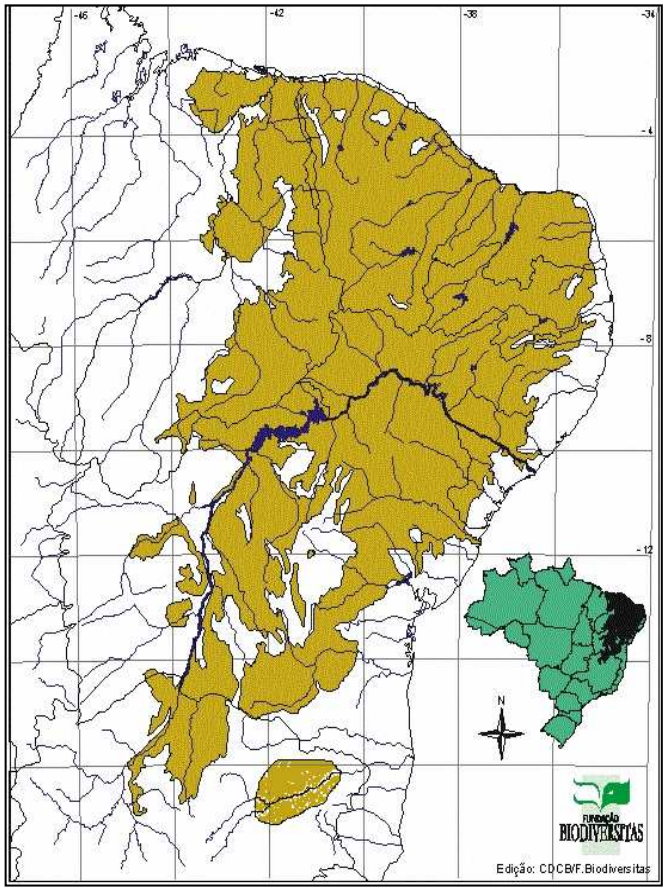
Immersing ourselves in the Brazilian semiarid region



Briefings of the Region

-Largest continuous semiarid in the world in the same country, equivalent to the joined German and France´s territories

- most populated (around 20.000.000 people)

- spatial and temporal irregularity of rain, concentrated in 3 or 4 months

- Northeast has majority of family small farms of Brazil (48%) most of them are in semiarid polygon

- Seasonally affected by droughts

Agriculture in humid parts of land

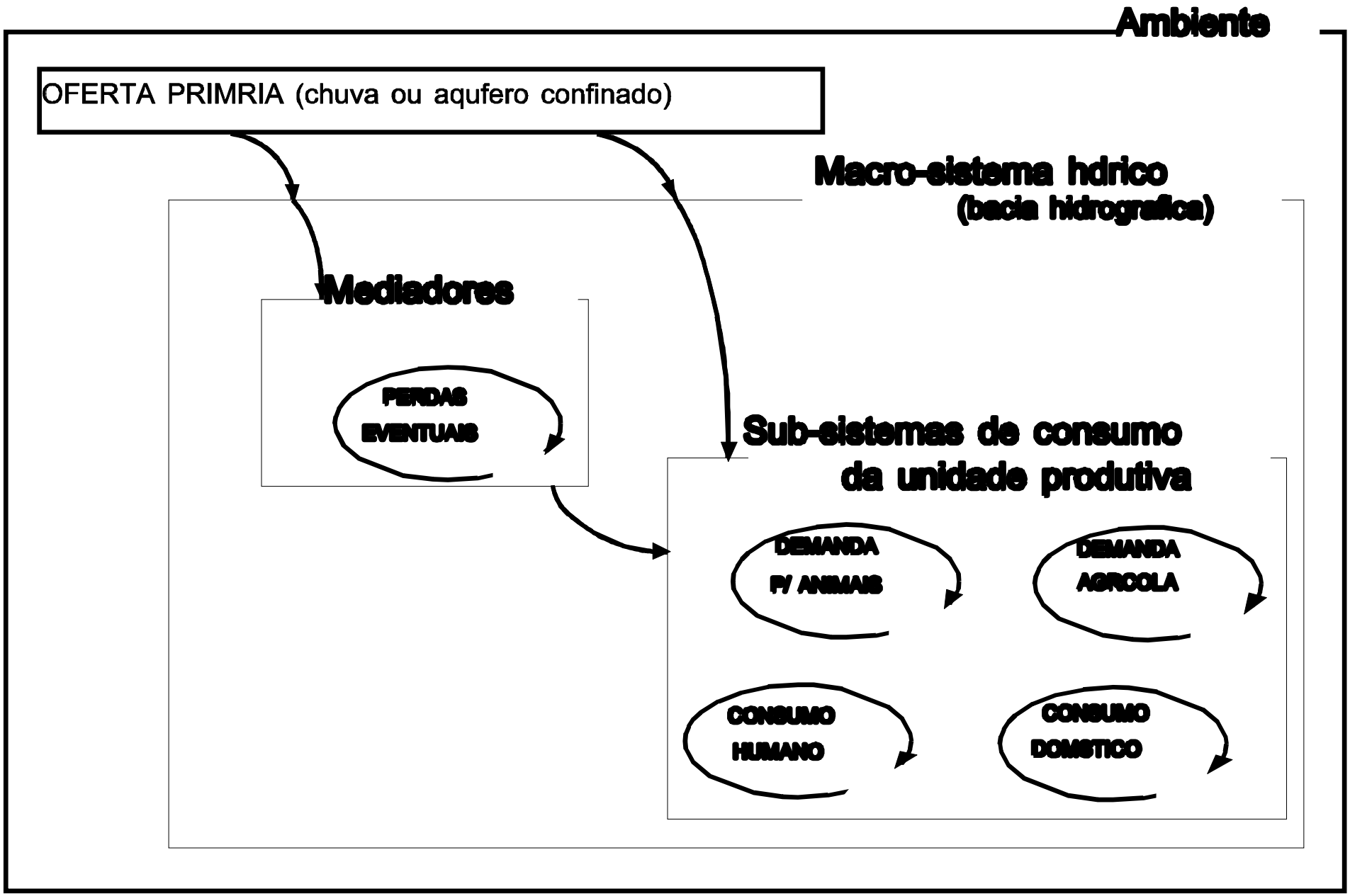
Brazilian semiarid region in during times of drought

- crop failure
- raids
- bad nutrition
- food insecurity
- death of animals

Generally the immediate Government Responses are

- Creation of temporary jobs
- Food-basket distribution

Queue for food distribution during the drought period, in Mirandiba/PE 1998


Ambiente
OFERTA PRIMRIA (chuva ou aquifero confinado)
Macro-sistema hdrico
(bacia hidrografica)
Mediadores
PERDAS
EVENTUAIS
Sub-sistemas de consumo
da unidade produtiva
DEMANDA
P/ ANIMAIS
DEMANDA
AGRCOLA
CONSUMO
HUMANO
CONSUMO
DOMSTICO

Offers water

- Direct rainfall or precipitation – cisterns
- Surface water - rivers, streams, ponds, reservoirs, dams, etc.;
- Groundwater - underground dams
- Deep aquifers – free or pressured

Demands for Water

- drinking water
- cooking
- other domestic use - (bathing, cleaning clothes, washing dishes, etc.)

- animal consumption

- agroindustrial consumption (eg flour mills)

- rainfed agriculture

- irrigation

Human consumption

5 liters / person / day for drinking and cooking

Considering a family with 5 members

25 liters per day

Around 10.000 liters per year

Domestic consumption

Between 7 and 20 liters / person / day

Considering a Family with five members

36.500 liters per year

Animal consumption

Rooster: between 0.2 and 0.4 liters / head / day

Goats and sheep: between 6 and 11 liters / head / day

Cattle: between 40 and 80 liters / head / day

Horses: between 40 and 70 liters / head / day

Pigs: between 6 and 16 liters / head / day

Irrigation

Can vary between crops

It is possible to assume an average of 50,000 liters / ha / day in sprinkler irrigation systems

2.000.000 liters per 4 months of cultivating period

Agro-industrial consumption

The case of cassava flour

Flour mills use 900 liters of water to produce 500 kg of cassava flour

Causes of deficits

Insufficient amounts of water (drought)

Evolution (or seasonality)

Distance between the source and the place of consumption
so to hinder the transport of water and condition rationing, or,

Existence of rules prohibiting use in private sources

Quality requirements the type of consumption

Specific forms of supply (site source or not)

Limitations of the processes of extraction, transport and storage,
where demands carried away from the source.

Excess of water

Flooding causing destruction of infrastructure
(pits, dams, bridges, roads, etc.);

Negative changes in water quality
with increased pollution and turbidity;

Harvest losses

Erosion

Excess of Dams x salinization

The interruptions in rivers reduce the salt exhausting

The artificial lakes exposes the water to evaporation

Pollution

Pesticides and fertilizers used in agriculture

When animals drink the water directly in the dams

Forms of pens of pigs and other animals confined

Clothes washing habits and types of soap used

Occurrence and frequency of bathing in ponds

Presence of mining companies and nearby industries

Causes x consequecies

(Text word)

RAPID RURAL APPRAISAL
QUESTIONS REGARDING OFFER

- What is the behavior of rainfall in recent years?
- Which were the years of high and low rainfall?
- What is the frequency of dry periods during the rain season?
- How often are the flooding?
- What type of water source the community has?
- Where are they located?
- What are the characteristics of water (quality, quantity, condition, etc.)?
- What is the evolution of these characteristics over time?
- What is the current use of those water sources (destination os water)?
- What is the use of the source system (private, public, existence of rules of consumption, etc.)?

RAPID RURAL APPRAISAL
QUESTIONS REGARDING DEMAND

- What are the requirements in terms of quantity?
- What are the requirements in terms of quality?
- Who are the most important consumers (women, men, children or old)?
- What is the time evolution of each demand?
- How is the consumption at home?
- Who is responsible for the supply?
- Who does? With what does? When does it make?
- How long to spend such a demand?
- When are planting season and activities calendar?
- Are there special practices to mitigate the drought?

