

Social Conflict over Displacement, Resource Rights and Survival Risk: A Case Study of Rajaji National Park, India

Suman Ranjan SENSARMA* and Norio OKADA

* Graduate School of Engineering, Kyoto University

Synopsis

In 1983, the confrontation arose between the Rajaji national park authority and the Van Gujjars who have been living in this area since long back. The real conflict is characterized by somewhat forcible displacement of forest based families from their traditional habitat and disruption of their livelihoods. This ongoing conflict and negotiation is analyzed by using GMCR, a game theoretic model. The game theoretic approach assumes that each player has knowledge, representability and executability. But, in the real world case, the stakeholders (players) seldom meet all the qualification of a player in the sense of game theory. Here, an attempt has been made to systematically categorize the player, e.g., null player, intermediate player and complete player in a game and to find out how their positions affect the structure of the game and subsequently their strategic choices. Another aim of this paper is to analyze the social network formation mechanism in conflict resolution process and their policy implications.

Keywords: graph model, conflict, game theory, survival risk, social network

1. Introduction

The independence of the country of India brought greater misery to people living in forests. The new State made old colonial forest laws harsher, limiting people's access to forests. Meanwhile, in the name of production forestry, depletion of the natural forests went on (Ghosh, 2006). The colonial way of forest conservation brought a critical conflict in relationship between people, land and natural resources. The forced displacement and resettlement pushed the marginalized people into poverty trap and insecurity. According to various movement groups working among Indian forest communities, about 300,000 families were evicted in last five years. There was no rehabilitation, and people of all ages were driven away from their homes, forests and agricultural land, to make way for plantations and wildlife areas (Ghosh, 2006)

Conflict and insecurity impact in multiple ways on lives and livelihoods of Van Gujjars and the peripheral forest dwellers in the Rajaji national park. The pastoral

survival depends on six capitals in livelihood perspectives, i.e., natural capital, human capital, financial capital, physical capital, and the social capital. After the rehabilitation in the new Pathri and Gandikhata colony, the Van Gujjars lost their buffalos (buffalos cannot survive in the plain area) and they were forced to move to find a daily wage job. This was a survival shock which forced them to live in chronic conflict and poverty trap. The peripheral forest dwellers were also fighting to get their resource rights. From the mid of 1980s, a number of local organizations have been started to support the gujjars and peripheral forest dwellers to articulate their needs and empower them to protest against the forcefully displacement.

The main focus of this paper is to address the necessity and possibility of resolving resource management conflict by participatory discourse. The paper then intends to analyze the process of enhancing coping capacity for yet undeveloped stakeholders to become complete players. The Graph Model for Conflict Resolution (GMCR), an ordinal preference based game

theoretic approach is used as an analytical tool to model and analyze the player's capacity building process in a game (Sensarma et al., 2007). Further this paper formulates recommendations on forced displacement policies considering local peoples' risks and livelihoods issues.

2. Background of the conflict

The proposed Rajaji national park comprises 825 sq. km of land, situated in the Shiwalik hills, and is representative of Shiwalik ecosystem which lies between the Himalaya and the upper Gangetic plains. The park is known as an ecologically sensitive area and is the habitat of many endemic plant species, and also forms the North-West most range of the Asiatic elephants. The Van Gujjars are the pastoral nomads who have lived for centuries in deras, large thatched circular huts, throughout much of the park area as well as in the Shiwalik forest division to the west. The majorities of the Van Gujjars either migrate to the mountains for the summer and monsoon seasons or move to the shorter distances out of the park. Basically their livelihoods are based on raising buffaloes and selling milk. They utilize the forest fodder to their animals. In the periphery of the forest, the local villagers' livelihood is also based on the local resources. The confrontation arose in 1983, when the Rajaji area was declared as a proposed national park. The real conflict is centered around forcible displacement of forest-based families from their traditional habitat and disruption of their livelihoods. The major claim made by the State government is to clear the national park area from encroachment. The history and the chronology of the conflict are described here in different time periods in Table 1.

3. Environmental risk and development conflict

Concerning the idea of 'wilderness to be conserved' along with the Malthusian theory of population explosion, and Hardin's 'Tragedy of Commons', in 1989, Ives and Messserli postulated their hypothesis, i.e., 'Perceived Himalayan Crisis' which has been widely applied in policy making concerning the hill and forest area in India. In this related context we can find two distinct discourses in the forest policy. When local people are seen as basically destructive to their

