MINING, GROUNDWATER MANAGEMENT AND WATER MONITORING TRAINING

2017

Trainers:

Sustainability East Asia LLC & Groundwater Solutions LLC

Objective of the Training

Provide technical and management knowledge on water management, and assist stakeholders to initiate actions that could contribute sustainable water management in the south Gobi Region of Mongolia

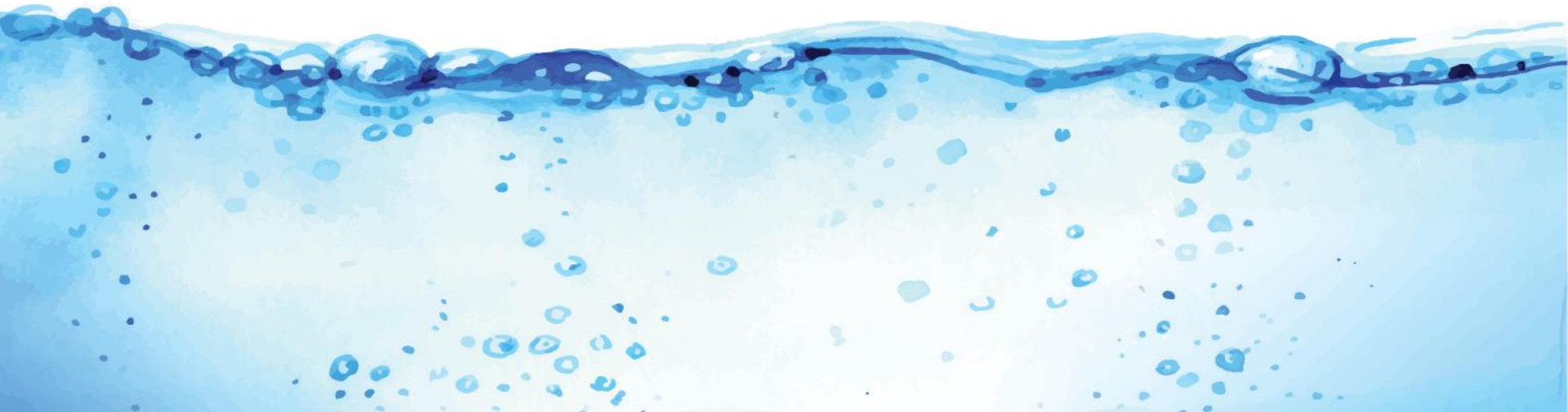
Your feedback is important!

Content

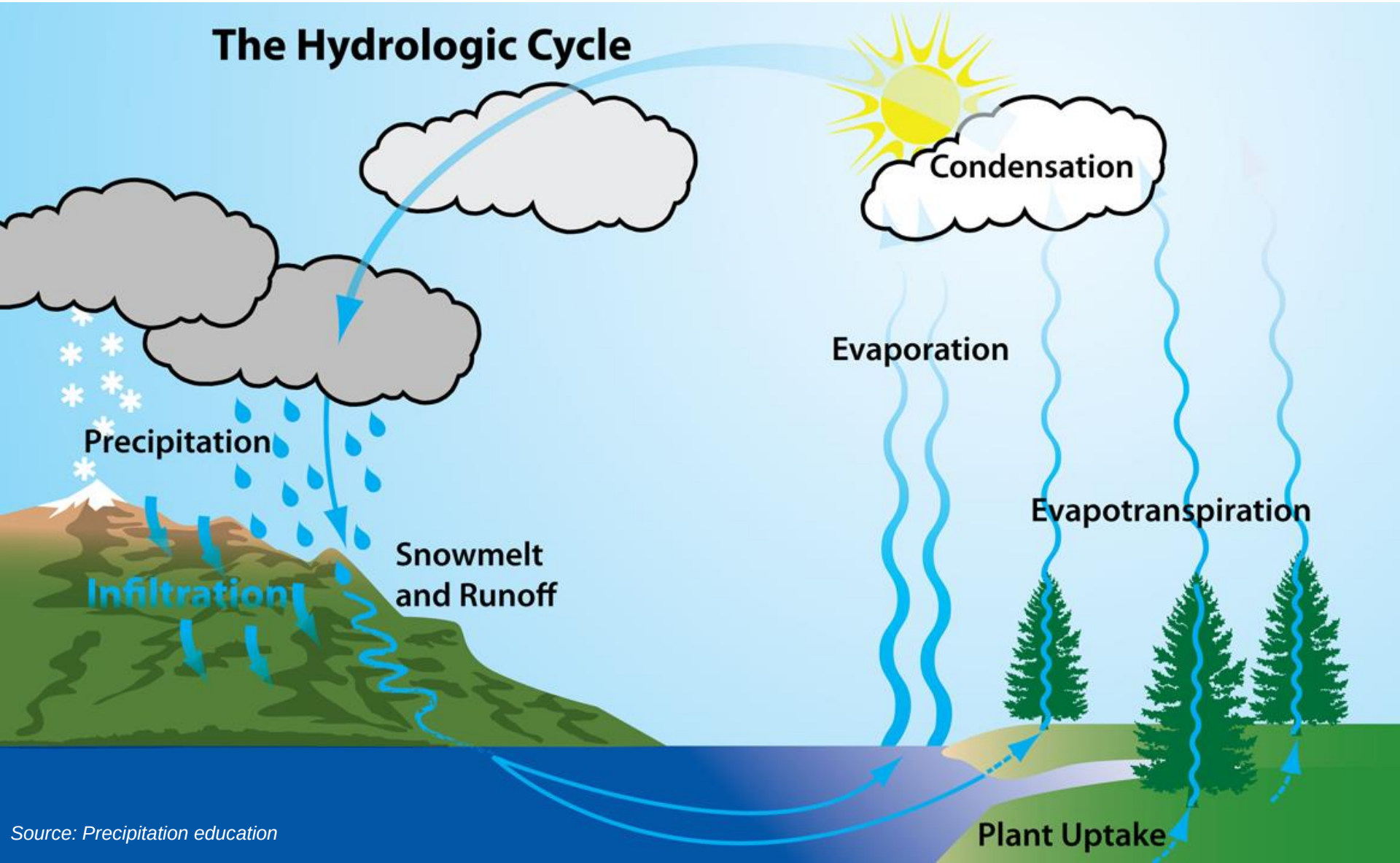
1. Understanding of basic hydrogeology/groundwater principles
2. Water monitoring
3. Well maintenance
4. Water use regulation
5. Mining lifecycle and Mine water use requirements
6. Challenges for achieving Sustainable water management in the South Gobi
7. Initiatives for achieving sustainable water management in South Gobi

topic 1

Understanding of Basic Hydrogeology/Ground water Principles



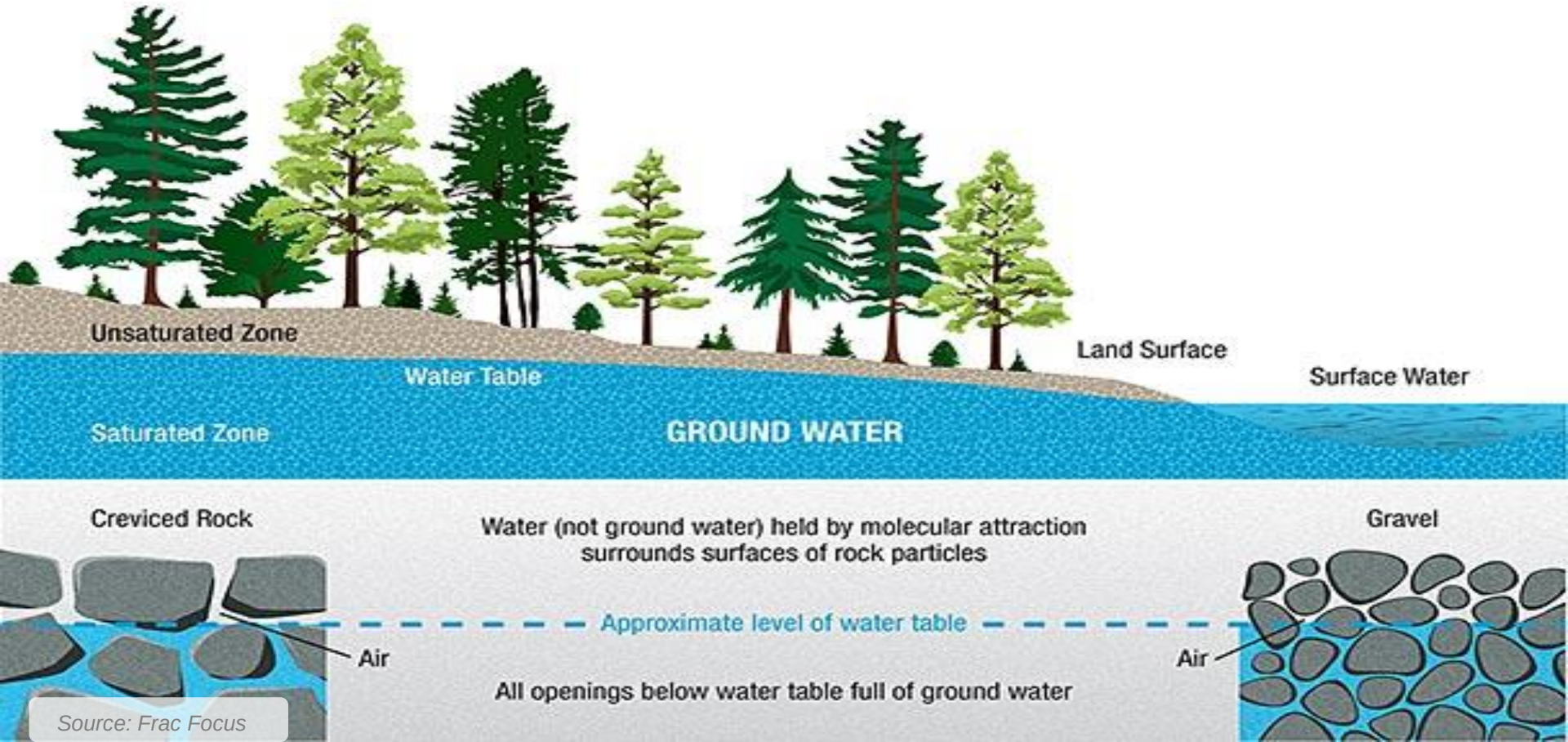
The Water Cycle



Source: Precipitation education

Groundwater Occurrence

Definition: Water found beneath earth's surface in pores and fractures of soil and rocks



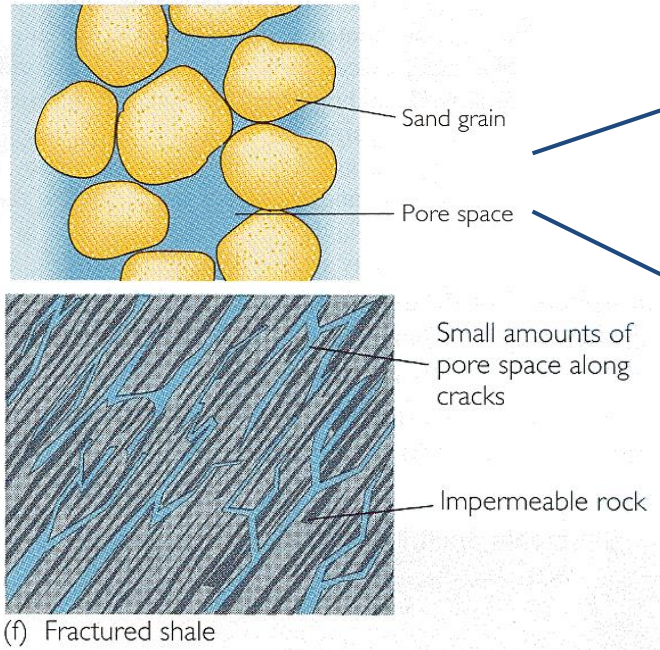
Source: Frac Focus

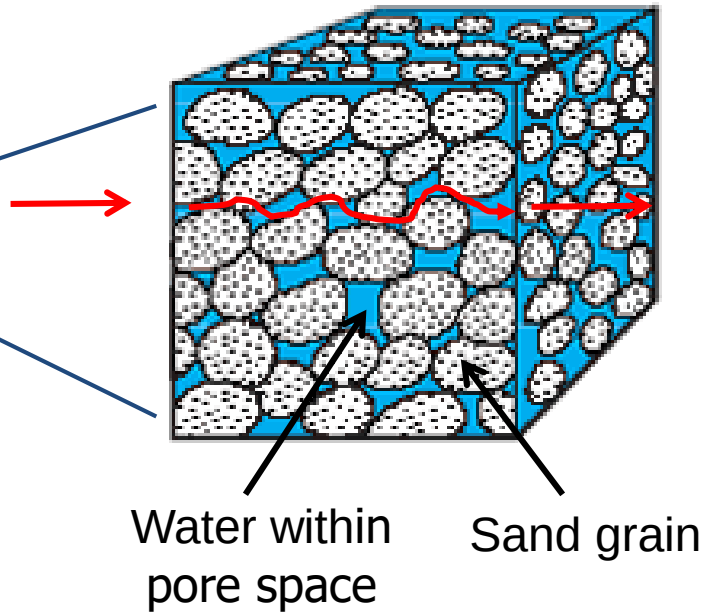
Basic Hydrogeology Concepts

Common misconception: Groundwater is Not "an underground lake"

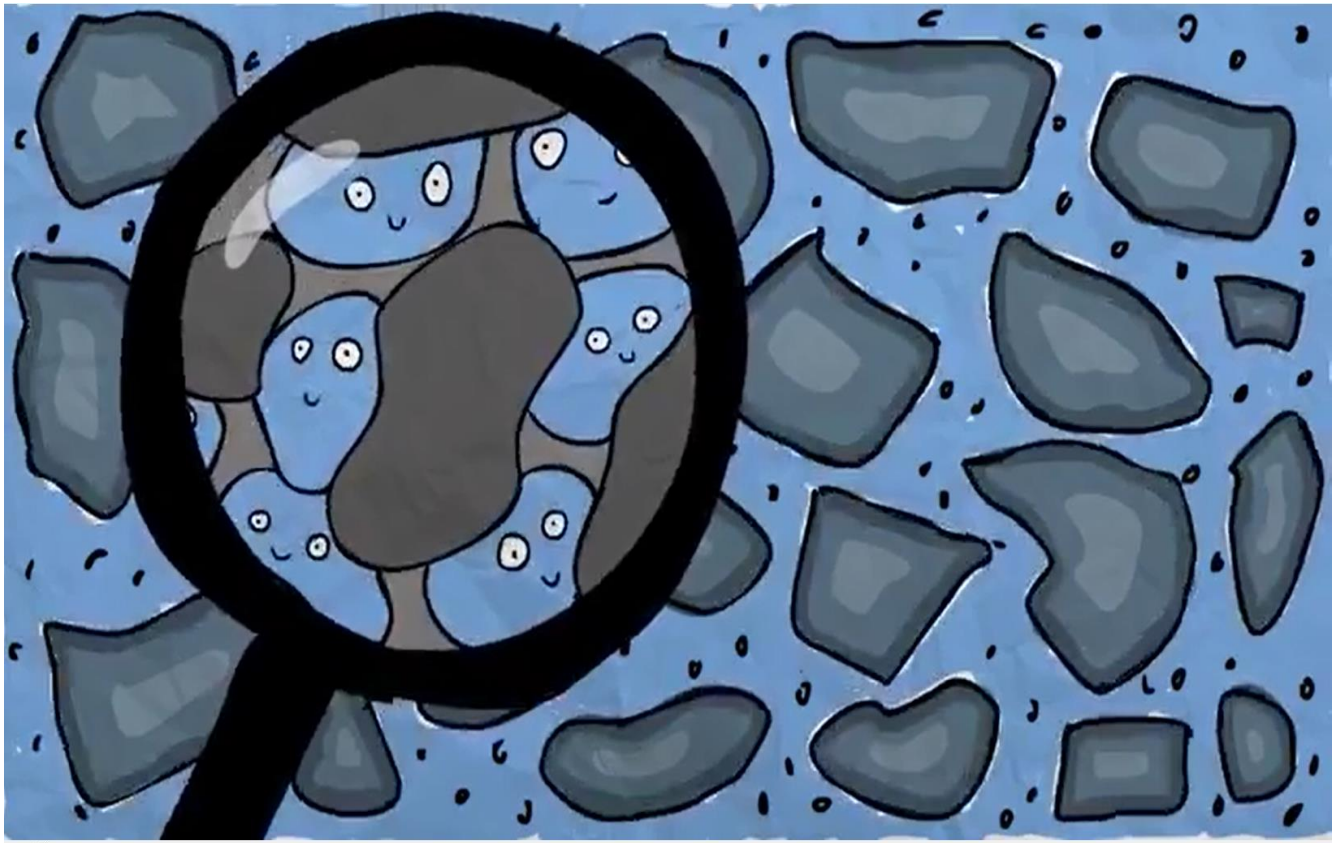
Porosity: empty space in a material, and is a fraction of the volume rock

