



# PONDS

## TRADITIONAL WATER MANAGEMENT SYSTEM OF KATHMANDU VALLEY:

### Challenges and Opportunities

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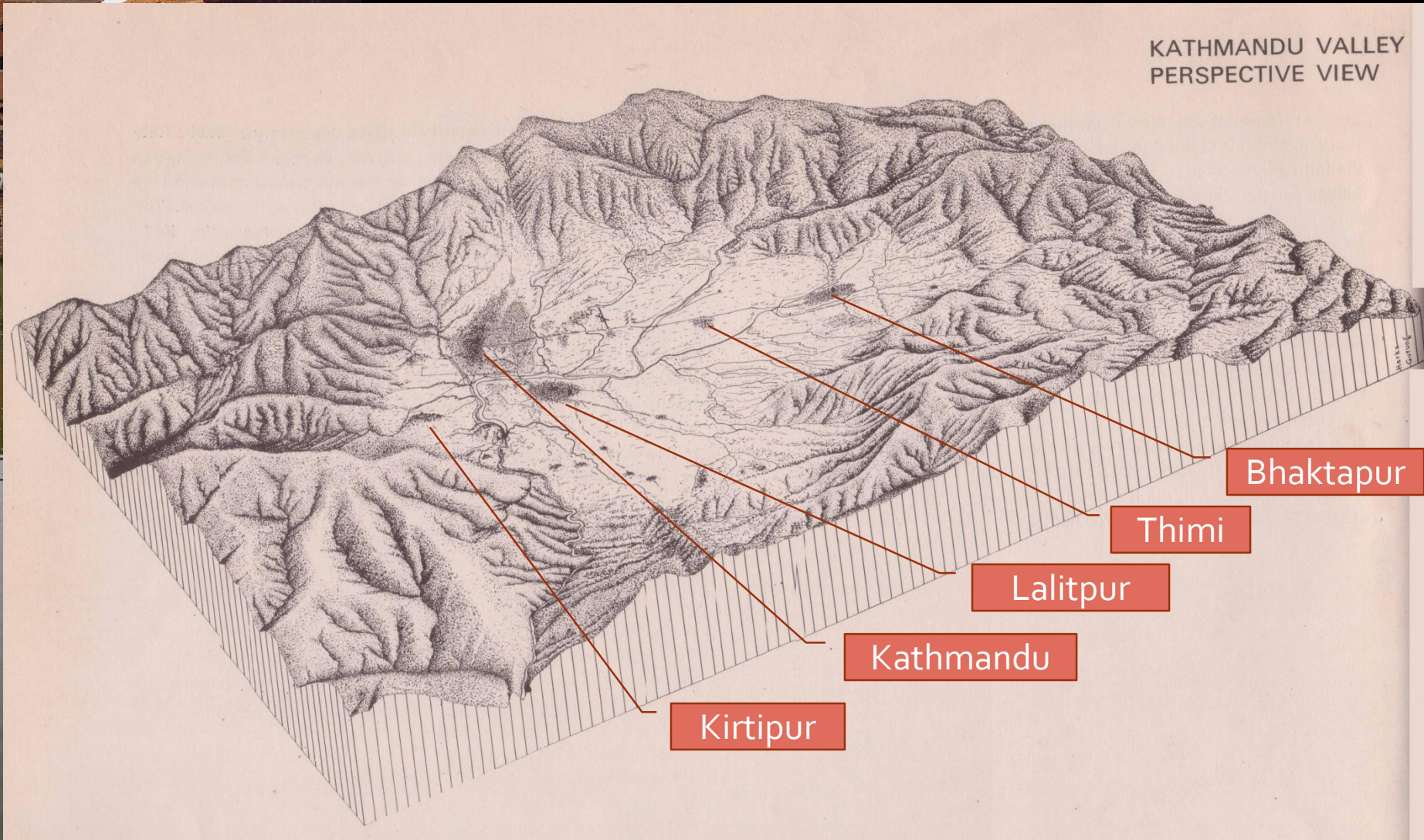


Pimbahal Pond 1880 (Oldfield)