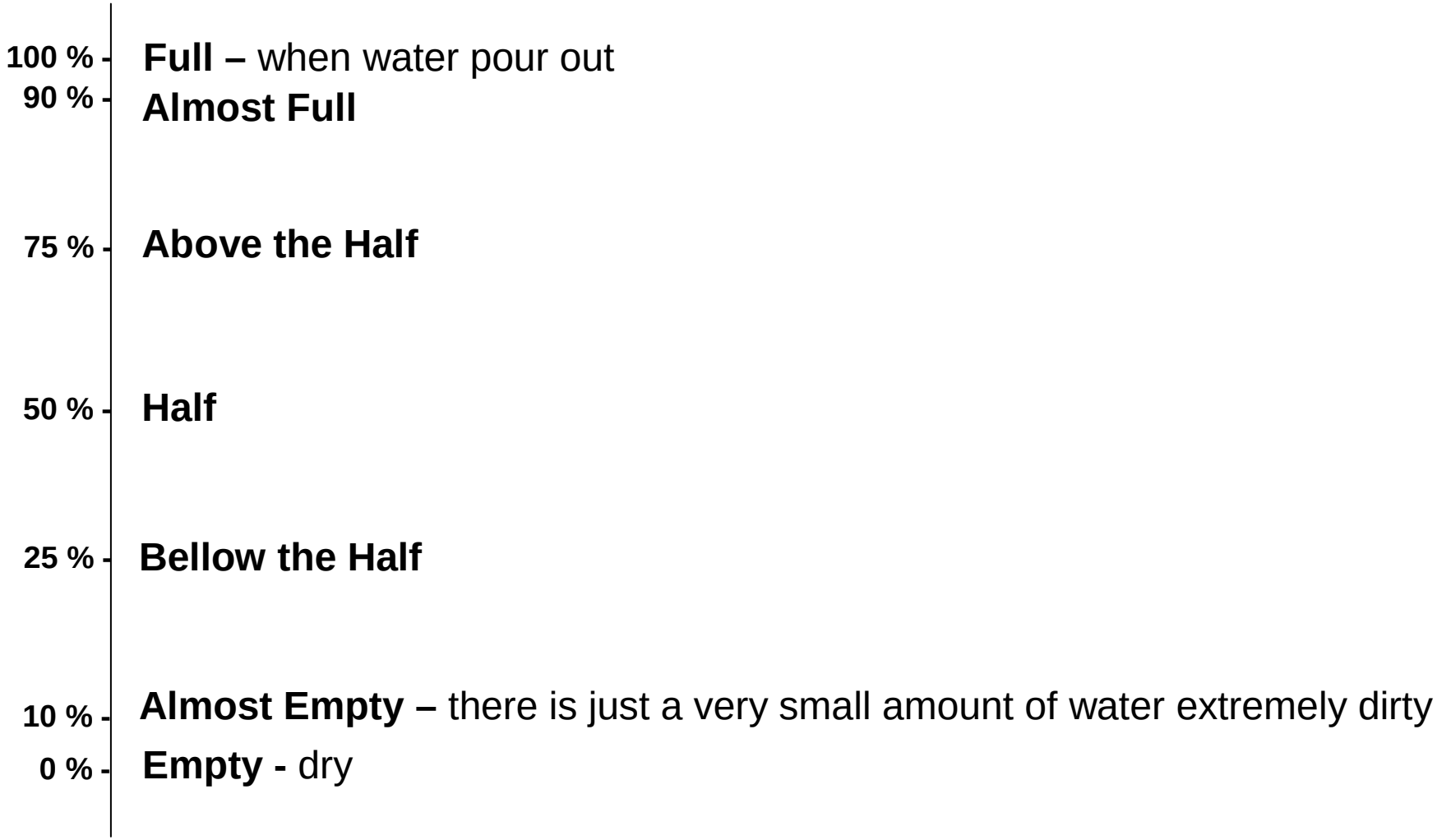
(irrigation, capture in situ tide, planting site, other)?

Rapid Rural Appraisal

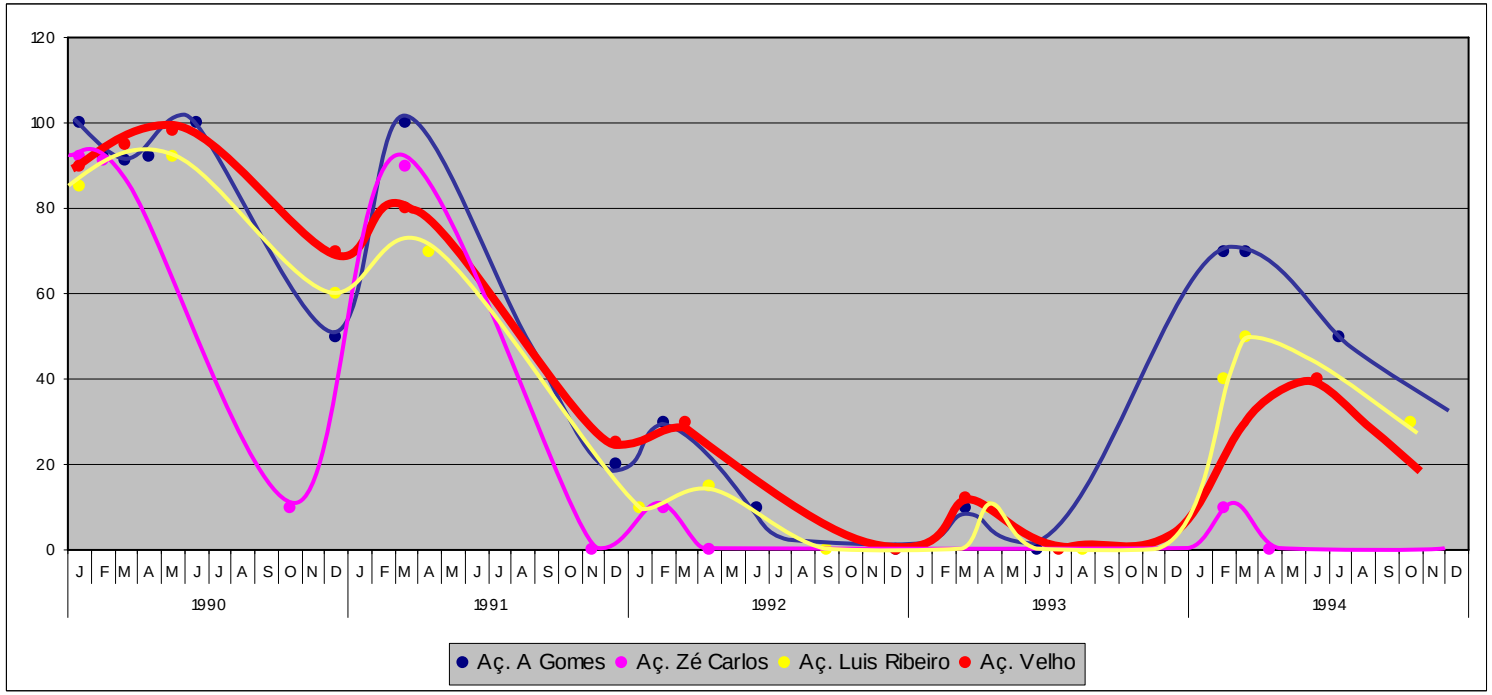
- Adequate Imprecision – the level of precision is compatible with the objectives.

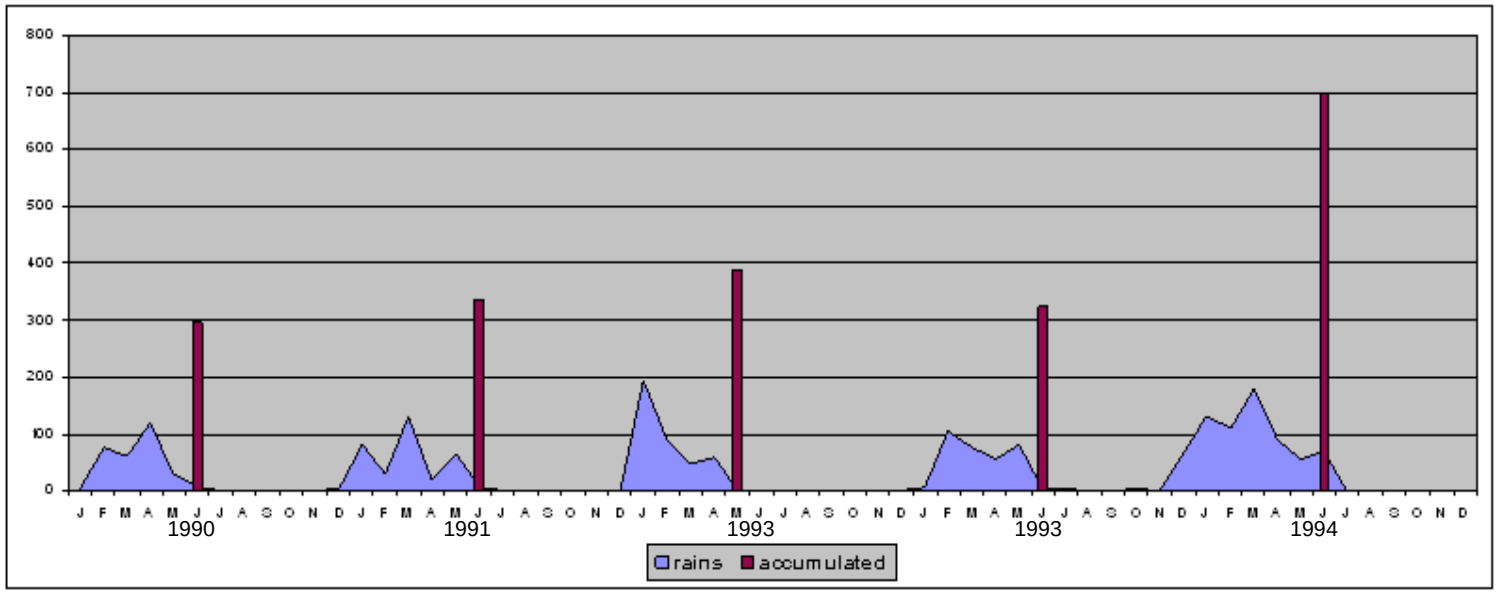
- Helpful ignorance – to intentionally ignore facts and data that could no be relevant to the results achievement.

Dam appraisal




Plant period
Harvesting
Soil Preparedness
Jan
Jul
Dec
Beginning
End of rain season
First storms
Rain season
Dry season


120
100
80
60
40
20
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1990
1991
1992
1993
1994
Aç. A Gomes
Aç. Zé Carlos
Aç. Luis Ribeiro
Aç. Velho


800
700
600
500
400
300
200
100
0
1990
1991
1993
1994
rains
accumulated

Community	**Rain season**	**Dry season**	**Drought**	**Long Drought**
Salgado	Aç. Luis Ribeiro ----------> Qc1	Cisterna da Igreja ----------> Qa1	Well of Elias ----------> Qb2	Cacimbão do Elias, wells, water trucks ----------> Q?? (unknown)
S.Felipe 1	wells of Toinho >---------- Qb?		Wells inside Ac A. Costa, Joaquim de Oliveira and others ----------> Q??	
S.Felipe 2	Well of Fr. Velloso ----------> Q?1	Cistern of Zé Leite ----------> Qa1	Well of Antônio Costa e Raimundo Pereira ----------> - Qb2	Wells and Water trucks ----------> Q??