Groundwater flow path through a sandstone formation



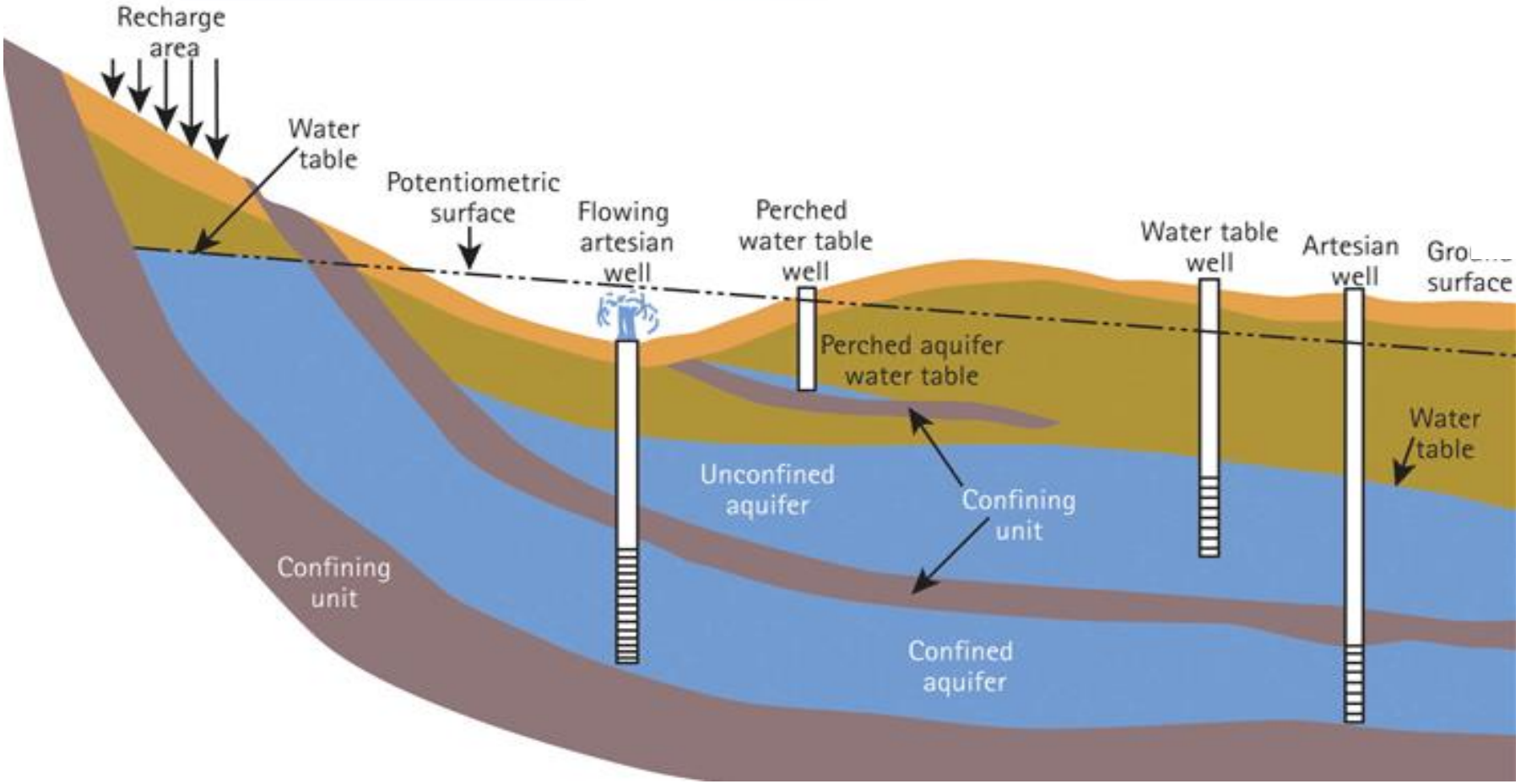


What is Groundwater



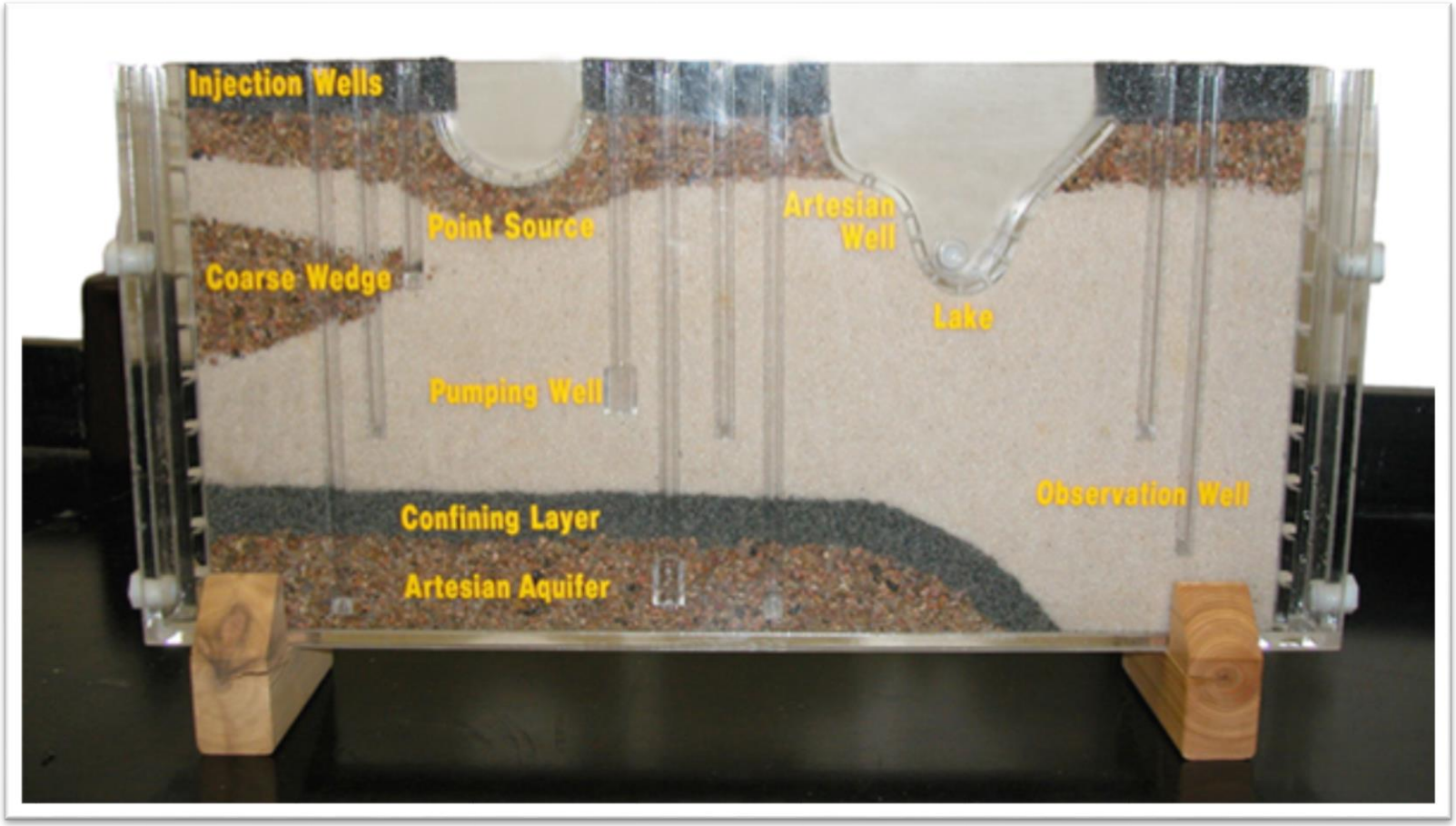
Source: Melanie Eirich

Confined/Unconfined Aquifers



Source: JSWATER

Groundwater Sand Tank

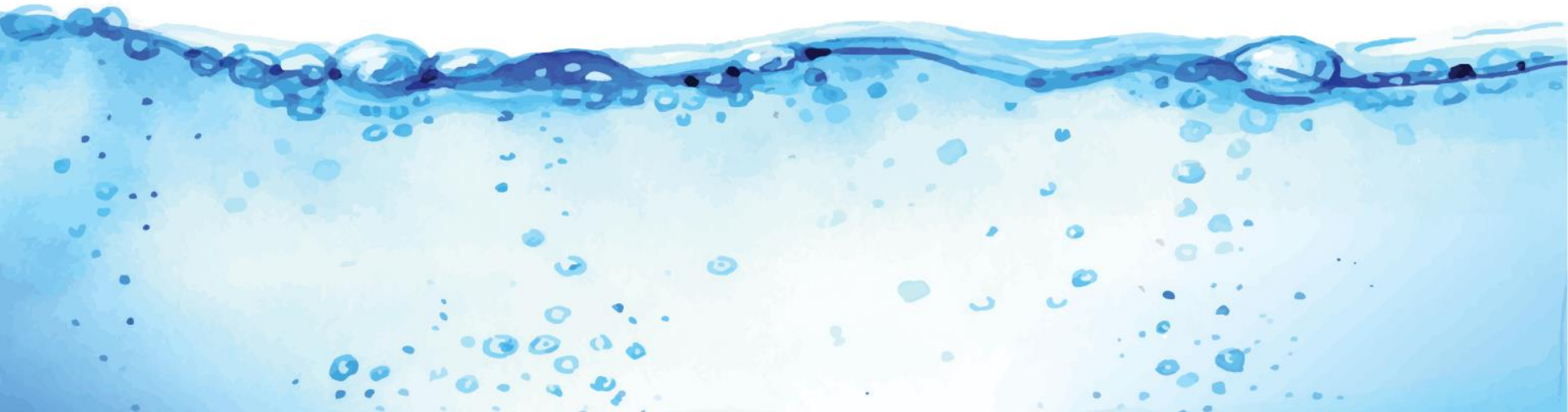


Source: Groundwater Solutions

Questions?

topic 2

Water Monitoring



Introduction to Water Monitoring

Water Monitoring

- Gathering data and information about water quality (chemical, physical, biological characteristics) and quantity (water use, surface water flow, water level in monitoring wells etc.);
- It is done on a regular basis;
- Needs to be done using rigorous and consistent methods

Why is it needed?

- To assess uncertainties such as levels and qualities;
- To assess natural variations of water parameters;
- To assess water use impact, or effectiveness of water management etc.

Water Monitoring Questions

Why? Background, baseline, climate, impacts

Where? Catchment area, impact zone

What? Parameters(water level, water quality)

How? Type of monitoring plan, equipment to use

When? Frequency, specific events(i.e. floods)

Who? Who does the work?(Government? Company? Community? Or stakeholders through participatory approach)

Water Monitoring Network in Mongolia

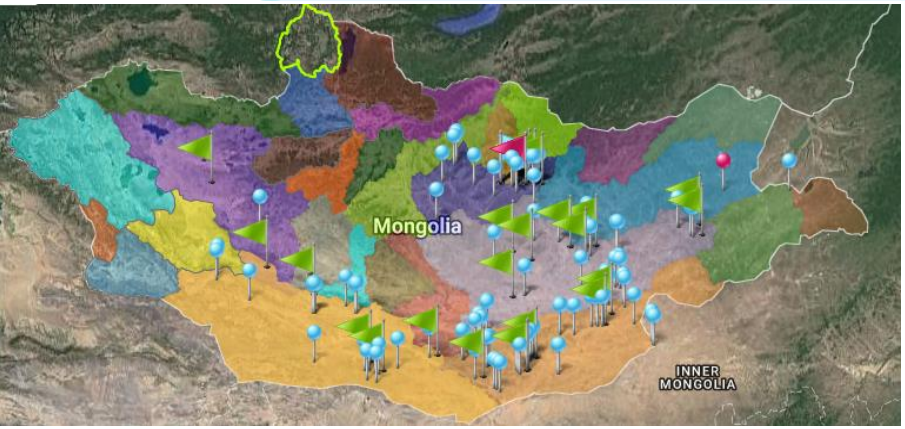
National monitoring network

River Basin monitoring unit

Entities internal monitoring

Water monitoring	Who conducts such monitoring?
National and regional level water monitoring	State organisations
Internal water monitoring within organisations	Organisations such as water supply, mining, and water users.
Participatory water monitoring or community-based water monitoring	Communities, organisations, local governments, universities, etc.

Water Monitoring Network in Mongolia



GUD-34

Umnugovi, Bayan-Ovoo
Last Date: 2016-12-19 18:12
Temperature (°C): 13.16
Level Toc (m): 29.21

Use www.groundwater.mn to access water monitoring information (subject to rights)

River Basin	Manual Logger	Automatic Logger	New bore	Old bore
North Gobi and Khalkha middle step	27	8	10	25
Galba-Oosh Dolood River Basin	49	6	7	48
Altain Uvur Gobi River Basin	23	4	7	20
Khyargas nuur- Zavkhan gol River basin	1	2	2	1
Kherlen gol River Basin	2	0	0	2
Tuul River basin	0	3	0	3
Total	102	23	26	99

Source: www.groundwater.mn (MINIS)

Water Level Monitoring

Water Monitoring

- Water level dipper
  - Can only take single data points
  - Easy to use (very little training required)
  - Relatively cheap

Automatic

- Transducer
  - Can be expensive but relatively easy to use once installed
  - Requires periodic data download
  - Ideal for pumping bores

Simple Tool for Water Level Monitoring (Plopper)

Plopper/sampler and tape measure

- Traditional and simple
- Can only take single data points
- Easy to use (very little training required)
- Relatively cheap

When do the monitoring:

- To measure before watering
- Note measurement of date
- To measure same level

Basic Water Quality Measurement

Basic water quality parameters can be measured in field

- pH – (Concentration of hydrogen)
- EC – (Conductivity)
- TDS – (Total dissolved solid)
- Temperature

Laboratory analysis are needed for detailed water quality parameters such as metals or bacteria

Water Monitoring Datasheet Examples

Water level

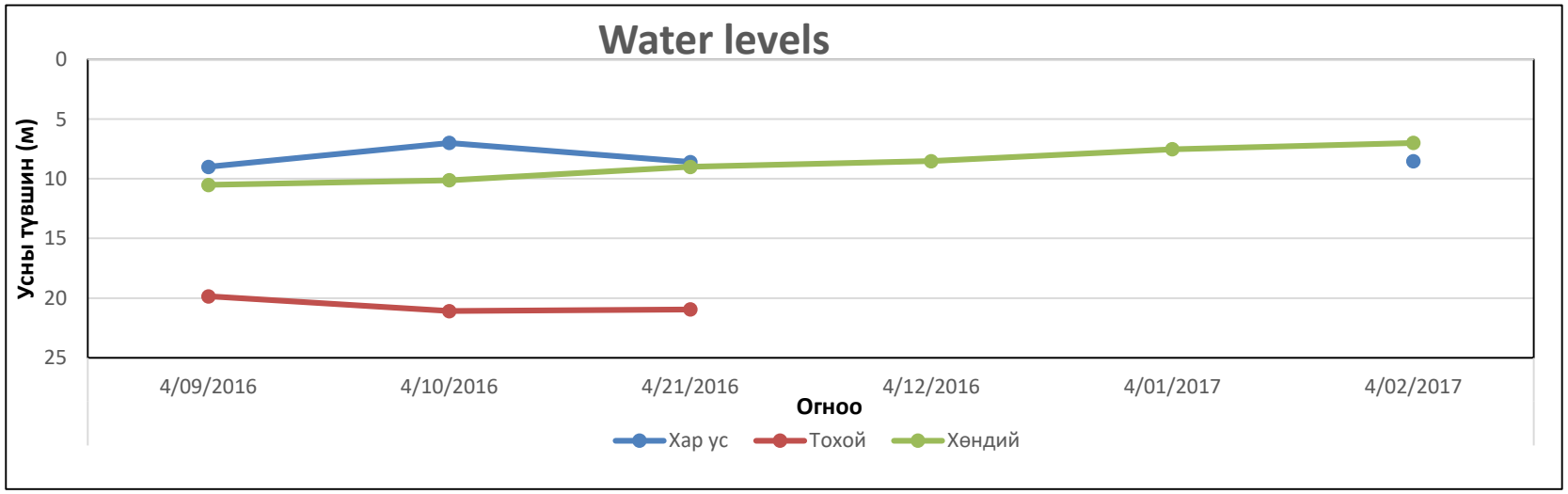
Bore №	Year/Month/Day	Stick up (cm)	Water level	Measured by

Water quality

Bore №	Sample №	Sampling date	Sampling time	Volume of bottle	Deliver to tab

Water Level Monitoring Data (example)

Well ID	Water level (м)					
	2016-04-09	2016-04-10	2016-04-11	2016-04-12	2017-04-01	2017-04-2harus
Har us	9	7	8.595			8.52
Tohoi	19.85	21.09	20.95			
Hundii	10.52	10.12	9	8.52	7.52	7



Participatory Water Monitoring (PWM)

Water Monitoring

Scientific data and information about water quality and quantity

Participatory Monitoring

Collaborative process to address problems together

Participatory Water Monitoring

Monitor water through participatory approach

Participatory Water Monitoring

- Participatory water monitoring - uses a participatory approach to monitor water. In the process, it not only generates credible data and information but also builds trust and helps resolve or avoid conflict surrounding perceived or actual impacts.
- Purpose – Any stages of project development if needed.