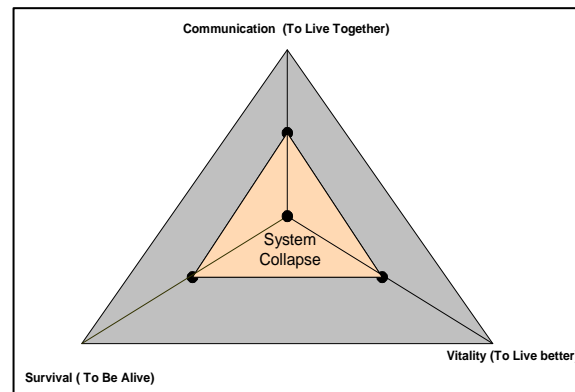


Fig. 1 Schema of Vitae System

environment, the environment in question should preferably be managed by an outside agent, say for example the State government representing forest officials and wildlife wardens, this type of approach as 'governance discourse'. Conversely, if local people with local knowledge are considered to be using their environment with care (if given the chance), and therefore the protected areas are expected to be best managed by the forest dwellers themselves. This approach can be seen as 'people oriented discourse'. More realistically, the negotiating outcome would be preferably a joint venture coordinated between the Forest Department and the local forest dwellers to collaboratively manage the forest. We call this approach 'participatory discourse' in the resource management. Most risk assessment is seen from the functional point of view. The Forest Department wants to reduce the risk to relocate the Van Gujjars and to restrict the access of common property resources. On the other side, as a result of forced migration and restriction of common property resource accesses, the Van Gujjars and the peripheral forest dwellers faced the livelihood risk. This different risk perception can be captured in the 'Vitae system' perspective (Misra and Okada, 2006) where survivability, vitality and communication have been taken the three cardinal point of development (Fig. 1). Survival is a basic and critical need, and it should tie up with vitality and communication. A prisoner's dilemma can occur in vitae system if the Forest Department near-sightedly perceives that the Van Gujjars and the peripheral forest dwellers is the risk generator. But they can take a broader view and overcome such a dilemma and reach some win-win state if they enhance the collaborative working capacity to share commons risks of survival and vitality. If there is no communication

then rational players cannot agree on the collective outcomes.

Table 1 Chronology of the conflict

Year	Events
Phase I	
1983	Within the notification of the proposed Rajaji national park in 1983 and on the basis of Wildlife Protection Act, 1972, the Forest Department forced the Van Gujjars to move from the core of the forest in order to protect the fragile ecosystem.
1985	Pathri gujjar colony was constructed by the Uttar Pradesh Government.
1986	The GKMM (Ghad Kshetra Mukti Morcha), a local NGO has been involved with several issues at the village level including the land rights, grazing rights, corruption in government departments, oppression of women, education.
1988	In view of the Honorable Supreme court order efforts were made for rehabilitant Gujjar families outside of the Rajaji national park at Pathri. As a result, in 1988, 62 families selected their houses at Gujjar colony.
1989	In January 1989, the Van Gujjars filed a write petition in Hon'ble supreme court of India in which they opposed rehabilitation outside of the Rajaji national park.
1991-92	In 1991, several rounds of meeting were held with the Forest Department to try and resolve the crisis of access to bhabar grass.
1992	The conflict had escalated in the September when the Forest Department forced the Van Gujjars to move from the park.
	The Van Gujjars brought the details of the case to the notice of the RLEK, a Dehradun based NGO.
1993	After the UN declaration, the Van Gujjars' conflict became a territory of national and global interests.
	The IPT (People's Tribunal on Environment and Human Rights) report declared on April 22, which recommended setup a multi-stakeholder platform to reduce the conflict.
1995	GKMSS has kept up the pressure on the Forest Department to find a suitable way to meet local resource requirements. In May 1995 the State responded by issuing an unprecedented order which has provided much hope in the region.
	The Forest Department succeeds in coaxing 65 Gujjar families to move to the Pathri rehabilitated colony.
Phase II	
1996	The issue attends the interest of, among others, a BBC film team as well as team from large German magazine Stern.
	The Wild Life Institute of India had launched a project called 'Building Partnerships For Biodiversity Conservation in RNP' with the help of Ford Foundation, an international donor agent, and continued till March 2000. This project has provided to create a participatory platform where all the stakeholders can share their views.
	In February, RLEK organized a national consultancy workshop and they presented the plan 'Community Forest Management in Protected Areas Van Gujjars-proposal for the Rajaji Area.' with the close collaboration with the Van Gujjars and the peripheral forest dwellers.

