NEURAL NETWORKS AND CONTESTATIONS IN CITY GOVERNANCE - GOVERNING INDIAN METROPOLISES

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INTRODUCTION

Neural networks are those biological and artificial networks that have properties of connectionism, cognition, and neural back propagation. Following Hopfield's hybrid network (1982) theory, one can state that neural networks, can propagate information in one direction only, or they can bounce back and forth until the network settles on a steady state. The actual structure of the network and the methods used to set the interconnection weights change from one neural strategy to another, each with its advantages and disadvantages. This neural network theory which is widely used now in Artificial Intelligence System is discussed in this paper to see whether it is applicable in Urban Governance Models from India, where complex systems of neural networks exist and contest, compete and many times converge similar to hybrid neural networks to take advantage of existing governance systems.

The neo-liberalism triggered by the economic reforms in India has initiated a new set of urban reforms that includes opening up of new spaces for the urban middle income group (Baud & Ninan:2008, Sridharan 2008). These new spaces have been captured either individually or collectively by various civil society movements such as Advanced Locality Management (ALM) in Mumbai and Resident Welfare Associations (RWAs) in Delhi. Prior to the urban reforms (pre 1990s), there were formal and informal associations that took interest in their neighbourhood cleanliness or solid waste management, etc in a limited way. But the post-reform period saw the scaling up of the activities of the neighbourhood associations (from individual building societies to colony level welfare associations) in several cities of India ranging from mega city like Mumbai and Delhi to comparatively smaller metropolitan cities like Bangalore. New alliances and networks were formed by these associations in order to protect and fight for their right to access basic infrastructure such as water supply, electricity, solid waste management, road development, etc. Their association and disassociation is political and issue based, hence the comparison with neural networks. Their strategies are based on non-zero sum games often resulting in conflicts with the government in many cases, and they stand divided as a civil society representing general public. Due to their NIMBY and rent-seeking approach, the political bosses leave them out during the democratic elections, which space they claim through other means.

This paper analyses the networks among the civil society groups in Indian cities, taking an example from Delhi and how these networks are formed and disassociate themselves based on various issues. Divided into three parts: neural network theory, Delhi's example of Resident Welfare Associations – a strong presence of civil society groups and their networks within and with the government, and how the social cohesion and exclusion occurs in a city due to the presence and absence of these networks based on the neural networks.

NEURAL NETWORKS

Neural networks are the key form of 'connectionism' that is widely used in artificial intelligence, cognitive behaviour analysis and mental mapping. The main principle of connectionism is that of simple and/or uniform interconnectivity between various units, which varies at times depending on the model and the size of the units. Theoretically the networks change over time and take the model of activation and/or

spreading. Spreading activation is an important aspect of neural network models, which is widely used by artificial intelligence and cognitive psychologists. This spreading activation model based on 'learning algorithm' – that assumes different networks modify their connections differently, is used here to explain the formation of and activation of civil society groups in cities of India. The learning algorithm model of the connectionist approach rely heavily on non-linear dynamic system of the model where in there is a multi-directional networks.

Neural networks depend upon 'cognition' and 'neural activity'. In other words, neural activity takes place once the units recognize a particular set belonging to it and try to link itself to that set or unit. This requires continuous learning, which is essential for the neural networks to propagate and connect. This learning process comes from experiences that a unit or single neural network has over a period in a particular given environment. How quickly one network adapts depend on how quickly the network learn from the other and connection takes place between the networks. This trigger action and reaction might be caused by spontaneous order of decentralized neural networks (as suggested in 1950s by Friedrich Hayek – a leading Connectionist) We will see later in this paper, how the civil society groups get connected quickly based on issues and adapts them to form a collective action groups. Like the artificial neural network, the RWAs were created or placed by the State to pressurize the local authorities (political contestation), and RWAs finally turned against the State itself by joining hands with other organizations/associations creating a series of 'micro level governance networks' against the State's 'micro level governance system'.