Source: Photos by Oyu Tolgoi LLC

Benefits and Challenges of PWM

Benefits

- Build trust/social capital
- Part of decision making by community and leads to better decision making
- Generates credible data, builds trust, helps resolve or avoid conflict
- Increased learning and knowledge sharing
- transparent stakeholder relationships
- Community empowerment

Challenges

- Coordinating and engaging with stakeholders with diverse views on impacts to water
- Managing stakeholders expectations
- Getting the monitoring indicators right
- Making extra efforts (time and resources)

Source: IFC's Advisory note. Participatory water monitoring: a guide for preventing and managing conflict 2008

AREVA Mongol LLC: Participatory Environmental Monitoring Program

- **Purpose** - to avoid any misunderstanding between the local communities and the company regarding environmental issues and increase transparency. Started in 2014
- **Participants** – involved 45 local stakeholders from Ulaanbadrakh, Zuunbayan soums who represented the local government and citizens
- **Activities** - water quality monitoring at 8 locations, presenting results to the soums and water training for communities
- **Results** - relieved tension that existed between the company and communities, improved relationships with communities

Oyu Tolgoi LLC: Participatory Water Monitoring Program

Background – started in 2011 with the aim of improving stakeholder environmental knowledge, building mutual trust, and increase transparency by engaging with herders through voluntary participatory water monitoring

Participants – OT, herders, and students from 7 secondary school students

Monitoring – water level and recharge rate (over 40 wells), water quality (7 schools), and precipitation (4 points).

Results

- Herders acknowledged that OT's water monitoring results are reliable
- Herders water knowledge increased
- Based on monitoring results OT delivers water to herders whose well water level decreased

Energy Resources: Participatory Water Monitoring Program

Background – started from 2011 (28 herders)

- 10 groundwater boreholes, 2 reservoirs with a total storage volume of 56,000 m3;
- In partnership with the authority of Galba Uush Dolood Gobi water basin, 2 groundwater monitoring boreholes around water extracting area were equipped with remote data loggers

Participants – 99 community members (Tsogttsetsii administration, hospital, kindergarten, secondary school), herders and citizens from Siirst, Bilgeh, Uguumur and Tsagaan Ovoo baghs, herders from Baayn-Ovoo impact area

Monitoring – monthly, herder wells around the mine, Tsogttsetsii soum centre and coal transportation road

Results – better public awareness; better trust

Role play – 30-60 min

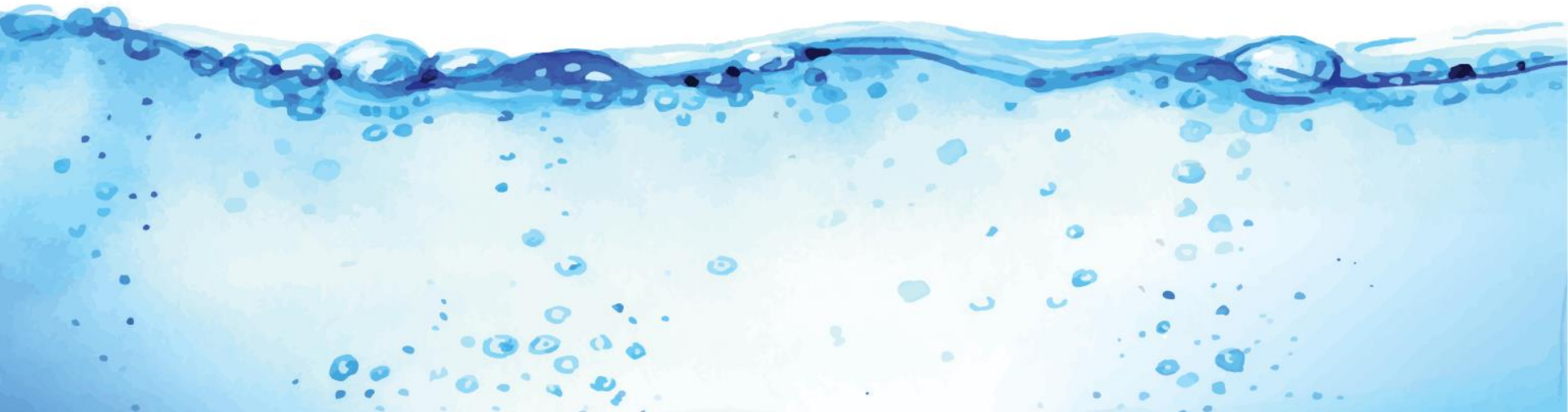
Watch video

Role Playing Exercise for Participatory Water Monitoring

Questions?

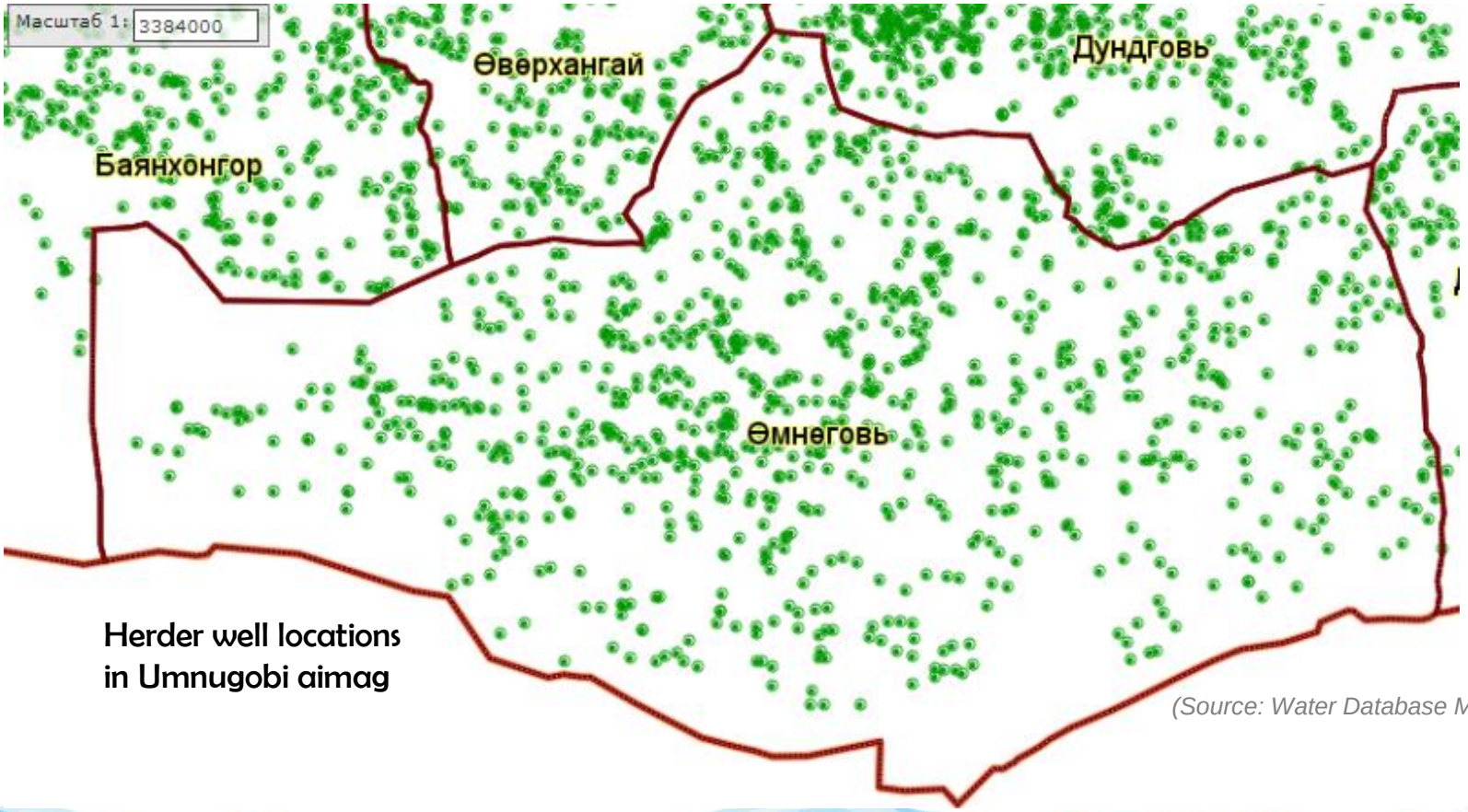
topic 3

Well Maintenance



Overview of well maintenance

Wells and springs - main source of water for in the Gobi and steppe regions of Mongolia

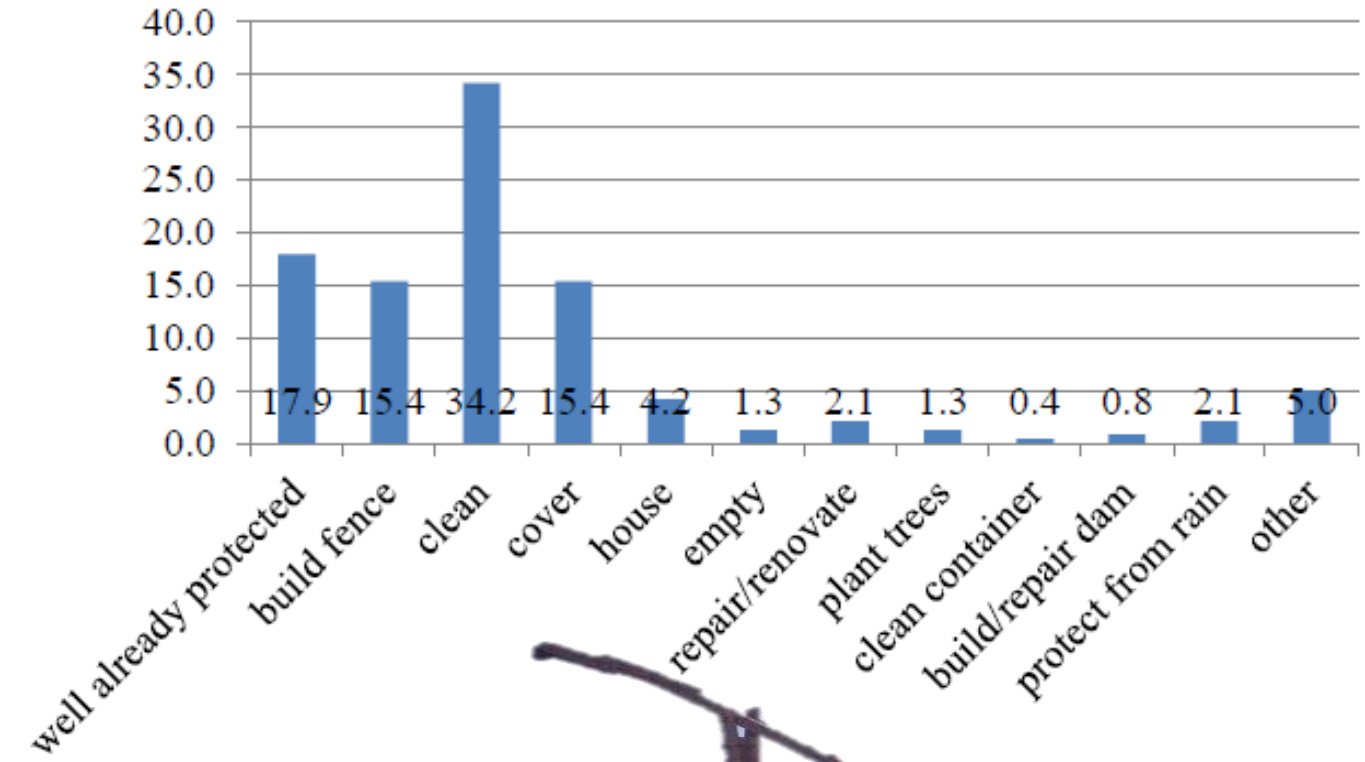


Herder well locations
in Umnugobi aimag

(Source: Water Database MET 2017)

Without regular maintenance well's service lifespan, yield, or water quality decreases overtime!

Well Protection in south Gobi
(Survey results 2013)



Source: Baseline community perception survey, IRIM, 2014

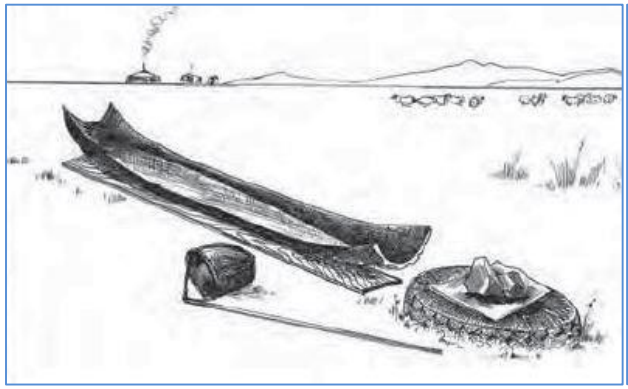
Types of well maintenance

Type of maintenance	Benefits
Removing solid i.e. mud, sand etc. materials and deepen the well	Prevent reduction in water level and/or drain of well water
Install concrete casing	Prevent well wall collapse and enhance well durability
Enlarging well shaft diameter	Provide enough space to work in the well
Elevate well collar	Prevent unwanted items and sand, mud and dirt to enter the well due surface run-off
Concrete well collar and areas around trough	Prevent soil contamination around well from livestock waste and surface run-off

Source: https://www.jircas.affrc.go.jp/english/manual/JIRCAS_Mongolia_technical_manual.pdf

Preparations for well maintenance

Well condition assessment

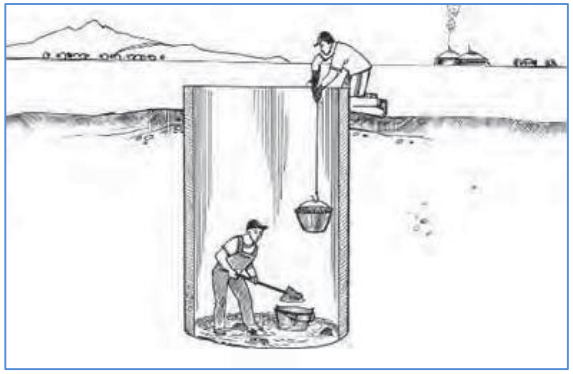


Planning

Collect necessary tools

Different types of well maintenance

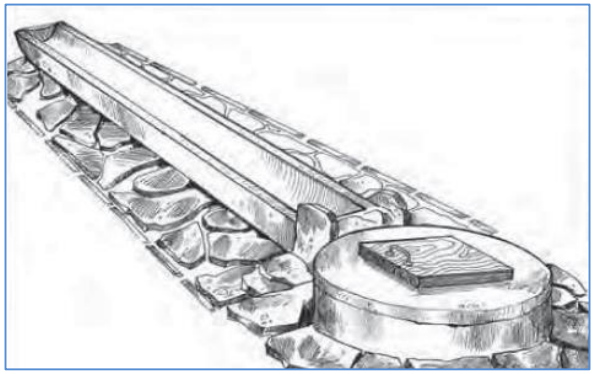
Well cleaning

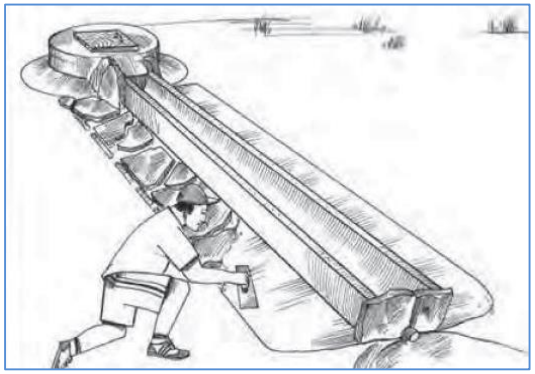


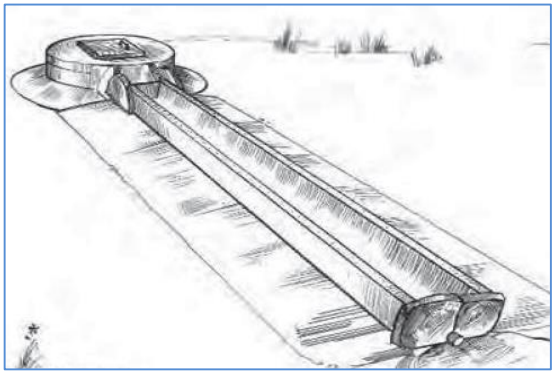
Elevating well rim

Making well cap

Concrete around well collar and trough







Source: https://www.jircas.affrc.go.jp/english/manual/JIRCAS_Mongolia_technical_manual.pdf