	Phase II
	On September, some of the Van Gujjars' representatives met the U.S. representative from the World Bank at a workshop in Delhi to discuss the eco-development project being jointly funded by the Global Environmental Facility (GEF) and the World Bank for some Indian national parks. This meeting was later presented in the Indian media as 'probably the first time World Bank sat down at the negotiation table directly with Indian forest dwellers.'
	The people of the villages took decision of the possibility of establishing resource utilization forest committees through their several public meetings.
1998	Gujjars through RLEK went to the Human Rights Commission and alleged the human rights violation against them inside the RNP.
	A fresh census of gujjars' families was carried out in which 1390 Van Gujjars were identified in side the RNP. A fresh rehabilitation scheme was prepared for them.
	The Human rights commission vide their consent order dated 15/03/99 passed the certain orders. The crux issues were, Van Gujjars living inside the forest are cannot be denied the rights which they have been enjoying since time immortal viz. right to lop and right to graze their cattle. The forest authorities are not entitled to coerce the Van Gujjar families to move out their habitation until their rights are legally determined in accordance with the law.
2000	On May 11, the Rajaji area came under the jurisdiction of newly formed state Uttaranchal formerly Uttar Pradesh.
	On September 30, Ministry of Environment and Forest (Central Government) again requested State/UT governments to consider the settlement order issued on 18th September, 1990 and to setup commission/comities at the District levels involving Revenue, Forest and Tribal welfare departments for the settlement of the disputed claims of tribal and forest dwellers.
2004	Another rehabilitation colony, Gandikatha, a few kilometers away from the park was built to rehabilitate 778 Gujjar families. But only 255 families moved and others opposed to move in this new location.
2005	Van Gujjars filed a write petition to the Lokayukta to take the further action for the rehabilitation issue and their rights of local resources.
2006	Van Gujjars had complained to the Uttaranchal Lokayukta against the move by the State government to forcibly evict the nomadic community despite earlier orders by the National Human Rights Commission (NHRC).
	The Forest Rights bill passed.

4. Graph Model for Conflict Resolution

The Graph Model for Conflict Resolution (GMCR) method is founded upon a mathematical framework utilizing concepts from graph theory, set theory and logical reasoning (Fang. et al., 1993). It represents a conflict as moving from one state to another state (the vertices of a graph) via transmissions (the arcs of the graph) controlled by the decision makers. Mathematically, this multi-player conflict game can be formulated in the following way: let $N = \{1, 2, \dots, n\}$ be the set of players, $K = \{K_1, K_2, \dots, K_n\}$ be the set of states of the conflict, and n-tuple $\{D_i\}$ ($i=1, 2, \dots, n$) be the set of directed graphs where $D_i = (K, V_i)$.

Set of arcs V_i means player i 's possible move between states. Let $k_i k_m$ represent an arc from state k_i to state k_m . If $k_i k_m \in V_i$ it implies that player i can move from state k_i to state k_m unilaterally. Payoff function P_i specifies player i 's preference order for states. If $P_i(k_i) > P_i(k_m)$, player i prefers state k_i to state k_m . The Graph Model for Conflict Resolution (GMCR) is presented by 4-tuple $\{N, K, V, P\}$, where $N = \{1, 2, \dots, n\}$, $K = \{1, 2, \dots, k\}$, $V = \{V_1, V_2, \dots, V_n\}$ and $P = P_i/i \in N$. One advantage of the graph model over more traditional game theoretical approaches is that it can explicitly represent irreversible moves. In such cases, a decision maker as a player can unilaterally move from state k to state q but not from q to k . Preferences in the graph model are expressed in terms of pair of binary relations, where $s_1 \succ s_2$ indicates

that player i prefers s_1 to s_2 , and $s_1 \sim s_2$ means that player i is indifferent between s_1 and s_2 (or equally prefers s_1 and s_2). In GMCR, players can make a transition of conflicts.

In the Graph Model, DM i 's reachable list $R_i(s)$, is the set of all states that DM i can unilaterally reach from state $s \in S$, in one step. Hence, the concept of unilateral improvement is built upon a DM's preferences and on his or her reachable list. Accordingly, $R_i(s)$ can be divided into two subsets:

$R_i^+(s) = R_i(s) \cap \Phi_i^+(s)$ is the set of all unilateral improvements from s to player i .

$R_i^{\leq}(s) = R_i(s) \cap \Phi_i^{\leq}(s)$ is the set of all unilateral disimprovements from s to player i .

When a player does not have an incentive to move from a particular state, the state is called stable for the player, and the state is called equilibrium if it is stable for all the players. The main stability definitions currently used in graph model analysis include Nash Stability (Nash), General Metarationality (GMR), Symmetric Metarationality (SMR), Sequential Stability (SEQ), Limited Move Stability (L_h), and Non-Myopic Stability (NM).

Applying noncooperative game to the type of the conflict as stated above, all the players are not always a real player as game theory ideally assume. We claim that in game theory each player is ideally assumed to be complete to obtain three following capacities i.e., representability, knowledge, and executability. Depending on the extent to which these capacities are fulfilled by the players, we propose to systematically categorize the capacity status of player, e.g., 'null player,' 'intermediate player' and 'complete player' in the game. The last is the ideal player obtaining the three capacities as assumed in the conventional game theory. Thus our concern is to find out how their status affects the structure of the game and subsequently their strategic choices.

