



# Assessing Communities Willingness For Urban Ponds And Its Catchment Conservation, Case Of Kakrola Urban Village In Delhi

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## Abstract

Community Participation is a well discussed concept in various urban sectors including water resource management. Most of the water body and catchment area conservation initiatives across India are either community led or initiatives that partly involve communities in the different stages of conservation plan. One of the typology of water body is a pond which is increasingly being recognized for the important ecosystem services as well as place making opportunity it provides to its local area. This paper is an attempt to assess willingness of a notified urban village, Kakrola, community members for the conservation of village ponds and their catchment. Community's responses were analysed based on gender, age, caste, education, occupation and income group along with their socio- cultural and socio-economic characteristics. Further the study proposes a case specific participatory framework and concludes with emphasises on systematic thinking for higher engagement of group of individuals for meaningful participation to achieve effective conservation.

**Keywords:** Catchment Conservation, Community Participation, Framework, Pond Conservation Urban Village, Willingness

## Introduction

Indian cities have always been benefitted by various typologies of water bodies including wetlands, lakes, ponds, baoli which are generally found in rural, peri urban or urban contexts. Their services include ecosystems, economic, social and ecological requirements of the cities. But depending on the scale of water body their function changes. The typology of pond is increasingly being recognized for the important ecosystem services they provide to society including flood alleviation, storage of urban storm water, the supply of irrigation water Takamura, (2012), and nutrient or pesticides removal from water. The common idea behind pond conservation initiatives has been restoration of the percolation pond to increase water retention capacity leading to ground water recharge; improve soil moisture levels supporting irrigation, biodiversity and help mitigate the effects of urban heat islands G.J. Steeneveld et.al, (2014) also contributing to place making, a community space.

Locally ponds may have different names like Talaab, Johad or Pokhar in Haryana, Rajasthan, Punjab, and Western Uttar Pradesh of North India. Interestingly in Bengal, many neighbourhoods were named after ponds or "pukur", like Monoharpukur, Ahipukur, Boespukur. Historically ponds in India were formed or created to catch and conserve rain water for storage and immediate use (Dying Wisdom, 1997). Most of these have remained as rain fed and storm water ponds based on the water feeding mechanism. Initially communities were not sensitive enough to realize the ecological services which ponds were serving until these dried, or became cess pools, sandwiched between planned and

unplanned urban areas. But many noticeable efforts have been made in different parts of the country like the participatory water conservation model in Molap Talab ( 20 Hectares) Tarsingri Sodha Village, Barmer district, in Rajasthan (2016) with a catchment of nearly 10 kms; Community led Chinnapallikuppam Village Initiative, Tamil Nadu (2019); Community Initiative for Pond or Pokhari in Nayapalli, urban village, Bhubaneswar; Kazi Pukur restoration in Kolkatta (2002) ; Delhi government pilot initiative for pond (0.5acres) in Rajokri urban village,(2017) ; Haryana Pond and waste water management authority constituted in 2018 is protecting rural and urban ponds, utilizing pond water (treated effluent) for the purpose of irrigation and many more initiatives especially in rural areas.

Delhi Parks and Gardens Society, Department of Environment, defines water bodies as “Bodies of still water in the urbanscape or ruralscape which are either naturally present or intentionally created”. The types of water bodies suggested by the society firstly include large scale body like Sanjay lake in East Delhi, secondly marshes found within floodplain embankments and thirdly, smaller to these in size, are the ponds which are mostly created bodies having small localized catchments for gathering rainwater. These are commonly found to be located in historical sites like Old fort, Hauz Khas (urban village), place of worship premises like Temple ponds, Gurudwara pond, lying within municipal wards or contained within newly recognized urban villages. The smallest scale is that of step wells and Baoli’s which are mostly under the ownership of Archaeological Survey of India.

The list prepared by the society documents different sizes of water bodies which are under the ownership of different government agencies like Delhi Development Authority (833), Municipal Corporation of Delhi (21), Block Development Officer (131), Public Works Department (1), Delhi Jal Board (6), Central Public Works Department (5), Delhi Arch. Department (1), Archaeological Survey of India (15), Forest Department (18), WAKF Board (1) , Delhi Urban Shelter Improvement Board (1), Delhi State Industrial and Infrastructure Development Corporation (3), Delhi Metro Rail Corporation (2), JNU (3) and IIT (1), which totals upto 1042 number of water bodies as recorded in 2018. Their status is either reported as encroached, converted into parks, near Yamuna river, dried or poor in terms of their quality, quantity and spread. The idea of conservation of these water bodies supports augmentation of declining ground waters, sustain operation of remaining tube wells, retain soil moisture, local biodiversity, micro-climate, recreational place in Delhi. Among the various ponds location, ponds in urban villages of Delhi were found to be more problematic as these are surrounded by settlements and are reported in poor condition due to anthropogenic activities. One such claim was reported by a team of environmental activists in Dwarka, about the degrading status of ponds in the urban villages like Dhul Sirus, Bhartal, Ambrahi, Bamnoli, Kakrola, Kaalhala, Palam, Sakrali, Holi Chowk, Nasirpur, Brijwasin, Chawla, and few surrounding sectors. As observed on ground (2019), ponds (0.5 - 5 acres) in these villages need conservation. Therefore, for the purpose of assessing community participation, notified urban village like Kakrola is chosen which lies in Dwarka subdivision having two ponds for conservation ranging from 1-5 acres fitting into the site selection criteria. The case study was conducted in early 2020 to assess if the immediate community living near the pond is willing to contribute in its conservation process.

## 2. Research Methodology

The methodology initially includes conduct of comprehensive literature study to identify indicators for assessing components of the study which are validated by Delphi, a popular technique to gather expert opinions on the subject. These experts are the academicians, environmentalist, conservationists, members of various government bodies etc. Secondly preparation of the work plan eased the understanding of data collection for various scales involved in the study. The use of different data collection techniques for qualitative and quantitative data enriches the study from various lenses for wider coverage of study components.

To fulfil the aim of this study, it is required to understand community’s characteristics, status of pond and community’s willingness in pond conservation. The first essential step is to analyse community’s past and present relationship with the pond to relate to their decision of participation or non-participation in the conservation process. The next step to analyse the village growth around the pond that may have affected its spatial extent over decades. Further the pond’s spatial spread directly impacts its water quantity. Therefore through satellite imagery change in status in terms of area is studied. Parallel to this water sample is collected in pre monsoon month to monitor impact of conservation plan on pond. The sample collected through “grab method” was assessed in a laboratory against CPCB, best use designated parameters followed by catchment analysis. As one of the key findings from the Delphi,

pond water quality is the most significant factor followed by water quantity as a measure of conservation.