# HITI: THE WATER SYSTEM OF KATHMANDU VALLEY

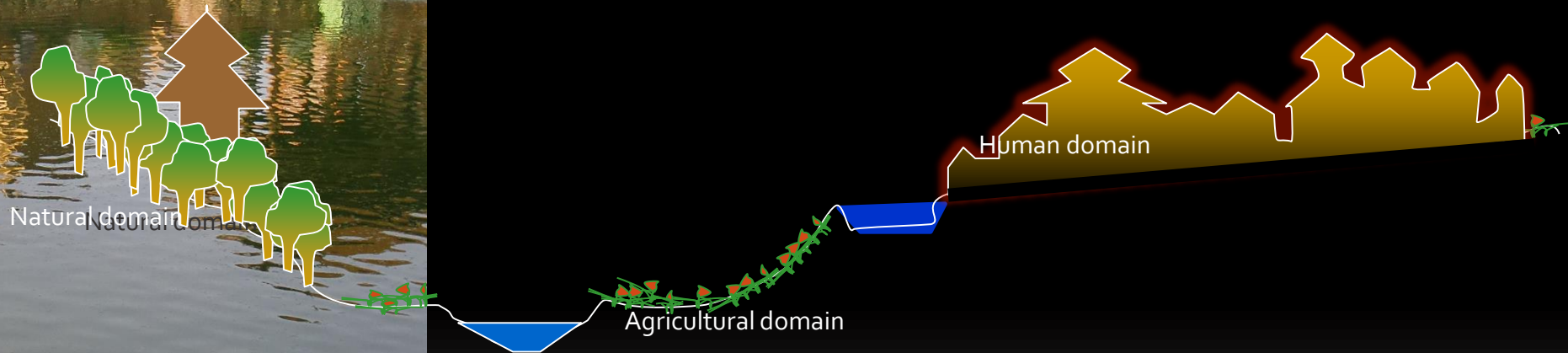


# The Context





# The Newar Town Planning Concept

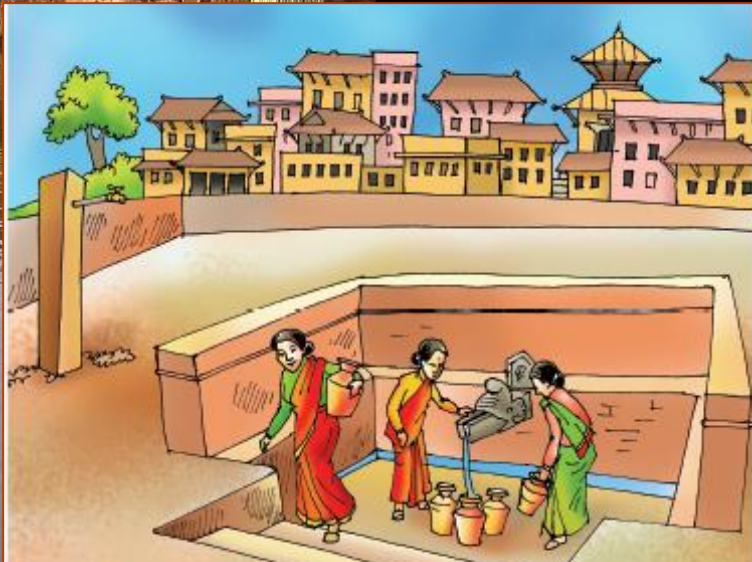


Topographic profile of Newar towns



# Introducing Hiti System

- Hiti system evolved to nurture the development of the great cities of the valley
- *Hiti*, the water spouts at manmade depressions are normally discharging through stone spout
- Hiti system utilise ground water, rain water and surface water to serve continuous flow throughout a year
- These systems date back to 1500 years or more





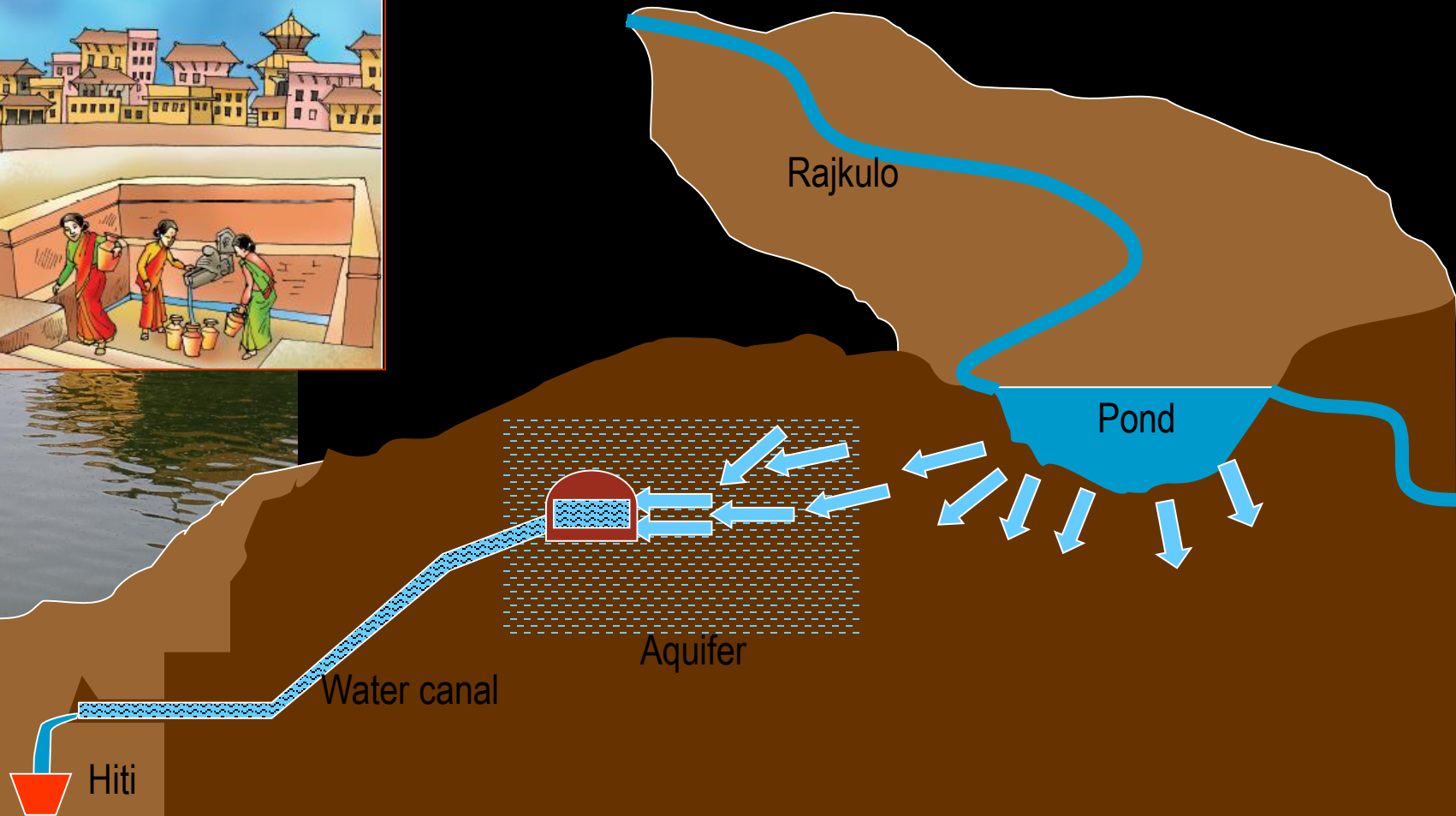
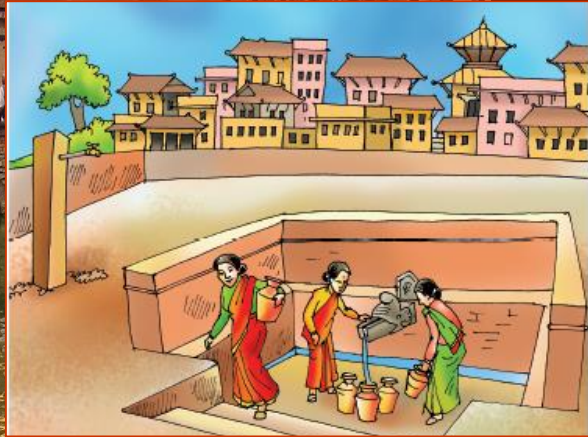
# Introducing Hiti System



- The system utilizes
  - ▣ Ground water
  - ▣ Surface water
  - ▣ Rain water
- Its components are:
  - ▣ Raajkulo, the canals
  - ▣ Pukhu: the ponds
  - ▣ Hiti: the spouts
  - ▣ Tun: the wells
  - ▣ Dhowan: the drains