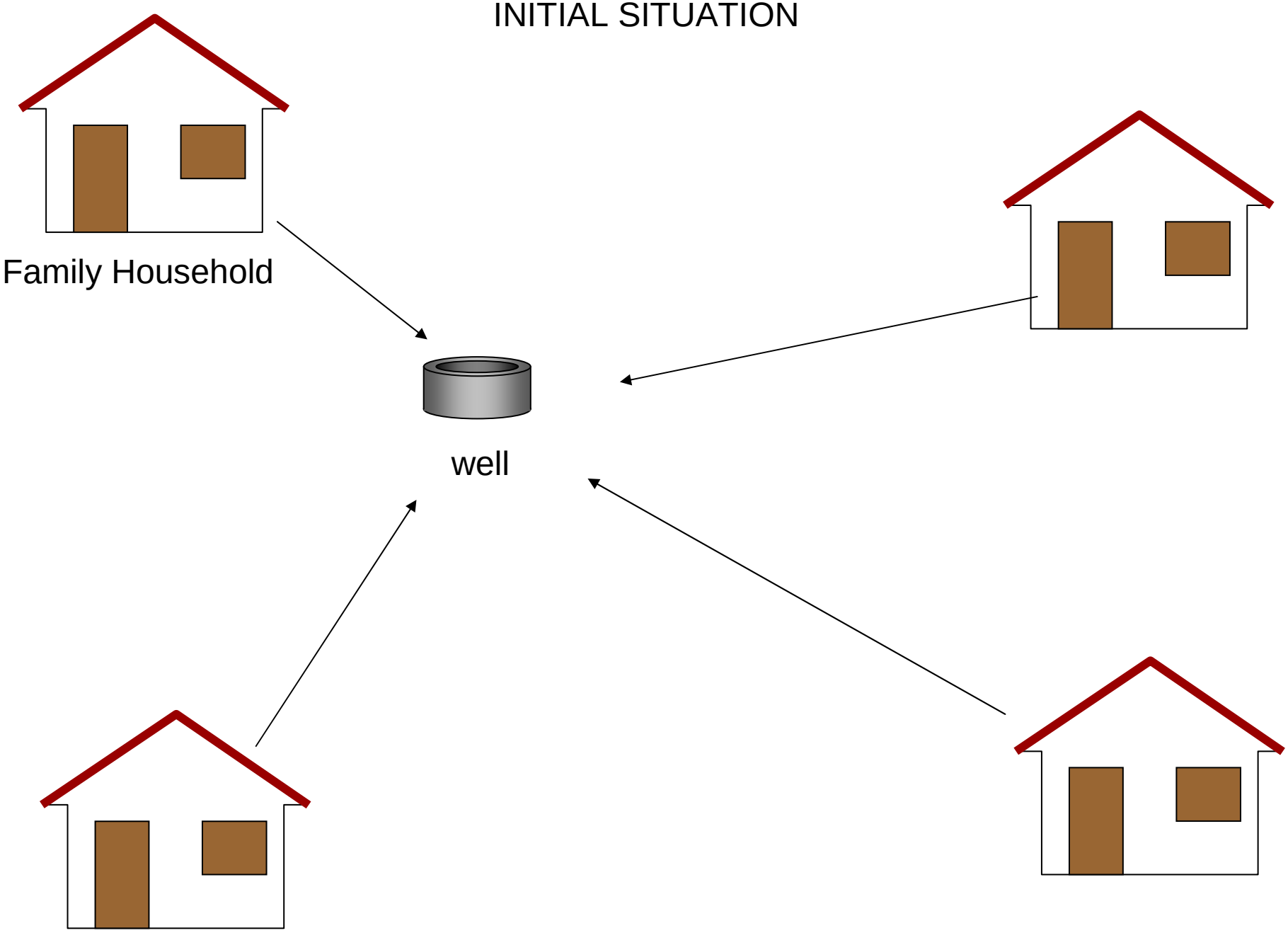
Q= Water Quality

a = non contaminated
b = low level of contaminatin – it could be desinfected at home
c = high level of contamination
? = unknown

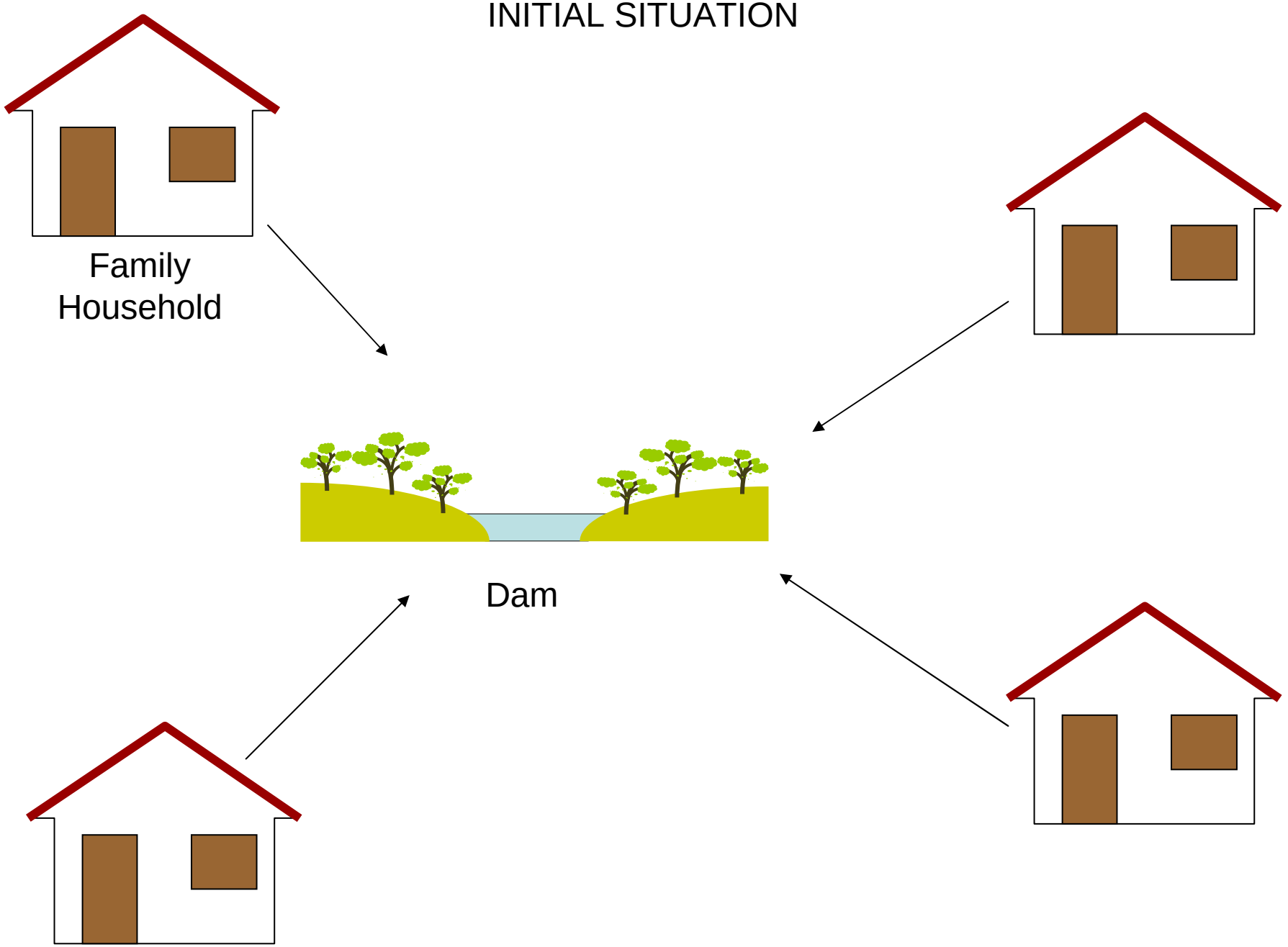
- level of salinity (µmhos/cm)

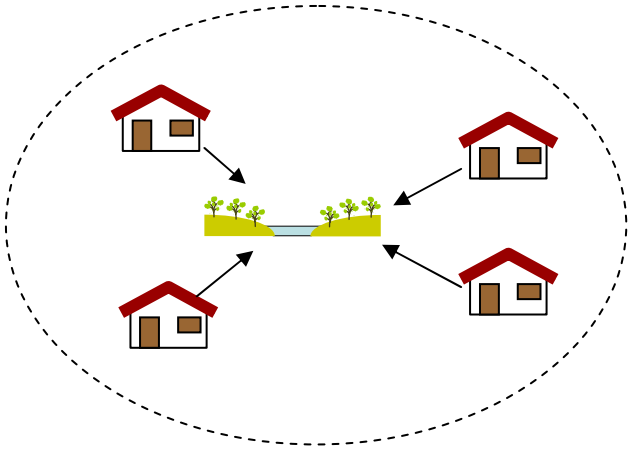
1 =	*0*	*< CE <*	*700*	*Low level*
2 =	*701*	*< CE <*	*1400*	*Medium level*
3 =	*1401*	*< CE <*	*2800*	*High level*