NEURAL NETWORKS AS APPLIED TO INDIAN CITIES – CASE OF RESIDENT WELFARE ASSOCIATIONS IN DELHI

Cities in India, like any other city in the world, are characterized by substantial stratification across ethnic, castes, religious and economic groups and associated with substantial levels of inequality (Ross: 2009). These stratifications, often caused by historical divergent societies and culture and fuelled by political and other governance system have become part of the governance system itself at various levels of governance. Resident Welfare Associations (RWAs), started to capture the land vacated by erstwhile agriculturist in Delhi, through co-operative formations is similar to 'neural activity' where one unit or set recognizes the other through cognition. Due to this initial cognition through learning process, a network is formed to have access to land in Delhi by the formation of co-operatives. Government at that time (post 1980s) promoted the formation of co-operatives for housing, so that its role in the land development process infrastructure maintenance can be lessened. More than 250 housing societies came up and registered themselves to claim their rights over land for housing. The learning and adaptation process was so fast that many societies mushroomed over night for these land rights access. However due to constrained land supply, not many societies benefited from the allotment of land at that time though they continue to remain registered in expectation of future land allotment. Post 1990s, economic reforms saw the reform process happening in the urban sector too. Delhi Development Authority (DDA), which is a Central Government Public Sector Agency that acquires, develops and disposes of the land in Delhi as a monopolist, started privatizing its activities. DDA regulated the existing supply of land as well as the future supply through its bulk land acquisition and disposal policy. It also restricted the sale and purchase of land within the Union Territory of Delhi. Before DDA came up in 1959, there were colonies that were built to accommodate the heavy flow of immigrant population that came from Pakistan after the partition. These colonies continued as it is without much of planning and regulation and were considered outside the purview of Delhi Development Authority to start with. These colonies were considered some time as illegal by DDA and where lands were allotted by DDA came up were considered legal. These colonies varied from plotted development (which formed colonies in different areas of Delhi) to flatted development (as in DDA housing). In mates of both the forms of development organized their own 'housing associations', later named as 'welfare associations' for accessing infrastructure for their members through collective action.

These welfare associations that were restricted to individual housing societies or colonies became prominent when they collectively faced the problem of security triggered by massive riots in 1984. In 1984, when the then Prime Minister of India, Mrs. Indira Gandhi was shot dead in Delhi, an unprecedented riot took place exposing many residential colonies to mob violence and killings. Delhi Police in the post-riot period came out with a suggestion of organizing various communities in the form of 'neighbourhood watch scheme', under which in each neighbourhood or housing societies a group was formed assisted by police to patrol and to control the crime and riots. This became popular among housing societies and colonies because

of the protection it got from the police and the network that it enabled to form within a colony or society. This is similar to what we stated as 'learning algorithm' earlier in the networks theory that is due to ' quick learning or adaptation' process that are familiar to neural networks. Individual housing societies formed groups of housing societies or neighbourhoods to protect themselves. The State legitimized the informal groups as civil society groups, by creating a scheme called 'Bhagidari Scheme' (Share holders' of the city Scheme – a literal translation). This process granted citizenship through partnering with the government of the legally defined neighbourhoods and alienated those who were illegal residents of the city (Srivatsava: 2009). A 'positive and negative social capital formation' (Habermas: 1989 quoted by Monga: 2006) happened in Delhi with the introduction of Bhagidari Scheme. Positive with respect to convergence of Civil Society groups to bring in democratic participation at the city level, and negative in the sense that the State dominated this informal democracy through its non-democractic exclusion of many not legally defined neighbourhoods. More over, as pointed out by Monga, some RWAs might actually work against the diffusion of freedom and the process democratic consolidation. As pointed out by Lake and Newman (2002), the entry and exit conditions are dictated by a 'shadow State' where in the entry of non-State actors may disenfranchise or differentiate citizenship rights. This is evident; as we shall see later in the type of networks they form to alienate illegal neighbourhoods from democratic decisions, similar to negation that happens in neural networks.