# Introducing Hiti System

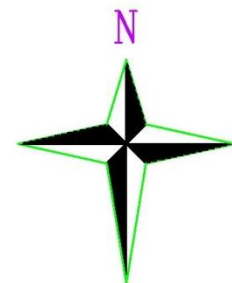
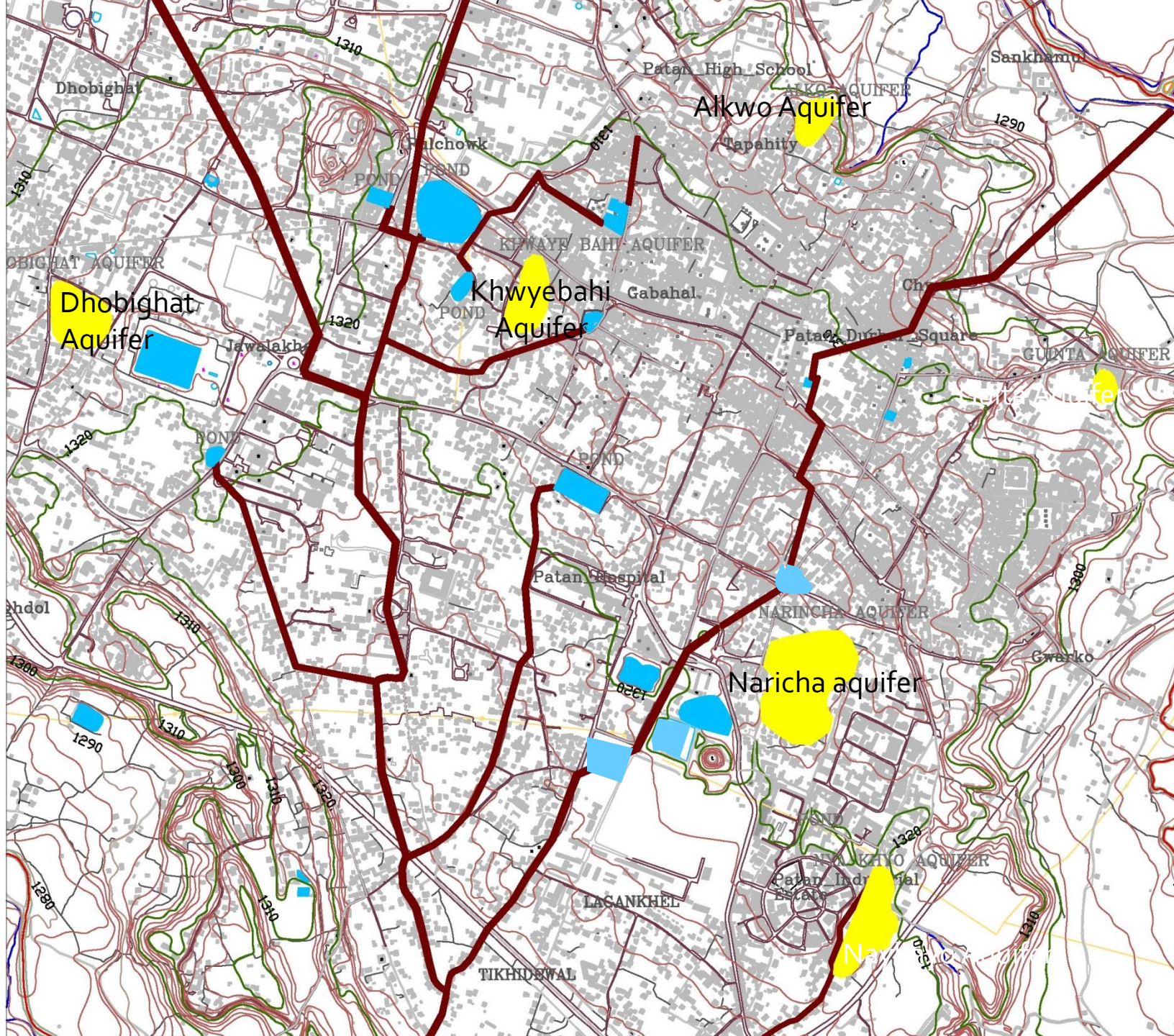




- Kathmandu: the Budhanilkantha System
- Bhaktapur: the Bageswori System
- Lalitpur: the Tikabhairav System







