



**IMPACT OF WATER AND FOOD
SECURITY ON HUMAN HEALTH
IN THE MINING REGIONS
OF GOA**

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RESEARCH QUESTIONS

- How water security is affected in the mining region of Goa?
- How food security is affected by mining activity in Goa?
- How water and food security are linked to human health in the mining region in Goa?

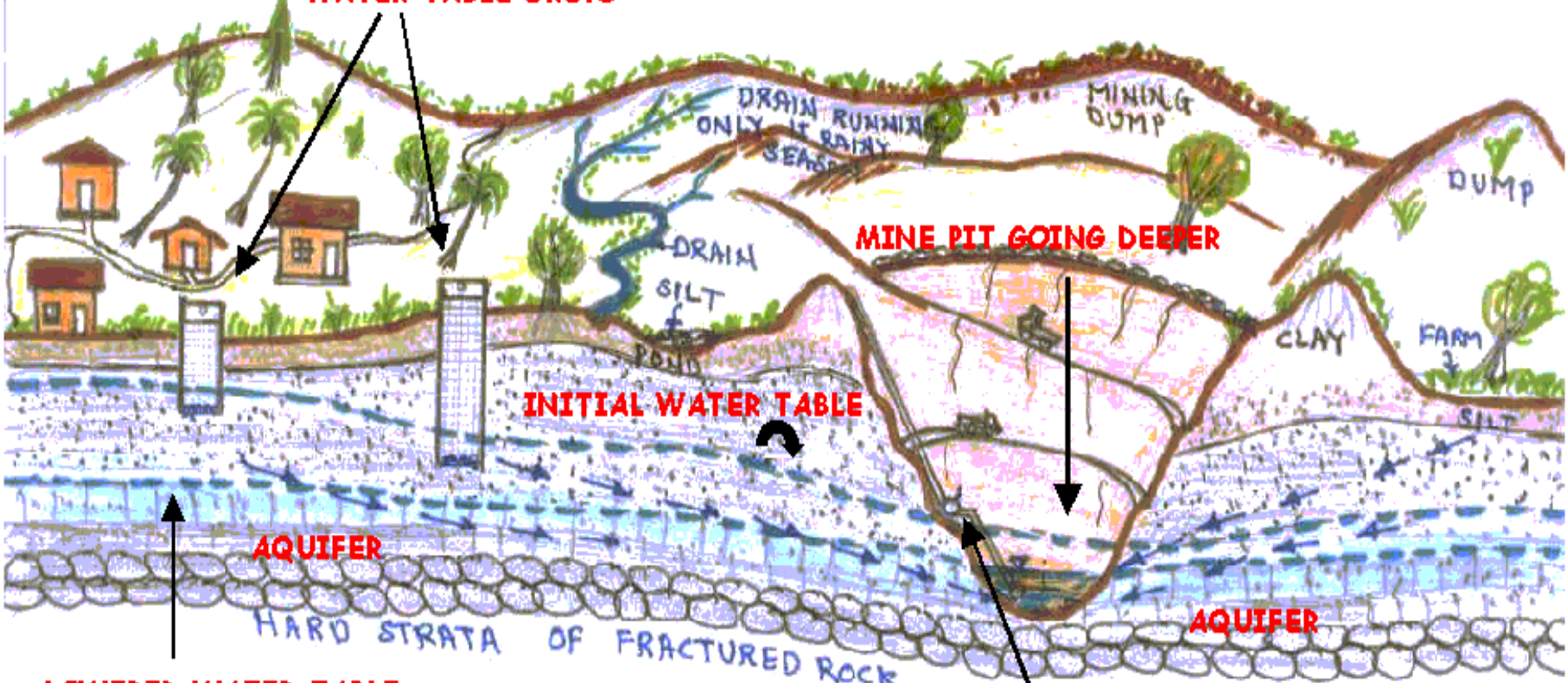
WATER SECURITY ISSUES IN MINING REGION OF GOA

- **Lowered water table (52.76%)**
 - Groundwater extraction
 - Changes in availability of ground water (39.2%)
- **Destruction of water reservoirs (34.3%)**
 - Mine pits cut through water table
 - Dewatering of pit (water scarcity)
- **Dry wells and springs (72.82%)**
- **Less alternative sources of water (32.6%)**
 - Insecurity, inequality and conflicts (22.4%)
 - Inequity of water distribution



HOW WATER INSECURITY OCCURS IN MINING REGION?

