

Ground Water Irrigation in a Punjab Village

Rakesh Tiwary

IWMI, Anand

Bhajjal-Geographical Features

- Lies in north-eastern part of Punjab state
- 265 mts. above MSL
- Agro-climatic Zone -1
- Sub-tropical climate
- Mean maximum temperature of 41 degree cent. is recorded during June
- Mean minimum temperature of 6 degree cent. recorded during January

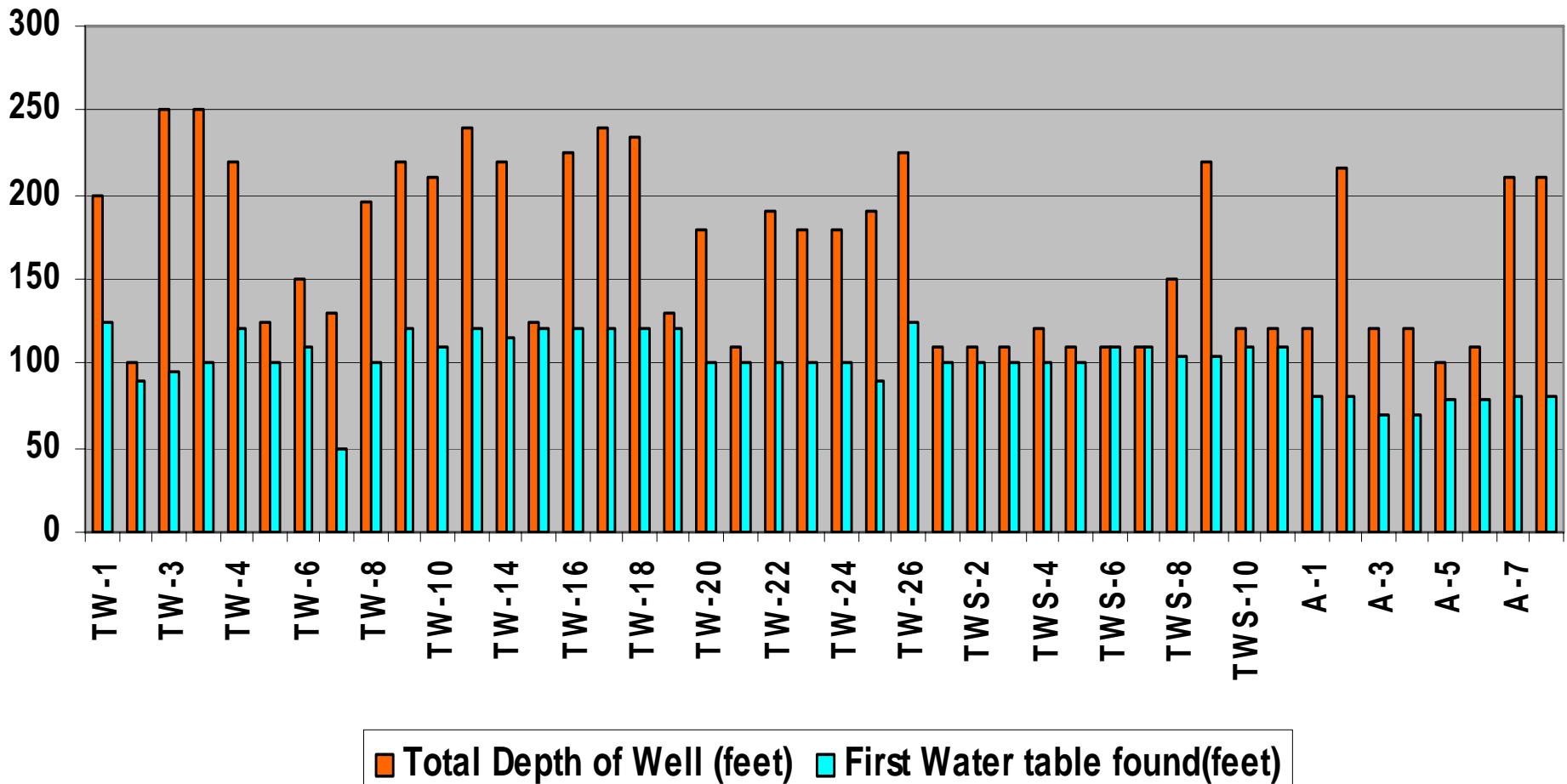
Geographical features –contd.