SCALE :- 1:10000

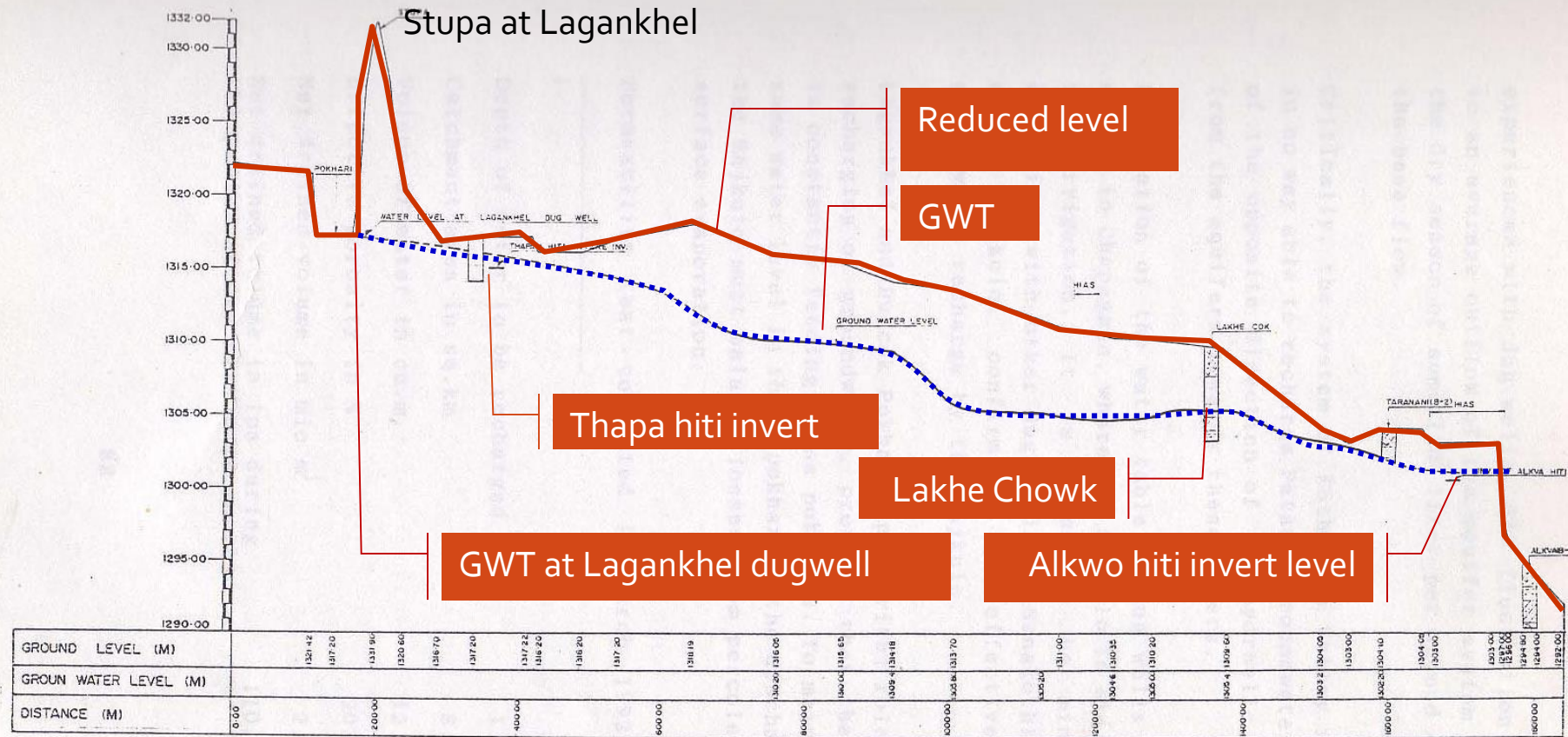
#### LEGEND

- RAJKULO
- AQUIFER
- POND
- BUILDING





# The Hydro-geology





# The ponds, aquifer and the cities





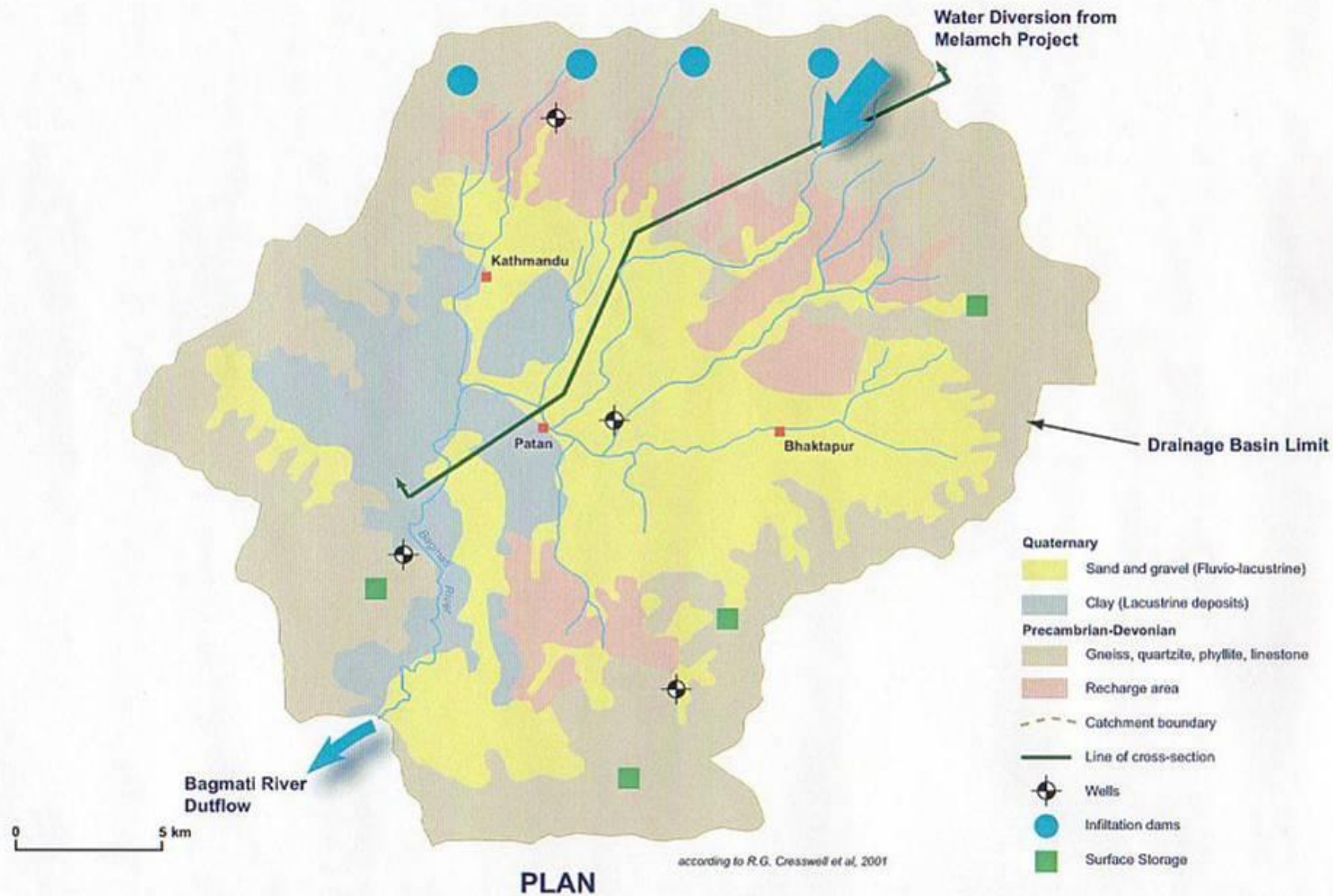
# The ponds, aquifer and the cities





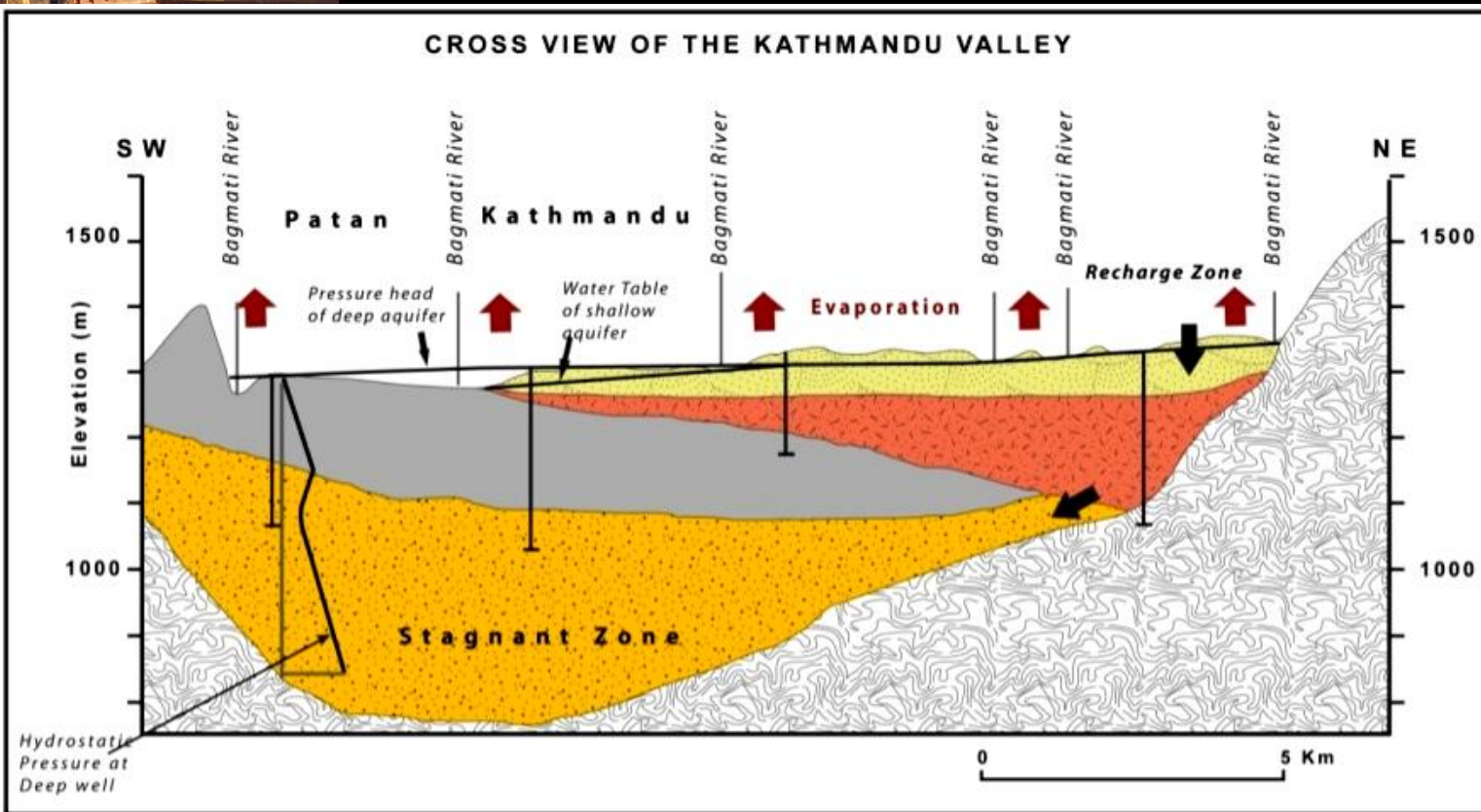


# The Hydro-geology

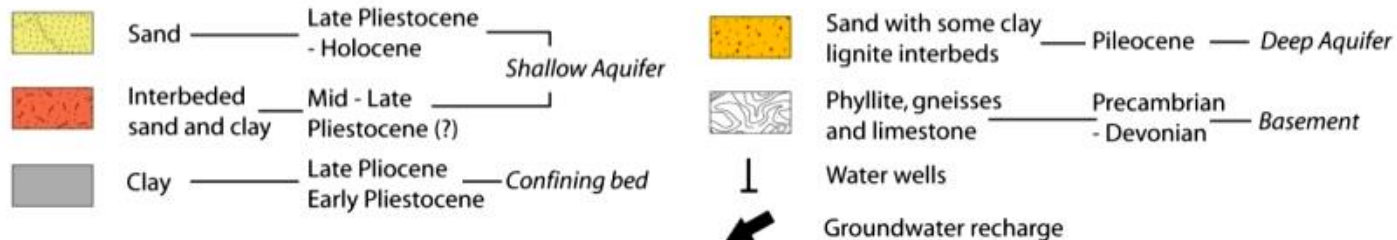




# The Hydro-geology



## LEGEND





# TRADITIONAL PONDS

## THEIR TYPES AND FUNCTIONS





# Traditional Ponds: their types and functions

- Ponds upstream of the settlements
- Ponds in the settlements
- Ponds downstream of the settlements



# Traditional Ponds: their types and functions

## Ponds upstream of settlement

- Buffer reservoirs
  - that collect rain water and surface water
  - recharge the aquifers
  - subsides flood in the settlement during downpours
  - irrigate during dry season
- Rani Pokhari, Lainchaur ponds in Kathmandu
- Ponds of Lagankhel, Pulchowk, Jyawalkhel
- Siddhi Pukhu, Rani Pukhu, Bhaju Pukhu in Bhaktapur









# Traditional Ponds: their types and functions



## Ponds inside settlement

- ▣ Relatively smaller in size
  - ▣ Collects storm water
  - ▣ Recharges local aquifers
  - ▣ Provides cleaning and washing water
  - ▣ Duck farming and animal husbandry
- 
- Pimbahal, Purna Chandi, Kapinchhen
  - Pako Pukhu, Khecha Pukhu,
  - Khancha pukhu, Byasi Pukhu,