## 2.1 Research Design

To get a true sense of community's response, out of 12000 urban village populations, a sample size of 350 was surveyed keeping 95% confidence level and 5% confidence interval to ensure that true percentage of representative population surveyed answers within similar range. Study of community indicators like gender (male, female or transgender), age (0-14 /15-29/30-45/45-60/ 60+), caste (Brahmin, Kshatriya, Vaishya, Shudra, Muslims), education (primary, secondary, higher secondary, graduate and above), occupation (home maker, student, business, retired), income group (no income, upto 50,000, 50,000- 1lac, above 1lac) enabled assessment of community's willingness in participation. Though urban villages in cities are found to be in the different stages of urban transformation, but the literature does not identify density as an indicator to assess willingness in participation for conservation. Most of the published literature on pond conservation has explored biodiversity conservation in floral and aquatic insect's studies in and around pond therefore to study change in status of pond, loss of biodiversity is not considered as a valuable indicator as urban ponds in Indian metropolitan cities are not necessarily surviving with greens around.

Community's willingness for pond and its catchment conservation was assessed through *levels of participation* (Arnstein.S,1969; White.A,1981;Buchy, Ross et al., 2000), measuring percentage people willing to participate at different stages of conservation, *empowerment* in terms of spaces, forms, levels (Gaventa.J,1980; 2006; Manzo & Perkins, 2006) indicating presence of platform for participation to take place within close proximity, *motivation (place attachment)* - psychological ties to a place: thoughts and attitudes, local resource influencing environmentally responsible behaviour (Vaske.J.J & K.C Korbin, 2001) assessing reasons for participation or non-participation, (*childhood place attachment*) – affiliations, bonding, rootedness and sense of place (Chawla.L 1992, Olwig.K.R,1982; Hines.J.M, Hungerford.H.R et al. 2010) analysing if the sub factors triggering community are associated with place dependence or place identity, *systems around people influencing their decisions* (Urie Bronfenbrenner,1977; Jill F.Kilanowski,2017) analysing people's awareness or knowledge with or without digital means and their capacities to support conservation. The idea is to think in three dimensions: What kind of participation?, Who is participating in it ? How is this participation occurring? as environment condition kinds of participation (Cohen and Uphoff,1980).The Status of pond is assessed through analysing its quantity (volume, m<sup>3</sup>), quality (standard parameters) and spread (area, m<sup>2</sup>) and catchment is assessed through service level benchmarks (2006) for physical *infrastructure provisions* measuring house hold connections for water supply, sewerage , storm water and solid waste management and *social infrastructure* through reporting number of functional community centres and other open spaces. The above mentioned indicators helped in comprehending the level at which community is willing to participate in order to realize the overall participation rate; availability of space for participation facilitating direct form of participation; identification of reasons to trigger consistency in participation throughout the process.

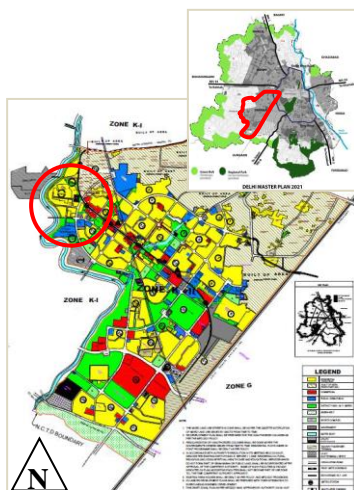
## 2.2 Survey Methodology

The site visits held in 2019 and early 2020 shaped the journey of familiarizing with community, their opinions and their relationship with pond and its catchment. On site, the first three visits on foot established a strong link with the leaders or trusted member of the community for an informed conduct of the study. Theoretically it involves knowing the access routes, representative sample size, sampling technique, community mix and characteristics, their dominated areas, dividing the settlement into equal part for household survey, identifying hot spots for focussed group discussions (FGD), play areas , chaupals in order to get opinions from different age groups and importantly deciding on dates and days of survey. Prior to the conduct of the survey, narratives were prepared for storytelling which fostered interest among community members in participatory mapping, formal surveys and FGD's; sensitize community about poor condition of village ponds and informed the benefits of conserving ponds and their local catchment. During surveys, photographic study documented physical condition of pond and its catchment followed by interactions with active elderly members, youth, women and children. The entire methodology induced positive attitude and behaviour that enabled and empowered people to think, share their thoughts, comprehend and enhance their knowledge together. Use of narratives in sub community areas was constructive in collection of their stories and experiences with respect to any previous pro-environment programs conducted or conflicts within village or with governing agencies.

### 3. Case Study: Kakrola Urban Village Dwarka, Delhi

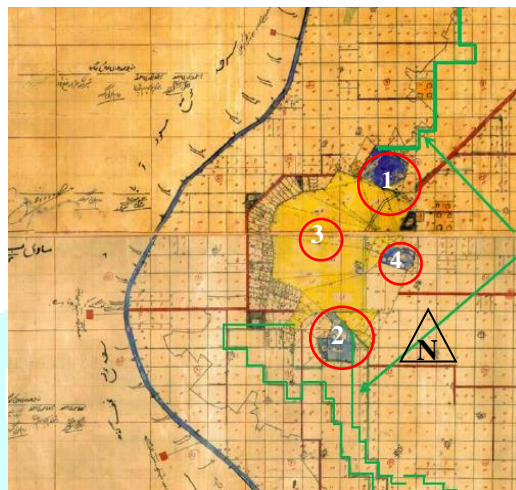
Kakrola with an area of 82 acres is situated in ward number 35, K-II planning zone, Dwarka, NCT Delhi, falling under Matiala assembly constituency. As per 2011 census, ward population is 64,898, with 77Acres in area and 188ppa density. From the primary survey, the urban village population is 12000. This village has two surviving ponds, marked below in map 2. The third pond was filled and built as a community hall in the village with the mutual consent of the village community (Primary Survey, 2020).