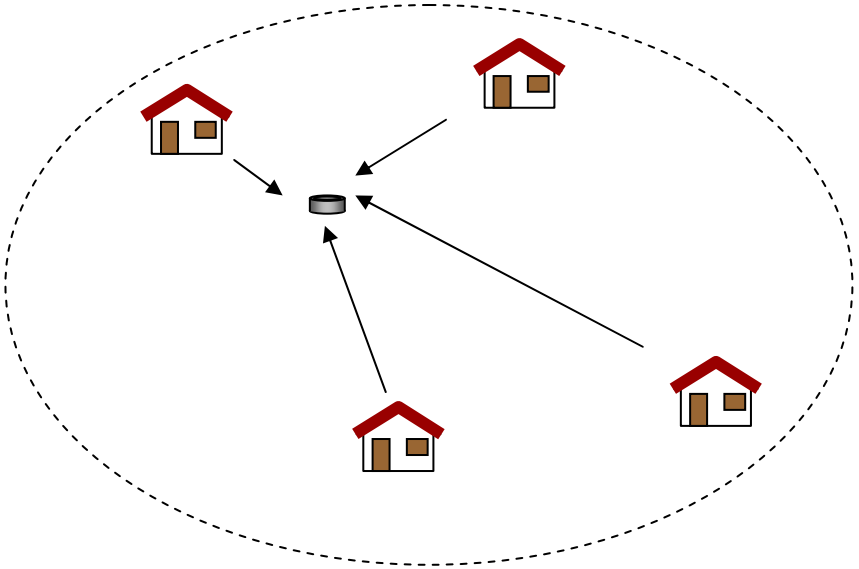
INITIAL SITUATION

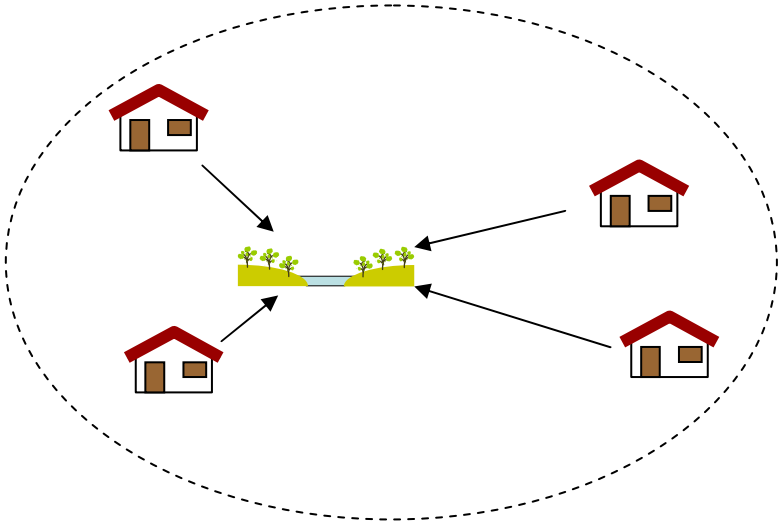


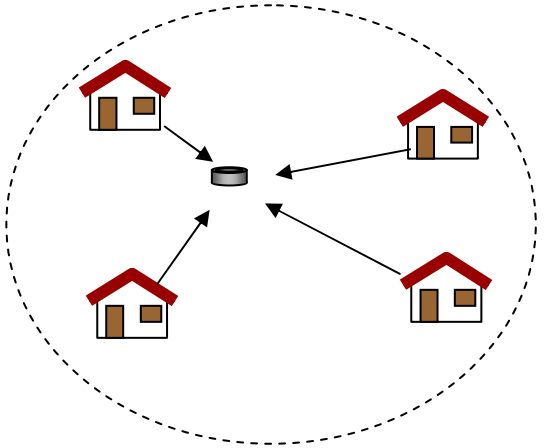
INITIAL SITUATION

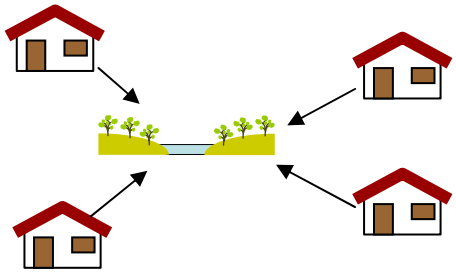


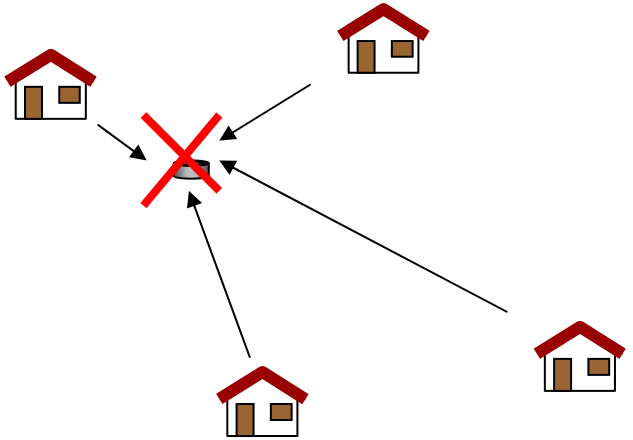


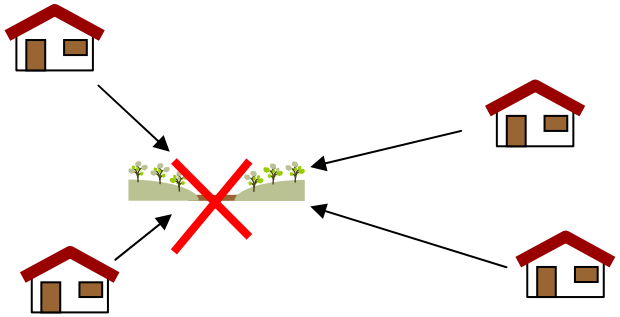


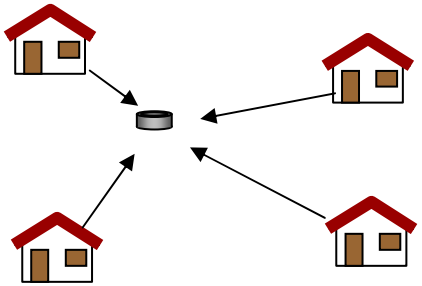