Well maintenance considerations

- Safety - Consider all safety risks before start
- Select your timing correctly - Spring or fall when there is low recharge
- Clean the tools before start work
- Removed materials should be disposed in a safe distance from the well i.e. not getting into the well.
- Select your tools depending on what is planned:




Video on well cleaning

Well cleaning work safety

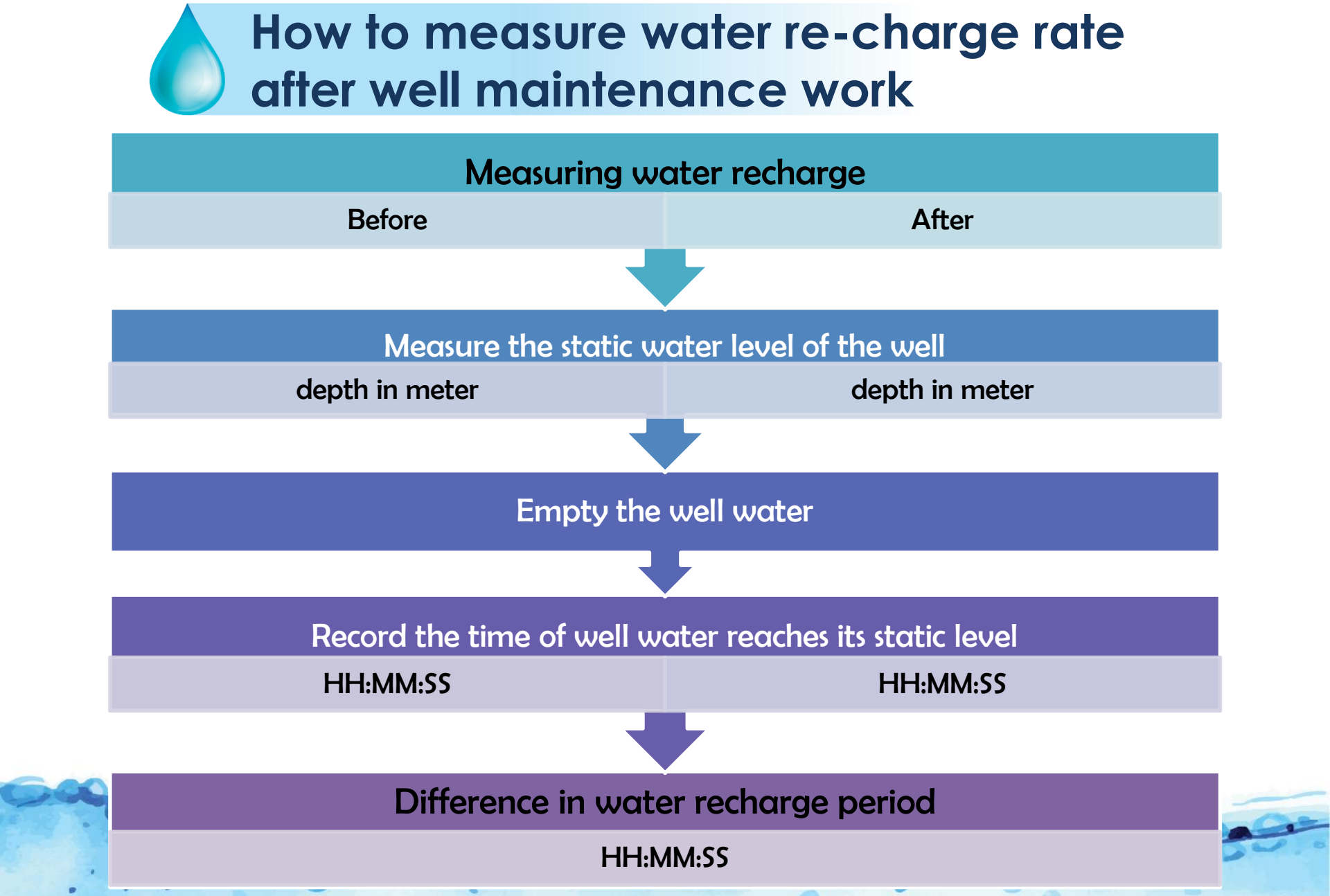
Key potential risks

- People falling into well
- Items may fall into well from surface or collapse of the well walls
- Faulty equipment e.g., ladders, ropes, hooks, buckets

Key mitigation measures

- Get advise from water expert prior to well maintenance;
- Don't do if it is unsafe
- Not recommended to work in too deep wells;
- Never work alone;
- Use safe ladder and/or safety harness
- Place tools or equipment in safe distance from well opening to prevent them falling into well
- Use minimum PPE such as no slippery waterproof boots and hard hat.

How to measure water re-charge rate after well maintenance work



Practices of well maintenance in Mongolia

During socialist times, collective farms organized the cleaning and protection of hand dug water wells, but now this type of work has almost been forgotten.

Initiatives by mining companies in Mongolia

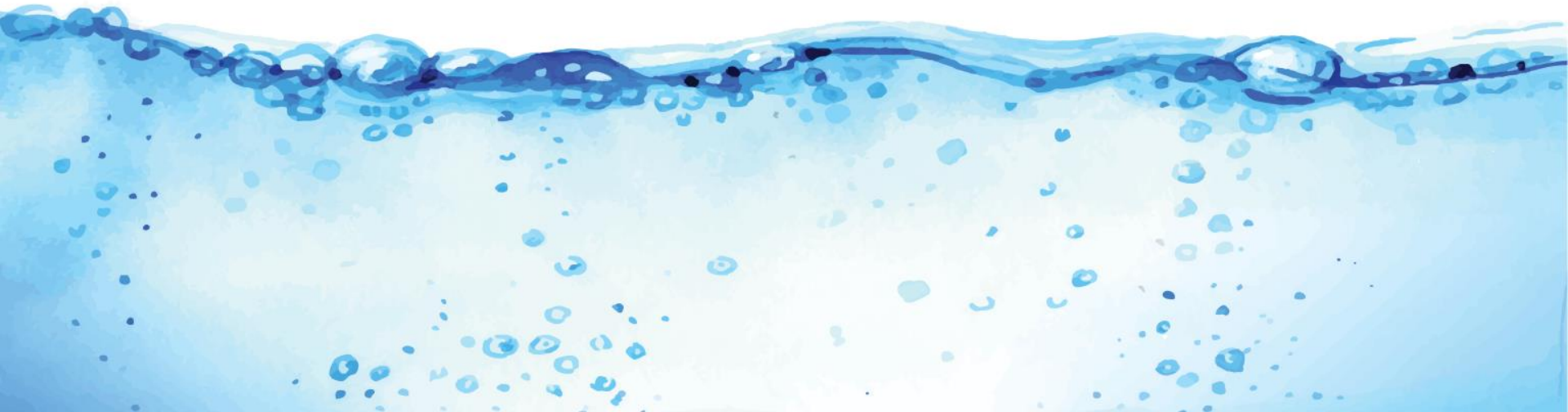
Oyu Tolgoi LLC
27 hand-dug and 12 deep wells were repaired and restored in Khanbogd and adjacent soums of Umnugobi aimag (2013)

Erdene Mongol LLC
Five wells (Khurentsav, Suul tolgoi, Khanan, Zadgai, and Mandal) commissioned during 1989-1990 in Shinejinst soum, Bayankhongor aimag were cleaned, restored and new cover sheds constructed in 2016.

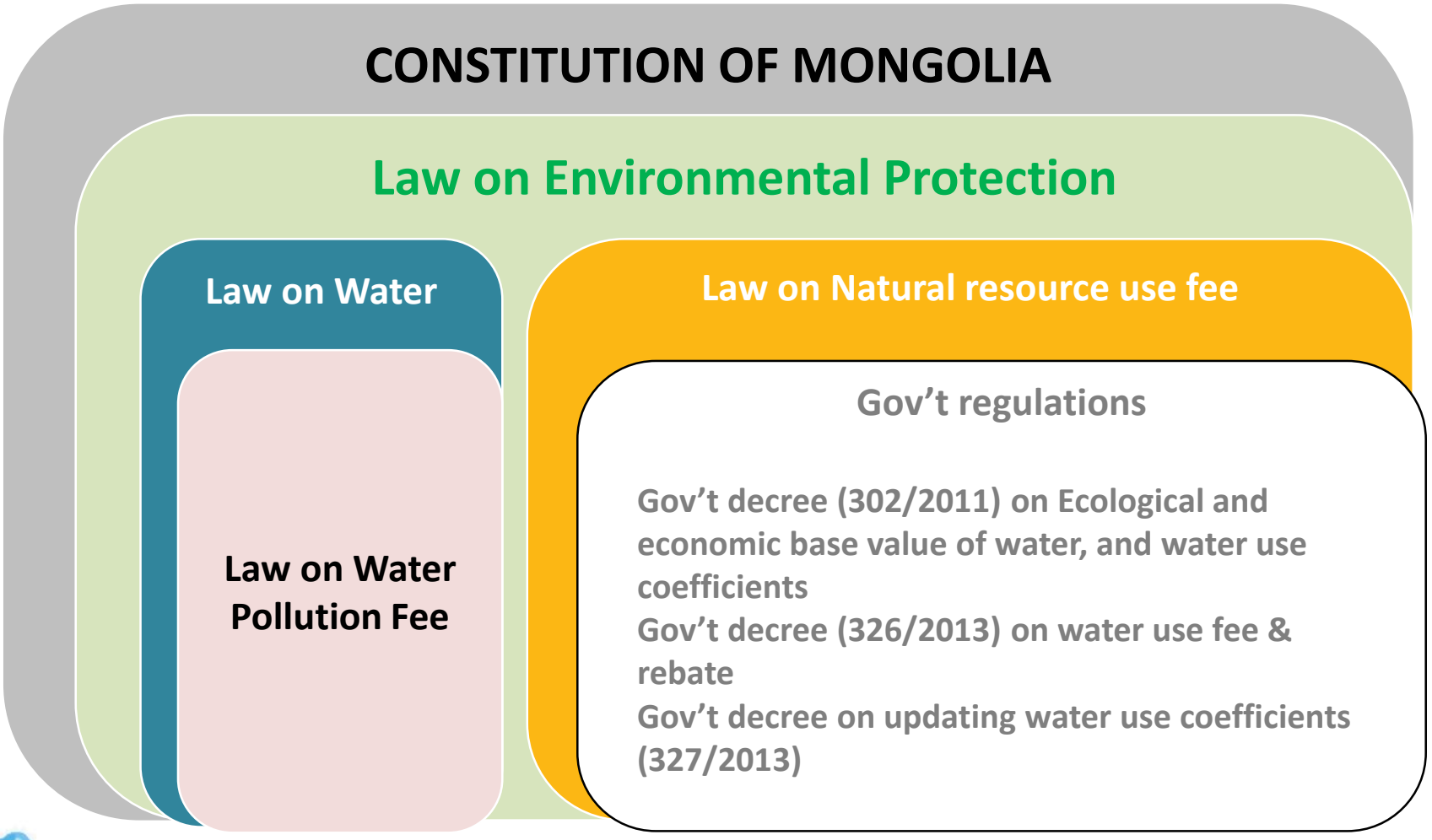
Questions?

topic 4

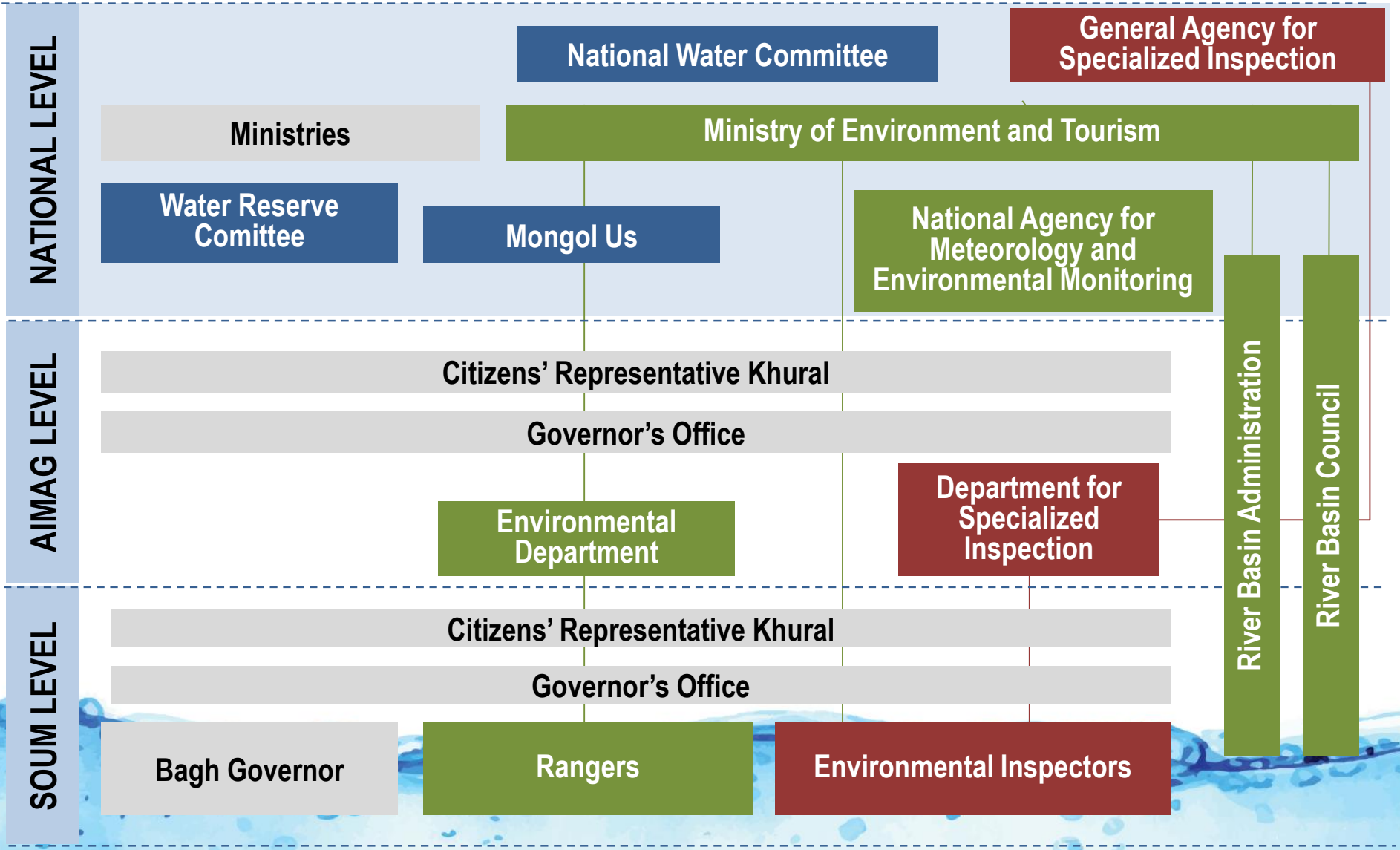
Mongolian Regulatory Environment



Key water resource and management laws



Water management institutions



Water Use Rights and Permissions

Water is under state protection – State manages water use permission

Right to use water (commercial)

- Land use right ≠ Water use right
- Not transferable and tradeable

Right to consume water (non-commercial)

Permit for bores, wells, diversion canal from rivers, etc. is provided by aimag or capital city EA

Is water available for use?