We define a null player as one lacking representability, complete knowledge or executability in a game. Null players cannot move unilaterally. They are forced to move along with their opponent players only. They have to see the game precisely to mirror their opponent's preference. A null player can become empowered to become an intermediate or complete player if he/she receives support from a supportive

actor. If the null player can obtain representability and common knowledge with the rest of the players, he/she will become an intermediate player. But to become a complete player he/she needs the capacity to execute his/her representative moves.

Here we note that actors are differentiated from players. An actor can be defined as an external stakeholder who can participate in the game only from outside and indirectly. Actors are, however, not players who can play the game openly. They serve to upgrade the status of a null player to become an intermediate and finally a complete player in terms of enhancing their representability capacity and common knowledge. The executability can also be provided by an actor with authority to do so.

5. First phase of the conflict (1983-1995)

5.1 Initial stage (Phase I)

In the beginning of the conflict, the Van Gujjars and the peripheral forest dwellers were not able to represent their utility. They were the null players in this conflict. As a complete player, the Forest Department had the full power to play the game. The players were not interacting (connected) to each others and thus the null graph evolved with no vertices and no edges in the initial confrontation phase. Fig. 2 represents the null space of this confrontation discourse. Table 2 shows the options available to the players during this phase. Here, the Van Gujjars and the peripheral forest dwellers cannot move unilaterally from state k to state q and their common move is also nullified.

5.2 Intermediate stage (Phase I)

In 1992, the conflict had escalated during in the spring (September) when some of the Van Gujjars returned from their annual migration they were stopped by the Park authorities (Forest Department) at the boundary of the national park and asked to move the Pathri resettlement colony and also those Van Gujjars who were staying in the park area had been forced by the Forest Department to put their thumb print on a piece of paper saying that they would not be allowed back in to the forest when they returned in autumn.

The Van Gujjars brought the details of the case to the notice of the RLEK, a Dehradun based NGO who organized the first meeting of the Van Gujjars to protest this incident. Since then this NGO had started different

development projects in cooperation with the Van Gujjars to strengthen their pastoral life and overall welfare. Another organization GKMM had been involved with several issues in the peripheral level, especially those involving dolits and other backward classes, including land rights, grazing rights, corruption in government departments, oppression of women, education, but the ban worker issue has always been a primary one for the organization. Obviously the turn of the conflict was due to the emergence of actors supporting the former null players the Van Gujjars and the peripheral forest dwellers. The actual game started when the null players got support from their external actors. The conflict is modeled as 3 players, i.e., the Van Gujjars, the peripheral forest dwellers and the Forest Department. In this stage, every one is connected interacting as a decision maker with others and they have the following options: Opposing the rehabilitation (Van Gujjars), claiming the resource rights (peripheral forest dwellers), rehabilitating the Gujjars, and opposing the resource rights (Forest Department) (Table 2). Mathematically there are total 18 ($2^4=18$) possible states, but after removing all the infeasible states there are 9 feasible states in total (Table 3). The number is reduced substantially by removing the infeasible states. In the Tables 2 and 3, 'Y' means 'Yes' and indicates that the option is taken for a corresponding state, and 'N' means 'No', that the option is not taken. Given this set of preferences, states 4, 6, 8 and 9 are the possible equilibria in this game. In equilibrium 4 both the Gujjars and the peripheral forest dwellers would be better off. But the status quo state is unstable. In 1995, the IPT requested the former justice P.S.Poti to visit the Rajaji national park, where a series of consultation meetings were held with representatives of the local communities, NGOs, the (former) field director of Rajaji and the other Forest Department officials, the Wild Life Institute of India and other organizations. Following the initiative the interim

report was released by the IPT on April 22, 1995. The major focus of the IPT report was on the process of combining conservation with meeting local people needs, including the creation of a multi-agency team to plan and manage the park. This effort basically forced the game to move on to the negotiation stage, i.e., phase II.