- Erratic rainfall
- 80 percent rainfall during South west monsoon
- 20 percent rainfall during winter months
- Sandy loam soil- medium textured soil
- medium fertility

Social Organisation of Irrigation

- Dependant on Ground water irrigation traditionally-
- District Gazetteer 1883-1884 –Hoshiarpur District
- Well irrigation predominant in Garhsankar Tehsil
- Till 1960s ,Kuccha and Masonry wells fitted with Persian Wheels as lifting device
- Now submersible pumps being used
- Currently- 44 tube wells

Features of tube wells-Bhajjal



Bhajjal story

- Even in modern economic contexts, social structures perform key functions for group economic activity
- How societies develop their own models of social organisation around resource uses
- Resource not purely an economic good, embedded in social structure and culture
- How social structure absorbs and accommodates the technological changes
- Cooperation and conflict around resource uses

Shared tube wells

- 33 out of 44 tube wells are shared
- Kinship and caste sharing
- Reasons of sharing- Investment costs are high- above 1.25 lakh Rupees
- Economies of scale – land fragmented
- Adjacent landholders come together
- New electric connections difficult- long waiting period

Sanjha *Kuan* -Regional phenomenon

- Bhajjal not unique
- Garhsankar and adjacent blocks similar phenomenon
- In different ratios
- Rampur Bidlon, Pukhrowal, Parwal, Goliyan
Baresron, Salempur, Satnour shared tub wells
- Bhajjal – high percentage of shared tube wells
- Principles of sharing are robustly expressed

Cultural History of shared irrigation

- Costs , connection may be immediate causes
- Shared irrigation not new phenomenon
- Shared *Kuh* with halt – Persian wheels
- In 1962 - 24 halts
- Sharing of labour , investments, oxen
- Water rights of partners defined- principles still strong used as references

Persian wheels

- Irfan Habib (1969) writes that method of irrigation
- diffused and generalised in Indus region by beginning of sixteenth century
- Contribution in extension of development of agriculture
- Critical change in the agriculture situation of Indus Basin region- many times the erstwhile pastoral communities were drawn into peasantry(1969)

Persian wheels

- Geographical relations- found commonly in areas where sub-soil water was not too deep
(Chetan Singh,2005)
- Ambala, Hoshiarpur, Gurudaspur district.
- Sub Mountainous region of Punjab- mountain springs fed region
- Drawing water from depth of 30 -35 feet
- Hoshiarpur District Gazetteer 1961-
- Considerable area was irrigated by Persian Wheels in Garhsankar Block.

Persian wheels

- Hardware- Wheels fitted with Iron Boxes
- Costs around 500 Rs. (in 1965)
- Shifts- twelve hours- One pair of Oxen
- In busy irrigation season -24 hours of functioning
- Four persons employed during working
- Shared labour during irrigation
- Landowner has to manage their own oxen – mutual exchange was also done

Persian wheels

- Mentions in Keesinger(1952) and Harschman(1972) studies
- Gradual phasing out between 1969-1974
- 1969- Electricity in Bhajjal
- Primary Census Abstract 1981 – shift
- Memories fresh in Bhajjal elders
- Elders describe material as well as behavioral aspects of Persian Wheel culture

Changed Technology

- Electric motor (monoblock engines)
- After 2000 – shift to submersible pumps of stronger capacity- 8-10 BHP
- Decline of ground water level
- Villagers aware – decline 10 feet per decade
- But principals of water sharing remains the same
- Social organisation evolved over time -crafted over new technology