EXPLORATION - Permission is given by MET

- State budget-Regional or urban supply study
- User's budget – All other

Who provides water use/waste water disposal permission?

WATER USE PERMISSION

- Water use permit can be cancelled by MET
- Initial permit 10 years, extended by 5 years

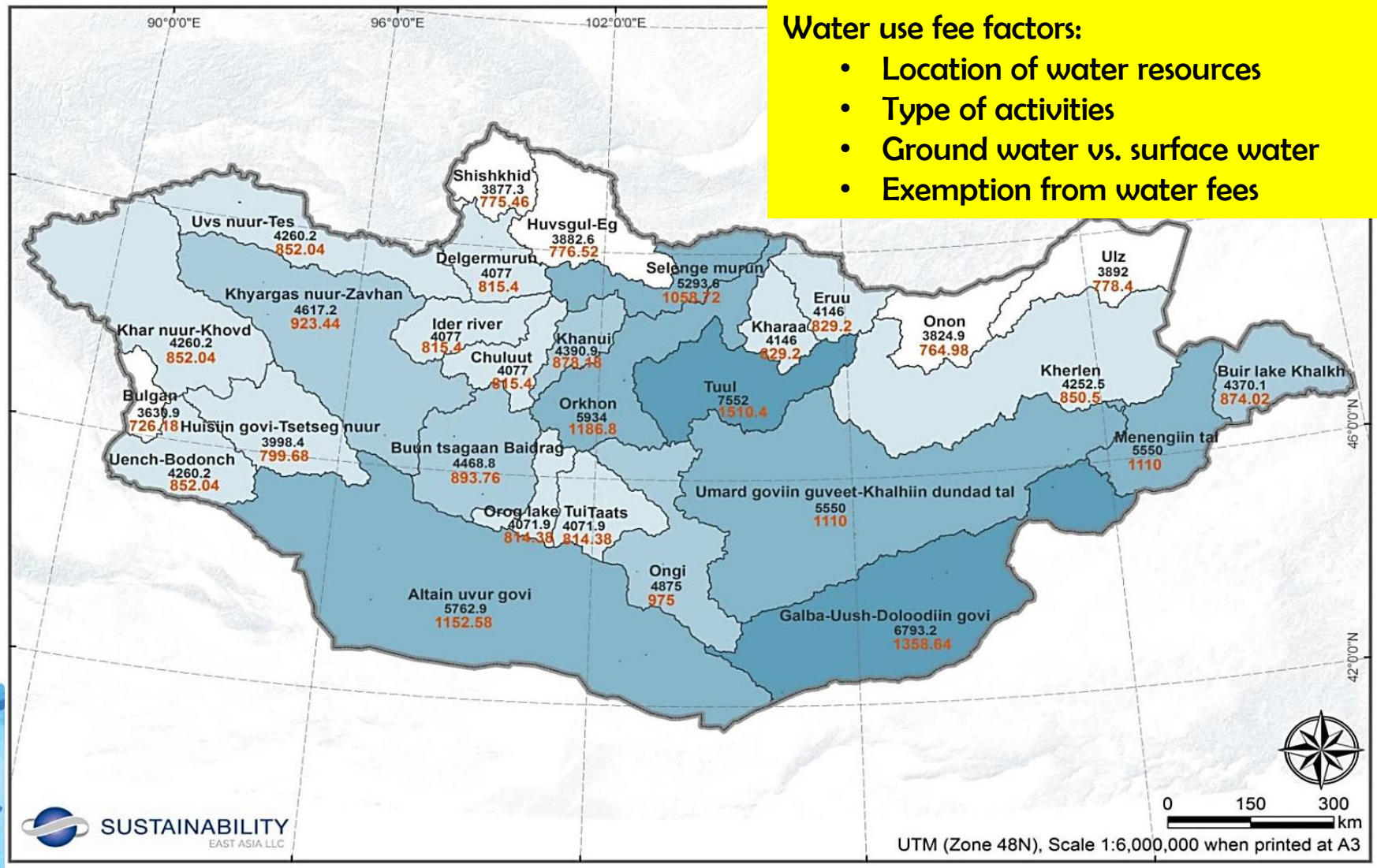
Consumption (m^3/day)	Screening	Permission
<50	Aimag EA	Soum Governor
50-100	RBA	Aimag EA
100<	MET	RBA

WASTE WATER DISPOSAL PERMISSION

Waste water (m^3/day)	Screening	Permission
<50	RBA	Aimag, soum EA
>50	MET	RBA

Water Use Fees

Mineral exploration water use fees in Mongolia (Tug/m³)

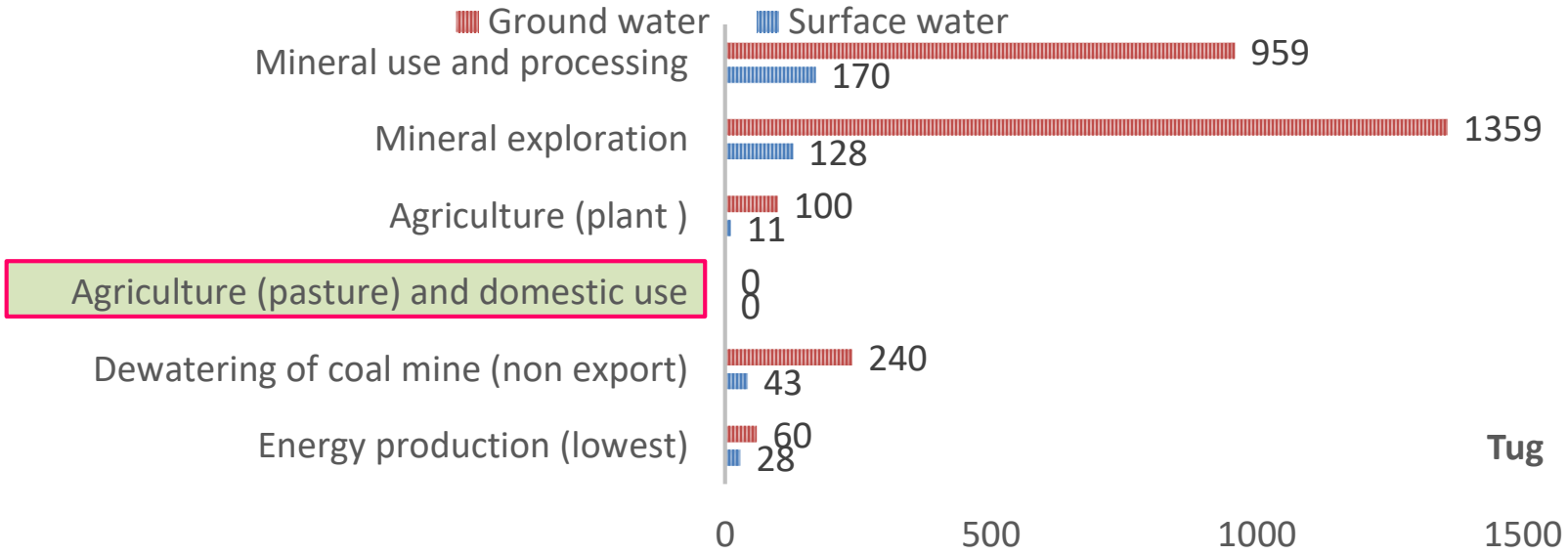


Water use fee factors:

- Location of water resources
- Type of activities
- Ground water vs. surface water
- Exemption from water fees

Water Use/water pollution fees for some industries

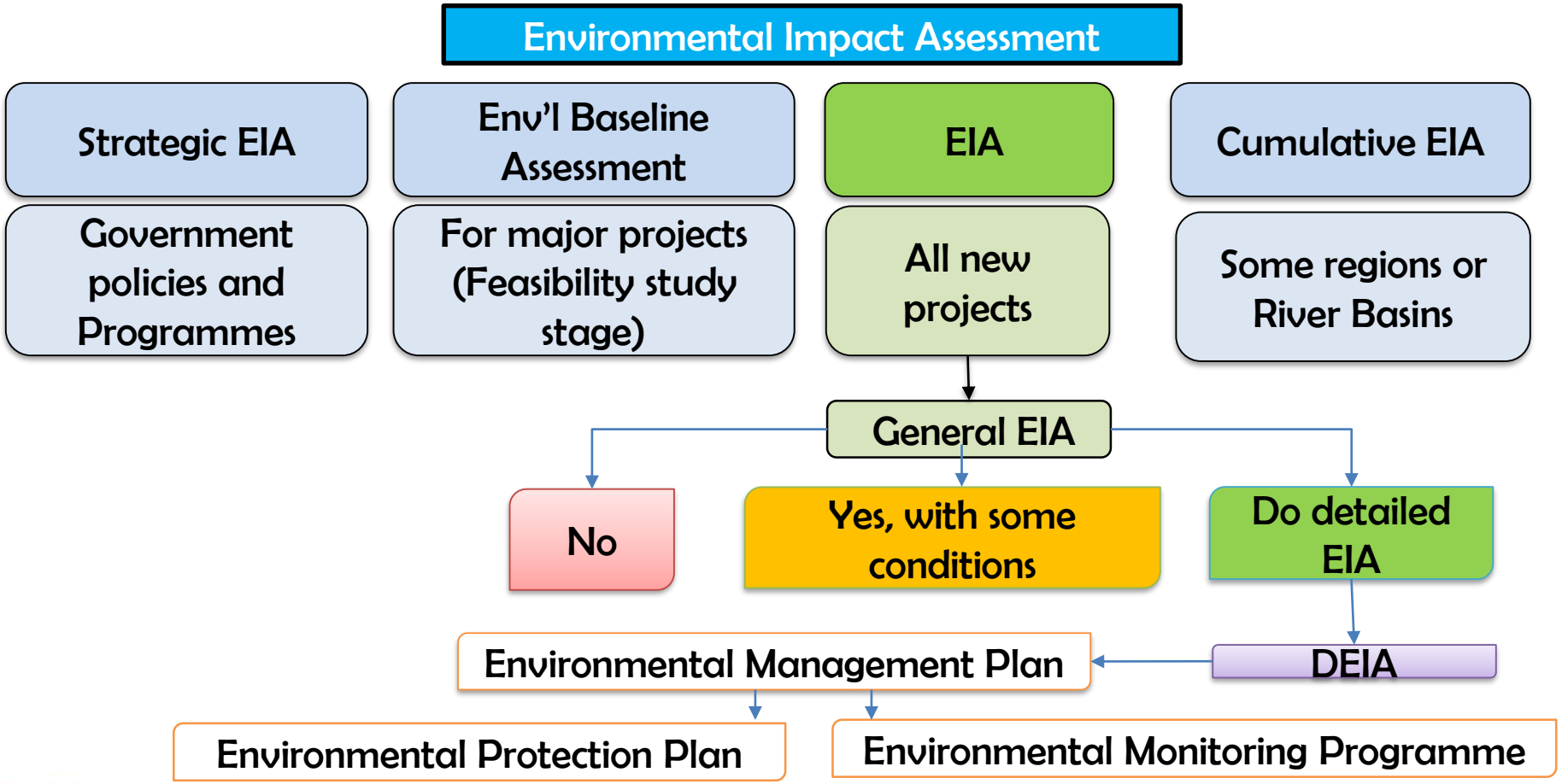
Water use fee: Galba-Uush-Doloodiin Govi basin (Tug/m³)



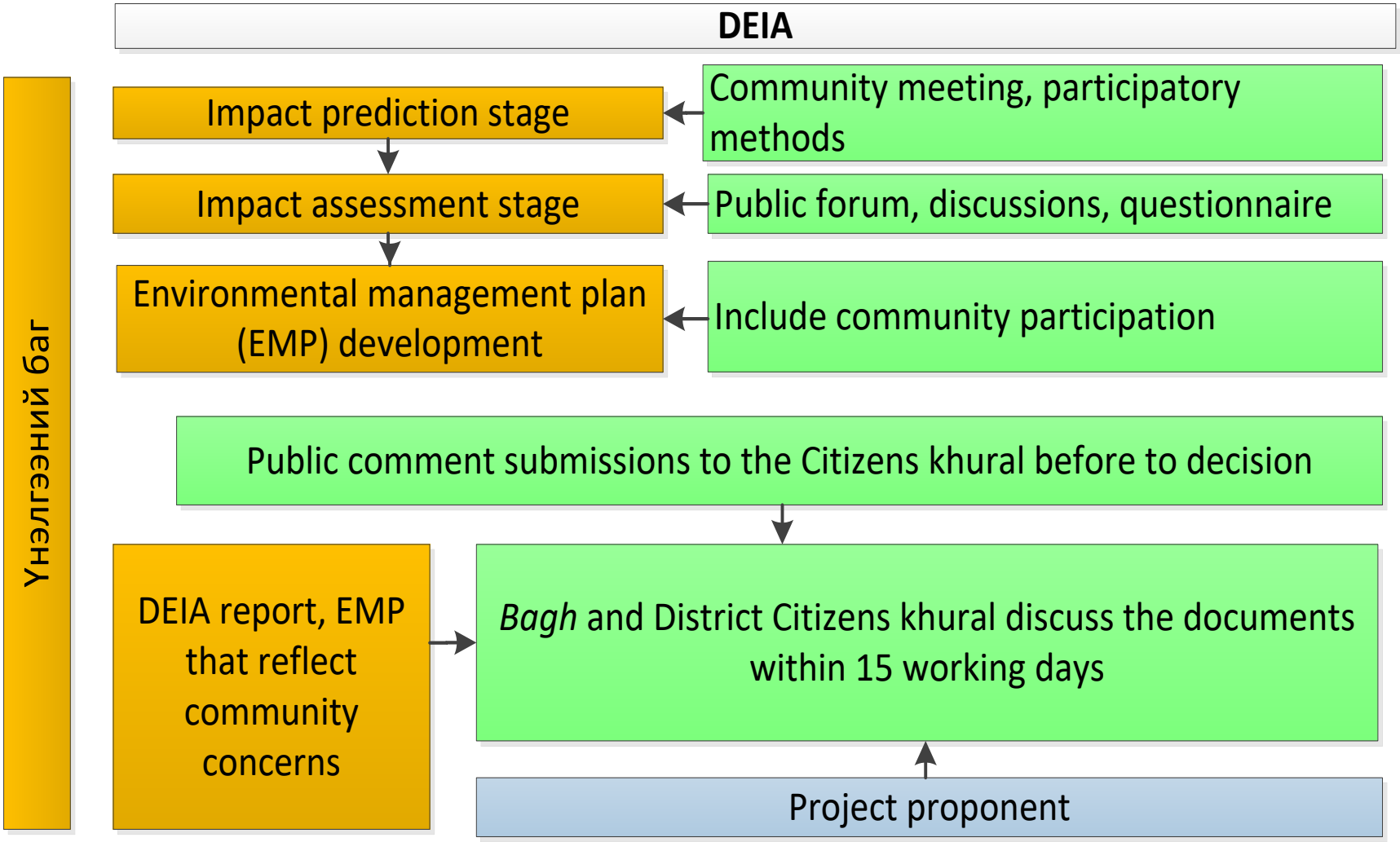
Water pollution fee is calculated considering the following:

- Amount of waste water
- Pollutants in the water (organic and mineral substances, heavy metals, toxic substances)
- Location of water resources

Water Use Impact Assessment Process in Mongolia



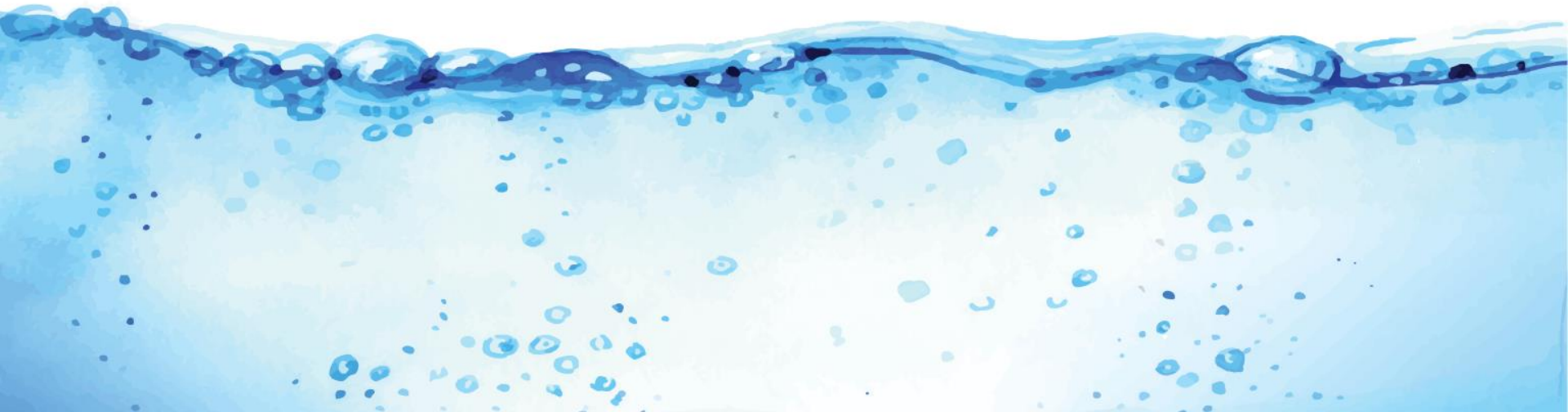
Community participation in EIA process in Mongolia



Questions?