**Map 1:** Kakrola in Dwarka , Delhi







Source: Master Plan Delhi; Zonal Plan, 2021

**Map 2:** Old Abadi Area, Kakrola Urban Village



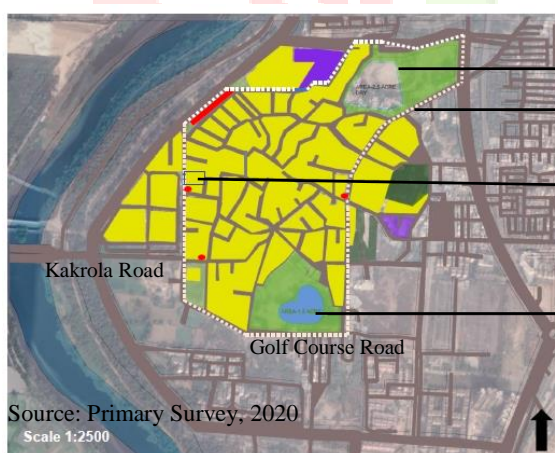
LEGEND (Map 2)

-  Ponds
-  Revenue Boundary/Agricultural Land
-  Najafgarh Drain
-  Old Abadi Area

Source: Delhi Archives, retrieved in 2019

Ponds 1 and 2 in map 3 below, situated within old abadi area are accessible and its immediate greens are daily used by community members for recreation purpose and gatherings. Pond 3 is built upon whereas Pond 4 is outside old abadi. Beyond abadi area toward east is the village extension abutting the newer development like factories; ware houses etc are accessible via 30 m wide road.

**Map 3:** Land Use, Kakrola Urban Village



Source: Primary Survey, 2020  
Scale 1:2500





Takkiyon Wala Johad  
Status : Dry  
2.5 Acre  
Phimi

Surajkund Johad (filled )  
known as Surajkund  
Dharamshala

· Peeplon Wala Johad  
Status : Wet  
1.5 Acre  
(Kitchen Waste Water  
reported)

Predominantly residential land use  
with 1% local level commercial  
facilities, in a mix use pattern that  
can be observed in the village.  
Area: 82 Acres

LEGEND (Map 3)

-  Residential
-  Greens
-  Commercial
-  Public Semi Public

**Map 5: Tracing Changes as recorded in Satellite Imagery**

Recorded: 05.04.2019



Eye level at 1000 m

To understand the change in status of ponds spatially, satellite imagery was used as recorded by Google Earth Pro platform from 1.0 km eye level. Though the map 5 records 2019 imagery but the study of last 20 years of satellite imagery does not reflect any effective change in the boundary of the ponds but due to topography and storm water line coverage near 1.5 acre pond, it remains wet throughout the year. The 2.5 acre pond area remains dry until monsoon as it lies at a higher elevation and lacks connection to storm water line.

There is a visible change in the green cover around these ponds from 2004 to 2019. Figure 1 and 2 below illustrates pond condition taken during visual study. Peelon Wala Johad remains wet throughout the year and is often surrounded by community for morning and evening walks. Takkiyon Wala Johad is a dry pond which only fills during monsoon.

Figure 1: Peelon Wala Johad near Shiv Temple, 1.5 Acre

Figure 2: Takkiyon Wala Johad near Hanuman Temple, 2.5 Acres



Source: Site Visit, 2019-2020



### 3.1 Status of Pond, Peeplon Wala Johad

To analyse the status of water quality, post monsoon water sample was taken to assess the above against the standard variables as mentioned in central pollution control board for designated best use. The other pond being dry is not a part of analysis.

**Table 1:** Status of Pond Water Quality, Kakrola Urban Village

S. No.	Parameters	Category	Acceptable	Permissible	Test Results
1.	Turbidity, NTU	D	1	5	15.4
2.	Ph Value	A	6.5-8.5	No Relaxation	7.81
3.	BOD, mg/l	A	-	-	1.5
4.	COD, mg/l	B	-	-	2.8
5.	TDS mg/l	B	500	2000	696
6.	DO ,mg/l	A	-	-	6.7
7.	Boron as B, mg/l	A	0.5	1	0.09
8.	Sodium Adsorption Ratio (SAR)me/l	A	-	-	3.47
9.	Ammonia( as total ammonia – N)mg/l	Below -E	0.5	No Relaxation	6.4
10.	Specific Conductance, uS/cm	C	-	-	1095

**Source :** Min Mec R & D Laboratory, Delhi; Water Sample collected via Grab Method from different points of pond

*Designated Best Use of Water (CPCP Standards) for Categories*

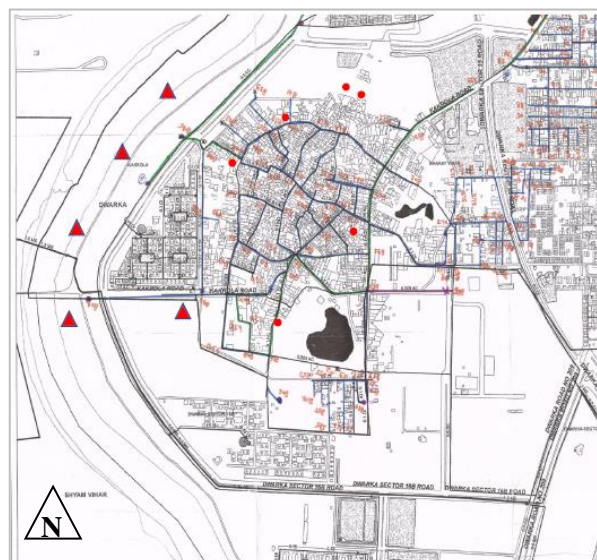
A	B	C	D	E
Drinking Water Source conventional treatment but after disinfection.	Outdoor Bathing (Organized)	Drinking water source after conventional treatment and disinfection	Propagation of Wild life and Fisheries	Irrigation, Industrial Cooling, Controlled Waste disposal

From the above table 1 and 2, test value results of variables like DO (dissolved oxygen), Ph, Boron and SAR are within permissible range and therefore belongs to A category whereas the TDS belongs to B category. COD is slightly more than 1.5 times the BOD value (0.55 times) which generally means a greater amount of oxidizable organic material in the sample that reduces dissolved oxygen (DO) levels. Even the turbidity levels are higher than the permissible limit which could be a result of higher concentrations of silt, clay and organic materials. The parameter of concern is Ammonia. In surface water quality free ammonia (as N) 1.2 mg/l or less indicates suitability for fisheries and wild life. Ammonia is relatively harmless to fish in neutral or acidic water. However, as the water becomes more alkaline (the pH increases), ammonia becomes progressively more poisonous to these same organisms. In this case Ph is neutral so overall the pond water can be allowed to percolate through ground for recharging.