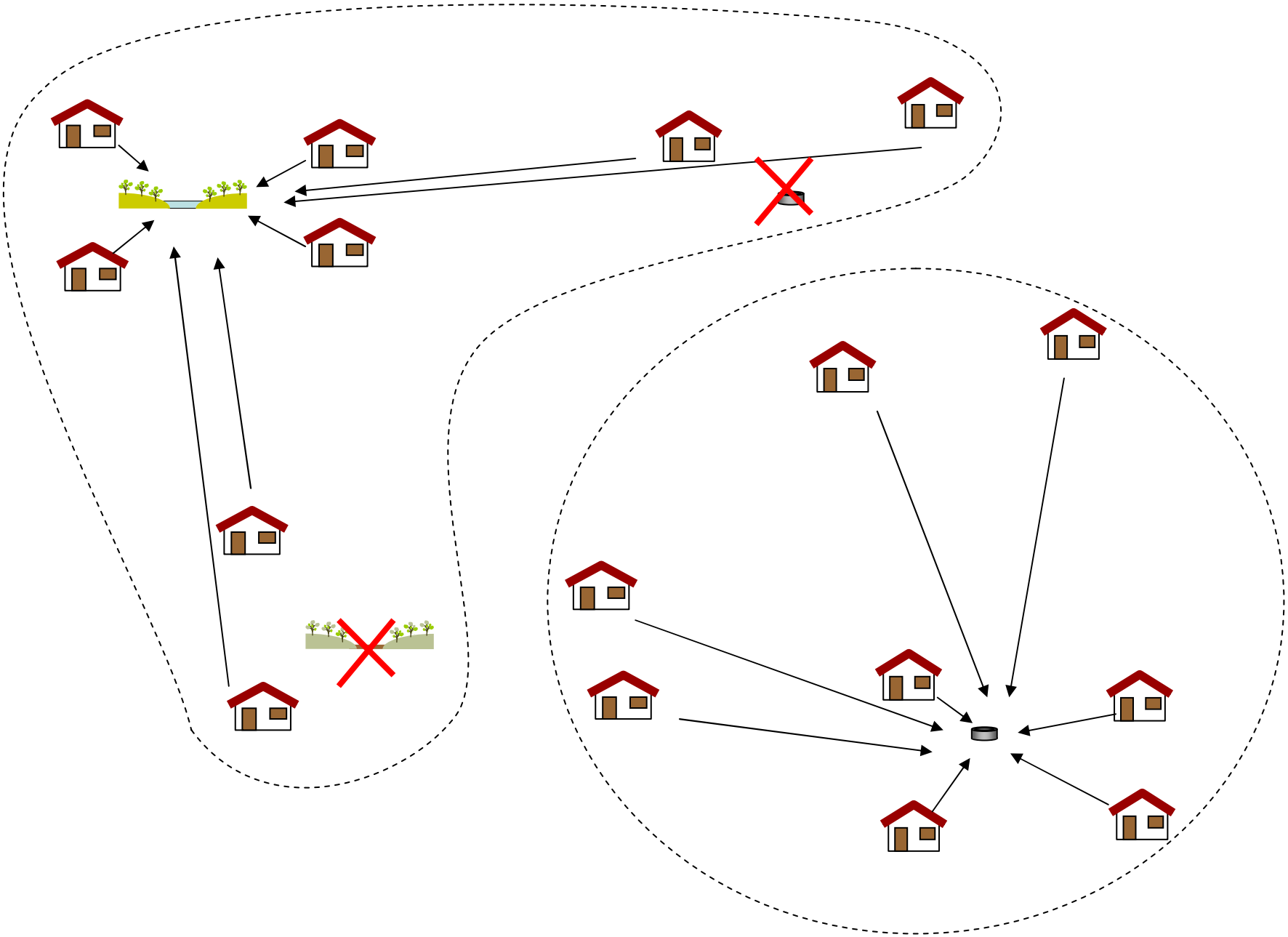


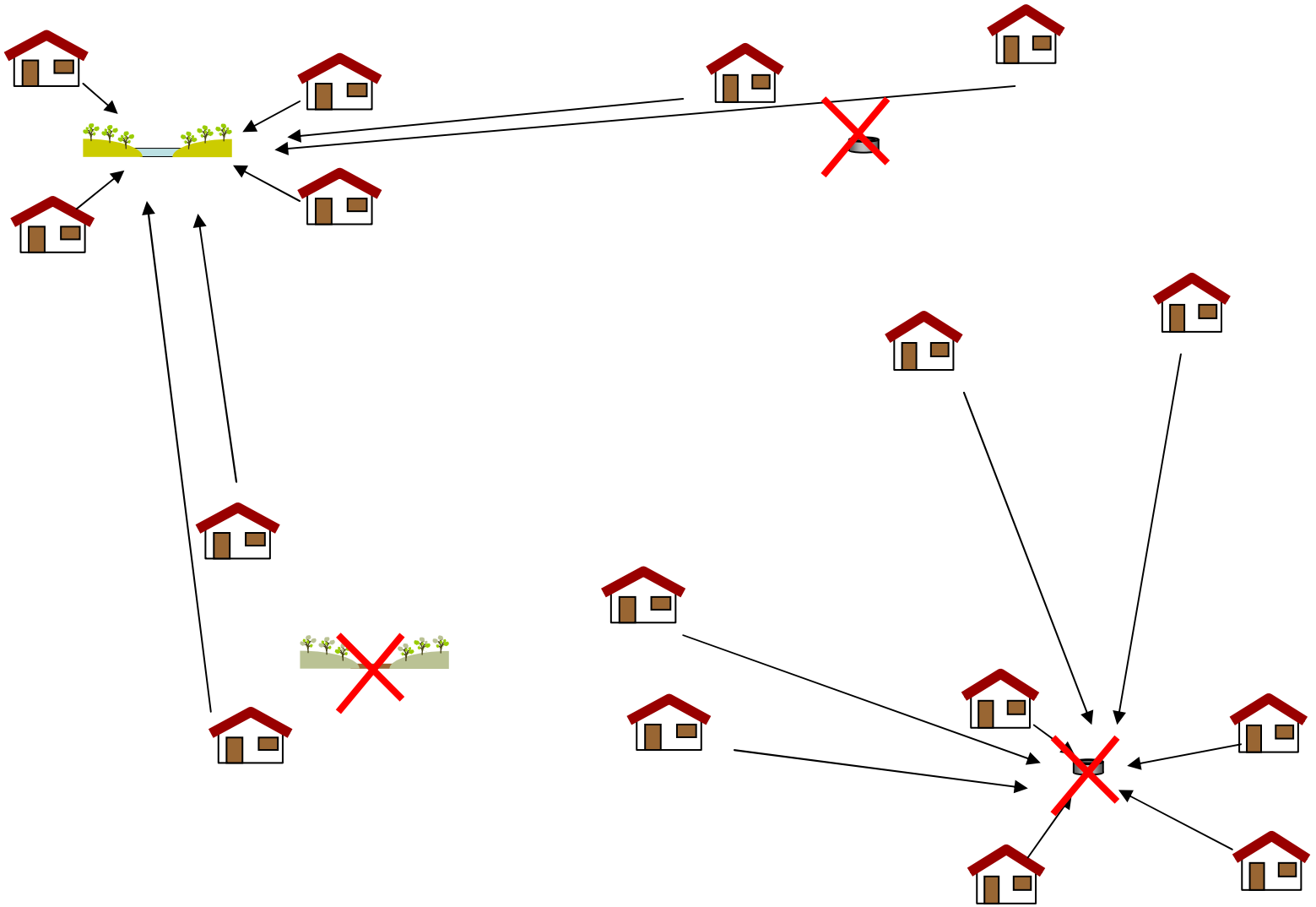


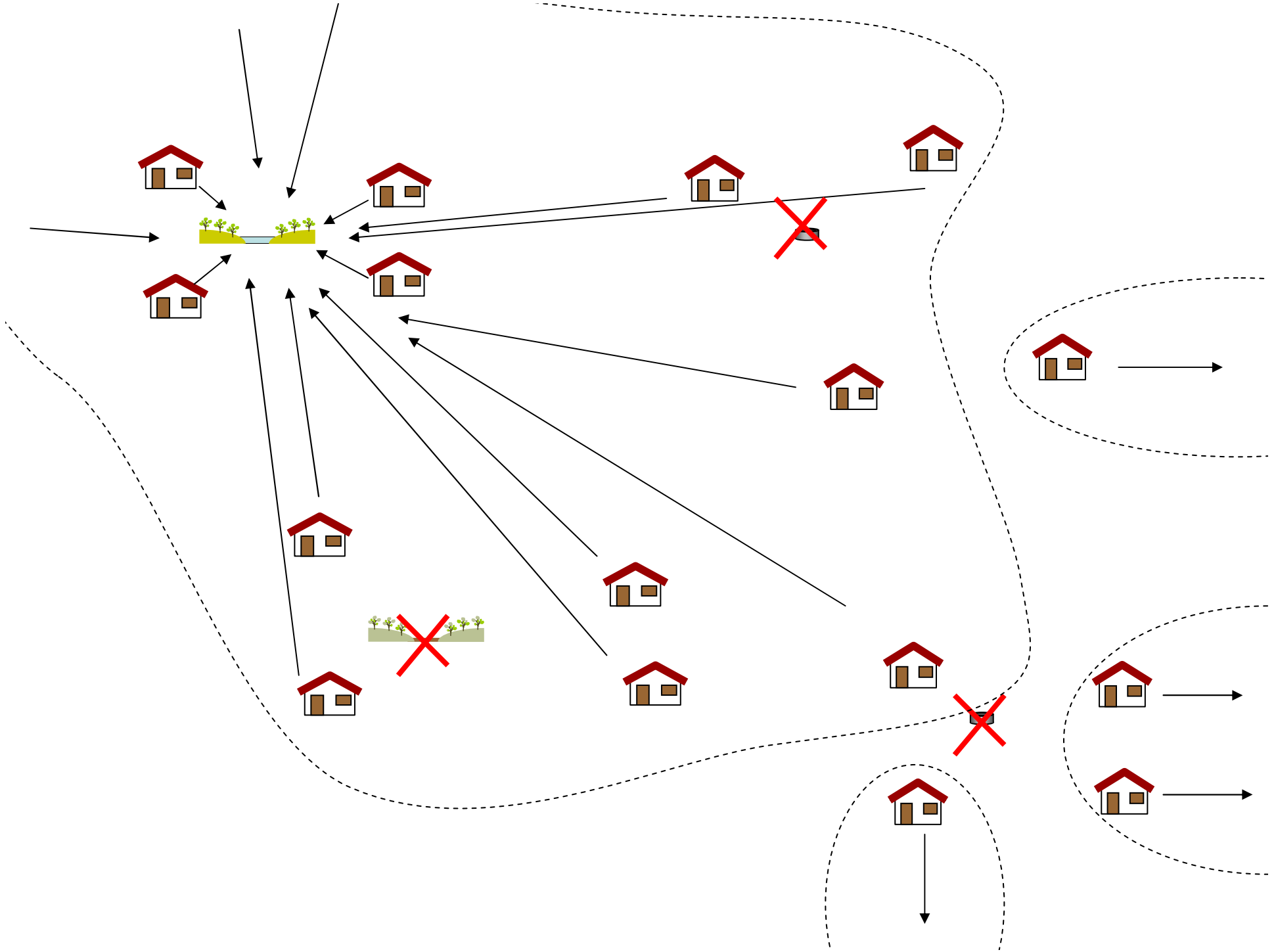


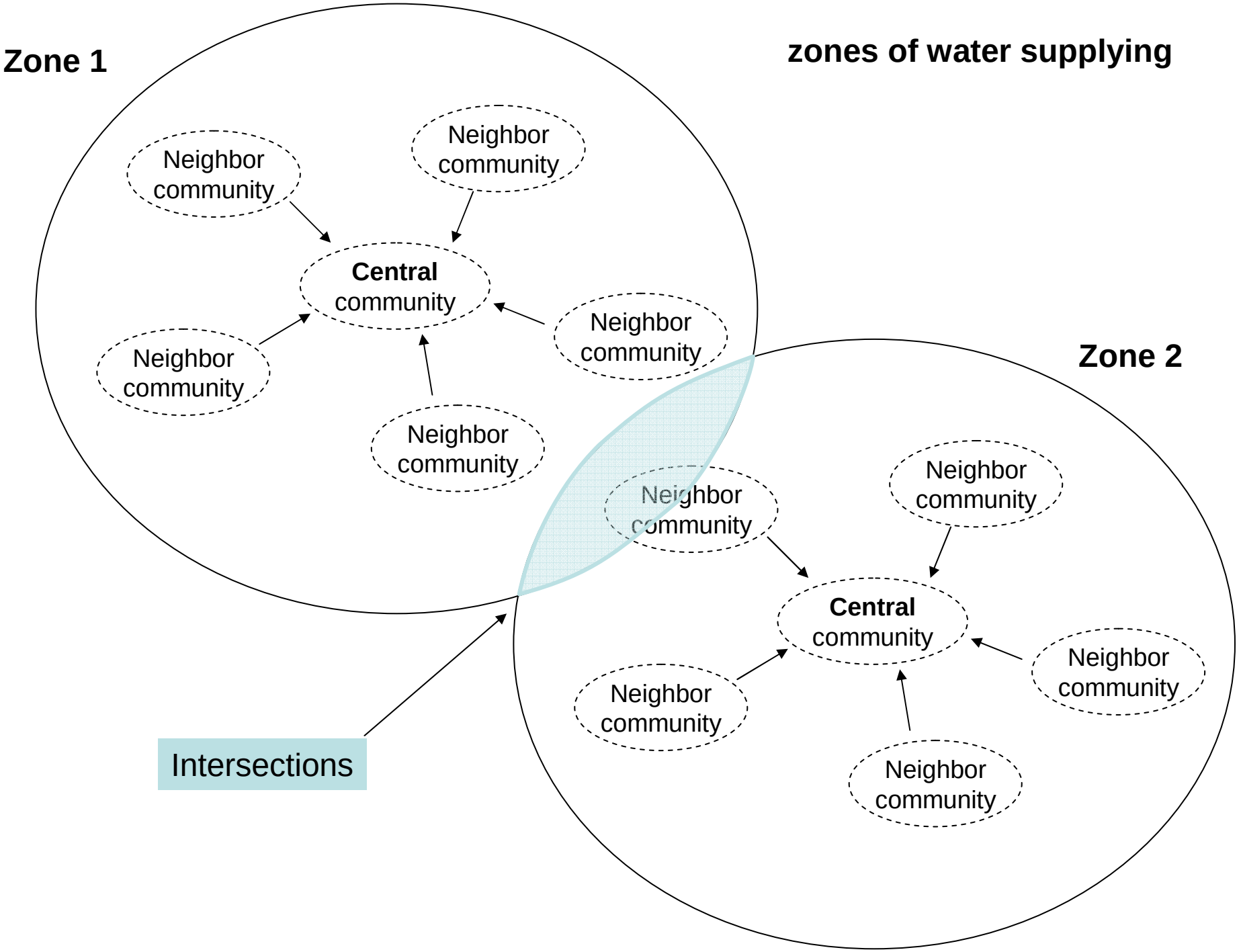


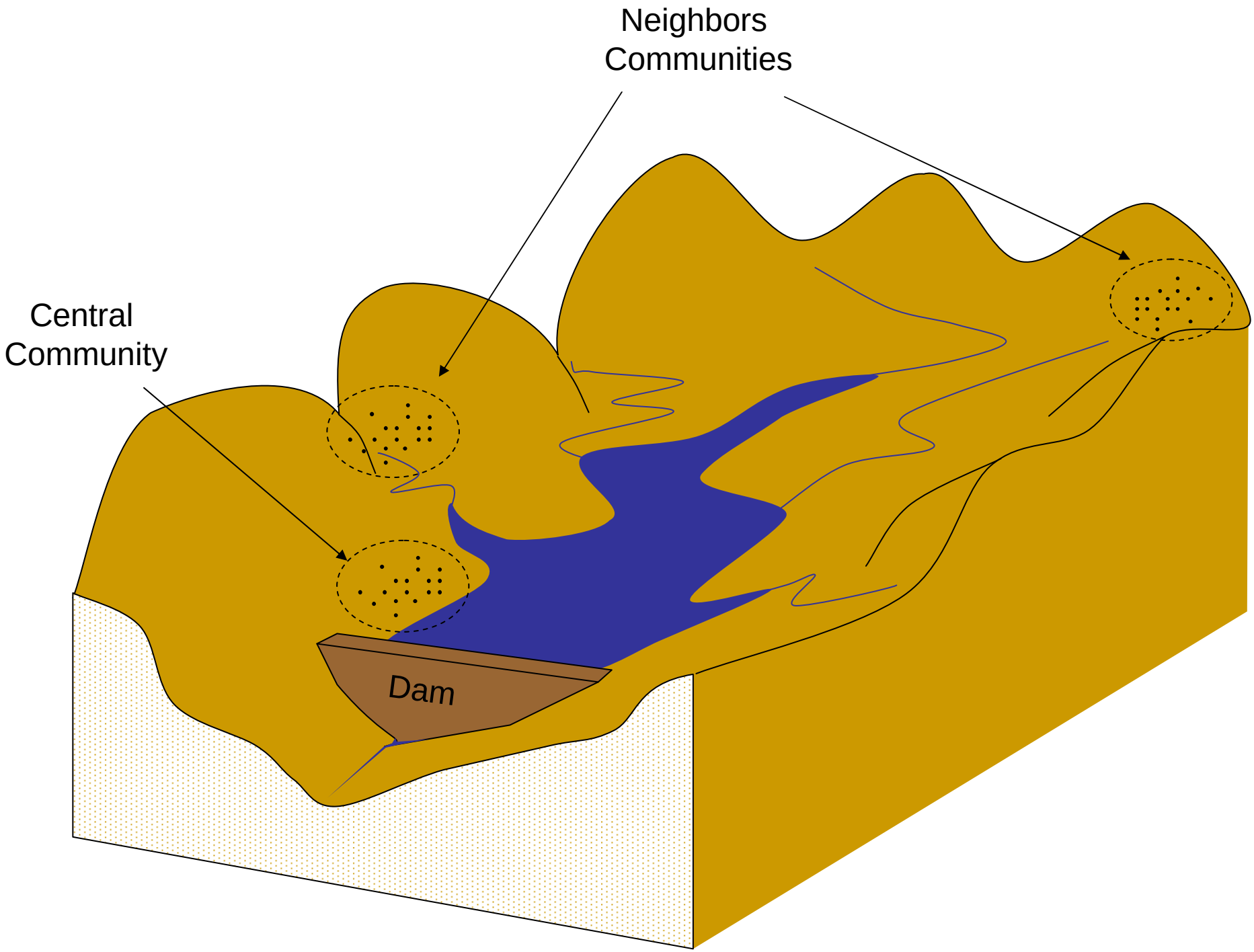


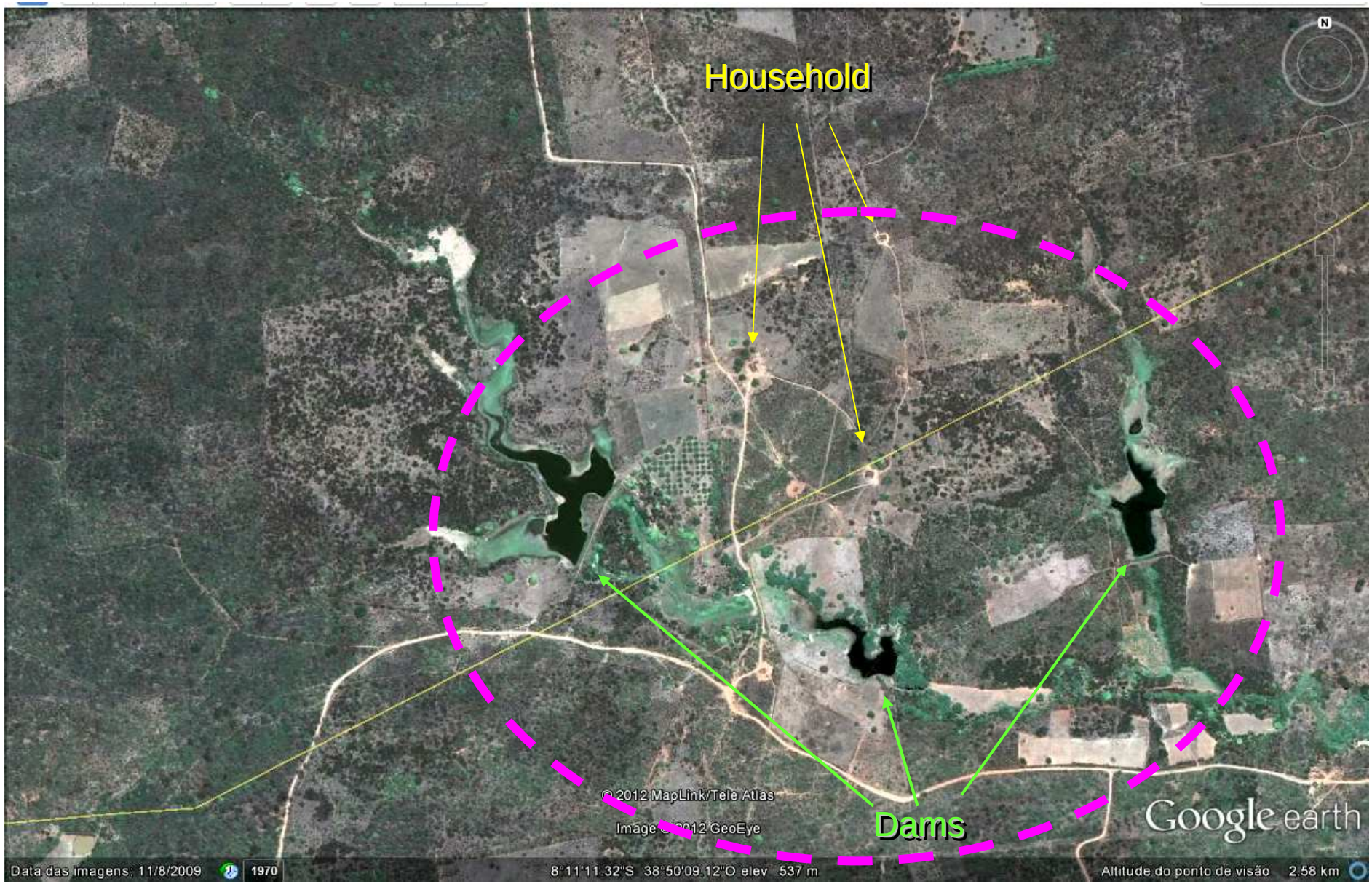


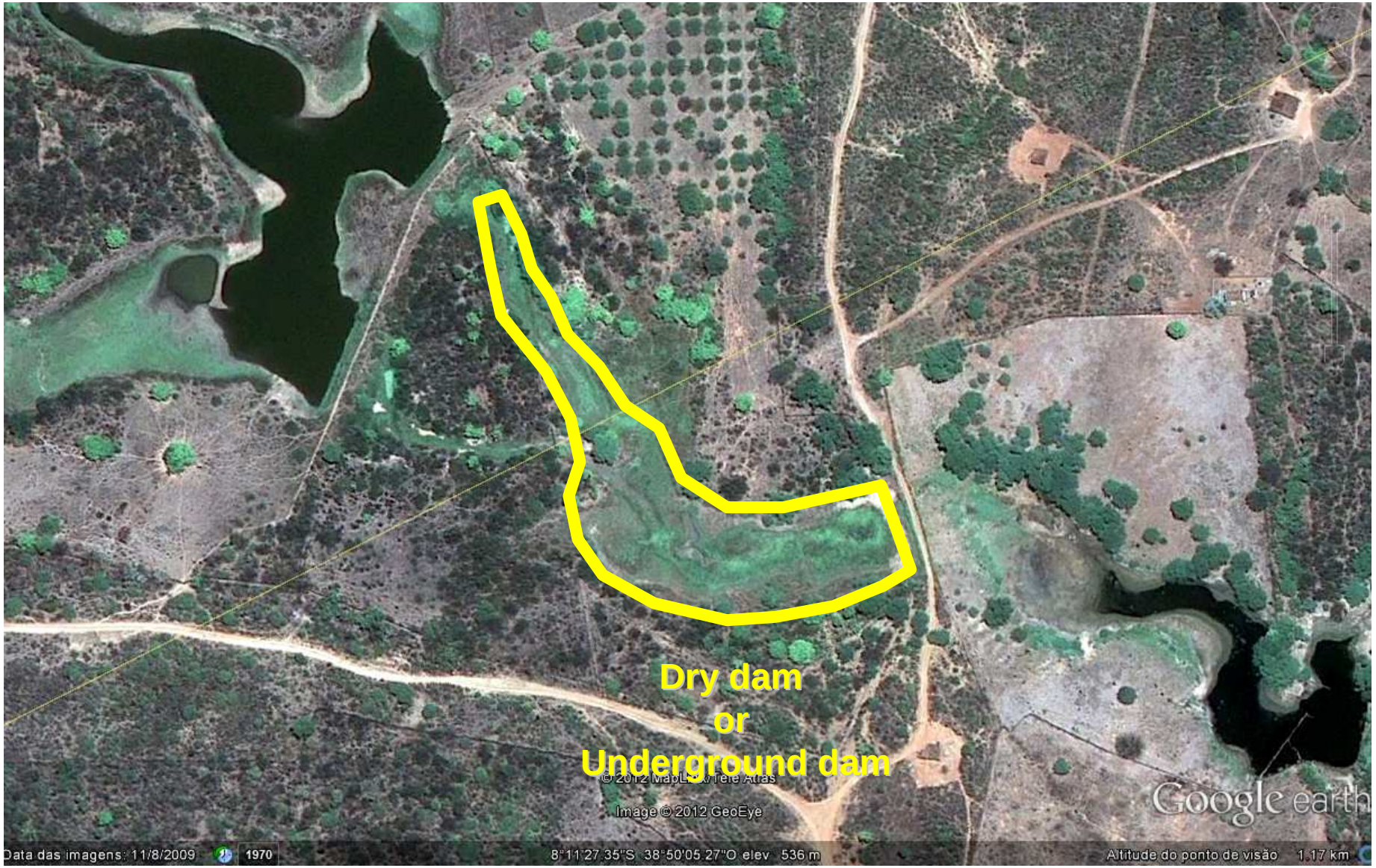


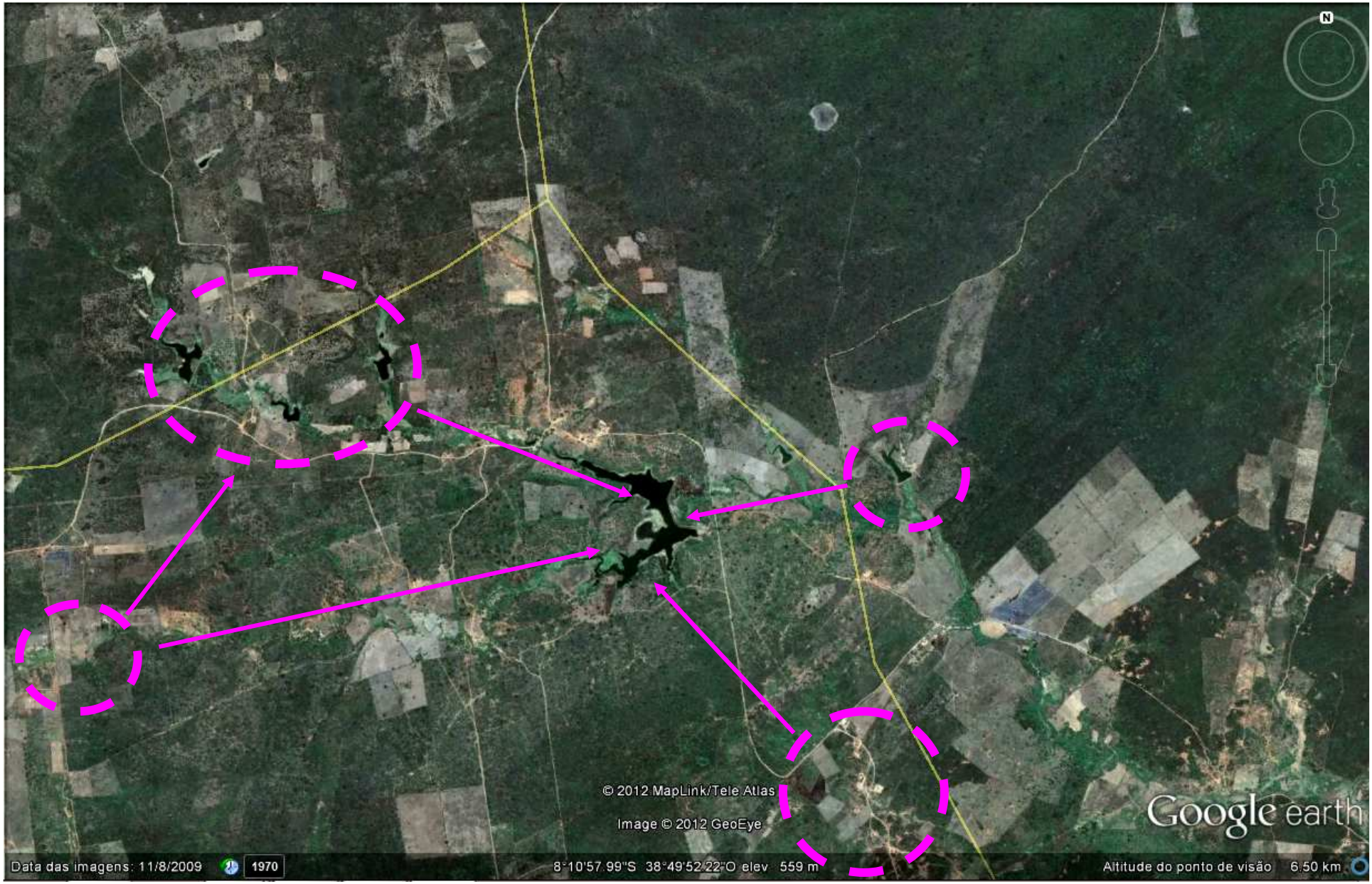