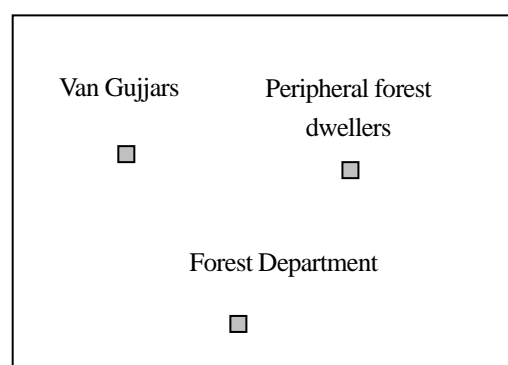


Fig.2 Null graph in the initial stage

Table 2 Players and their options (Phase I)

Players and their options	Status Quo State
Van Gujjars	
1. Opposing the rehabilitation	Y
Peripheral forest dwellers	
2. Claiming the resource rights	Y
Forest Department	
3. Rehabilitating the Gujjars	Y
4. Opposing the resource rights	Y

Table 3 Feasible states of the conflict (Phase I)

		1	2	3	4	5	6	7	8	9
Van Gujjars	1	N	Y	N	Y	N	N	N	Y	N
Peripheral forest dwellers	2	N	N	Y	Y	N	Y	N	N	N
Forest Department	3	N	N	N	N	Y	Y	N	N	Y
	4	N	N	N	N	N	N	Y	Y	Y

5.3 Social Network formation (Phase I)

In this phase (intermediate phase) a social network evolved through the involvement of different actors limited to different players, their strategy and link with others (Fig. 3). All the players have now gained the common knowledge due to such an external intervene. The Gujjars and the peripheral forest dwellers are able to represent their preferences due to the support of the RLEK and GKMM. Table 4 shows the reachability and the payoff functions of the players. The Van Gujjars and the peripheral forest dwellers reachability and payoffs represent the joint involvement with the supportive actor (s). The IPT's role was more like a catalyst to reinforce the conflict to move on to a negotiation stage. They also provided the knowledge to all the concerned players. The media also played a vital role to open up this discourse to a large public. A Swedish researcher wrote, media representations of the Van Gujjars pastoralists and the conflict over Rajaji has consequently been very important in changing the public image from one at the beginning of the conflict, where they were pictured as 'destroyer' of their forest environment to one which gained in importance during time, where they are seen as 'saviors' of the very same environment. Fig. 4 shows the possible moves of the players in this phase in a state transition

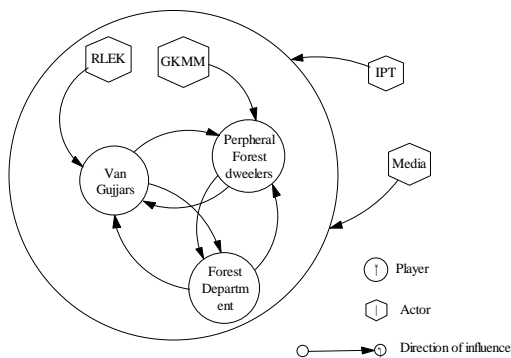


Fig. 3 Network formation (Phase I-intermediate stage)

graph.

Table 4 Reachability lists and payoff functions (Phase I- Intermediate stage)*

k	Van Gujjars		Peripheral Forest Dwellers		Forest Department	
	$S_1(k)$	$P_1(k)$	$S_2(k)$	$P_2(k)$	$S_3(k)$	$P_3(k)$
1	2	5	3	5	5,7,9	4
2	1	8	4	6	8	2
3	4	6	1	8	6	3
4	3	9	2	9	\emptyset	1
5	\emptyset	2	6	4	1,7,9	8
6	\emptyset	3	5	7	3	7
7	8	4	\emptyset	2	1,5,9	6
8	7	7	\emptyset	3	2	5
9	\emptyset	1	\emptyset	1	1,5,7	9

* Note: K = state number; $S_i(k)$ = reachable list for player i from state k ; $P_i(K)$ = payoff of player i for state k .

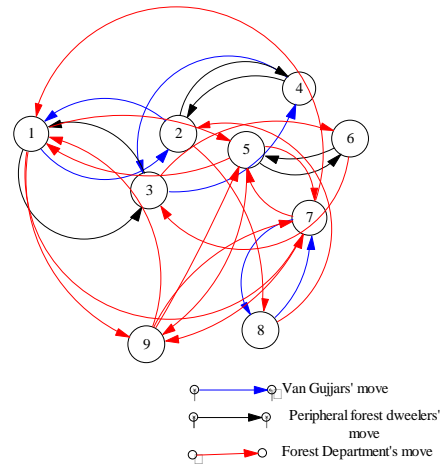


Fig.4 State transition graph (Phase I-intermediate stage)

6. Second phase of the conflict (1996-2006)

6.1 Intermediate to complete game stage

In the second stage of the conflict, many national and international actors took their respective roles. As an effort of IPT, in 1996, the W.I.I launched a project called 'Building Partnerships for Biodiversity Conservation in RNP' with the help of an international donor agent, 'Ford foundation' and this continued till March 2000. This project provided to create a participatory platform where all the stakeholders were able to share their views. Another major initiative was taken by the Van Gujjars in 1998. Through RLEK, they went to the Human Rights Commission and alleged the human rights violation against them inside the RNP. The issue attended the interest of media, like the newspapers, a BBC film team as well as a team from large German magazine Stern. In this way the images of Gujjars become more global even if the people themselves stayed in a forest.