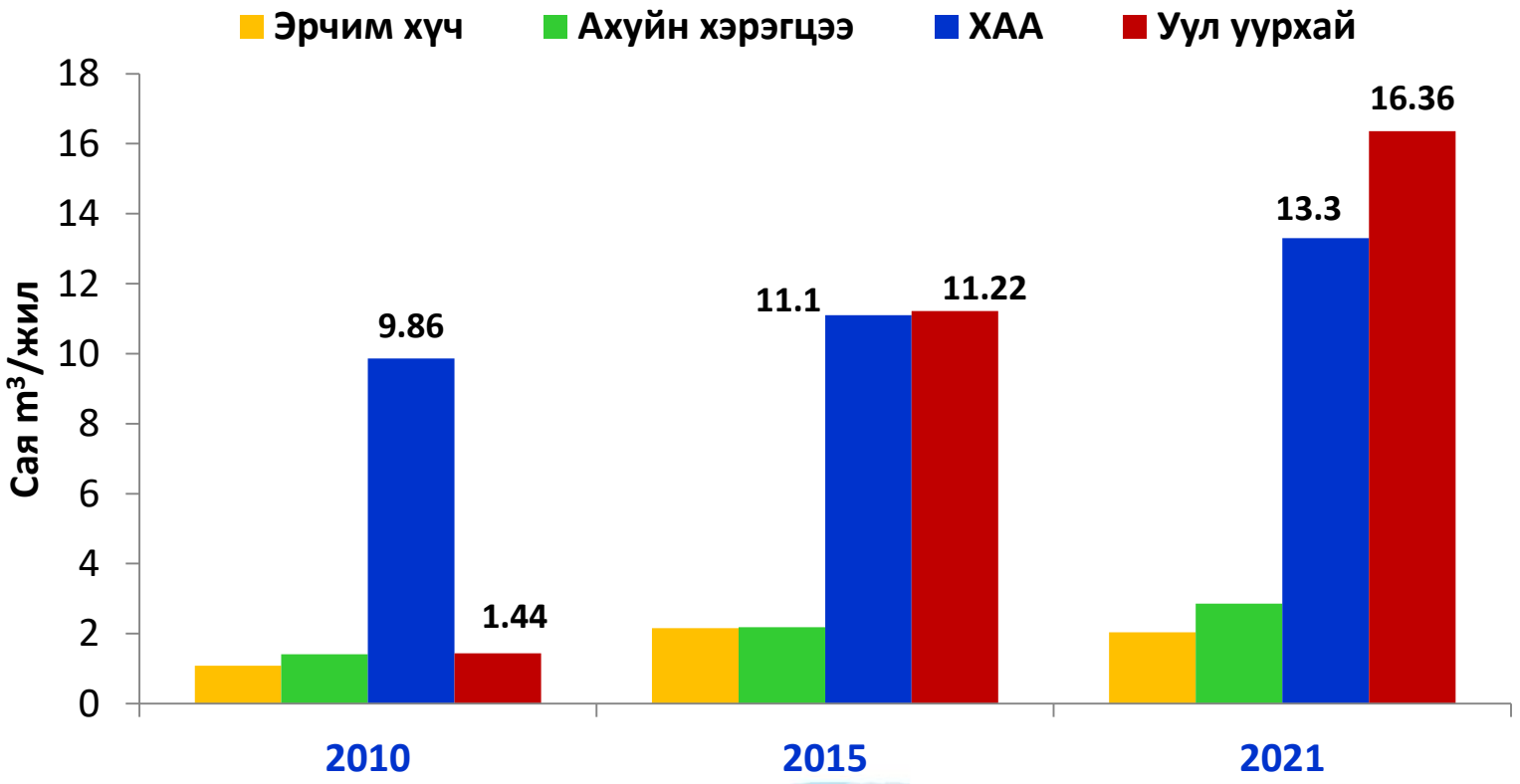
topic 5

Mining Lifecycle and Mine Water Use Requirements



Mining Water Demand Estimate

Changes in water use demand in south Gobi region
(based on medium economic growth scenario)



Data source: Integrated Water resource management. Volume 3. MEGD 2012

Mine lifecycles and Water Use Requirements

Phases	Key water use/issue
Exploration	Drilling, dust suppression, camp, temporary water supply, discharge of excess drilling water, water disposal, site stormwater
Planning / approval	Water supply identification, quantification, EIA,
Development	Construction water use, dust suppression, camp use, water supply, storage, treatment, disposal, site storm water management
Production	Mineral processing, dust suppression, camp use, water supply management, water treatment, mine dewatering, worked water recovery, storage, reuse, catchment management, acid drainage, rehabilitation
Closure	Rehabilitation, contaminated site treatment, mine pit lake, stakeholder approval, management plan
After closure	Monitoring, erosion control, contaminated site treatment and verification

Characteristics of Mining Water Use

- Without water mine cant operate
- Most of the mine operates water scarce regions
- Mine is water intensive, but water quality is of less concern
- Mining water use could cause negative env'l, social impacts if it is not managed properly
- Mining water use does not get good perceptions by community, it is increasingly becoming a source of conflict

Sources of Mining Water Use Conflicts

- Lack of information or knowledge about regional water resources available and impacts from water use
- Water pollution or shortage caused by the mining elsewhere
- Lack of collaboration or cooperation by mining companies
- Sense that mining companies take what they want at the expense of others
- Lack of participation by local community in water management decision making
- Lack of water infrastructure/sustainable service provision to locals
- Competing water uses (herders and mining, domestic)

New Approach in Mine Water Resource Management - Engagement and Collaboration

Potential negative environmental impacts of mine water use

Water resources

- Changes in hydrological and hydrogeological regimes
- Contamination, deterioration of water quality and quantity
- Mine pit water issues such as salinization
- Water level lowering and herder well access
- Degradation of aquatic ecosystem etc.

Ecology and biodiversity:

- Water shortage impacts habitat or species (wetlands, ground water dependent ecosystems)
- Excess water could cause polluted water table, threatening groundwater dep[illegible]ent species

Impacts and management differs case to [illegible] pos[illegible]parent dialogue is the key recipe for responsible water management

Potential social impacts of water use

- Reduced access to water (quantity and quality - legal human rights)
- Impacts on culture (worshipped springs or water points)
- Competition, tension, and dispute among water users
- Health issues
- Resettlement

Without effective management in place these may lead to →

- Tensions
- Lack of trust
- Conflict

Engagement needed ↑

Effective impact management needs both technical and social engagement approaches

Assessment and Management of Mining Water use Impacts

Impacts Assessments

- Hydrogeological study and approval
- Detailed Environmental Impact Assessment (DEIA)
- Lender required env'l and social impact assessment

Management

- Annual Environmental Management Plan (EMP) in DEIA
  - Environmental protection plan
  - Environmental monitoring plan
  - Water monitoring requirements for > 50m3/daily use
- Dedicated water manager for water use > 50 m3/daily
- Mine closure plan
- Lender requirements for water management plan and monitoring

Social Impact Assessment Requirement are not well defined by current regulations!

Impacts and management differs case to case, but positive and transparent dialogue is the key recipe for responsible water management

Stakeholder Participation for Water Management

River Basin Council

RBA initiates and MEGD institutionalises

- Monitoring of RBA, and water users' actions
- 31-45 members
- Representation of Gov't, Env't authority, GASI, NGO, citizens, water users, researchers, professional entities in the basin

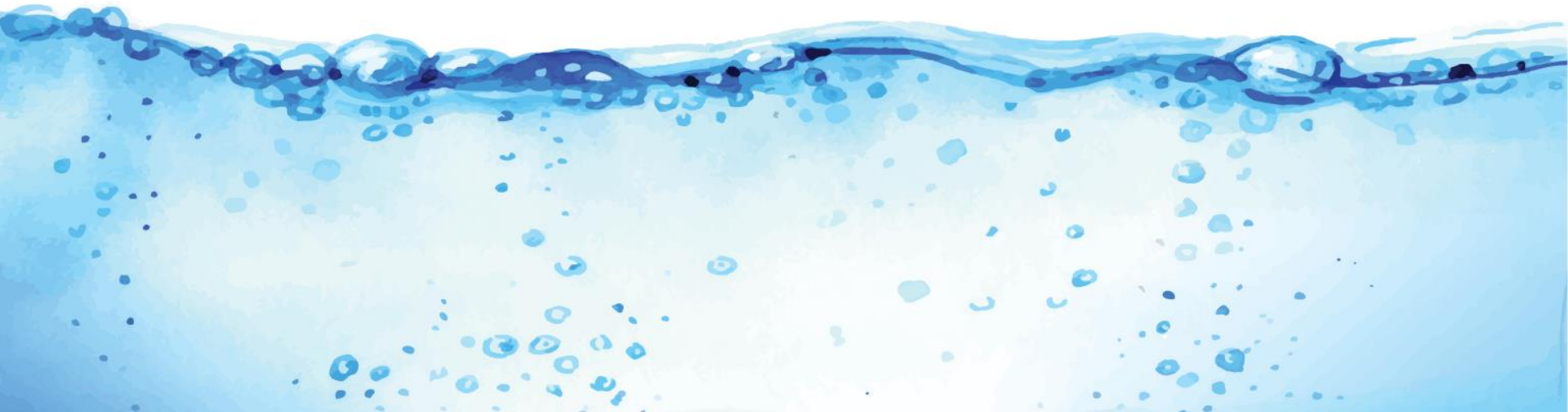
Community consultation (CC) is not in the current water legislations!
DEIA (2012) Law requires CC.

Case Study: River Basin Councils in Mongolia

Questions?

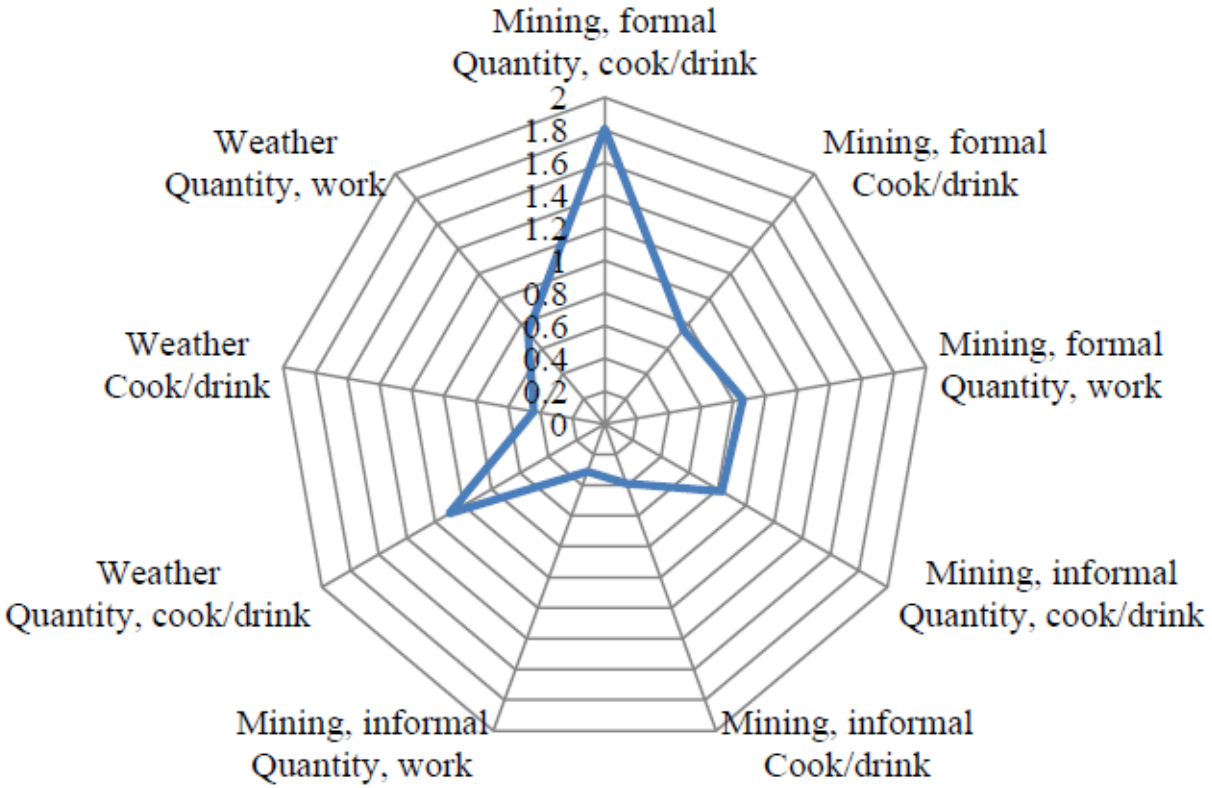
topic 6

Challenges for Achieving Sustainable Water Management in the South Gobi



Mining water use and Community perceptions

Perceived factors for Water quantity and Quality in south Gobi



Fears that mining industry is impacting quantity and quality of water available to local residents

Source: Baseline community perception survey, IRIM, 2014

Mining water use and Community perceptions

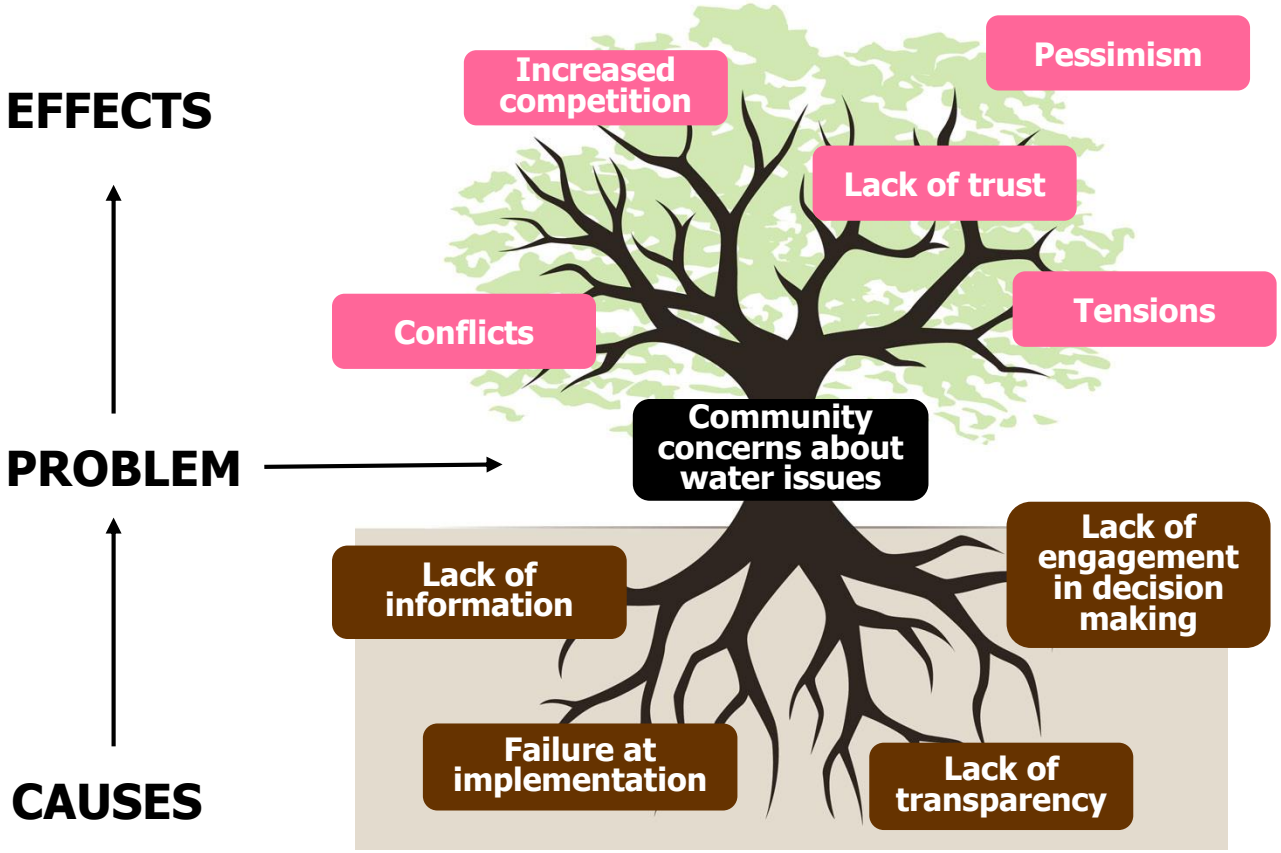
Perceived Water Management stakeholders and trust levels by community