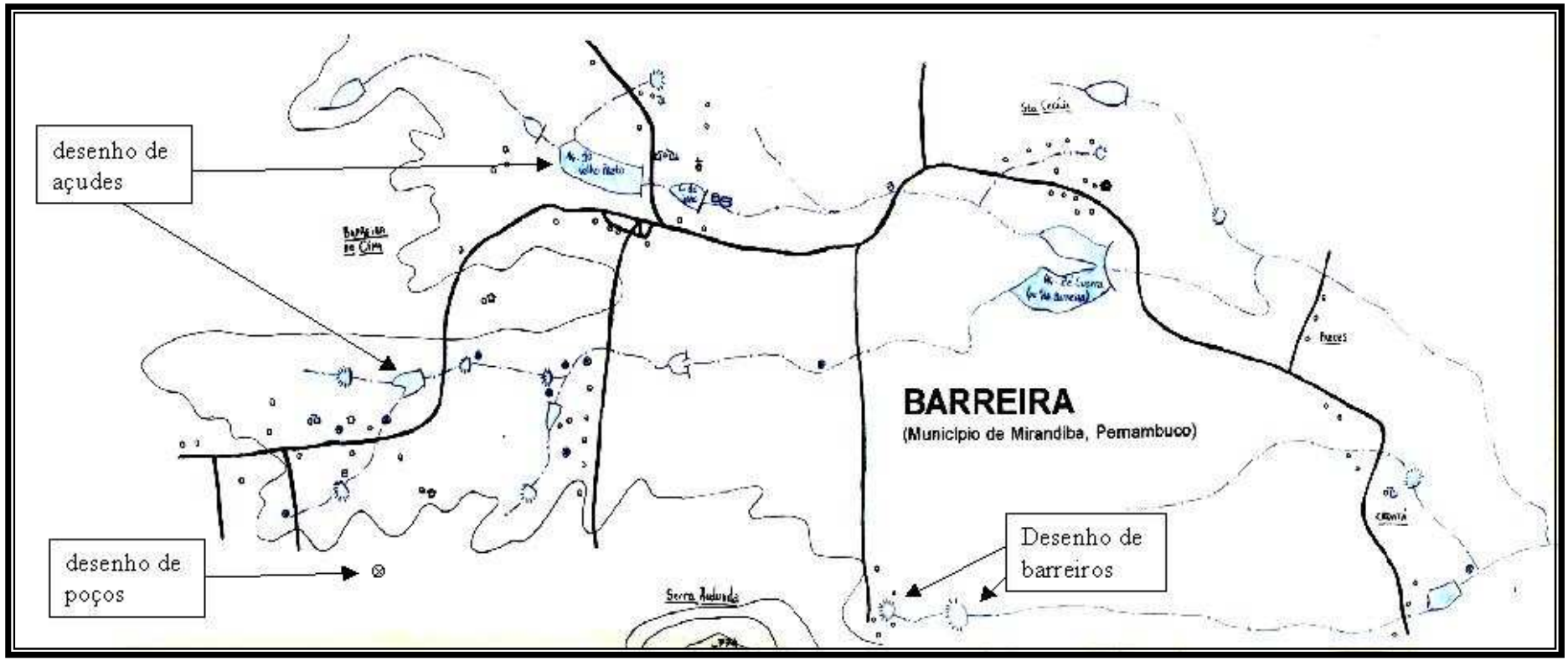

zones of water supplying
Zone 1
Neighbor community
Neighbor community
Central community
Neighbor community
Neighbor community
Neighbor community
Zone 2
Neighbor community
Neighbor community
Central community
Neighbor community
Neighbor community
Neighbor community
Intersections