# Traditional Ponds: their types and functions

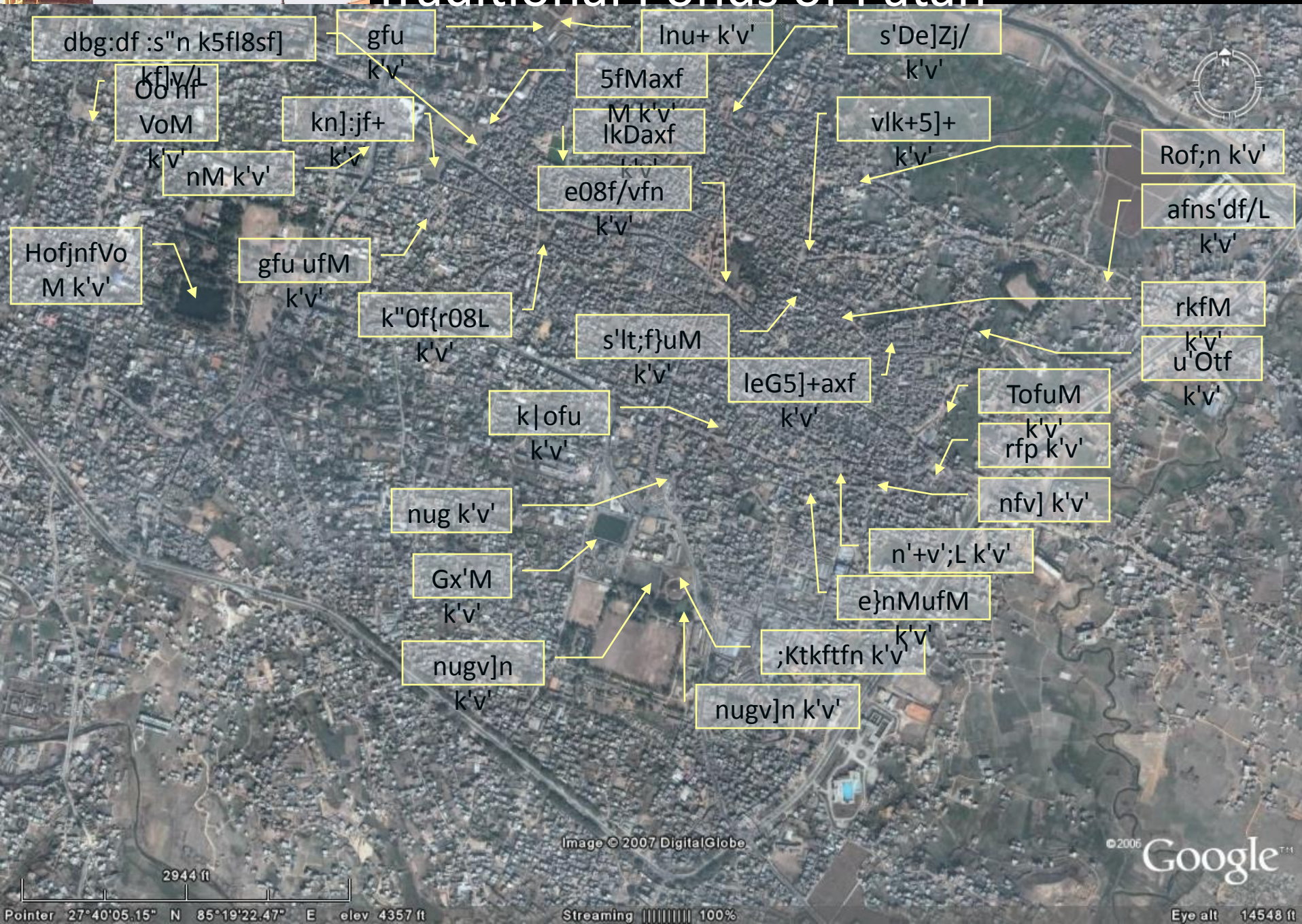
## Ponds downstream of settlement

- Primarily for controlling flood and landslide in the downstream of settlements
- Dirty as used water is collected
- Most of them are near open defecation areas
- Water available for cleaning, duck farming, buffalo raising, and irrigating downstream
- Chyasal Pukhu, Guita Pukhu, Ligan Pukhu





# Traditional Ponds of Patan







# CONDITION OF PONDS



# Condition of ponds: example of Patan



Out of 39 traditional ponds in Patan

- 16 are still intact
- 9 ponds are encroached and reduced in size
- 14 are already encroached