### 3.2 Status of Catchment

The catchment assessment indicators as discussed in research design require status assessment of facilities at village level. It is important to ascertain 100% status of line networks as per service level benchmarks in order to avoid pollution due to absence of networks or leakages which would lead to direct or indirect waste disposal into the pond. **Map 6** illustrates 100% coverage and connection of the water supply line network in Kakrola urban village. Further there are five operational tube wells on the east edge of the village boundary to suffice the gap of 35lpcd as the village receives 100 lpcd. Therefore there is less scope for exploitation of pond water for domestic needs but it continues to be used for cultural and recreational purposes. The village has 85% operational sewer line system (primary survey) connected to Households.

### Map 6: Water Line Network, Kakrola



50% - Piped Supply  
 40% - Tube Wells  
 10% - Submersible Pumps  
 - 5 Tube Wells  
 - 5 Traditional Bharna Kuans, abandoned / defunt

1:3,600

Projection - UTM Datum - WGS 84

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The 15% uncovered area is around the built up of Tikkiyon wala pond which remains dry. The urban village has 85 % storm water drain coverage connected to each household, the inadequacy of size makes it inefficient during monsoons resulting in overflow.

Importantly, the drains need to be cleaned pre monsoon in order to feed cleaner water to Peeoplon wala pond which lies at a lower altitude. Ponds are found to be a convenient location for garbage disposal where community members lack civic sense.

This is evident from the neglected Takkiyon Wala Johad as its edges remain covered with dry solid waste. Both the ponds lack adequate covered dustbins as per standards. Daily cleaning of street wastes avoid accumulation of waste in the catchment.

Source: DJB Official, Dwarka Office

Note: Participatory Mapping with community members enabled detailing of Map 6, 7 and 8.

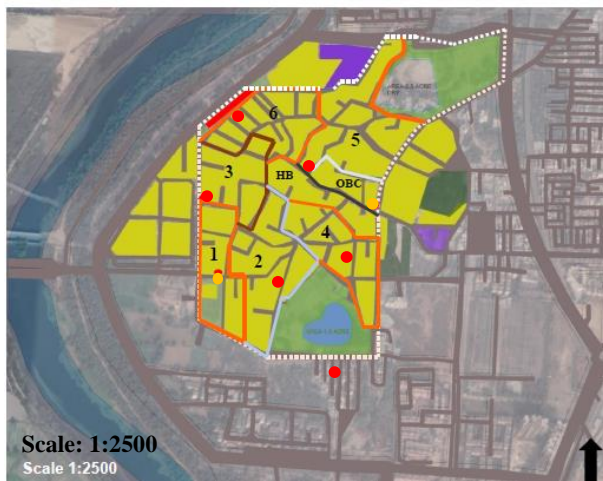
### 3.3 Community Characteristics

According to the discussions with elderly community members, during British period the settlement was divided into 6 patti's (based on names or surnames of Lumberdars). The 6 names of the patti' or land division as found during primary survey are as follows: Khojana, Andha, Ganja, Bhajan, Chunni, Jagram patti system. After independence, government did not relate to the lumberdar system. In early 1950's land consolidation (Chakbandi) committee was formed and was named after the member heading the Khojana Patti. In 1969, first panchayat elections were held where five panch each belonging to different castes, Brahmin, Shatriya, Vaishya, Shudra, and fifth could be other trusted individual from any of the castes were selected. Table 2 below details the community characteristics to understand heterogeneous nature of the community.

**Table 2: Caste Classification within Kakrola Community**

S. No	Castes	Sub Division/ Surnames	Occupation (Previous Generations)	State (Origin/ Migrated From)
1.	Brahmins	Vashisht, Kaushik, Bhardwaj, Vats	Priests, Astrologers and Ariculture	Gurugram, Gomti Village Delhi, Indore, Madhya Pradesh
2.	Shatriya	Jat (Gehlot, Sherawat, Dabbas, Rajput (Kashyap)	Zamindars, Agriculture, Cattle	Rajasthan, (Baghani Village), Haryana, Delhi
3.	Vaishya	Aggarwals, Guptas	Jewellers	
4.	Shudra	Valmiki, Harijn (Julahe, Chamaar); Kumbhar Chippi, Nai, Lohaad, Khati	Cleaning Workers, Weavers and Leather Making Potters, Barbers, Iron Workers, Carpenters Furniture	Mehrauli, Masukabad – Jhajjar (Haryana) Najafgarh, Baapdola Village, Nangloi, Gopalpur (Haryana)

Source: Primary Survey, 2019-2020

**Map 7: Patti System, Sub-Community Areas and Chaupals, Kakrola**

1. **Khojana Patti:** Brahmin and Shatriya; **Valmiki Chaupal**
2. **Andha Pathi:** Brahmin and Shatriya with Harijans settled at Bottom; **Koka Chaupal**
3. **Ganja Patti:** Brahmin and Shatriya; **Harijan Chaupal**
4. **Bhajan Patti:** Harijans and OBC; **Saat Baraat Ghar**
5. **Natka Patti:** Brahmin and Shatriya, Shudra, Harijans and OBC; **Suraj Kund Chaupal**
6. **Sadh Patti:** Shatriya and Brahmin; **Badi Chaupal**

OBC - Jheevan, Khatti, Kumbhar and Darji  
Harijan Basti

Source: Autocad generated, Primary Survey

Participatory Mapping with the concerned community members gave a kick start to the surveys. Map 7 illustrates land divisions or patti system within old abadi area where different castes people have collectively settled. Chaupals as marked in Map 7 are the community areas for discussions or specific gatherings which are well located in different sub community's areas. Most of the functions or events of different castes are performed in these respective chaupals. This system ran for at least two decades and later got dissolved in 1986-87. In early nineties Delhi Development Authority acquired land including ownership of water bodies and so it does play an important role in the conservation process.

The entire experience of meeting reputed elderly members at their residences, confirming history, routes and physical changes in the village helped in fostering environment to hear the unheard voices, creating a safe space to be heard. During the walk, core is experienced as topographically the highest area in the village with narrow streets. 4-5 storeys of residences are common with multiple water tanks to serve different families (if on rent). The only open space is the space around ponds. Youth especially expressed their concern for garbage around Takkiyan wala johad in the absence of water for the pond. Open discussions gave an insight about the street level conflicts that happened between members on filling of the wells located at the junction of their streets. These wells today are found as temples at the street ends or left abandoned. Such conflicts in the community are informally mediated by trusted elderly members.