Principles of sharing

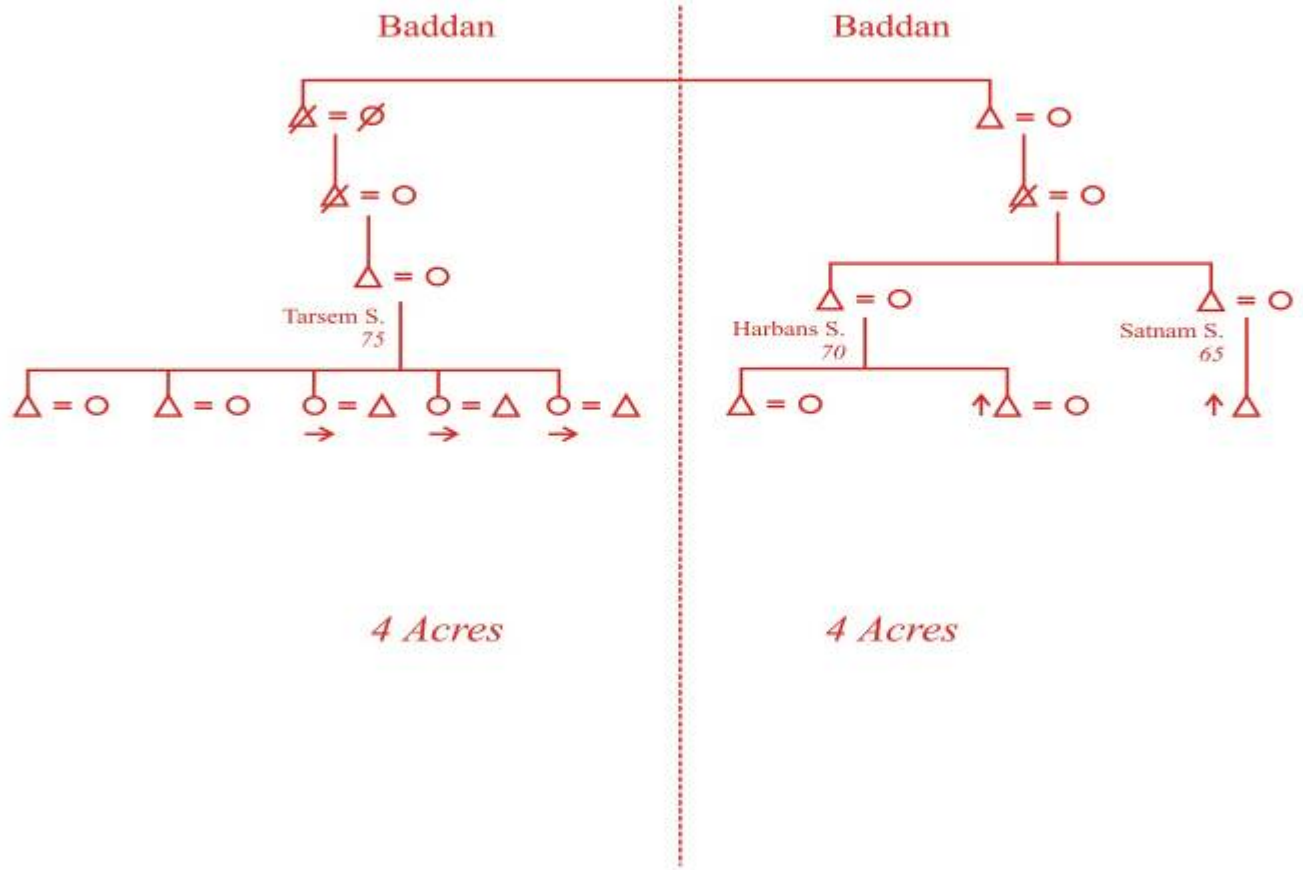
- Owners of adjacent land come together, kins and caste persons, same and different *Got*
- Number of partners vary
- Golden rule- “each according to its land”
- Water Rights according to land ratio of original partners
- Cost shared according to land ratio
- Maintenance cost according to land ratio
- Water rights are inherited along with land rights (mentioned in will)

Principles of sharing

- Water shared in time -not amount/volume required
- Scheduling according to land ratio
- Internal structure of channels- construction cost shared equally among beneficiaries. Cleaning of channel is done by partners whose land will be irrigated by particular section of the channel
- Electricity bills- according to land ratio
- Arrangement in most cases –oral
- Schedules can be exchanged on mutual basis

Basis of Sharing

- Normative order they have created- history of water sharing for irrigation
- Rules based on traditions
- Basis of Fairness, just, what is proper
- New issues emerge- solution by consensus
- Cooperation
- Disputes are inherent part
- Disputes over exchange on schedules, payment of maintenance bill, construction of channels
- Resolution by mediation of other partners, elders sometimes Caste Panchayat