# Ta Pukhu at Kumari Pati

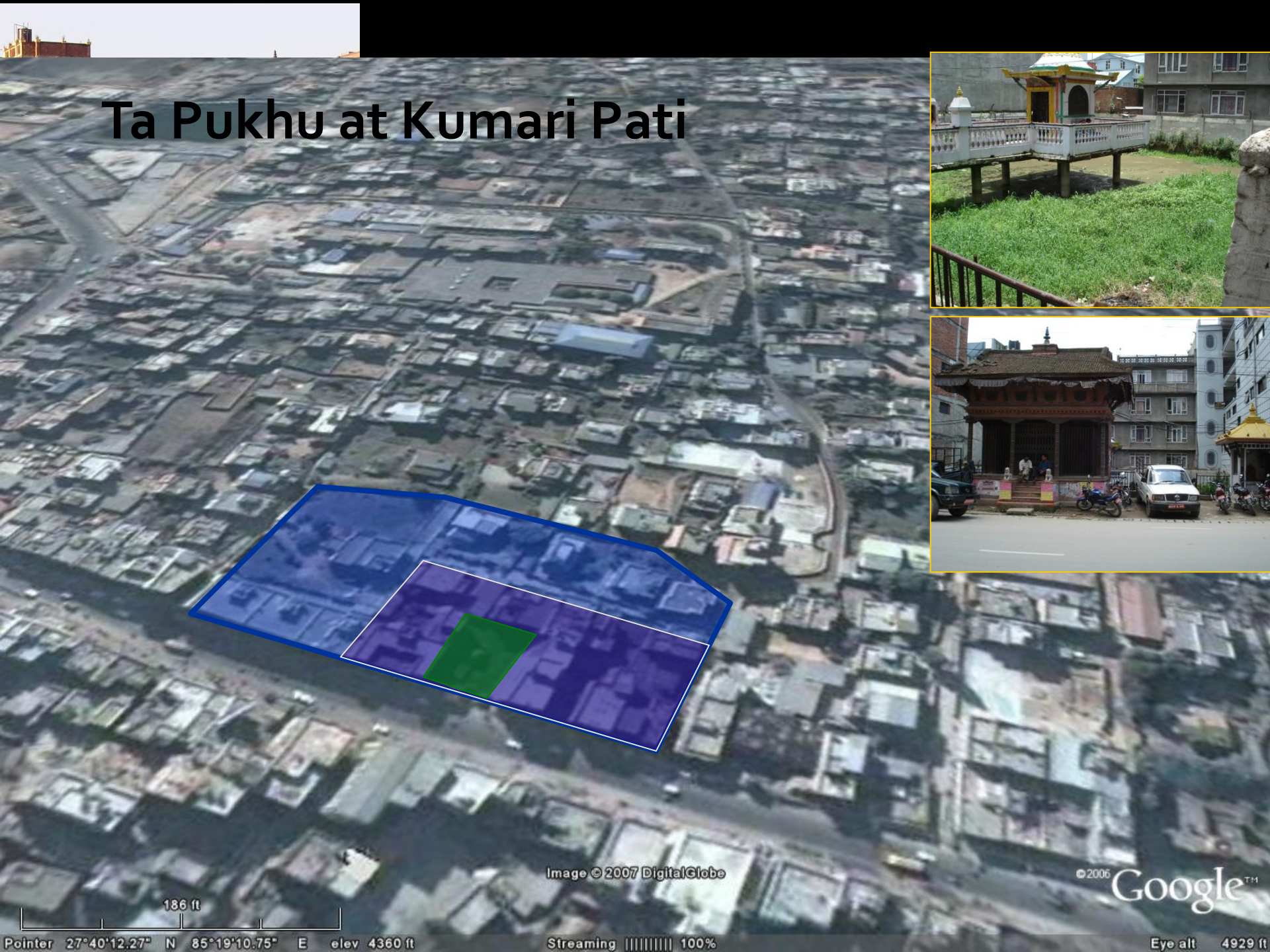


Image © 2007 DigitalGlobe

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186 ft

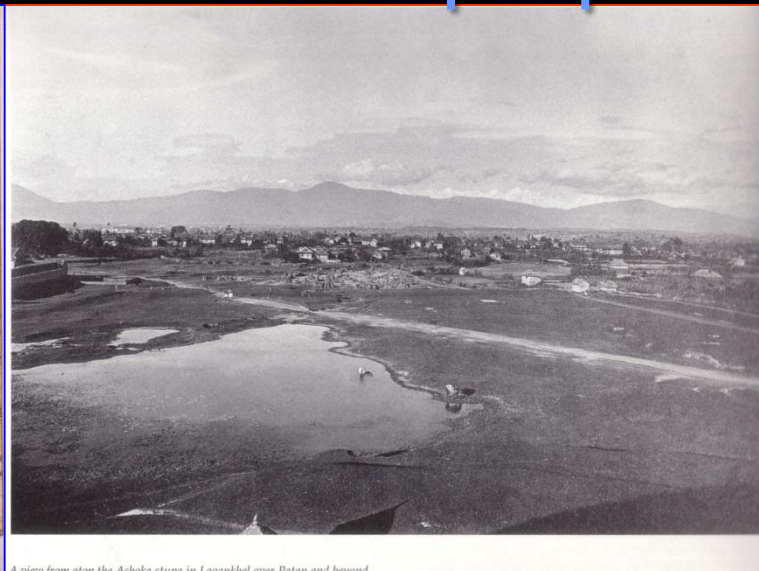
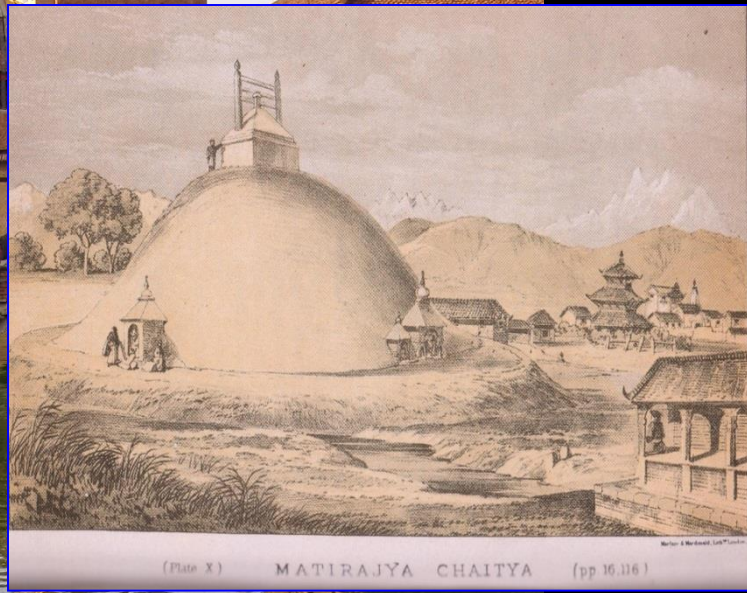
Pointer 27°40'12.27" N 85°19'10.75" E elev 4360 ft

Streaming 100%

Eye alt 4929 ft



# Case of Saptapatal Pukhu



A view from atop the Ashoka stupa in Lagankhel over Patan and beyond to Shivapuri Hill, in the mid 1920s