Figure 3: Exploring Kakrola through Community Lens; Participatory Mapping and Open Discussions



3. Participatory Learning and Action during surveys

4. Involving Women of Different Age, Income and Literacy Level

5. Bharna Kuans or Traditional Wells encroached / abandoned (defunct) or built upon as landmark temples.



Figure 3 above gives a glimpse of journey of onsite study with community using different tools and techniques. The interaction started from introducing the intent of the study to the trusted member of the village community to focussed group discussions at the five identified hot spots during reconnaissance survey.

#### 4. Analysis and Findings

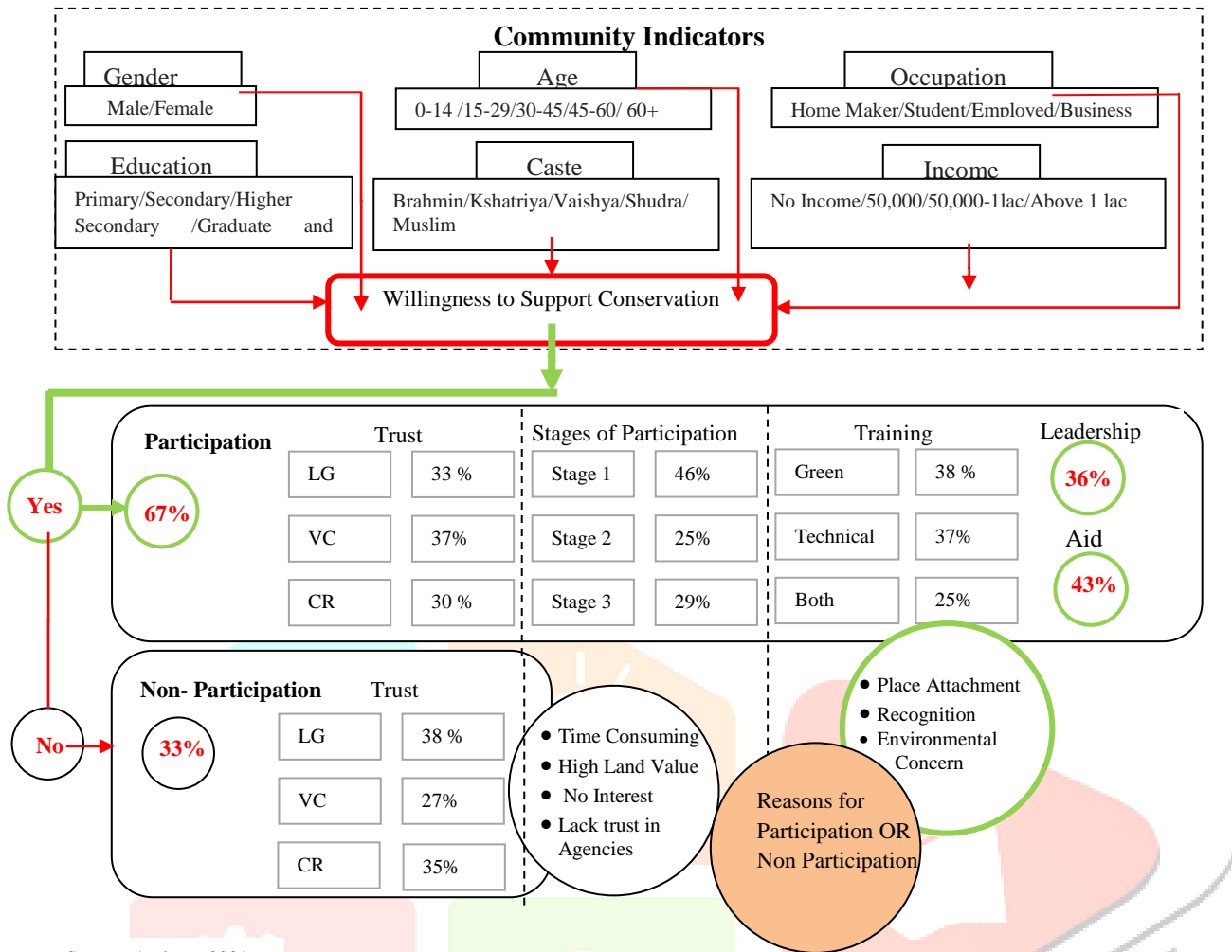
To analyse community's willingness in pond conservation, their opinions are documented based on their age, income, caste, occupation and education in relation to their willingness in participation of conservation plan stages. Figure 4 provides overall opinion of the members followed by detail indicator wise analysis listed below –

- As per analysis, 67% of people are willing to participate in conservation of pond. Among these 46% have interests in plan formulation, 29% in monitoring and 25% in implementation.
- Members are equally keen on green (38%) and technical (37%) training. 36% are willing to work as team leaders and 43% are willing to financially aid the process of conservation.
- From among the community members, 33% people are not willing to participate; 38% trusts the decisions of local government on infrastructure matters. Contrary to this people willing to participate trusts village committee.

Overall the primary survey assessed community's socio-economic socio-cultural and socio cultural variables influencing their willingness to engage in the conservation process. The respondents revealed six main factors that they considered to be important reasons for their participation or non-participation.

- a) economic status;
- b) understanding of the planning process;
- c) efficacy of the communication methods implemented by the planning agency;
- d) trust in the planning agency;
- e) sense of urgency (i.e. whether or not the plan influenced them personally)
- f) social capital status.

Figure 4: Analysing Community's Opinion



Source: Authors, 2021

LG - Local Government, VG - Village Committee, CR- Caste Representative; Source: Authors, 2019-2020

Figure 5: % Age Group Willing to Participate in Conservation of Pond and at different stages of conservation

Figure 5A

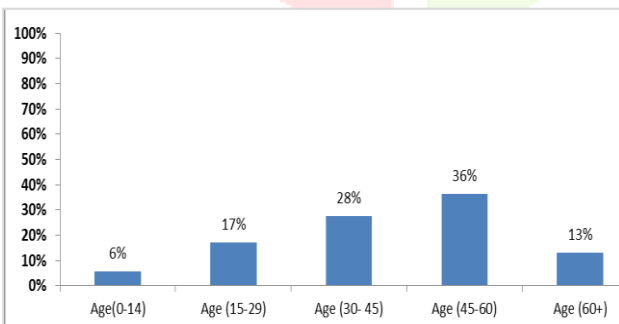


Figure 5B

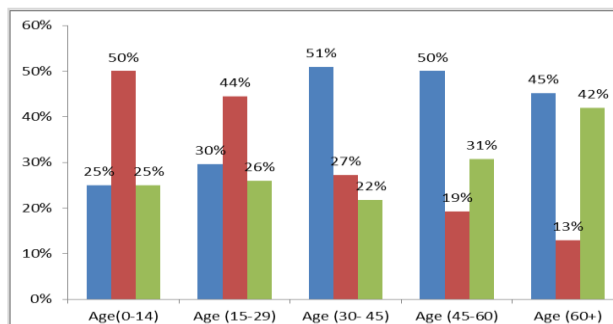


Figure 5A analyses responses of different age groups. Maximum willingness is shown by 45-60 years of age group followed by young members of 15-29 years. Figure B, age group 45-60 emphasized 50% interest in plan formulation stage; 51% by 30-45 years age group. 15-29 age group showed keen interest implementation stage.