Historically Delhi represents politics, power and centralization to any ordinary citizen of India. From that of Centralisation, thanks to the 74th Constitutional Amendment Act in 1992, the Delhi Government wanted to experiment a new form of decentralization of governance. Unlike in Mumbai that started the decentralization in a different way, by allowing the formation and integration of Advanced Locality Management (ALMs) by local municipal government, in Delhi, the State government by leap frogging the local elected government, networked with the existing housing co-operatives that functioned as Resident Welfare Associations for urban governance. It is like introducing a neuron in a biological network that accepts or rejects the system that already in existence. In other words, learning algorithm and adaptation is the key in the process of network propagation here. By going directly to the RWAs, the State government killed the democratization process envisaged under the 74th Constitutional Amendment Act (74th CAA of 1992) that guaranteed democratic participation at ward level (the smallest administrative unit in a city). RWAs are often created by elitist groups and are restricted, as stated earlier to legal colonies. The State by legitimizing the RWAs there by excluded a majority of the citizens from this democratic decision.

The kind of functions does the RWAs perform, how they get linked with the government and at what level, do they really represent the voices of the citizens of their area, and in what way they are linked to the elected representatives to bring in a democratic process of governance, are all akin to neural networks. We try to answer these questions through the analysis of telephonic interviews we carried out initially with the RWAs and a detailed survey of selected RWAs in four Wards in Delhi. The results are astonishing and questions at times the concept of democratic decentralization that has been the aim of the 74th CAA. It shows that the State Government in reality does not want to give away the basic powers that are assured in the 74th CAA to the local government (Centralisation by stealth). The analysis also shows that a new elite equation with the state is emerging for 'state capture' and exclusion of certain groups from utilizing the basic services in the city. The State as well as the RWAs excludes the poor and the informal in terms of access, as the RWAs are now treated as 'paying consumers' as against the 'free riders' in the city (informal settlements) through their networks or 'collective action' and 'negotiation'. Similarly, the State used its political power to ward off the local authority (Municipality) through informal negotiations with the RWAs by passing a resolution in the State Assembly to take over the functions of the local authority, which is directly elected by the people.

INSTITUTIONAL VACCUM OR INSTITUTIONAL PSCELOROLISIS: THE EMERGENCE OF RWAS IN DELHI

In Delhi, in contrast to Mumbai, 'trust' and 'co-operation' took its back seat due to various policy regimes that were based on historically rooted causes such as autocracy, colonial power and religious disarray. Hence, citizen – government partnership was not forth coming as in other metropolises of India. Delhi remained a seat of power for each and every ruler in the pre-independence period, and every party in power in the post-independence period wanted the city to be under their direct control. Due to this singular reason, Delhi was never given a 'Statehood' till 1990s, even by the strongest believer of democracy, Jawahar

Lal Nehru, the Prime Minister of India during the formation of various states. As a result, Delhi's institutional milieu was made in a mess with local, state and central functions with their own territoriality and contestations may be deliberately. It was also thought that by increasing the role of the state, thereby the public sector in all basic services, the government could bring in efficiency and equity. So, when the state was formed in the post 74th CAA period way back in 1992, many of the powers that the other States in India enjoyed, such as urban development, land management, and police powers were not delegated to the Delhi State. Similarly, three authorities continue to function directly under the Central Government that is the Delhi Cantonment Board under the Ministry of Defence, and the New Delhi Municipal Corporation under the Ministry of Urban Development directly, in addition to the Delhi Development Authority that looks after the land management and city planning for Delhi. The only local government that undergoes the process of political election is the Municipal Corporation of Delhi (MCD), which has a little power in terms of planning the city or infrastructure provision.   The institutional complexity of Delhi is presented in **figure 1.**

Figure 1 shows the dominance of the Central Government and State Government in most of the local affairs. Land and Police is controlled by the Central Government directly. New Delhi Municipal Corporation and Cantonment Area is controlled by the Central Government indirectly through its Ministries.