WELLS GOING PROGRESSIVELY DRY AS WATER TABLE DROPS



MINE PIT GOING DEEPER

INITIAL WATER TABLE

AQUIFER

HARD STRATA OF FRACTURED ROCK

AQUIFER

LOWERED WATER TABLE DUE TO MINING

PUMP WHICH REMOVES WATER FROM WITHIN THE PIT SO AS TO CONTINUE MINING

(Shivnath Gawas, TERI, 2006)

WHAT IS FOOD SECURITY?

“...ready availability of nutritionally adequate and safe foods and assured ability to acquire food in socially acceptable ways”
(ADA 1998)

“...availability, access and stability at various levels” (Murthyjanjaya 1997)

“sufficient, reliable, nutritious, safe, acceptable and sustainable...”

HOW FOOD SECURITY IS DISTURBED IN THE MINING REGION?



- **Loss of agricultural lands**
- **Degraded agricultural lands**
 - Low soil fertility, water logging
 - Lack of irrigation
 - Increase in erosion/ siltation rate
 - Increased salinity (fields/ rivers)
 - Increased nutrient flows (loss of uptake)

Decreased agricultural yields

Inappropriate use of fertilizers

Reduced quality of foods

Less food production

Food insecurity

Altered food consumption

Compromised health outcomes

FOOD SECURITY ISSUES IN MINING REGION (COMMUNITY PERCEPTIONS)

- **Loss of agricultural land holding (50 – 60%)**
 - Disturbed food security for family sustenance
 - Compensation is not a healthy substitute for steady annual food supply
 - Insecurity and inequity
 - Loss of agricultural work days (56 – 65%), esp for women
- **Degraded agricultural land**
 - Low soil fertility (35%)
 - Low water holding capacity of water bodies (17.8%)
 - Change in land contours
 - Lack of irrigation (42.3%)

IMPACT OF WATER AND FOOD SECURITY ON WOMEN

Water security	Food security
Collecting water	Preparation
Storing water	Cooking
Cooking	Preserving food
Washing dishes/ clothes	Storing family's food
Heating water for bathing	Feeding children/ family
Cleaning house, applying dung	Producing
Sanitation	Purchasing
Cattle feeds	Market the crops grown
Agriculture, kitchen garden	Income source and work

HOW HUMAN HEALTH IS RELATED TO WATER AND FOOD SECURITY?

Nutritional causes:

Micronutrient deficiency
(anemia, vit A, IDD,
PDD)

Malnutrition

General:

Chronic / non-
communicable
illness

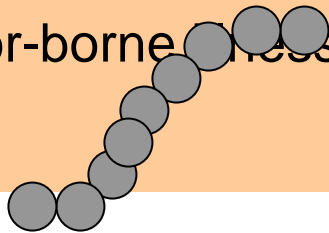
Respiratory illness

Fatigue/ stress

Water stress:

