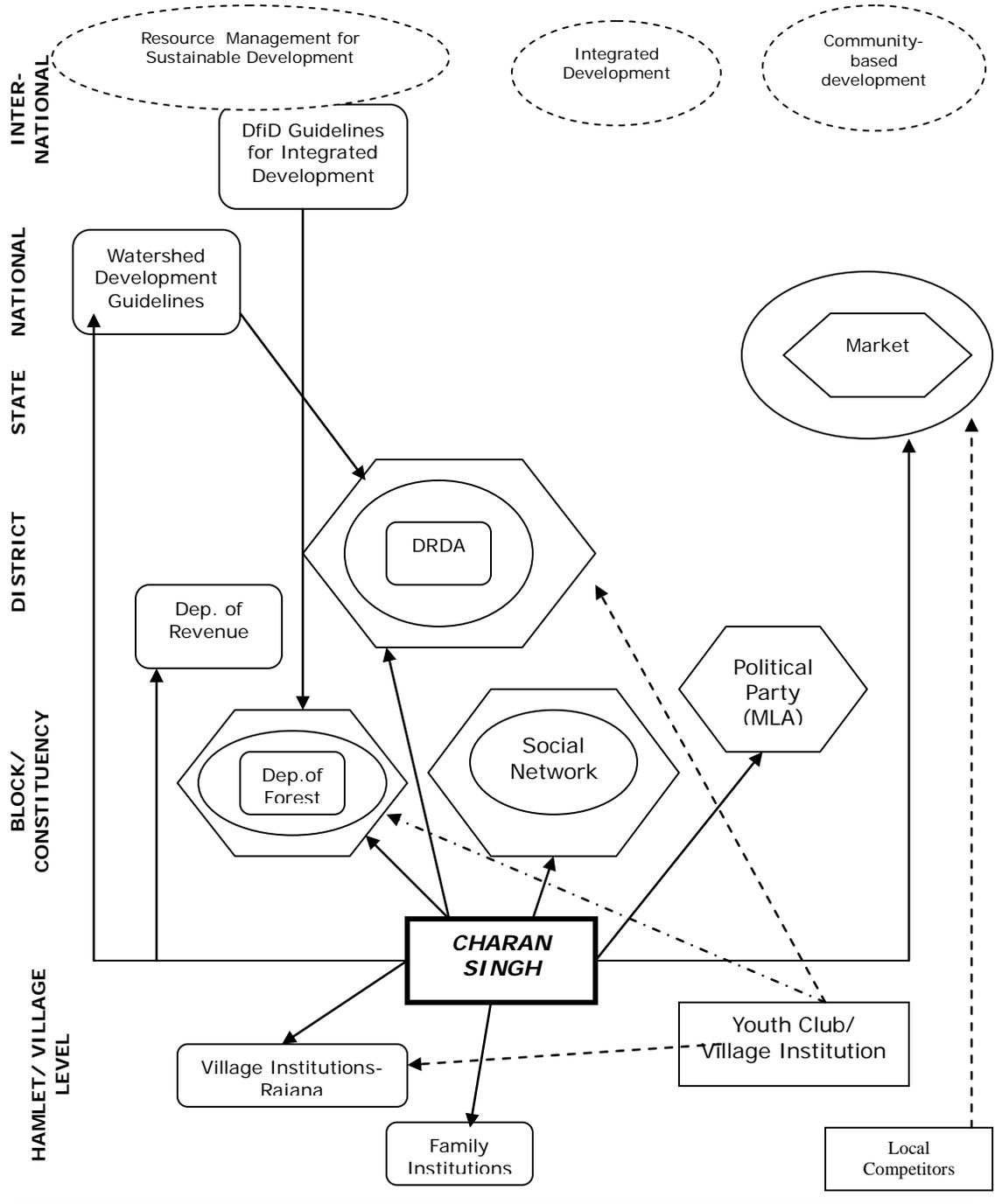


**Fig. 2 Institutional Integration at Block Level Arenas  
Pipalwala**

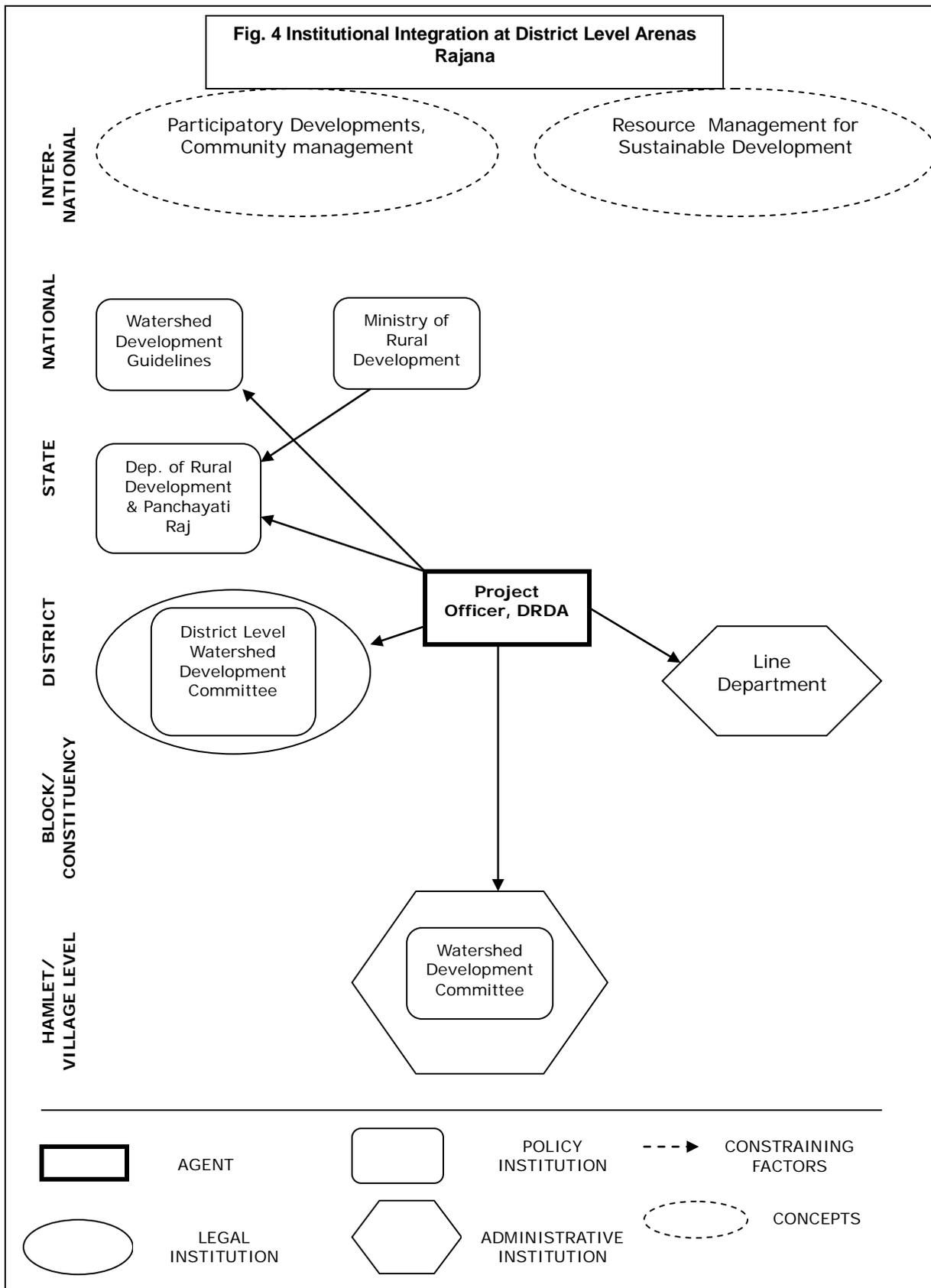
INTERNATIONAL  
NATIONAL  
STATE  
DISTRICT  
BLOCK/  
CONSTITUENCY  
VILLAGE  
HAMLET/  
LEVEL



**Fig. 3 Institutional Integration at Hamlet Level Arenas  
Rajana**



**Fig. 4 Institutional Integration at District Level Arenas  
Rajana**



**Fig. 5 Institutional Integration in Markets  
Rajana**

INTER-  
NATIONAL  
  
NATIONAL  
  
STATE  
  
DISTRICT  
  
BLOCK/  
CONSTITUENCY  
  
HAMLET/  
VILLAGE LEVEL