Basic infrastructure such as water, electricity, transport and slum housing are provided by the state level agencies (function as state government undertakings) such as Delhi Jal Board (DJB), Delhi Transport Corporation and Delhi Electricity Supply Undertaking (DESU). The slum housing is shifted from the Central, State or local authority using the 'NIMBY' policy depending on the announcement of election dates for the local and state assemblies. Hyden and Court (2001) observed that in India, 'there was an overarching concern that policy-making is rather divorced from the people – especially the poorest members of society. Democracy in India is more impressive in form than substance'. Taking political advantage of this 'state failure' (Virmani 2006), the 'co-ordination failures' (Devetag and Ortmann ????), and to minimize state government losses in public sector undertakings, Delhi's Chief Minister launched the 'Bhagidari' Scheme – ' people – government partnership' (GNCTD 2003).
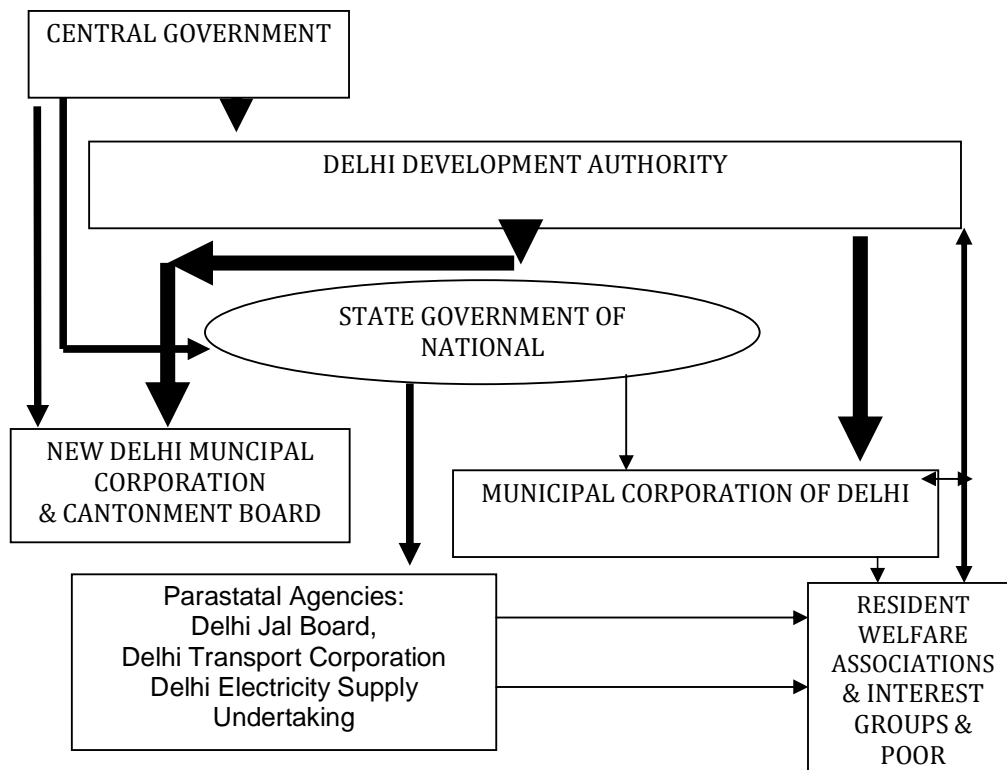

Figure 1: Institutional Arrangements in Delhi
Source: Sridharan & Joop de Witt (2007): ' Judicially induced Governance', Jan, 9, 2007. Presentation made at the International Conference on Urban Governance in University of Amsterdam, Amsterdam.