Interestingly, in figure 5C, 60+ age elderly people showed more interest in willingness for technical and green training in comparison to youth and middle aged group.

Figure 5C

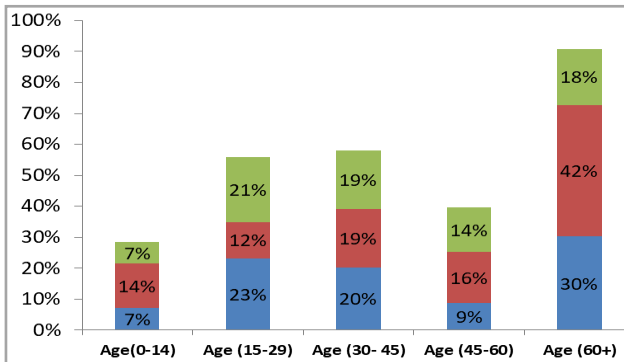
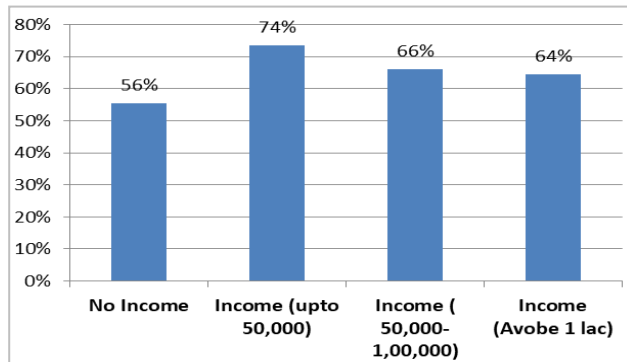


Figure 6: % Income Group: Willing to Participate in Conservation of Pond and at different Stages of Conservation.

Figure 6A



- Willingness for both
- Willingness for Technical Training
- Willingness for Green Education

Figure 7: % Income Group: Willing to Participate in Conservation of Pond and at different Stages of Conservation.

Figure 6B

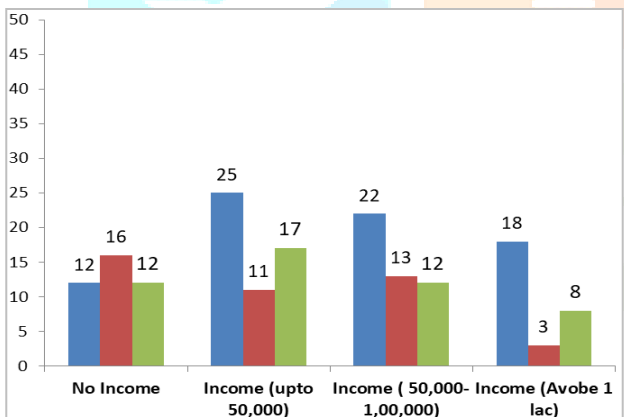
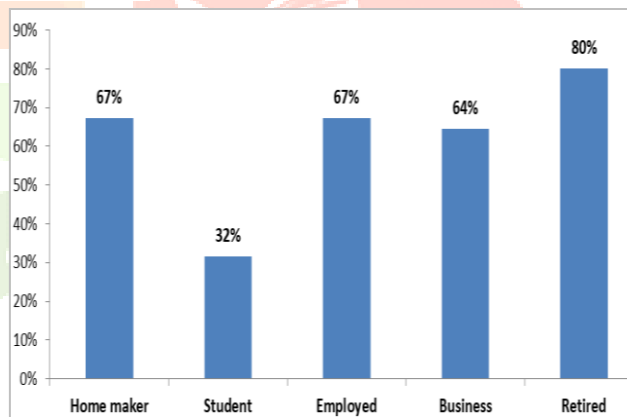


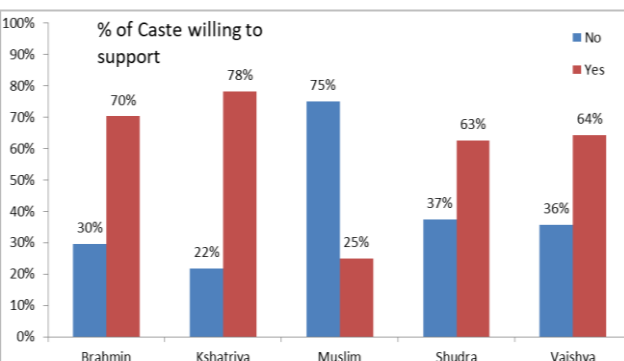
Figure 7A



- Plan Formulation
- Plan Implementation
- Plan Monitoring

Legend: Figure 6B, 7B, 8B and 9B

Figure 7B



According to figure 6 (A and B) community members at Kakrola earning upto Rs. 50,000 showed 74% willingness to participate especially in plan formulation (25%), plan implementation (11%) and plan monitoring (17%). Home makers and employed people showed 67% interest whereas elderly accounted for 80% willingness for participation. Among their interest, 28% willingness is in plan formulation, 8% in implementation and 44% in plan monitoring as per figure 7 (A and B).