Tarsem Singh

4 acres

1 day

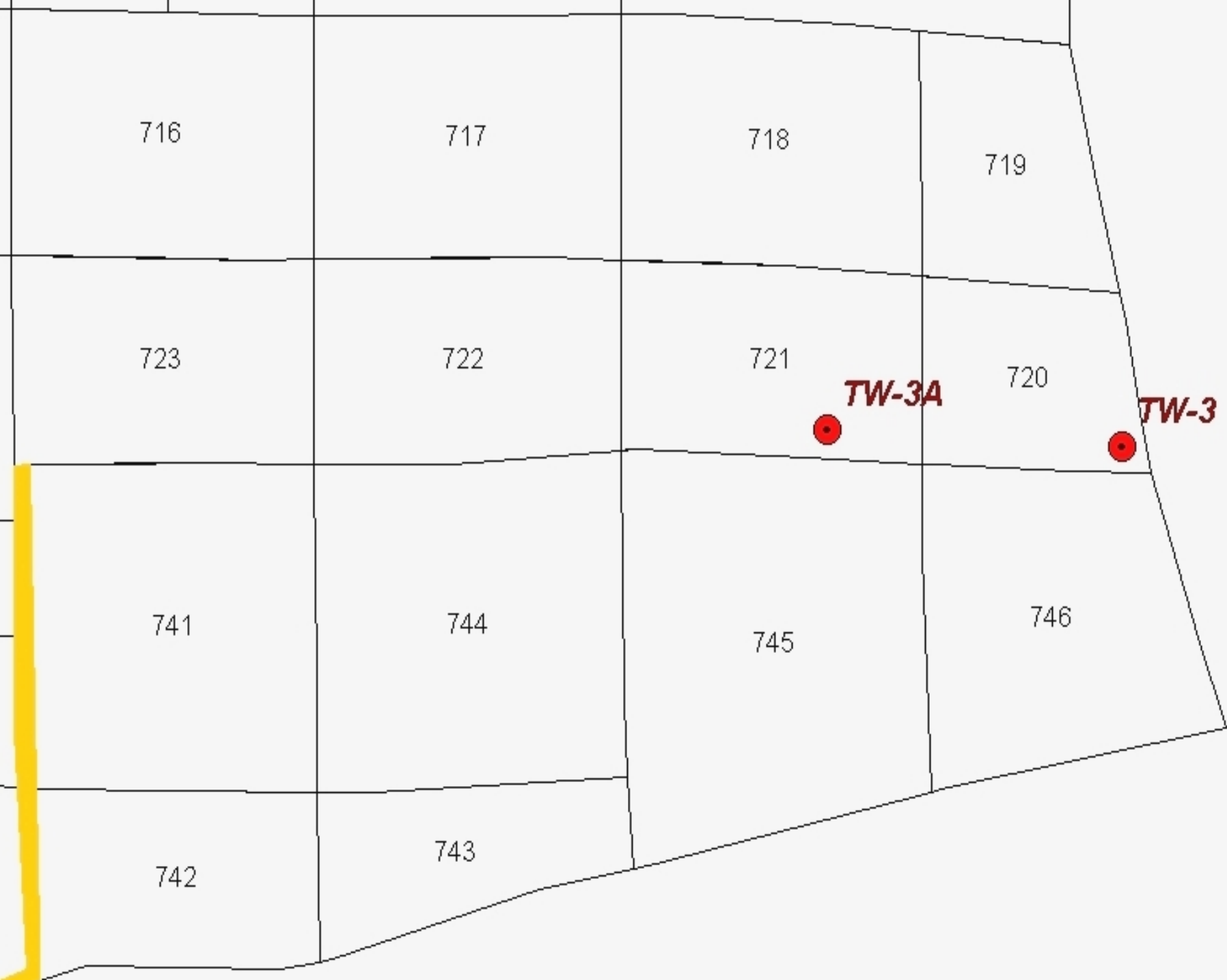
Harbans - Satnam

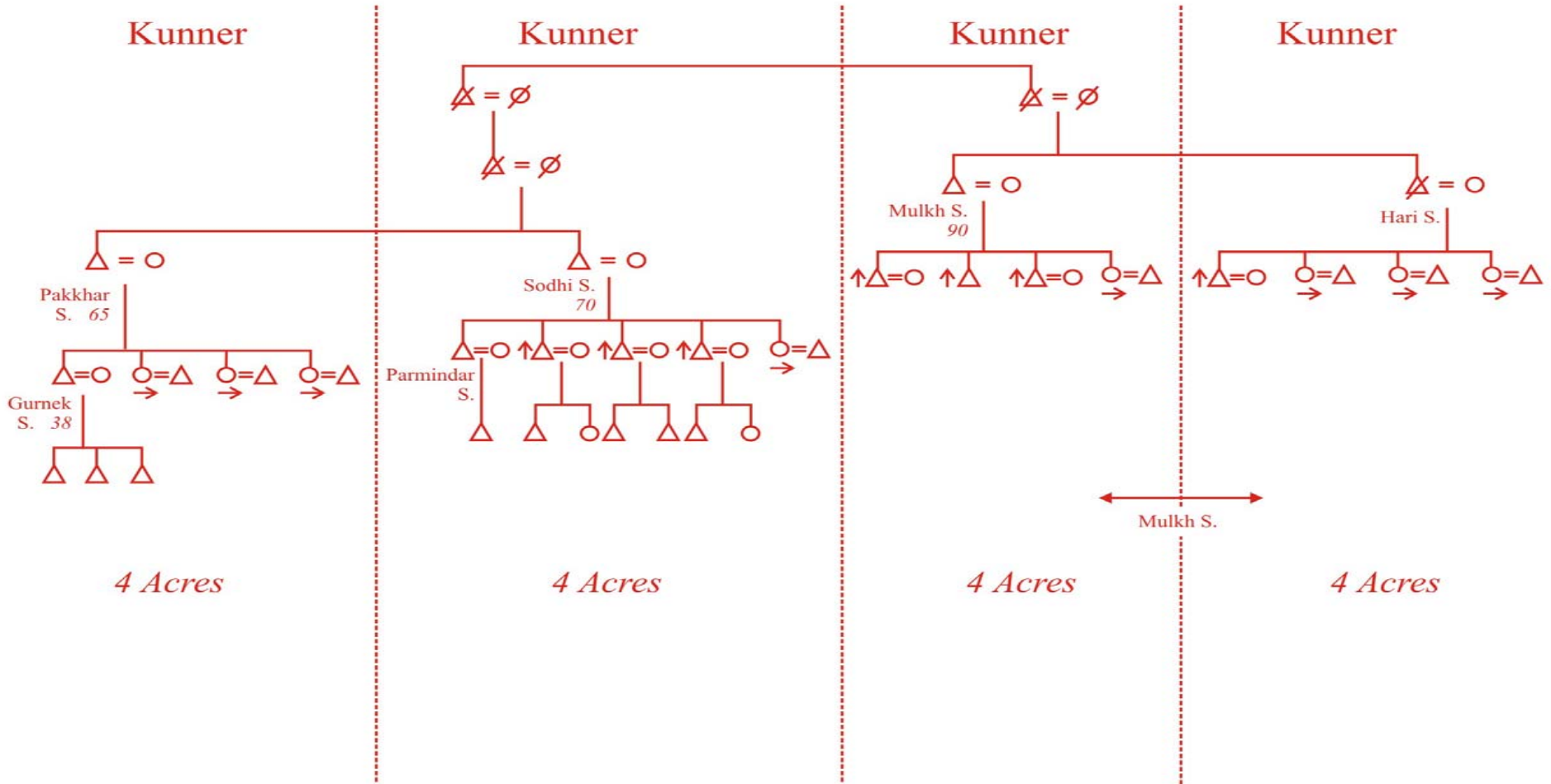
4 Acres

1 day

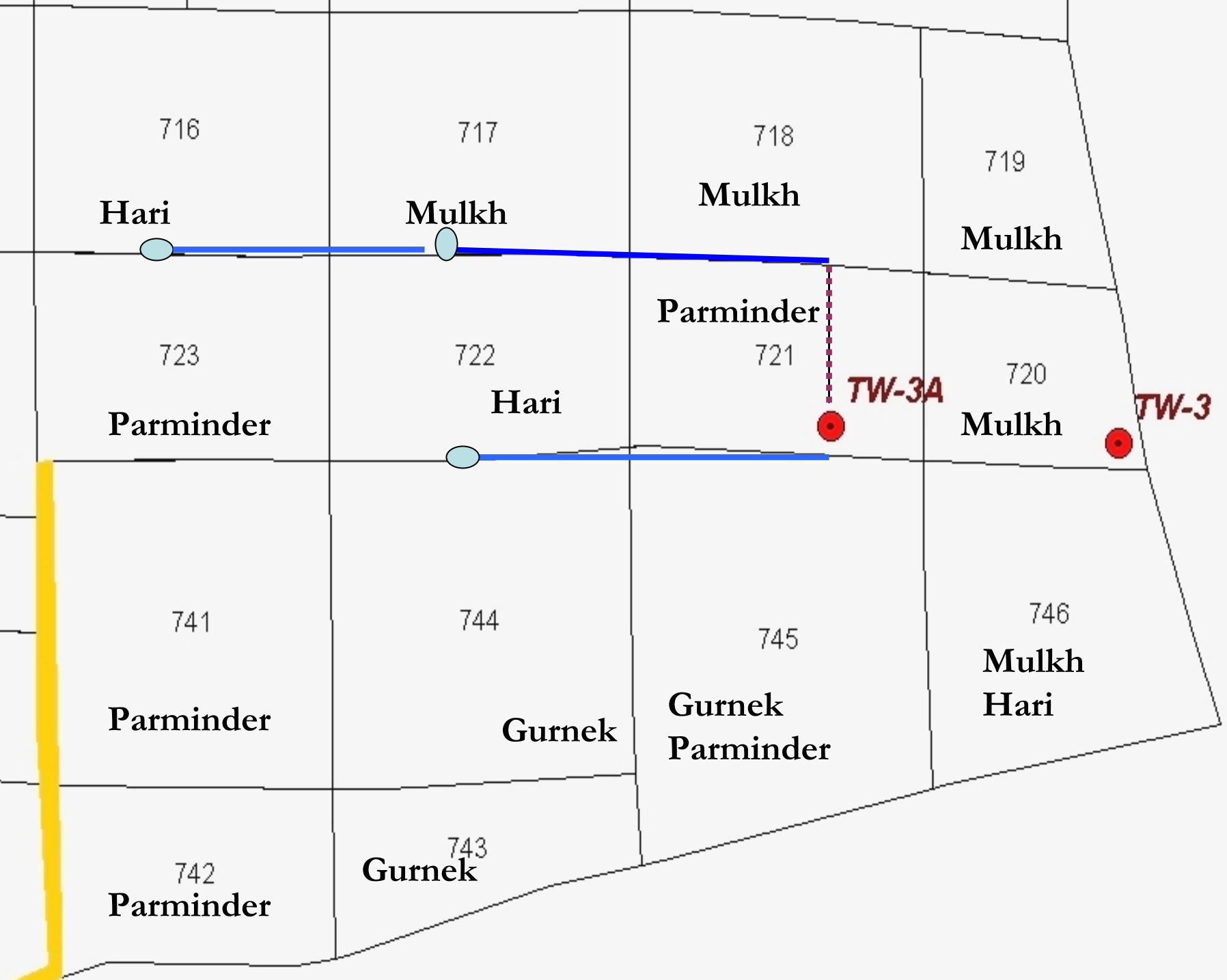
Shared tube well

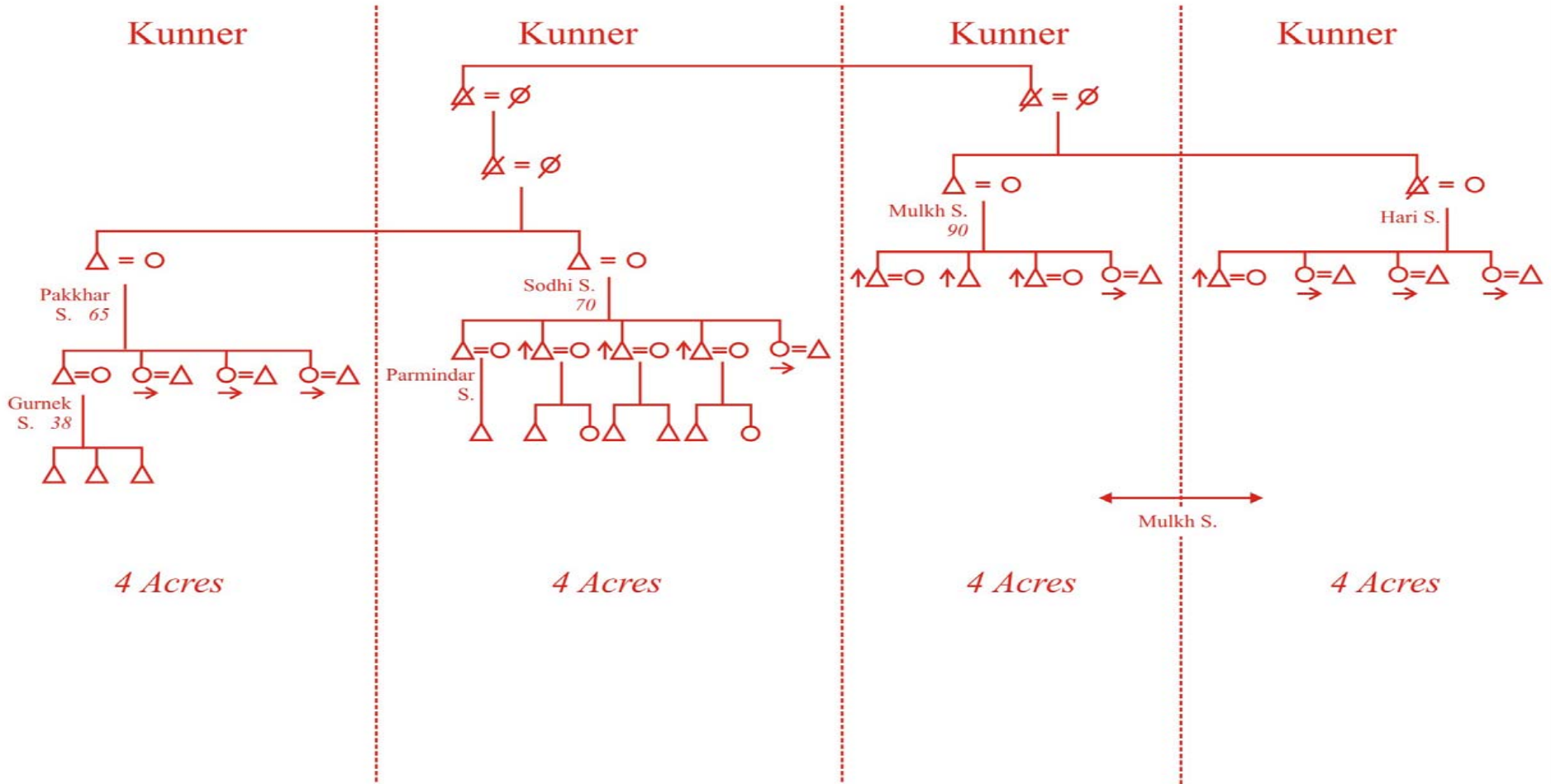
- Tarsem and Harbans- Satnam kins
- Both are Baddan- live in same Patti
- 2004 –submersible pump ,100 thousand Rupees
- Registration in Harbans- Satnam fathers name
- Equal land , equal water right
- Half share in investment, maintenance
- One day each household, no dispute
- Satnam looks after maintenance work





| Gurnek | Sodhi | Mulkh | Hari |
|---------|---------|---------|---------|
| 4 Acres | 4 Acres | 4 Acres | 4 Acres |
| 1 day | 1 day | 1 day | 1 day |