While there were examples of successful 'peoples' planning campaign' that existed in Kerala (Sridharan 2006), prior to the introduction of 'Bhagidari scheme', the Chief Minister of Delhi, Ms. Sheila Dixit, brought in the exclusionary process of involving all, through regulated access to urban governance by the RWAs in 2000. To nurture a political coalition inside as well as outside the established political institutions (Meyer 2003), the Chief Minister of Delhi encouraged the Resident Welfare Association at the local level to manage their own infrastructure and went ahead to provide adequate incentive for carrying out the same. A new method of bringing in 'micro governance system' that was suppose to work. Taking advantage of this 'institutional psclerosis' (Olson 1982) and 'political psclerosis' (The Financial Express 21 November 1997, p.6) the middle class of Delhi started their 'we-ness' (Snow: 2001) in establishing their 'collective identity' for the first time to fight for their right to access for basic services through 'collective action'.

BHAGIDARI: SURVEY RESULTS

Method of Sample Selection – Telephonic interview

For the telephonic interview of RWAs, first a directory of RWAs was obtained from the Government of National Capital Territory of Delhi. As per the list provided by that Directory, 600 RWAs were selected at random from each of the Revenue District provided. This does not synchronize with the zonal map of the Municipal Corporation of Delhi, under which electoral wards are based.   A short questionnaire was prepared for the interview and RWAs were told about the quick survey over phone before obtaining the details. Where there was no response on the phone, alternative RWA was selected in the same district and survey was carried out. In fact, only 279 RWAs could be contacted over a period of a month, out of a total of 859 given in the directory. Other researchers have reported similar problem of non-availability of RWAs as per the list provided by the State Government as well (Stephanie 2008, CSD: 2006). The spatial coverage of the selected samples is given in Figure 2. It is not proportional to the number of RWAs in the district as the responses were too low. Also most of the RWAs were located in High and Middle Income Group Areas. The low income settlements, especially the resettlement colonies as well as unauthorized are not encouraged to have their own Resident Welfare Associations and falls outside the purview of the Government's Bhagidari Scheme.
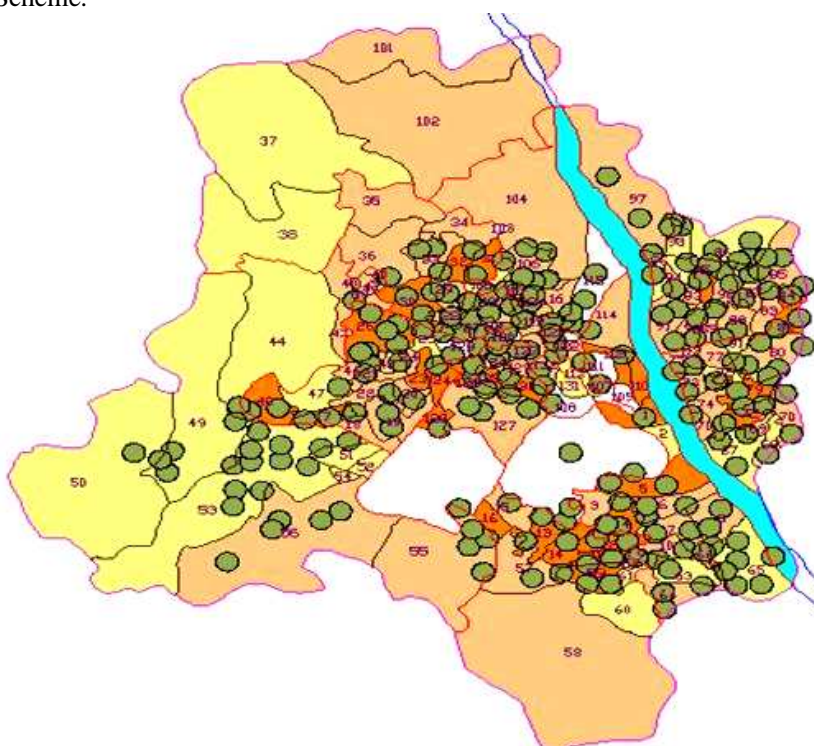

Figure 2 Distribution of selected RWAs for telephonic interviews in Delhi
Source for map: MCD, 2003.
Source for RWAs: GNCTD, 2003.