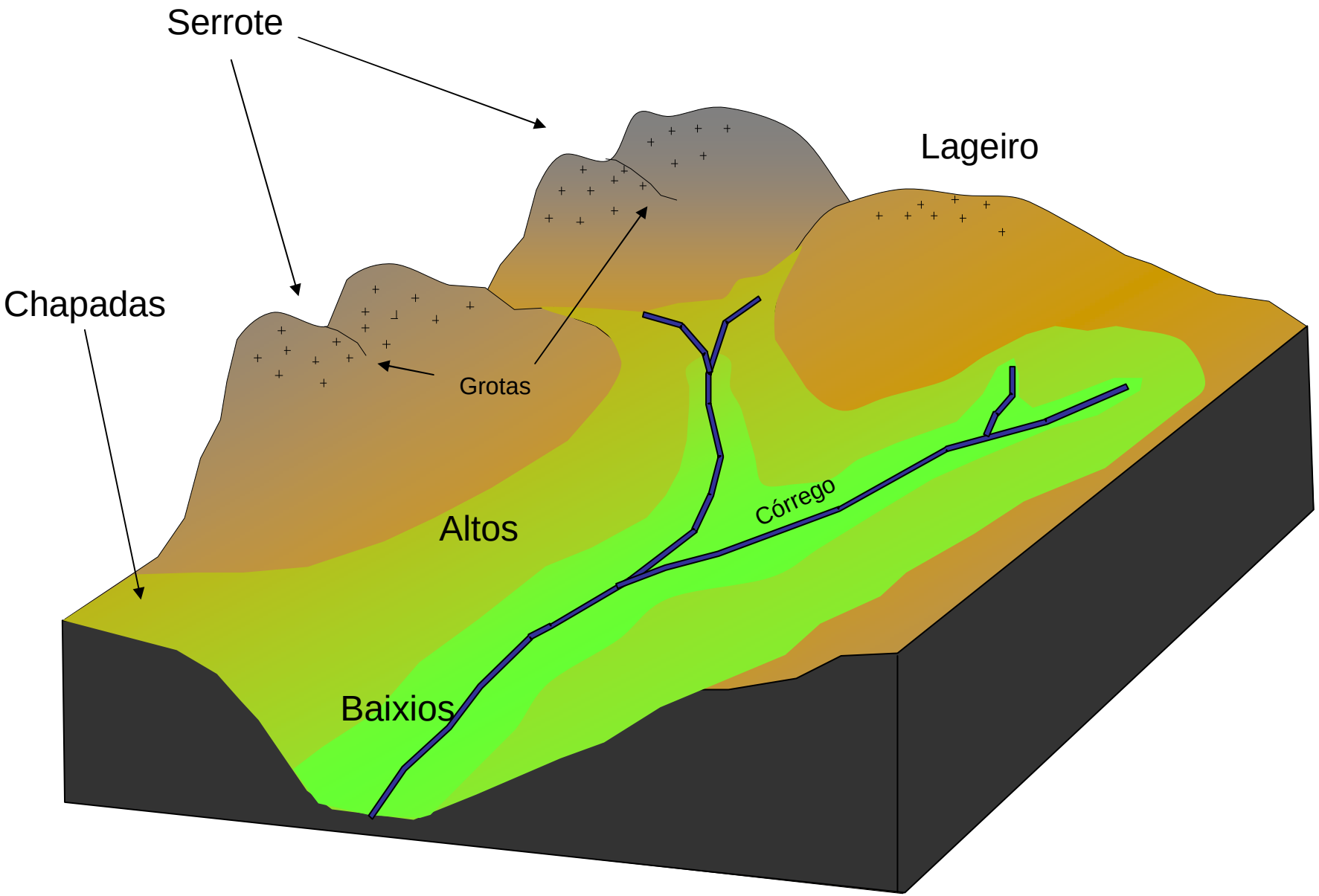

Neighbors
Communities
Central
Community
Dam


Household
Dams
© 2012 MapLink/Tele Atlas
Image © 2012 GeoEye
Google earth
Data das imagens: 11/8/2009
1970
8°11'11.32"S 38°50'09.12"O elev 537 m
Altitude do ponto de visão 2.58 km


Dry dam
or
Underground dam
© 2012 MapLink/Tele Atlas
Image © 2012 GeoEye
Google earth
Data das imagens: 11/8/2009
1970
8°11'27.35"S 38°50'05.27"O elev 536 m
Altitude do ponto de visão 1.17 km

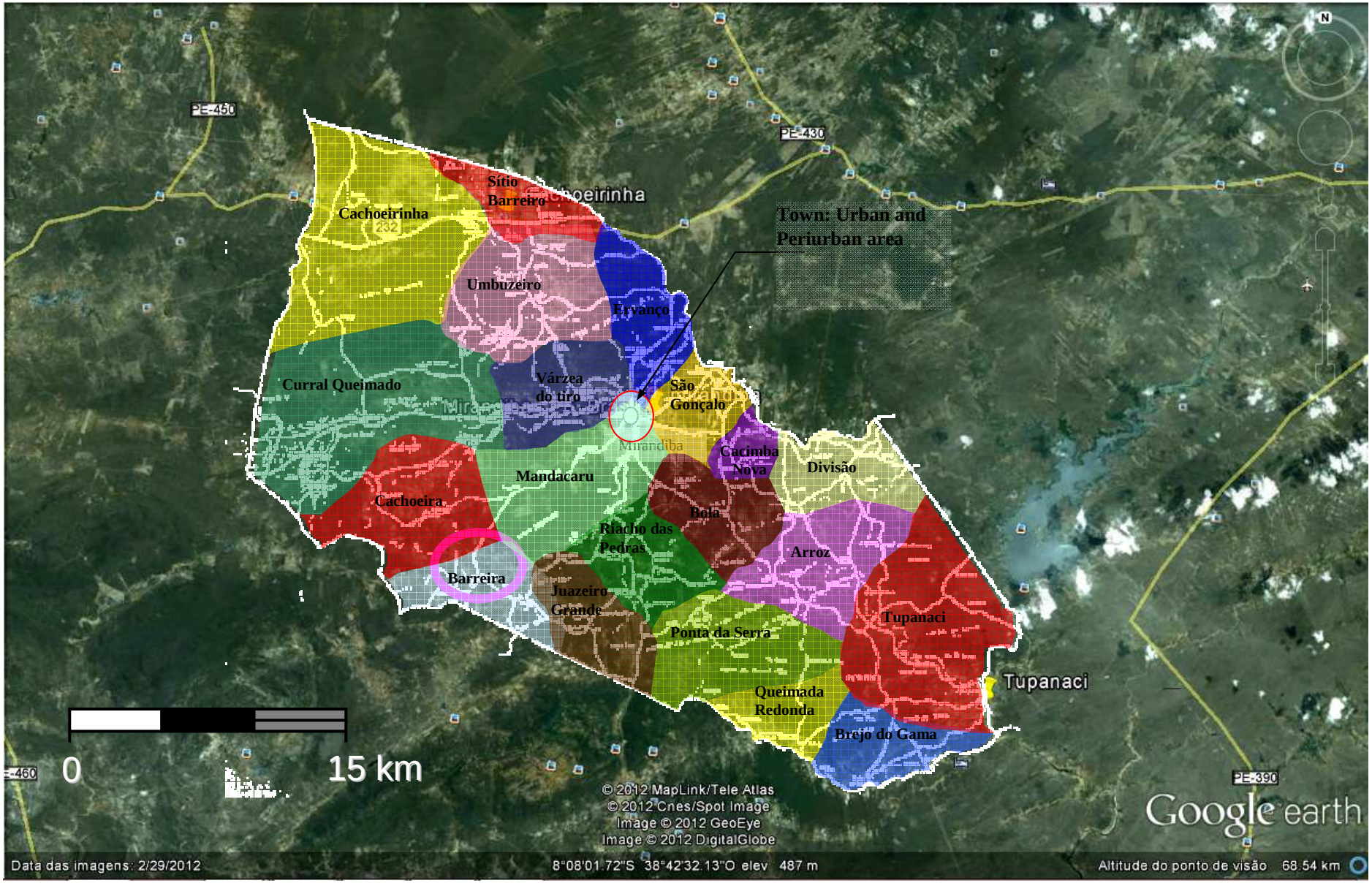

N
© 2012 MapLink/Tele Atlas
Image © 2012 GeoEye
Google earth
Data das imagens: 11/8/2009
1970
8°10'57.99"S 38°49'52.22"O elev 559 m
Altitude do ponto de visão 6.50 km


desenho de açudes
desenho de poços
Desenho de barreiros
BARREIRA
(Município de Mirandiba, Pernambuco)

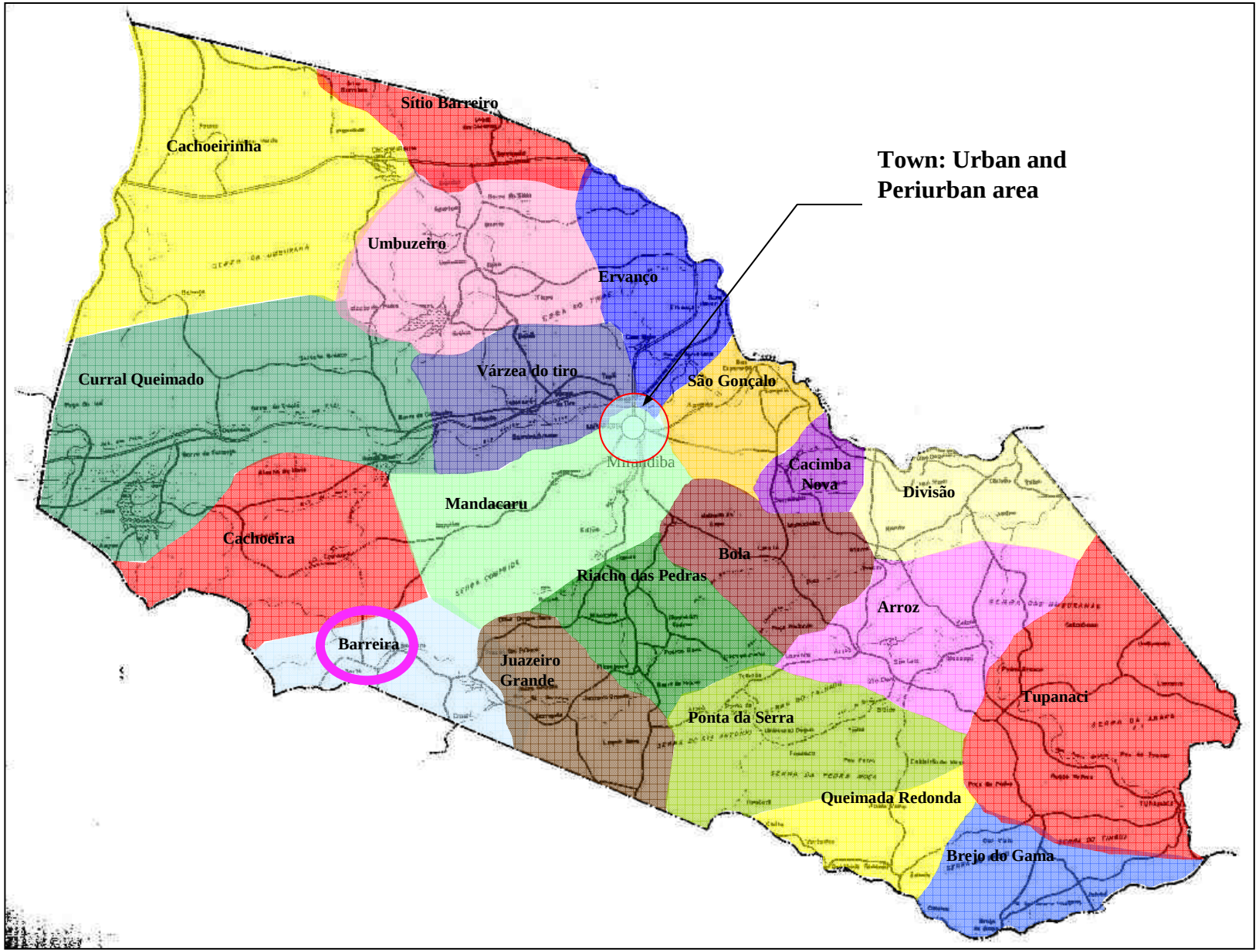

Serrote
Lageiro
Chapadas
Grotas
Altos
Córrego
Baixios

Agriculture in humid parts of land


Mirandiba
mirandiba
Image © 2012 GeoEye
© 2012 MapLink/Tele Atlas
© 2012 Cnes/Spot Image
Google earth
Data das imagens: 11/8/2009
8°11'37.57"S 38°47'34.16"O elev 541 m
Altitude do ponto de visão 29.10 km