Figure 8: Population (Caste Wise) willing to participate in Conservation and at different Stages of Conservation

Figure 9: Willingness of Population with Formal Education

Figure 8A

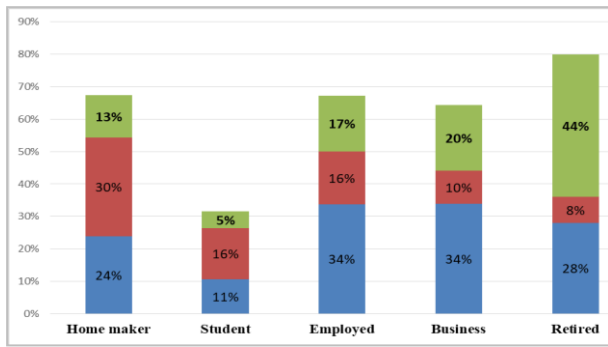


Figure 9A

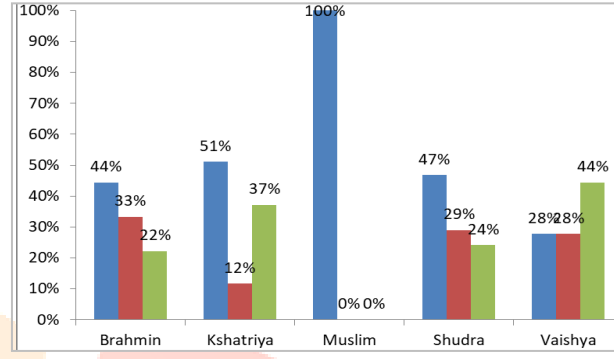
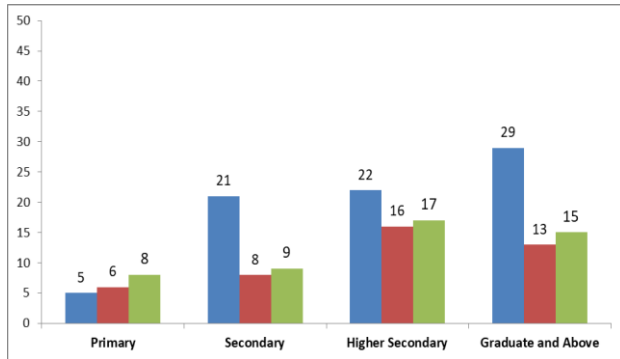
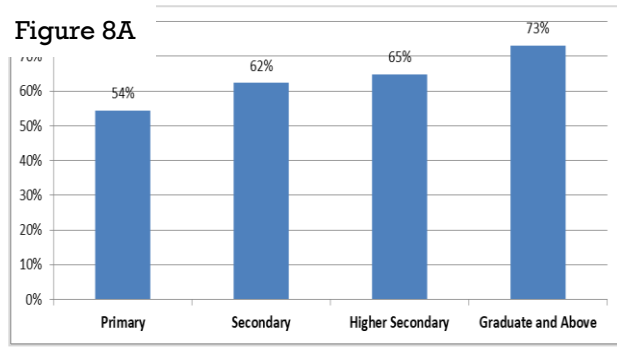


Figure 8B

With respect to caste, maximum interest is shown by Kshatriya (Jaat) community (78%), followed by 70% interest shown by Brahmin community (Figure 8, A). To realize the conservation plan (Figure 8 B), shatriya community showed more interest in plan formulation (51%) whereas Vaishya community were least (28%) interested in formulation stage. Brahmins were keen about implementation stage (33%) whereas Kshatriya community showed least interest. Monitoring at pond and catchment level received maximum interest from Vaishya community members. Graduated and above supported 73% for the cause. Their maximum interest is reflected in conservation plan formulation. To aid conservation maximum percentage of willingness is supported by Brahmins (69%) and minimum by Shudra members (42%), as shown in Figure 11. People living in rented accommodation did not participate in the surveys which may reflect their lack of place attachment. Distance of residence from the pond does not play major role in willingness for participation as revealed during FGD's.