As the first telephonic interviews of 279 respondents were too short to know the details about RWAs and their interaction with various levels of government, inner democracy, their networking with other RWAs, etc,. Hence, we covered 20 selected RWAs in four wards of Delhi Municipal Corporation area. A detailed questionnaire was canvassed to assess the various issues related to RWAs. We present here the analyses of all these surveys.
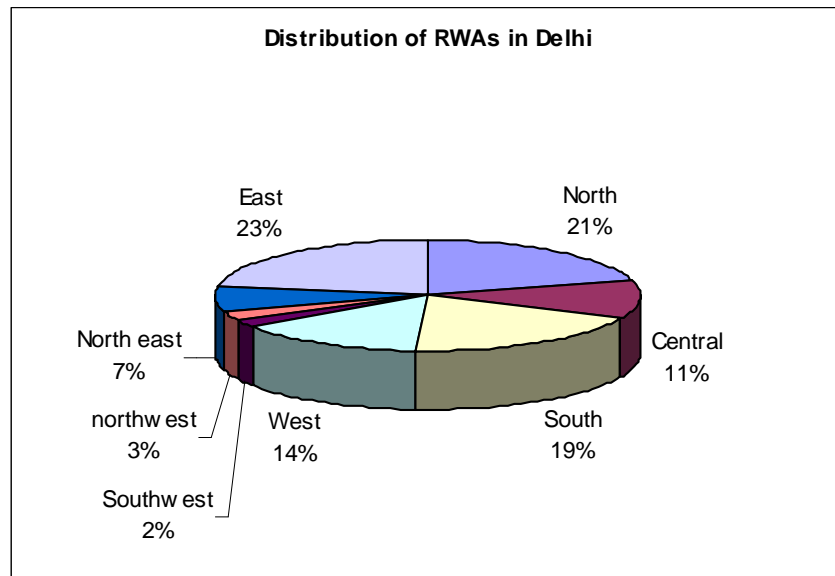

Figure 3: Spatial spread of selected sample RWAs (Telephonic Interview)

We try to follow the broad framework given by Lake and Newman (2002) in terms of analysis, ie, 1)Organisational capacity, 2)spatial coverage, 3)client selectivity in service delivery, 4)programme support and 5)outside network or unconsidered clients' preferences.

1) Organisational Capacity: This has been analysed in terms of Inner democracy (assuming that a simple participation is not equivalent to democracy – see earlier comment on Cunha and Pena: 1997) and ' Collective Action'. We assume that Collective Action requires leadership and which comes through democratic process. Hence we followed these two analyses.

a) Inner democracy: RWAs are very restrictive in allowing the exit and entry of new members within its fold. As they are governed by the Co-operative Act, any new entry has to be approved by the Governing body of the RWA which is usually headed by a group of elites within the RWA (Lawa Tama 2006). For example, the tenanted residents within a group housing society, though they are the consumers of various services such as water, electricity, etc, are not eligible to vote in the annual general body meeting or for change of leadership, as they are not permanent members of the society. The judiciary tried its level best to solve this problem by allowing the recent occupants (meaning those who obtained the house through purchase from erstwhile members) to vote in the election. Still the rented tenants were kept out. As most of the new colonies that habited the RWAs came after the 1986 privatisation process of land development through co-operatives (Sridharan 2003) that were promoted by the elites through their rent-seeking process, the elites within are not interested to part with their control or finances within the RWAs. Elections do take place as per the guidelines of the Co-operative Act, in reality most of the elections are through consensus of restricted voters who were allowed to vote. In all our 20 detailed surveyes of RWAs, it was reported that the elections were held within five years. Conducting elections is also a part of the mandate under the Co-operative Housing Societies Act. Inner democracy was avoided by selecting the same Secretary and President by most RWAs. Exclusion similar to non-propagation in networks is used here. It is like a virus rejecting the system in a network.