Sítio Barreiro
Cachoeirinha
Umbuzeiro
Ervanço
Curral Queimado
Várzea do tiro
São Gonçalo
Mandacaru
Cacimba Nova
Divisão
Cachoeira
Bola
Riacho das Pedras
Arroz
Barreira
Juazeiro Grande
Tupanaci
Ponta da Serra
Queimada Redonda
Brejo do Gama
Town: Urban and Periurban area
PE-450
PE-430
PE-390
0
15 km
© 2012 MapLink/Tele Atlas
© 2012 Cnes/Spot Image
Image © 2012 GeoEye
Image © 2012 DigitalGlobe
Google earth
Data das imagens: 2/29/2012
8°08'01.72"S 38°42'32.13"O elev 487 m
Altitude do ponto de visão 68.54 km

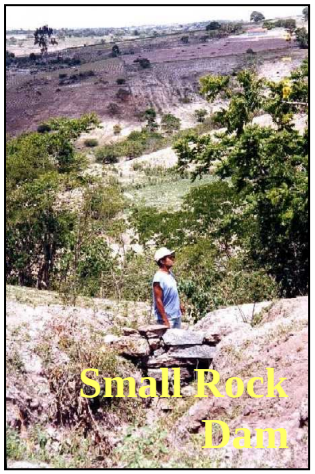
Water Zones

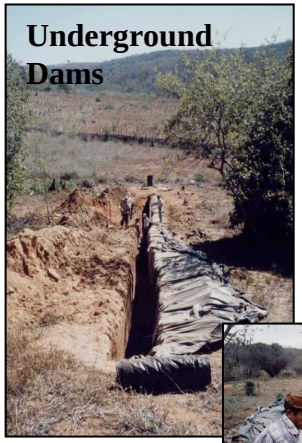

Sítio Barreiro
Cachoeirinha
Town: Urban and Periurban area
Umbuzeiro
Ervanço
Curral Queimado
Várzea do tiro
São Gonçalo
Mirandiba
Cacimba Nova
Divisão
Mandacaru
Cachoeira
Bola
Riacho das Pedras
Arroz
Barreira
Juazeiro Grande
Tupanaci
Ponta da Serra
Queimada Redonda
Brejo do Gama

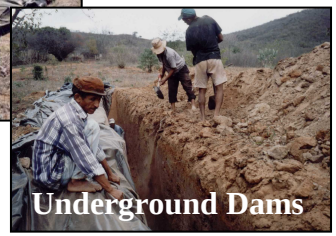
The response should consider
HARDWARE and SOFTWARE

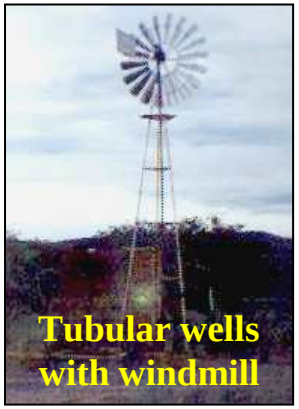
Hardware	**Software**
Structures	Strengthening of grassroots organizations
Technologies	Training
Inputs	Participatory Appraisal, planning and monitoring
Assets	

Some examples of local Water Resources (hardware)










Nº320.938
UGM:CEAT
MUNICÍPIO:MARCO
LOCALIDADE:BAIXA DO MEIO 2
ASA
FOME ZERO

Some “software” activities

- Capacity building and education for environment management in semiarid conditions
- Participatory process of local diagnostic and planning
- Microfinance and revolving funds
- Seed banks
- Contextualized education

Participatory process involving young people

Lobby and advocacy activities for Semiarid


ASA


ENCONASA, 2003

-Semiarid Articulation (ASA) join more than 700 entities from across the region

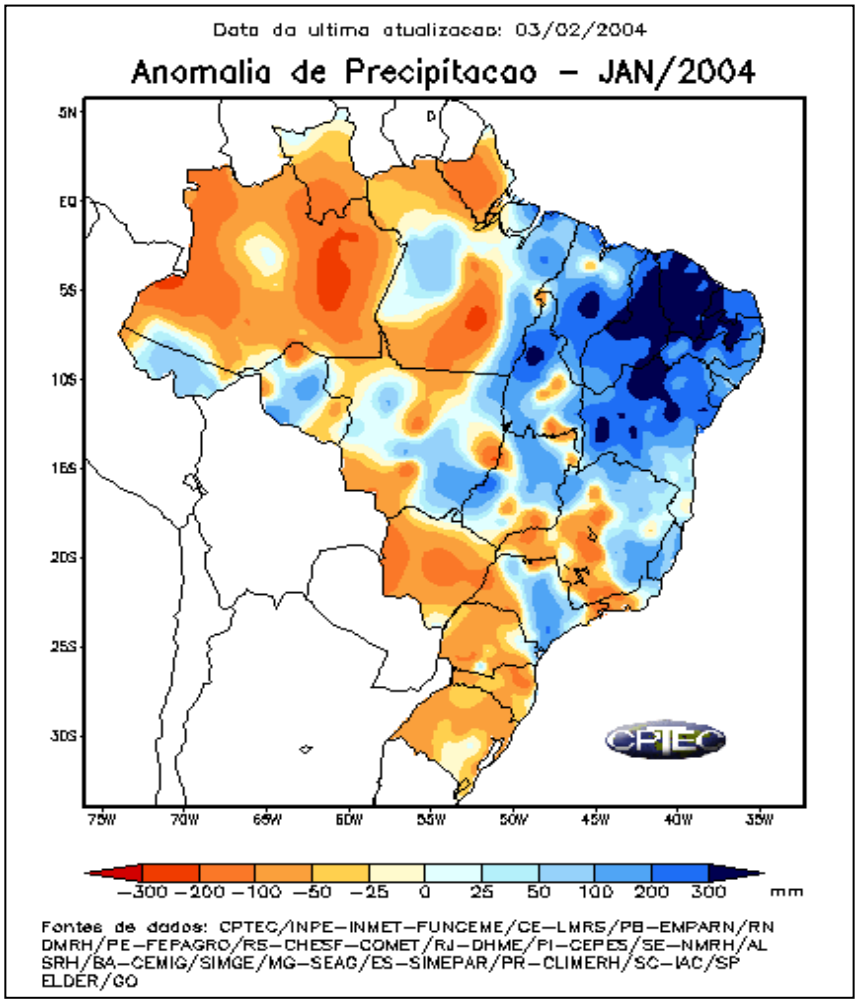
-Scaling-up of cistern experience based on One Million Cistern Project (P1MC) of ASA

-Lobbying and advocacy for adapted public policies


President Lula and National Bank Federation meet ASA delegation to support P1MC

2004 Floodings
Emergency Situation

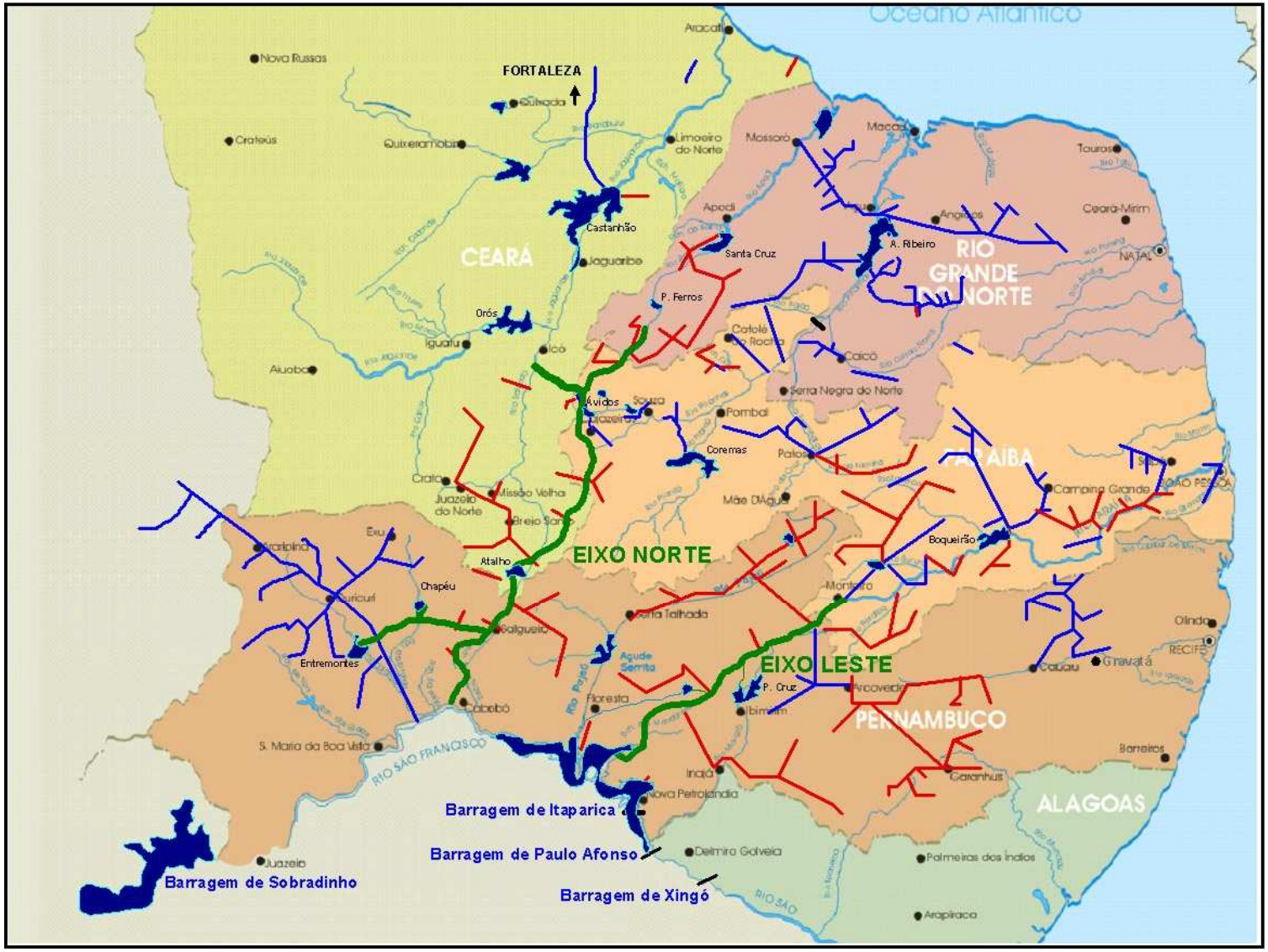
- **300% of average annual precipitation fell between mid-January and early April of 2004**
- **8 Northeastern States affected (equivalent area size of California)**
- **Most severely affected: Pernambuco and Piaui**
- **200,000 people displaced**
- **50,000 people who lost homes**



Teresina/ PI, 2004

Alagoa Grande/ PB, 2004

Mirandiba/ PE, 2005



Legenda

- Eixos de Integração
- Adutoras Construídas e em Funcionamento
- Adutoras Planejadas e em Construção