We have modeled this game incorporating the same players as noted in the first phase of the conflict but their options and preferences have changed from the previous period. Now the Van Gujjars have several options available which strengthen their survival issue. The Forest Department has also shifted their preferences to the resource rights negotiation issue with the peripheral forest dwellers. There are a total six options available to the players. These are, staying in the park, appealing to the NHRC, making a proposal for CFMP (Van Gujjars), exercising the rights of natural resources (Peripheral forest dwellers), and rehabilitating the Gujjars, negotiating with the peripheral forest dwellers (Forest Department) (Table 5).

There are potentially 18 feasible distinct states to consider in this conflict. However some of the states are mutually exclusive or option dependent which subsequently reduces the number of feasible states (Table 6). Like the Van Gujjars stay in the park and the Forest Department rehabilitates them, both are mutually exclusive. The state 17 is a strong equilibrium under all the stability concepts and the state 5 is stable under GMR and SMR stability concepts, and 11 is stable under GMR, SMR and SEQ concepts. The equilibrium 17 represents the negotiation scenario among the players which partly took place during this period.

Table 5 Players and their options (Phase II)

Players and their options	Status Quo State
Van Gujjars	
1. Staying in the park	Y
2. Appealing to the NHRC	Y
3. Making a proposal for CFMP	Y
Peripheral forest dwellers	
4. Exercising the rights of natural resources	Y
Forest Department	
5. Rehabilitating the Gujjars	Y
6. Negotiating with the peripheral forest dwellers	Y

Table 6 Feasible states of the conflict in phase II

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Van Gujjars	1	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	N
	2	N	N	Y	N	Y	N	N	Y	N	Y	N	N	N	N	Y	N	Y	N
	3	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	N	N	Y	Y	N
Peripheral forest dwellers	4	N	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Forest Department	5	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	Y
	6	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y

6.2 Social Network formation and outcome (phase II)

We have examined the social network formation process and how it changed over time. Many national and international actors played their perspective roles as a supporter, facilitator, donor, mediator, and arbitrator (Fig. 5). As an intermediate player the Van Gujjars and the peripheral forest dwellers along with their supportive players have common moves in this game. In this phase, the Van Gujjars have more options due to the external supports. Alone they are not able to appeal to the NHRC (National Human Rights Commission).

The proposal for community forest management is also only possible due to the RLEK intervenes. The peripheral forest dwellers' option is also shifted from claiming rights to the exercising rights due to constant efforts from the GKMM side.

The negotiation among the peripheral forest dwellers and the Forest Department occurred due to the GKMM's constant efforts. The RLEK and the GKMM provided the common knowledge to the Gujjars and the peripheral community and the representability power also upgraded due to their constant efforts. Table 7 shows different reachability and payoff functions in this negotiation phase. Figure 6 represents the possible move of the players in the state transition graph. Now, we will discuss the role of donor, mediator and arbitrator in this negotiation. The WII with the support of a donor agent has influenced the decision makers' actual state of ranking in this mediation process. But it was project based mediation for a stipulated time. Within this time, many conflicts had been resolved and a participatory platform evolved as a result of this mediation. The players coping capacity also enhanced and trust building among the stakeholders was another achievement in this mediation process.

Table 7
Reachable lists and payoffs: RNP conflict (Phase II)

K	Van Gujjars	Van Gujjars along with the supportive actor		Peripheral forest dwellers along with the supportive actor		Forest Department	
	$S_1(k)$	$(S_1(k))$	$P_1(k)$	$S_2(k)$	$P_2(k)$	$S_3(k)$	$P_3(k)$
1	2	2,3,4,5	4	6	3	11,3,4,5	12
2	1	1,3,4,5	7	7	5	\emptyset	9
3	1,2,4	1,2,4,5	13	8	4	\emptyset	5
4	1,2	1,2,3,5	10	9	6	\emptyset	3
5	1,2	1,2,3,4	16	10	7	\emptyset	7
6	7	7,8,9,10	5	1	8	12,13,18	1
7	6	6,8,9,10	8	2	11	14	13
8	6,7	6,7,9,10	14	3	13	15	10
9	6,7	6,7,8,10	11	4	12	16	6
10	6,7	6,7,8,9	17	5	14	17	4
11	\emptyset	\emptyset	1	12	15	1	8
12	\emptyset	\emptyset	2	11	16	6,13,18	2
13	14	14,15,16,17	6	\emptyset	1	6,12,18	17
14	13	13,15,16,17	9	\emptyset	2	7	15
15	13	13,14,16,17	15	\emptyset	9	8	18
16	13,14	13,14,15,17	12	\emptyset	10	9	16
17	13,14	13,14,15,16	18	\emptyset	17	10	14
18	\emptyset	\emptyset	3	\emptyset	18	6,12,13	11

In 2006, the Forest Rights Bill passed which further strengthened the Van Gujjars and the peripheral forest dweller's survival issue. Several meetings were held at the national level where not only the Gujjars and the forest dwellers currently from the RNP took part in these meetings but several forest dwellers from the other places also participated. In this way, they are in the process of forming a network at different levels incorporating different actors to whom they are directly

or indirectly linked. In this process the Van Gujjars and the peripheral forest dwellers were empowered by the external actors to become complete players in this ongoing game.