Water borne diseases

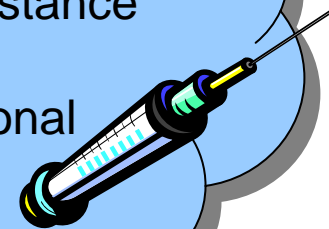
Vector-borne diseases



Health

Host factors:
Immunity, resistance

Genetic, hormonal
constitution



PERCENTAGE OF PEOPLE REPORTING ACUTE AND CHRONIC ILLNESS

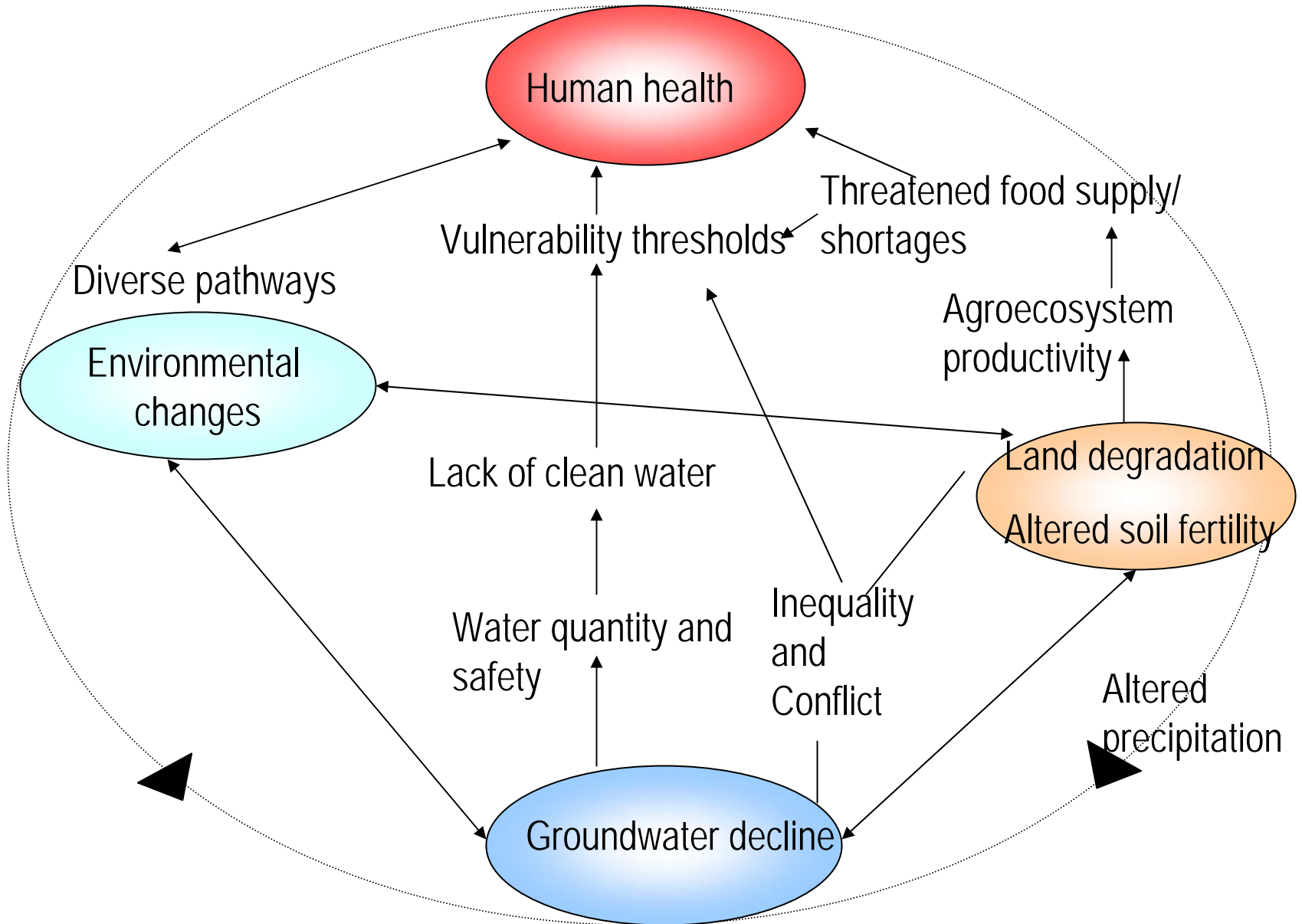
Illness	> 45 yrs	35 - 45 yrs	< 35 yrs	Total
Sensory (eye, skin, throat)	24	31	29	30
Cardiovascular	12	11	12	13
Respiratory (TB, ARI, COB)	71	76	73	74
Gastrointestinal (GE, jaundice, diarrhoea)	34	41	41	41
Nutritional (anemia, IDD, PD)	24	21	20	20

N= 1412 . Years- Number of years of mining activity in the villages of Goa

COMMUNITY HEALTH ISSUES IN THE MINING REGION OF GOA

- Changes in food consumption pattern (21.5%- 41.1%)
- Altered immunity and lack of resistance to illness
- Community pre-disposed to illness (infections, chronic/ non-communicable illness)
- Prevalence of nutritional (20%) and water borne illness (41%)
- Aggravate existing health conditions of the individual (30- 74%)

INTERLINKAGES OF WATER AND FOOD SECURITY IN MINING REGION OF GOA



CONCLUSION

- Water and food insecurity caused direct and indirect health problems in the mining region of Goa
- Women disproportionately bear the grunt of water and food insecurity