Item	Percent
District	35.0
Sub-district	29.5
Neighbour, close	25.6
Neighbour, distant	23.8
GoM	18.3
Mining	11.2

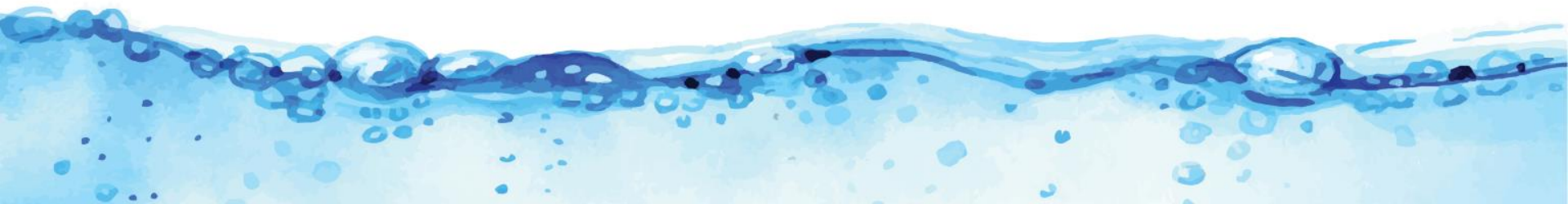
Source: Baseline community perception survey, IRIM, 2014
Photo source: http://ventureburn.com/2015/08/building-merchant-consumer-trust-vital-ecommerce-success/

Widespread lack of trust in the mining industry's water resource management

Causes and Effects of Community Concerns around mine water use



Technical uncertainties for sustainable water management in South Gobi



Water Availability in South Gobi Region

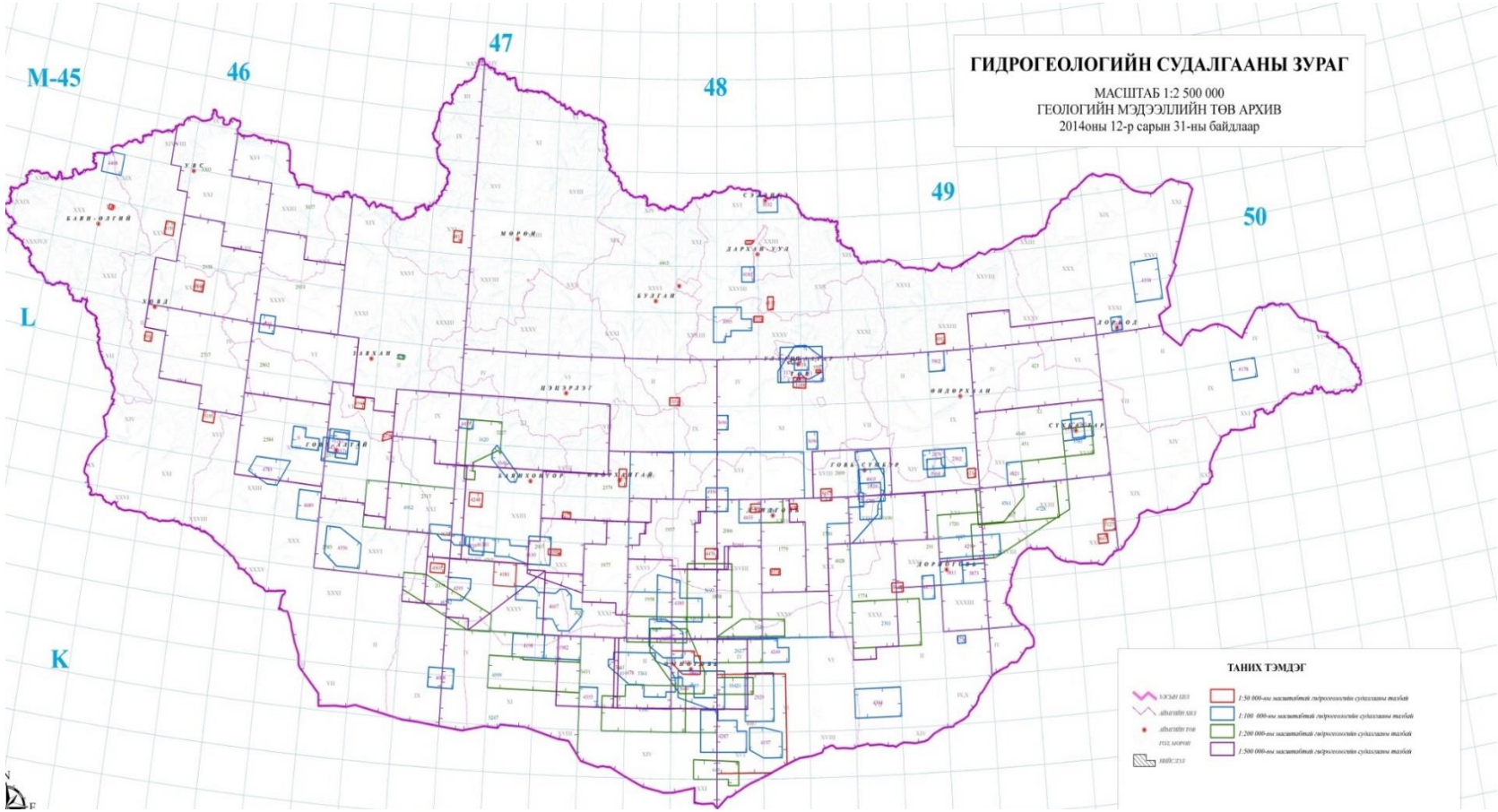
- Mongolia has arid climate / low recharge
  - Limited surface water – groundwater often best or only viable option for large scale water supply
- Main aquifers present
  - Alluvial aquifers – highly variable
  - Fractured rock aquifers – uncertainty in storage potential
  - Basin fill sedimentary aquifers – large storage potential
- Groundwater quality highly variable
  - Often brackish/saline
  - However still suitable for industrial purposes
- Significant technical uncertainty exists
  - Some quantification for Southern Gobi
  - Overall lack of rigorous systematic regional / countrywide study
- Developing a secure water supply can be a risk
  - Requires comprehensive exploration to establish supply longevity
  - Work needs to follow a structured approach / started early

1.

2.

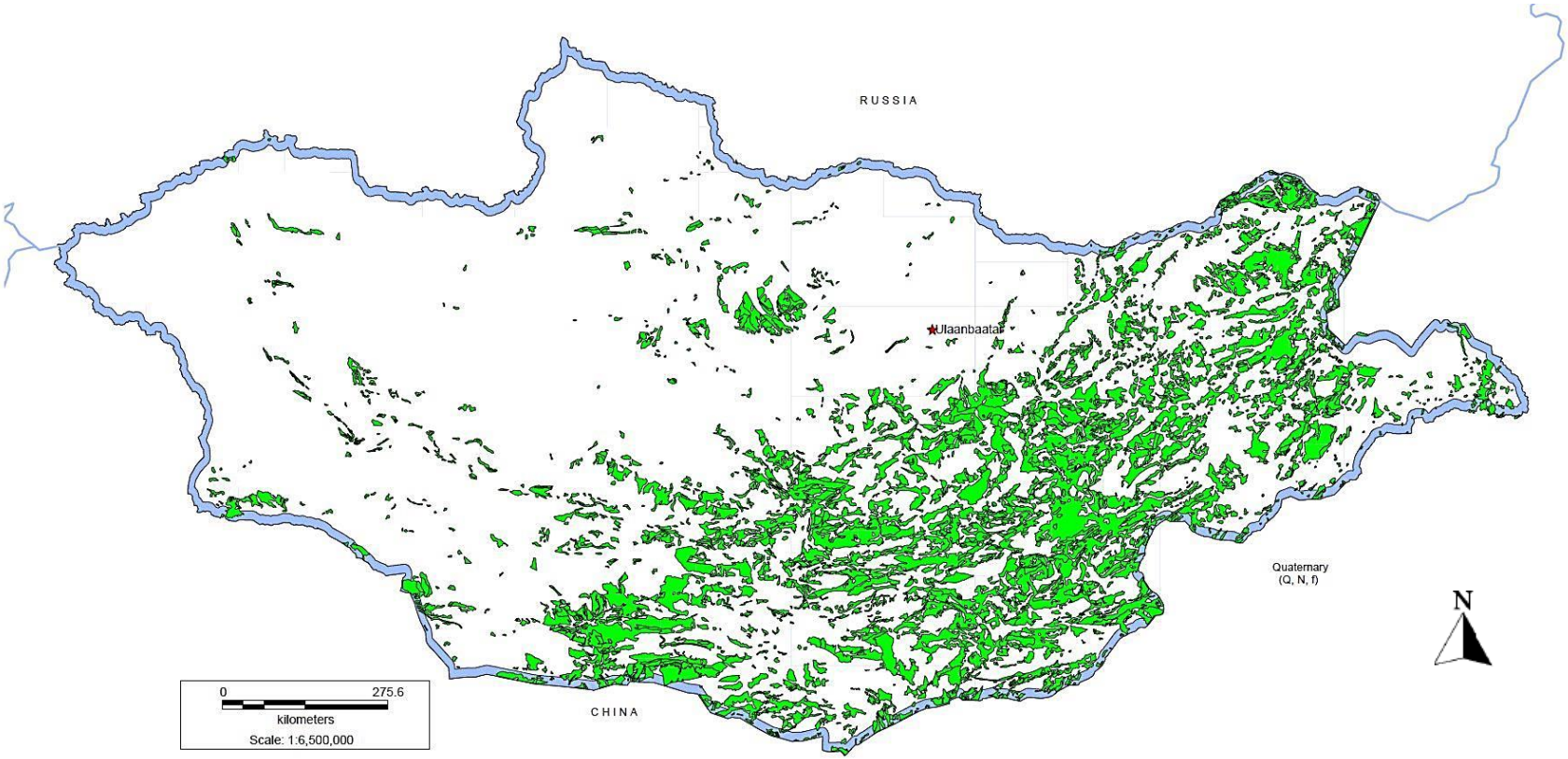
3.

Coverage of hydrogeological survey

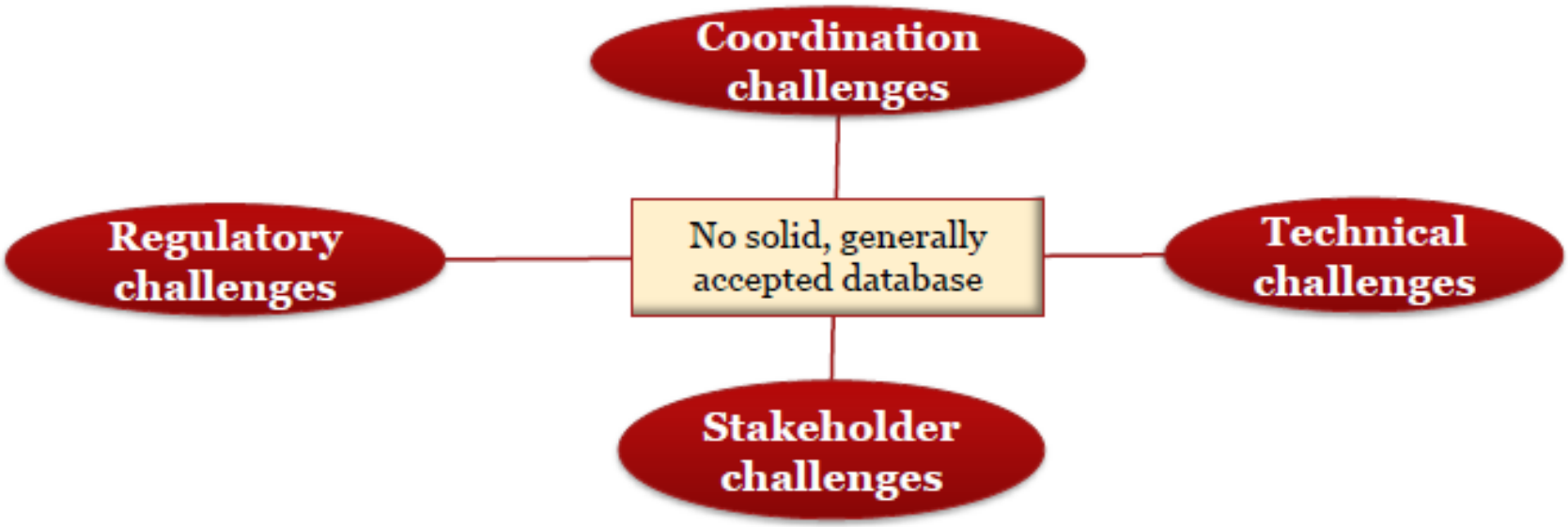


Source: MRPAM

Potential groundwater deposit (K)



Challenges for Mongolia Water Management



Source: Mongolia: Targeted analysis of water resources management issues 2014

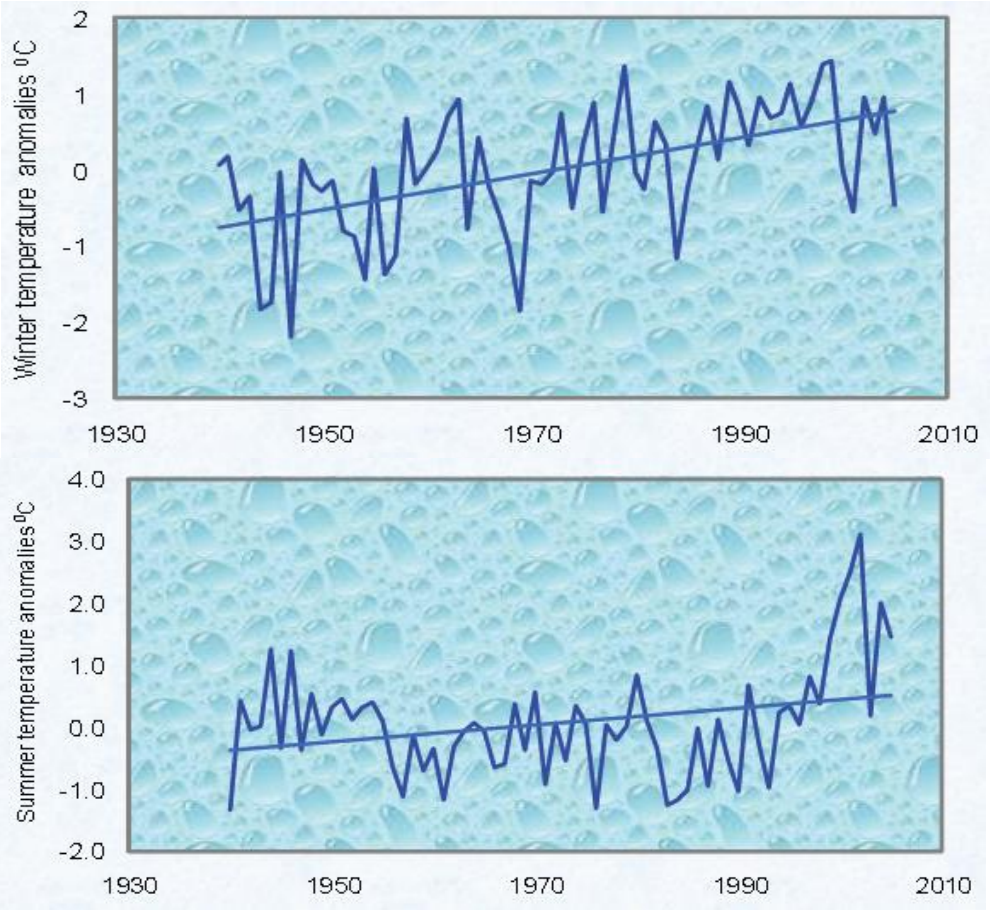
Current Knowledge Gaps

- Lack of baseline data and detailed Impact Assessments
  - Groundwater level and groundwater quality baseline monitoring
  - Numerical groundwater model development to simulate long term impacts
  - Climate change uncertainty
- Potential areas of concern through long term groundwater supply operations
  - Reduction in groundwater levels
  - Potential impact on existing herder wells
  - Potential impacts on groundwater supported vegetation
  - Change in water quality
- Require social and environmental studies in parallel with hydrogeological studies