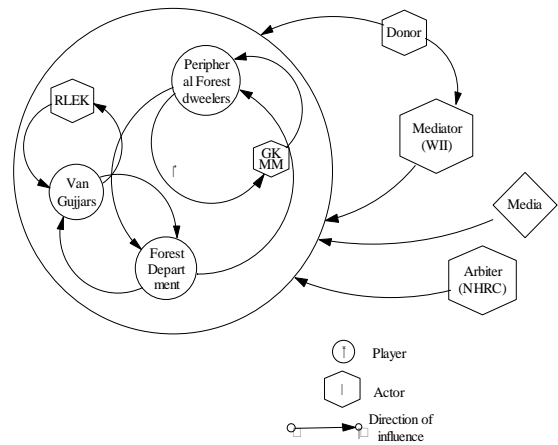


Fig. 5 Network Formation (Phase II)

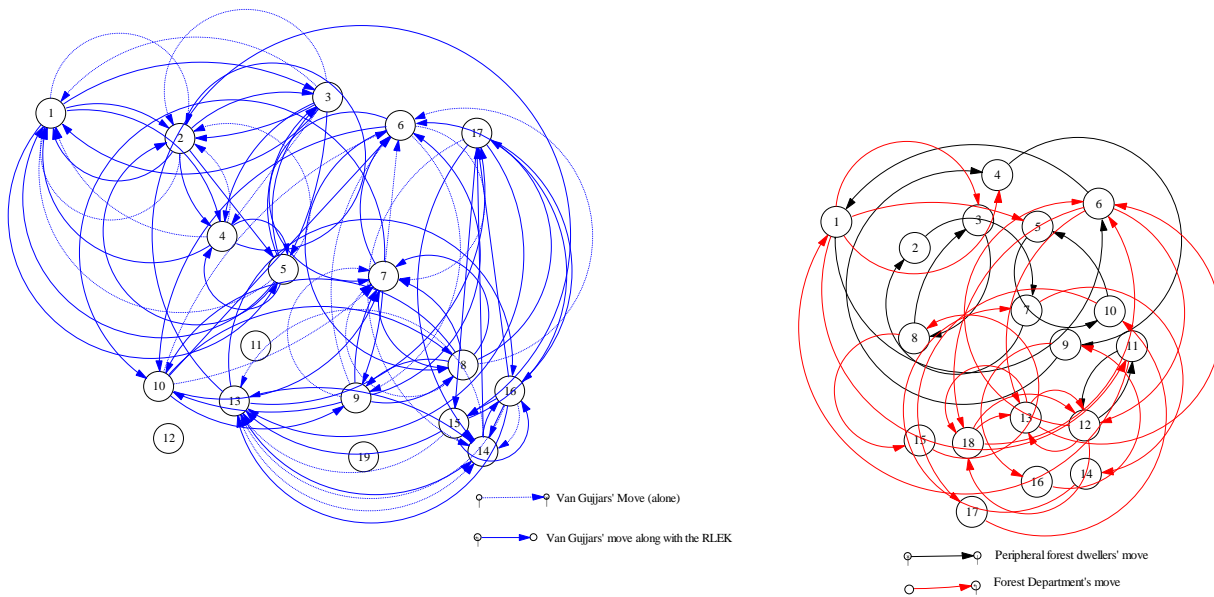


Fig. 6 State transition graph (Phase II)

7. Conclusions

Here, we have attempted to categorize the player's capacity status and to analyze the process of capacity building over time in a game implicitly attained by the respective social networks joined by the actors (supporters, mediators, arbitrators). The game can start only when the players are able to participate in the discourse. But to participate they should have knowledge, representability and executability which are often missing in a real world case. The different phases of the conflict and negotiation have been discussed here, including the initial stage (where some players are null), the intermediate stage (a null player becomes an intermediate player), and the complete game stage (player may be intermediate or complete). In the beginning of this confrontation, the Gujjars and the peripheral forest dwellers was a null player. But subsequently, as a result of external actor's support they learned more common knowledge and earned the representability power. The executability was reinforced by the arbiter. Apart from the supportive actors, other actors like the mediator and the arbitrator also facilitated this conflict to transfer it in a stage of negotiation and collaboration (Sensarma et al., 2007).