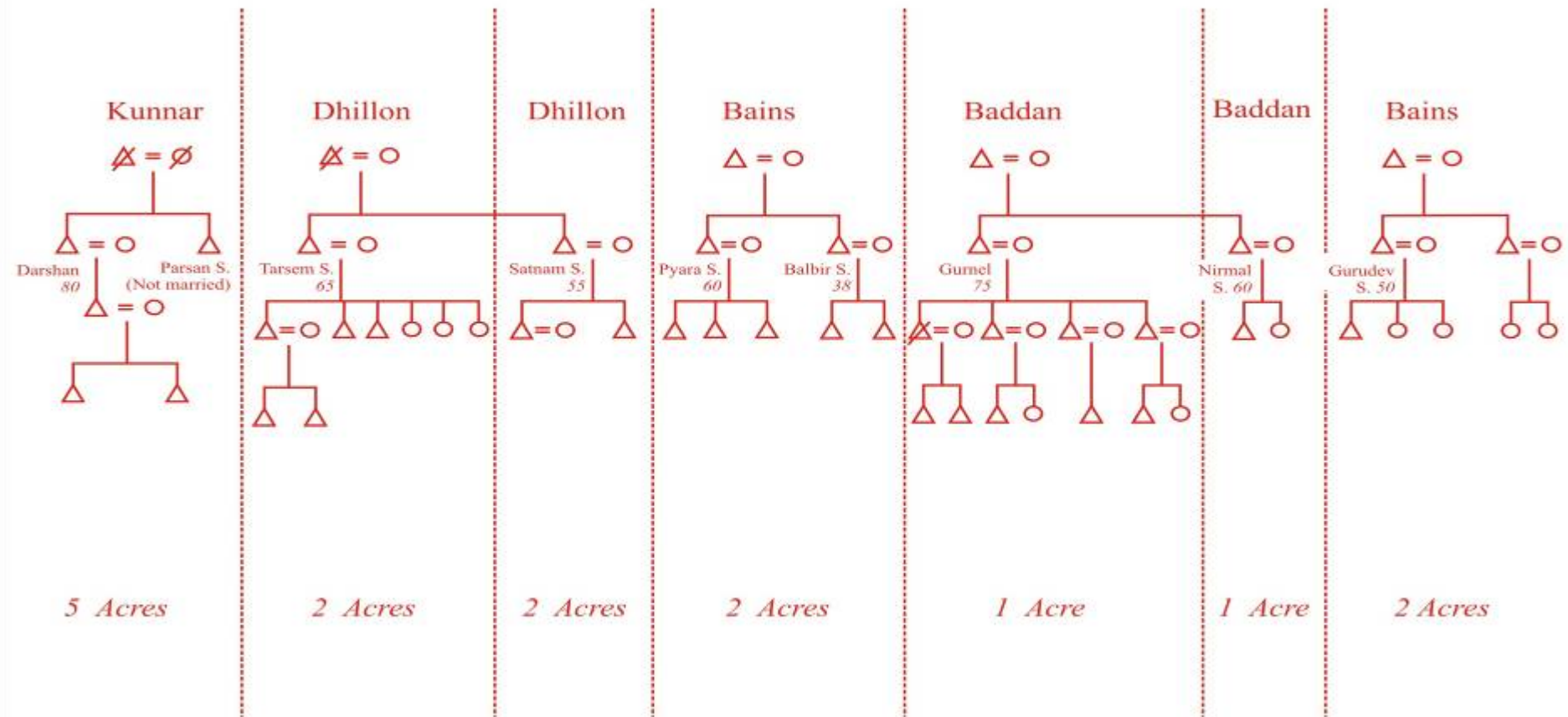




| Gurnek | Parminder | Mulkh | Hari |
|---------|-----------|---------|---------|
| 4 Acres | 4 Acres | 4 Acres | 4 Acres |
| 1 day | 1 day | 1 day | 1 day |