We observed that (see table 2) that the average membership of the Resident Welfare Associations increased during post 1990s, when the Delhi Development Authority moved on to promote freehold from leasehold in land rights. This paved the way for many land transfers in the city and encouraged the formation of new co-operative housing societies. This is similar to the propagation of networks through learning algorithm as seen in network theory.

Table 2. Resident Welfare Association – Analysis of Membership pattern

	Total	**Members**	**Average**	Average Members	
				Minimum	Maximum
Before 1990	**10**	**6383**	**448**	240	1000
After 1990	**10**	**3261**	**531**	21	2500
Total	**20**	**9644**	**490**	-	-

Source: Primary Survey: 2006.

Table No.2 shows that the membership varies from mere 21 to 2500 in the post 1990 period, when RWAs emerged strongly as a 'collective action group' as compared to pre 1990 period.

Except in the case of government provided housing colonies (that is Delhi Development Authority provided housing colonies) where there is a positive social mix, in the case of housing co-operatives where RWAs were formed, the dominant class takes over the responsibility of leadership. This (leadership) is usually based on caste, religion, past power and responsibility held in the society, etc. Within a RWA, a leader is selected in many cases through consensus, who can act as an 'intermediary' between the RWA and the Government to get their rights. Hence, in many cases during our survey we found that the President and Secretaries of the surveyed RWAs (20 samples) were ex-government officials who could negotiate with the government easily for their rights. In a day to day activities, no RWA was interested to take up issues of other RWAs or those citizens outside their area – a clear exclusion process, as these areas are socially and economically protected. Networking is based on convenience and non zero sum game among the RWAs.

The internal problems of access to services are solved through an established office for maintenance of services on regular basis for which an individual members, irrespective of their tenure status, pay on monthly basis. This monthly subscription covers maintenance of public spaces, public lighting, maintenance of captive power plant, cleaning, water supply problems, and, waste collection and disposal within the society area. Bigger the RWA, bigger is the fight to capture the office, a seat of power. In one of our survey, we found that a RWA has to go to the local Councilor for mediation to sort out its internal leadership problem.

b)'Collective Action' (Neural networks) amongst RWAs is based on the principle of 'prisoner's dilemma'. For example, in one of the meetings convened by the state government (give the date : October, 2006 at IHC, New Delhi) to meet the court appointed monitors on 'ceiling of unauthorized buildings', there were clear cut divisions among RWAs of the North West zone (highest number of RWAs come from this zone) were opposing the South Zone RWAs (representing 145 RWAs) saying that the mixed use should be allowed. Many of the RWAs were unhappy when the Delhi government introduced an Act to regularize unauthorized colonies (Delhi Scoop: 12:5:2006). While on the other hand, when the issue of tariff rise for electricity was announced by the government, all the RWAs joined hands and came to the street to fight against the increase in electricity charges. Here too they were concerned about the increase of charges for the group as a whole (that is RWAs as a whole group) and they deliberately excluded those in the unauthorized colonies. In fact, they went to the extent of demanding the government to come out with a penalty class for those living and using electricity in those areas. This virtually shows the 'collective self-interest mechanism' that is in place and the process of exclusion and inclusion is decided by the type and quantum of benefit that they seek from the government. In reality collective action occurs among RWAs, when they benefit mutually as per the Jackson and Wolinsky's assumption (1996 and quoted by Rui and Iori (2006)) that 'agents may derive benefits not only from the nodes they are directly connected but also they are connected indirectly'. In the process of better governance, the RWAs of Delhi feel that they have direct access to power and politics through which they can demand better infrastructure services.