Based on our examination and evidences in our case study, we found that there is a missing link in risk assessment process in order to formulate the national park conservation policy where the marginalized people are neglected. Forced displacement as a mainstream park creation strategy in developing countries is profound conflict with poverty reduction (Cernea et al., 2000). Cernea identifies eight major impoverishment risks within the displacement or resettlement process in his Impoverishment Risks and Reconstruction (IRR) model. These risks are risks of landlessness; joblessness; homelessness; marginalization; increased morbidity/mortality; food insecurity; loss of access to common property resources; and social disarticulation. The same has happened in the Rajaji national park case also. Now with the proposed forest rights bill, the struggle of India's forest communities enters a more decisively "political phase", where forest movements need to be on constant vigil, to reach possible benefits and relief from the bill to the downtrodden and the poor among the ethnically and economically diverse groups of people living in and around India's forests (Ghosh,

2006). Based on our field visits in Rajaji national park area, we found that State government did underestimate the possible risks of forced resettlement policy. The creation of national park without sustainable livelihoods alternative to the Van Gujjars and peripheral forest dwellers ultimately leads to a win-lose situation. Our modeling and analysis shows that the forced displacement and disruption of forest people livelihoods cannot be a sustainable solution in park management policy.

References

- Bhardwaj, Anil K., Baroda, R., and Misra, B.K. (2002): Building partnerships for biodiversity conservation- a collaborative project with Ford Foundation in Rajaji national park, Wildlife Institute of India.
- Cernea (2000): Risks and reconstruction: experiences of resettlers and refugees, the World Bank, Washington, D.C.
- Fang, L., Hipel, K.W., Kilgour, D.M. (1993): Interactive decision making – the graph model for conflict resolution, Wiley New York.
- Fang, L., Hipel, K.W., Kilgour, D.M. (1988): The graph model approach to environmental conflict resolution, *Journal of Environmental Management*, Vol., 27, pp.195 – 212.
- Gooch, P. (1968): At the tail of the buffalo; van gujjar pastoralists between the forest and the world arena, Department of Sociology, Lund University.
- Ghosh, S. (2006): India: End of forest evictions? New forest bill, available: <http://www.wrm.org.uy/bulletin/106/Asia.html>.
- Hardin, G. (1968): "The tragedy of the commons," *Science*, 162:1243-1248.
- IPT (2002): Preliminary report on the Rajaji national park.
- Krishna, S. (1996): The environment discourse in India; new directions in development in T.V. Sathyamurthy (Ed.) *Class formation and political transformation*, Vol.4, Delhi, Oxford University Press.
- Misra, B., Okada, N. (2006): The Vitae system approach to strengthen implementation science in the context of total disaster risk management (unpublished).
- Naill, M. Fraser., Hipel, Keith W. (1984): *Conflict analysis models and resolutions*, New York, NY: North

- Holland.
RLEK (1997): Community forest management in
protected areas, Natraj Publishers, Dehradun.
Sensarma, S.R., Okada, Norio (2007): Game
theoretic analysis of the process of player

empowerment in resolving social conflict, IEEE
International Conference on Systems, Man, and
Cybernetics, Montreal, Canada (in print).

土地退去、資源権利および生存リスクをめぐる社会コンフリクト:インドRajaji国立公園のケーススタディ

スーマン=ランジャン=センサルマ*・岡田憲夫

*京都大学大学院工学研究科

要 旨

1983年にこの区域に昔から住んでいる Van Rajaji 部族の国立公園の管理当局との間で対立が起こった。対立の実態は以下のものであった。事は、この部族が従来から住んでいた居住地から突然退去するように当局によってある種、強制されたことに端を発する。これにより彼らの生存権や資源利用の権利が侵害される危険が生じ、これをめぐって社会紛争が起きた。本コンフリクトはその後いくつかの展開を経て現在でも進行中である。本研究ではこれを GMCR 法を用いてモデル化し、分析する。その際、コンフリクトの当事者として、ゲーム理論的にモデル化されるプレイヤーが現実には不完全なことが多く、それが当事者能力を獲得することによってゲームにおける役割が変化していくことに着目した。完備なプレイヤーの三要件(知識獲得性、代表可能性、執行可能性)を提示するとともに、不完全なプレイヤーとして無力プレイヤー、中間プレイヤーを規定することを提案した。最後に、ケーススタディとして Rajaji 国立公園を巡るコンフリクトの展開を説明・分析する上で、このようなモデル化が有効であることを示した。

キーワード: グラフモデル,コンフリクト,ゲーム理論,生存リスク,社会ネットワーク