Shared tube well

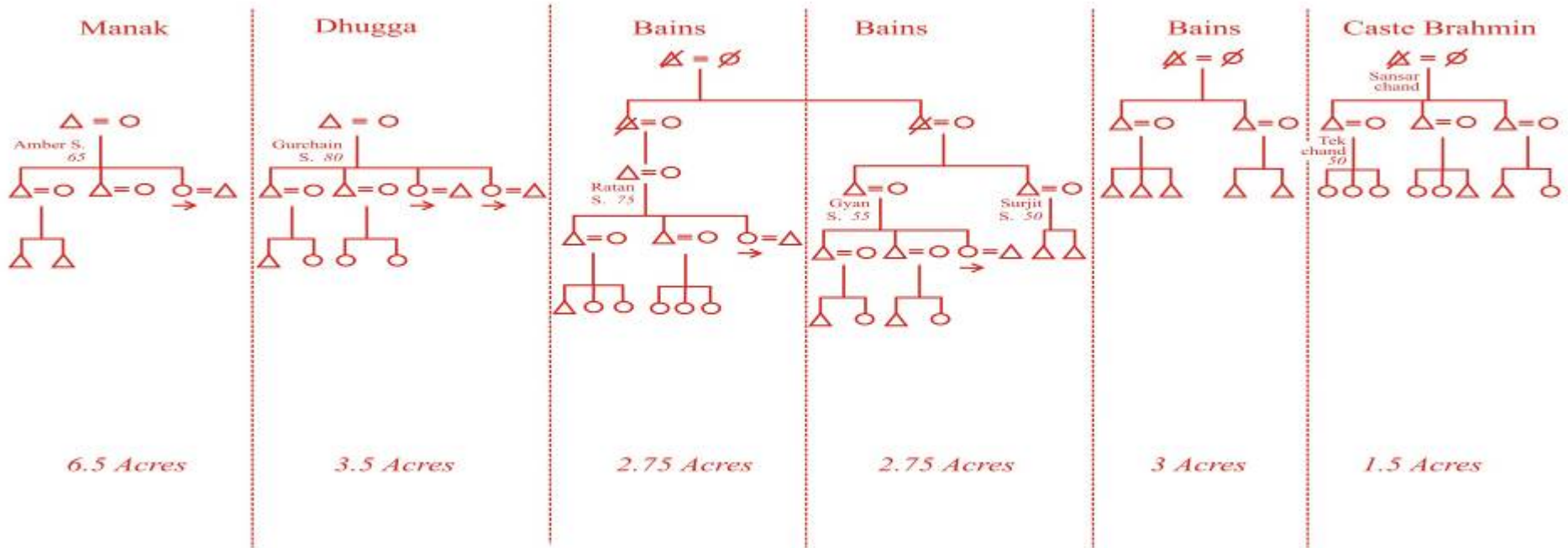
- Persian Wheels – 2-2 days each
- 2001 Submersible pump
- Electricity connection with Mulkh Singh
- Investment in improved motor – three
- No paper was done that time regarding maintenance, installation, ownership etc
- Other partners feel the need
- Maintenance cost shared



| | | | | | | |
|---|---------|---------|---------|---------|---------|---------|
| Darshan | Tarsem | Satnam | Pyara | Gurnel | Nirmal | Gurudev |
| 5 Acres | 2 Acres | 2 Acres | 2 Acres | 1Acre | 1Acre | 2Acres |
| 3 days | 1 day | 1 day | 1 day | ½ day | ½ day | 1 day |
| 1 st ,2 nd ,3 rd day | 4th day | 5th day | 6th day | 7th day | 7th day | 8th day |

Shared tube well

- Submersible pump in 2003
- 95,000 Rs –shared equally- No paper work- oral
- One *Bada sanjha*
- Grows paddy in small part
- Others irrigation inadequate
- Maize , fodder crops
- Functional but also limiting
- Nirmal Singh trouble creator
- Disputes resolved by mediation and consensus



| Amber | Gurchain | Ratan | Gyan- Surjit | Pyara | Tek Chand |
|----------|----------|-------------|-----------------------------------|------------------------------------|-----------------------------------|
| 6.5 | 3.5 | 2.75 | 2.75 | 3 | 1.5 |
| 2 days | 1 day | 3 days | | | |
| 1 Amber | 2 Amber | 3 Gurchain | 4 Ratan, Gyan-Surjit, Pyara, Tek | 5Ratan, Gyan- Surjit, Pyara, Tek | 6Ratan, Gyan-Surjit, Pyara, Tek |
| 7 Amber | 8 Amber | 9 Gurchain | 10 Ratan, Gyan-Surjit, Pyara, Tek | 11 Ratan, Gyan- Surjit, Pyara, Tek | 12 Ratan, Gyan-Surjit, Pyara, Tek |
| 13 Amber | 14 Amber | 14 Gurchain | 15 | 16 | 17 |

Lived in order

- Within broad principals-social organisation varies
- Behavior patterns may vary
- Size asymmetry, electricity connection, seasons of demand
- Bada Sanjha- higher responsibility
- Disputes are settled within broad principals
- Partners accommodative of demands of few hours according to felt requirement