Till recently, individual RWAs used to deal with the State independently and the state also negotiated in the same way. However, in the post 2000 scenario, the state paved the way for forming Federation of RWAs

– a non-linear dynamic networks that were in existence in a decentralized network system were forced to join through 'collective action', when the State invited various RWAs for interacting with the government departments. The final stroke was the increase in the price of electricity and property tax rates, when the RWAs felt that collective action through a Federation was better than individual interaction with the government. Hence, area wise many RWA federations came up in the city to negotiate with the State. 'Cognition' and 'neural activity' that triggers connectionism or association among neural networks happened among RWAs. These Federations also occurred in those areas where the majority of the Middle and High-income group resided. The state capture by the elites through collective action at local level and also at national level is not a new phenomenon in India (Bardhan, P.K., & Mookherjee, D. 2000).

Two main points emerge from this analysis: a) from that of historical class/clan based associations, a formal emergence of 'civil society' has emerged, and, b) from that of individual actions, these Resident Welfare Associations have now moved on to take a big role in demanding their rights through a bigger 'collective action', that is federations and participating in elections. Though there are differences of opinion regarding calling this emergence of 'collective action' or 'connectionism' as 'movement' (Stephanie 2007), definitely there is an interaction amongst these Resident Welfare Associations and it is sustaining to the extent that their rights are being met through collective action.

2) Spatial Coverage of RWAs: North West and South dominate the Dehi's RWA scene, followed by other districts (See Table No.1). These areas, especially North West colonies such as Rohini, came up after 1980s as 'a city within a city'. These colonies are occupied by middle, middle-middle and high income-groups. Similarly many new colonies came up in the East too adding more RWAs. These areas are, dominated by the middle-middle and high middle-income groups. While the South district had the maximum number of households per RWA, the Central District had only 2844 households per RWA. However, this representation may not be true, as actual representation in RWA is restricted by the entry and exit rules stipulated by the Act (as stated earlier). Similarly, not all the households, that is households living in unauthorized colonies, were part of any RWA. Even if one considers an average of 500 households covered per RWA, in terms of membership, total households covered by RWAs were not more than 10% (that is not more than 2.3 million out of 13.6 million population) (Sridharan, 2005). Hence, the coverage by RWAs to bring in change in governance is restricted.

- Sectoral Coverage: The sectors that were covered under the Bhagidari schemes were mostly those that came under the purview of the State and Central ministries and governments, such as Police, Land and Urban Development, Water Supply, Electricity, and maintenance of Green spaces. Except for Waste management and cleaning of rain water drains that came under the Municipal Corporation list, the so called co-governance, and decentralization is restricted. Unlike in the case of Kerala (Sridharan 2004), where there is an effective political, administrative and fiscal decentralization, in Delhi's case the Municipal Corporation has been kept away from this administrative and fiscal decentralization process. Even the elected representatives of the Municipal Corporation avoid these Bhagidari meetings, as they do not have much say in these meetings.

In fact, in some of the RWA areas such as New Friends Colony, Friends Colony that are occupied by rich income group, even the cycle rickshaws and auto-rickshaws are not allowed to ply through their areas. The operation of 'NIMBY' theory in its worst form happened when one of the citizens of Delhi approached the court against a RWA closing the neighbourhood gates on security grounds, when the person was in medical emergency (give the court order). The court intervened to pressurize the RWAs to appoint an attendant so that the gate can be opened at odd hours in the night in case of emergency. However, cost constraints restrict the RWAs to adhere to the court order and as usual it is difficult to monitor the implementation of the court order.

CONCLUSIONS

The concept of neutral networks as applied to RWAs of Delhi, showed that concepts such as connectionism, cognition and dynamic multi-layered networks operate in the governance model that is emerging in Delhi. **Micro Governance Networks** are emerging replacing or operating parallel to existing State government and local government institutions' micro-level governance. Second, neural network theory as in the case of artificial intelligence are useful tools to effectively analyse the governance system that are operating in developing countries like India that are riddled with caste, religious and socio-political norms.

Neo-liberal outlook of the present political regime that favours and supports parallel governance systems as in artificial networks adds support to this theoretical basis of analysis.

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