Figure 10: % Population Willing for Leadership Role

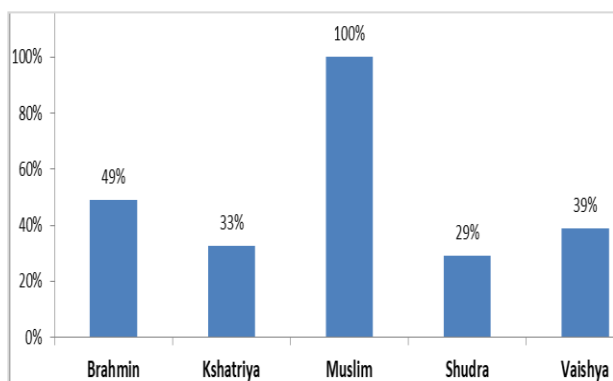


Figure 11: % Population Willing to Aid Financially

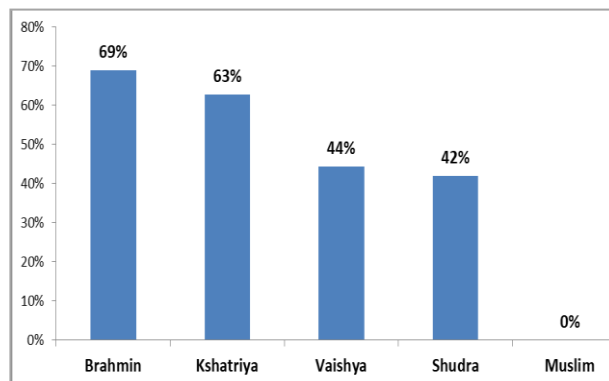
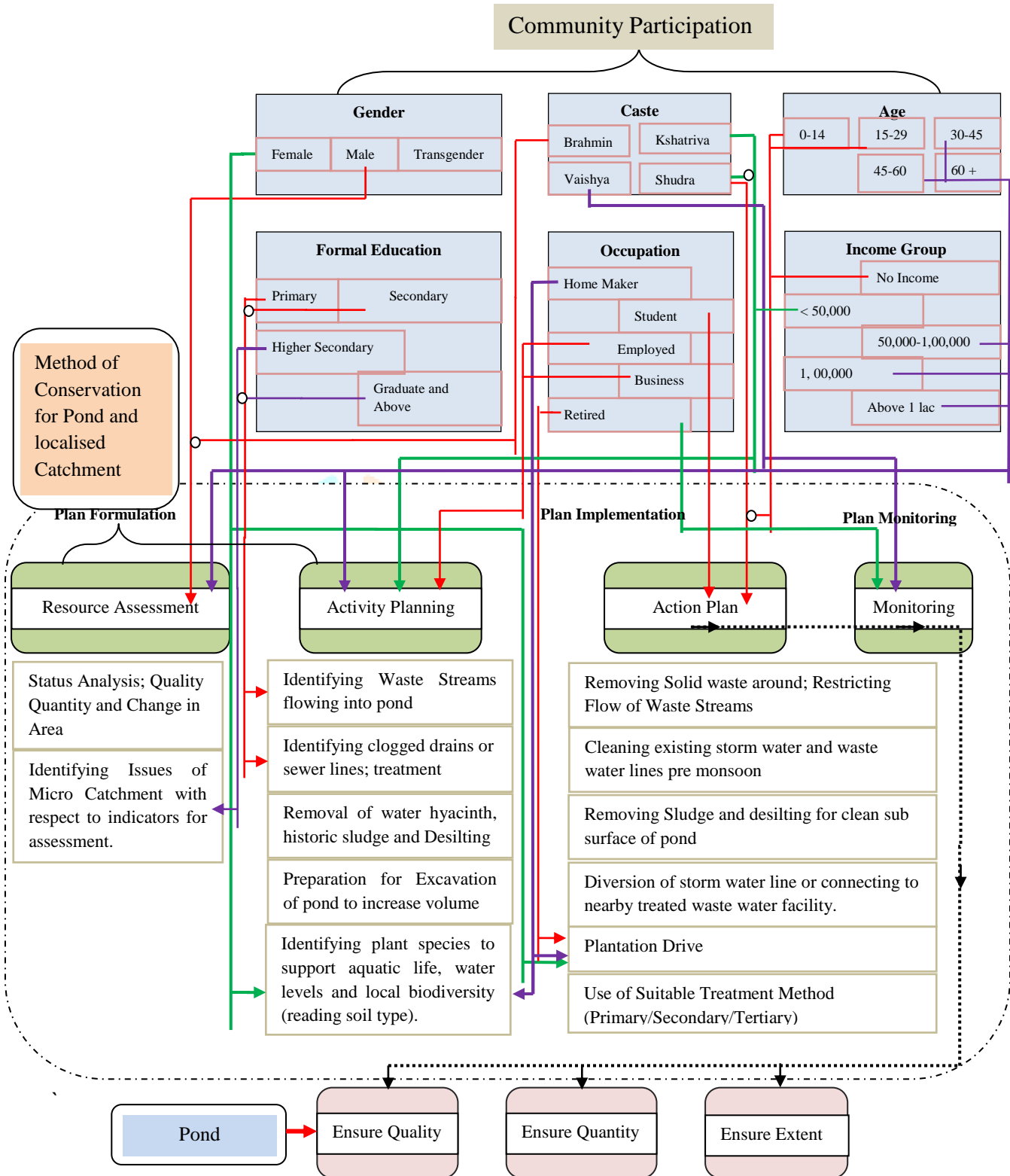


Figure 12: Proposed Framework of Participation for Kakrola



Source: Authors, 2021

Note\*: Colored arrows are means to distinguish interests of members and are not coded, ○ Meeting Original Line

Though the walking culture through short and narrow streets is still prevalent in urban villages making it faster to reach from one point to another, the encroachment by private vehicles at the nodes of the village defeats the purpose of open spaces. Figure 12 above is a representative expression to illustrate interests shown by various members during primary surveys based on their potential interests. The insights from the preliminary analysis gave a way to design this framework. It is specific to Kakrola community characteristics and overlaps with literature on participatory theories. Here community indicators like gender, age, caste, formal education, occupation, and income group connects to methods of conservation like resource assessment, activity planning, action plan and monitoring. It is observed

that male members are more interested in giving inputs for activities at resource assessment stage whereas female members are keen in activity planning for plantation drive as well as participation in drive. Formally educated people showed equal interest in resource assessment and activity planning for plan formulation stage. With respect to caste, Brahmins are keen in planning for resource assessment, Kshatriyas in activity planning whereas Vaishyas and Shudra's in conservation plan monitoring. Similar pattern of interests can be read for people of different age group, occupation and income group in the figure below.

## 5. Conclusion

In case of Kakrola, there is no prior experience of participation for any cause but the village had experienced cleanliness drive during Swachhta Abhiyan wave in 2014-15. Community does realize lack of recreation or open space within the village and therefore positively associate itself with conservation of ponds and surrounding areas. 67% community is willing to participate but requires training (green and technical knowledge) to participate in stages of conservation plan. Among the sub-communities at Kakrola, Jaat community (Shatriya) showed highest willingness in participation.

People's responses suggested that presence of external and internal forces influence their decision to participate; two of the major factors are investments like time and economic status of the members. Members claimed high land values of the village limits interest of few members in saving the pond from encroachment. With respect to catchment, piped network coverage, commissioning and its access in the catchment are considered as the responsibility of local body and therefore community's role is limited. Some of these factors resulted in 33% of the community being non-willing to participate in the conservation plan. But community needs to realize that taking connections, monitoring and informing gaps in the infrastructure provisions is a way to systematic participation. For an effective participation it is imperative to analyse community characteristics based on gender, caste, accommodation, occupation, income etc. as participation varies accordingly. This could be suggestive in realizing:

1. Importance of higher participation from selective members (caste, age, gender etc.) at different stages to monitor the quantity, quality and extent of water body.
2. Throughout the process, it is necessary to identify, who could be best involved at which stage with clarity in the mode of participation. It may not be necessary for majority to participate in direct mode.
3. The teams to require mapping issues that contribute to deteriorating status of pond and its catchment undergo trainings to improve knowledge to design participatory action plan and monitor infrastructure provisions. This could be supplemented by the use of visual tools like colour codes indicating status of pond for ease of monitoring. Such a comprehensive approach would be instrumental in designing an effective participatory framework for long term conservation.

Clearly, the three reasons for community participation or non-participation is when people are in need of the resource, attached with the resource or under the influence of pressure groups. These groups may be from among community or under supervision of community representatives like NGO's or CBO's. In the absence of any group, participation is a decision taken under the influence of their cultural values, belief system, economic condition, or importantly previous experiences of the community engagement. Therefore, while understanding community participation, assessment of socio-cultural-economic factors are imperative as they directly relates to people's values. Secondly, attachment means to identify factors influencing their motivation; this may involve credit/recognition, place attachment in terms of dependency on the resource, environmental concerns or identity through the resource.

One of the major challenges is the possibility of community itself being responsible for degraded status of pond by polluting, encroaching or extracting ground water from within their plots which might have affected water levels in the pond. Moreover, people will participate only if they have capacity to support the cause. Other than individual capacities or knowledge, presence of platform for participation like operational community halls, chaupals, active NGO's within community provides a ready provision to facilitate participation throughout the conservation process. Adequate and efficient infrastructure in place certainly increases the chances of community's willingness to participate. Overall meaningful participation requires generation of ideas which would serve best for the community.

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