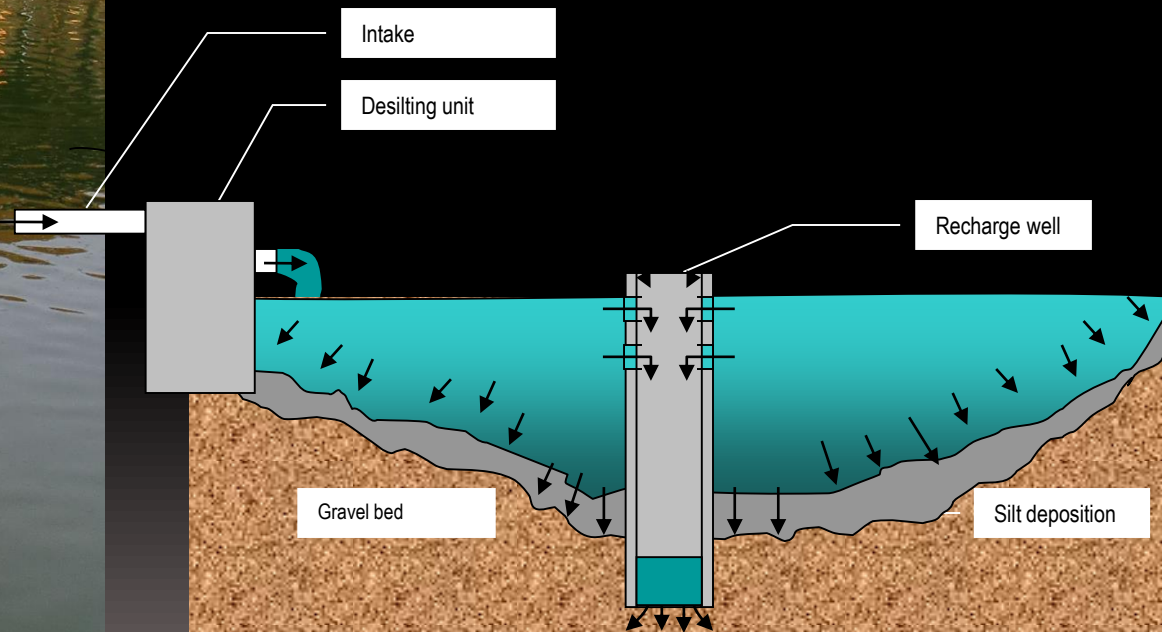


**SOME POSITIVE INITIATIVES**



# Taking up the challenge

## ■ Typical pond recharge system



Schematic Diagramme: Recharge Pond with Central Well



# Taking up the challenge

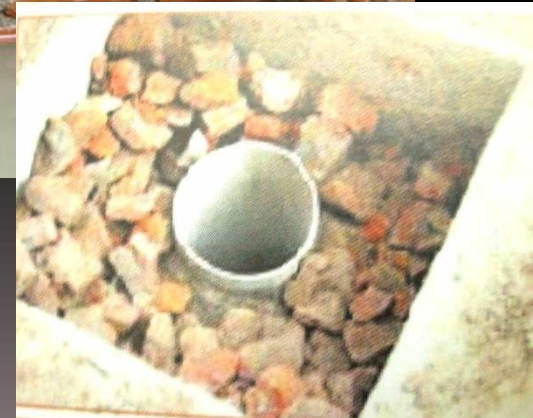
- Lalitpur City is renovating 3 ponds for the recharge system
- UN-HABITAT and partners are supporting the process





# Taking up the challenge

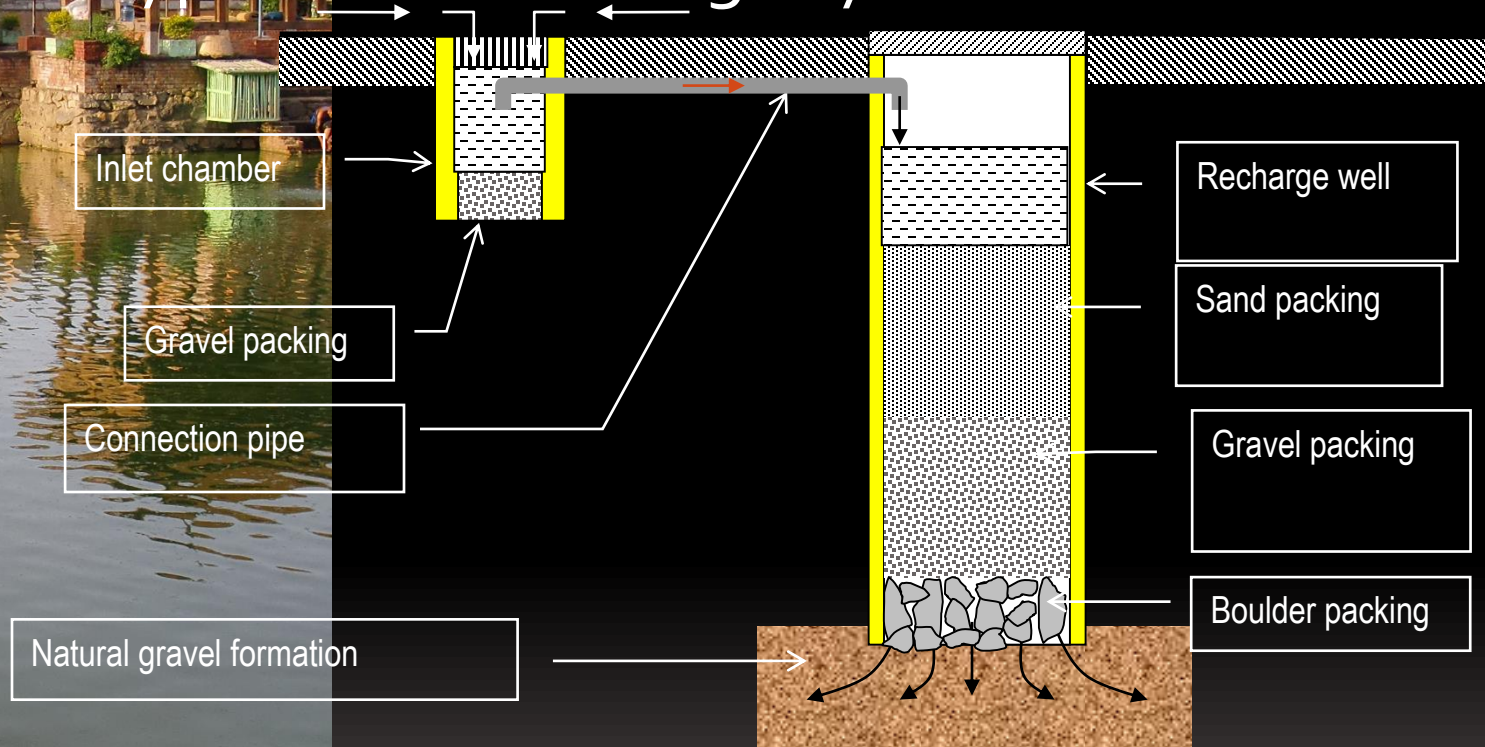
- Similarly community recharge wells are constructed





# Taking up the challenge

## ■ Typical well recharge system



X-Section Recharge System: Inlet and Recharge Wells







# Taking up the challenge

Paved streets and courtyards are the catchment for RWH to recharge the ground





# Taking up the challenge





# Other initiatives

- Janankpur communities initiating reviving the ponds
- Pani Bhakari





# What are the lessons learned?

- Recharging is possible both at household and community level
- With the depleting GWT people are more and more attracted to this alternatives
- Since this is a communal activity their involvement in installation and management is important







## Few challenges

- How to manage these systems in changed context?
- How to mainstream the maintenance and improvement in municipal system?
- Can't we replicate this in other cities and towns?
- More R&D.....





# Thankyou