Observed climate change in Mongolia

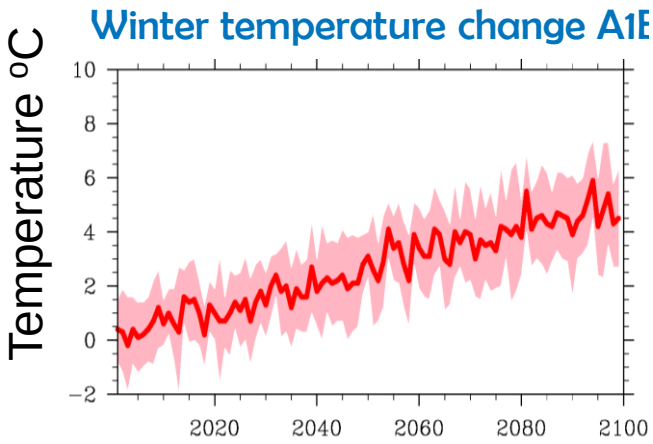


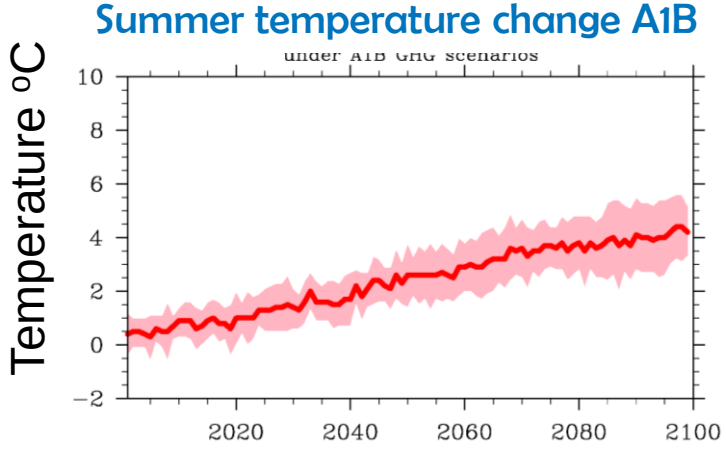
Climate change in Mongolia for the last 60 years:

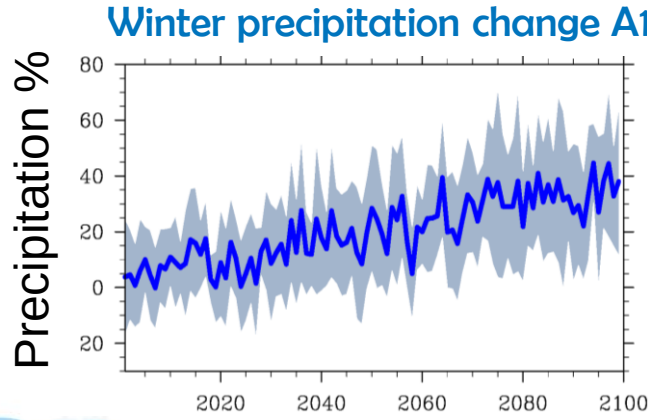
- Annual mean temperatures have risen by 2.14°C since 1940s. The warming has been most pronounced in winter, with a mean temperature increase of 3.6°C, while spring, autumn, and summer mean temperatures have risen by 1.8°C, 1.3°C, and 0.5°C respectively.

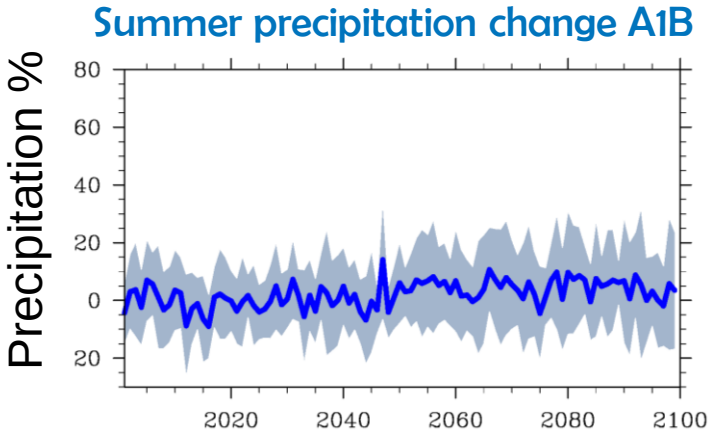
Data source: Natsagdorj.L 2008

Projected climate change in Mongolia









Both winter and summer temperature will likely to increase, while winter precipitation is projected to increase. The changes are not uniform across the country.

Projected climate change impacts on water resources in Mongolia

- Climate change impacts on groundwater resources are poorly understood
- The Climate change impacts on groundwater will likely be through surface water processes and recharge

What might happen to the surface water from Climate change in Mongolia:

- Mild winter could cause less water stored in snow and glaciers
- Slight increases in stream flow
- Increased evaporation will outweigh the stream flow increase
- River basin will likely be drier than now, due to increased evaporation

Projected climate change impacts on groundwater resources in Mongolia

Shallow aquifers may be impacted via:

- Less soil moisture due to elevated evaporation
- High run-off probability due to extreme rainfall
- Reduced recharge especially for shallow aquifers

Deep aquifers:

- Not adequately studied and understood
- Unlikely to impact deeper aquifers not linked with shallow aquifers

Discussion time: What should be done to address the challenges

What should Government do?

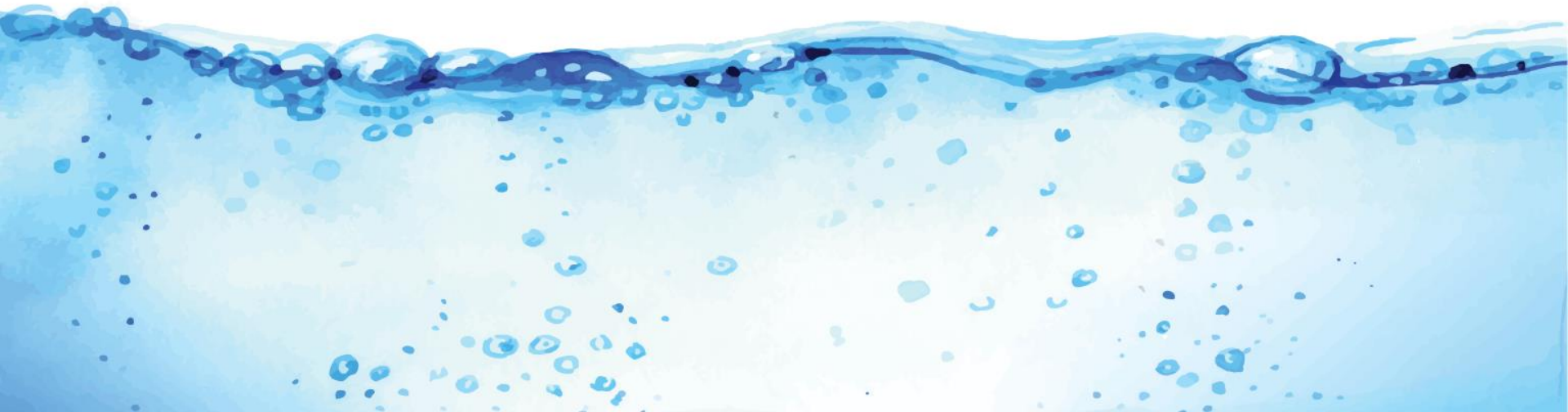
What should Mining industry do?

What might be the community inputs to the solution?

Who else should be involved?

Questions?

Initiatives for Achieving sustainable Water Management in South Gobi



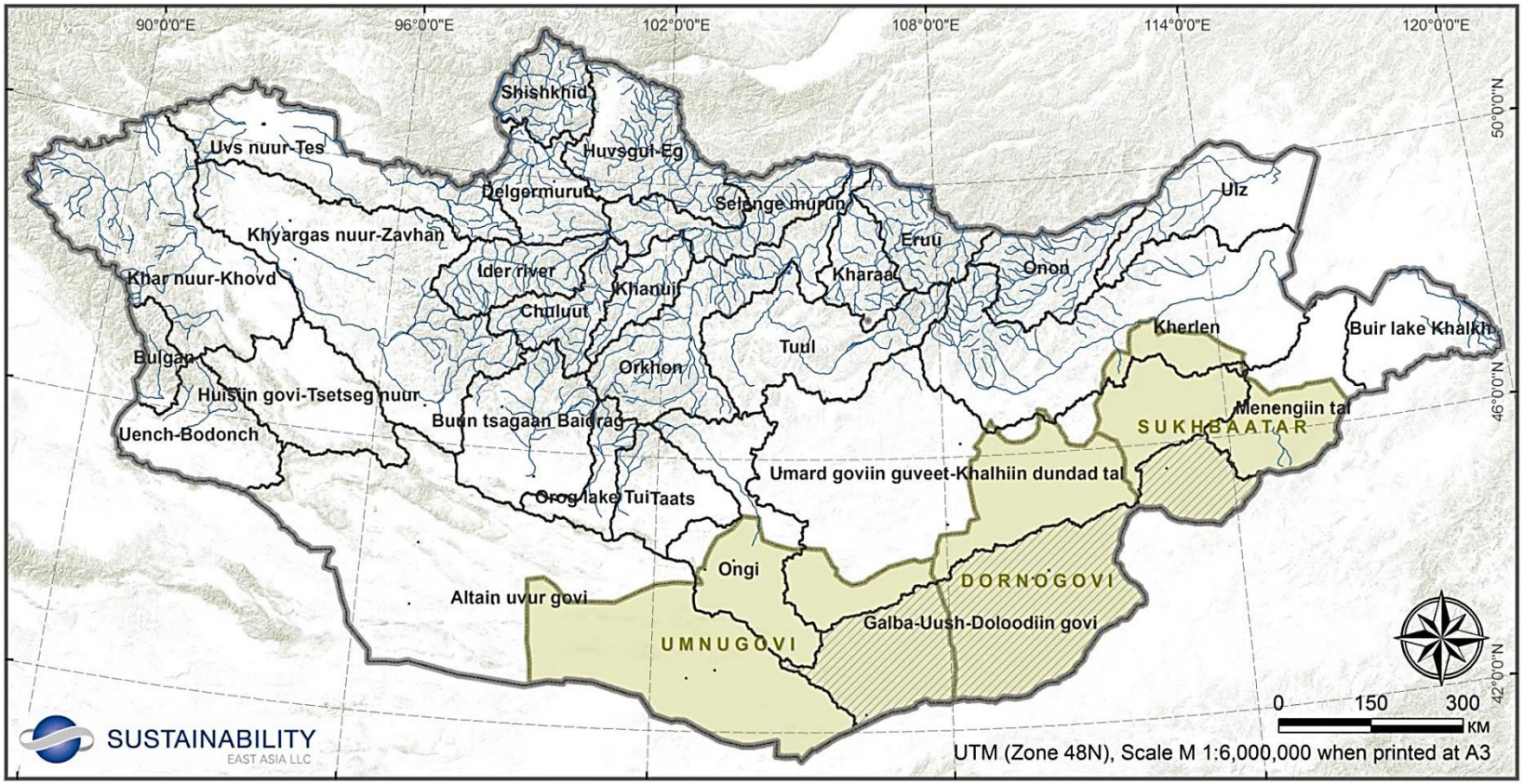
Government Initiatives

Changes in regulations

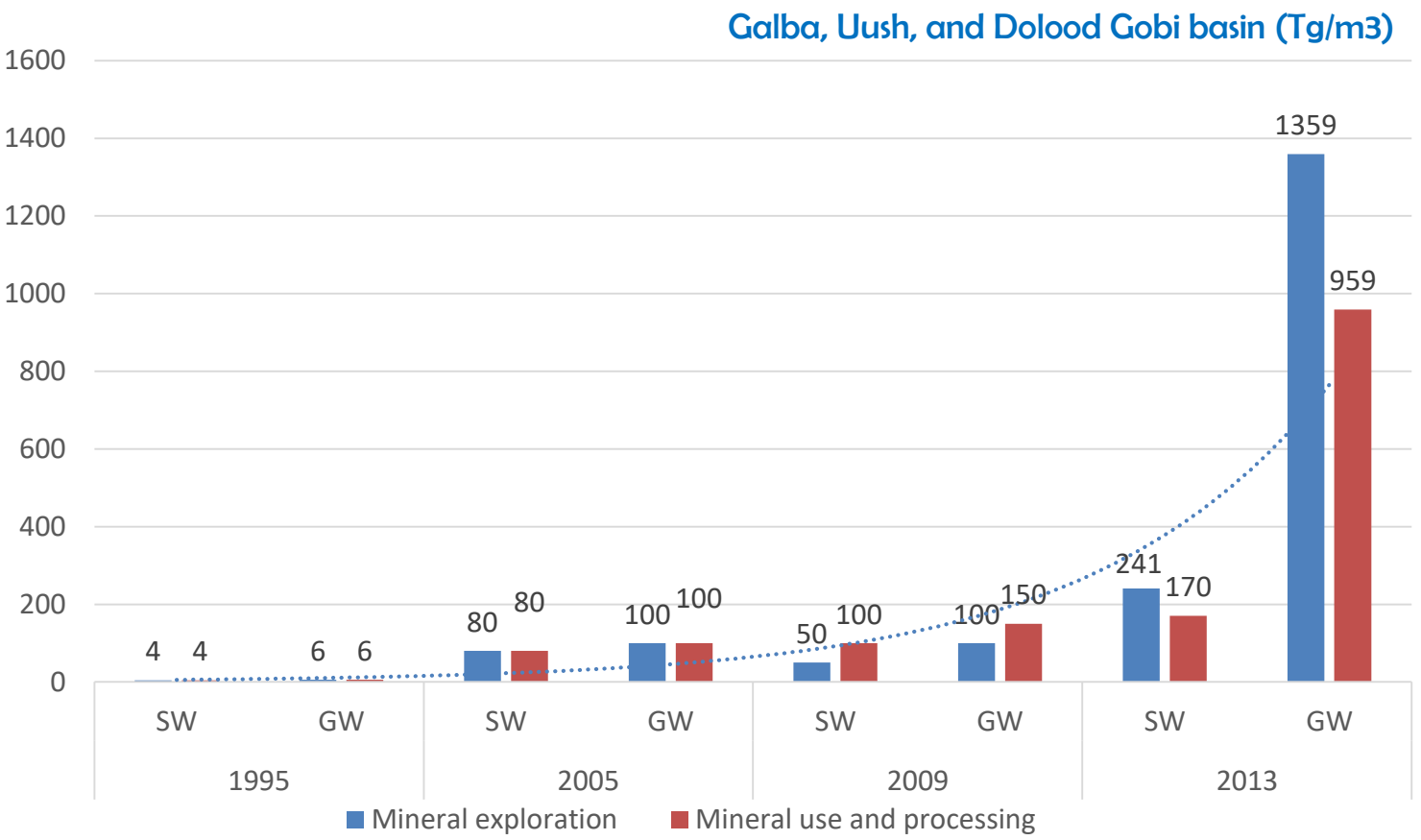
- Integrated water resource management
  - Catchment based water management – RBAs
  - Catchment based Water Management Planning
  - Stakeholder participation in water management - RBC
- Inter-sectoral coordination
  - National Water Committee is headed by Prime minister
- Increased responsibility by water users
  - Increases in water use tariffs
  - Introduction of Water Pollution fee
  - Requirement for dedicated water manager if water use >50 m3/day
  - Requirement for internal water monitoring bores if water use >50 m3/day
- Research and development
  - National ground water monitoring network
  - Hydro-economic analysis in selected areas

IWRM and River Basin Administration

29 River basins in Mongolia under direct management of MEGDT



Mining industry water use fee trend



Monitoring of Groundwater

Establishment of ground water monitoring network in south Gobi

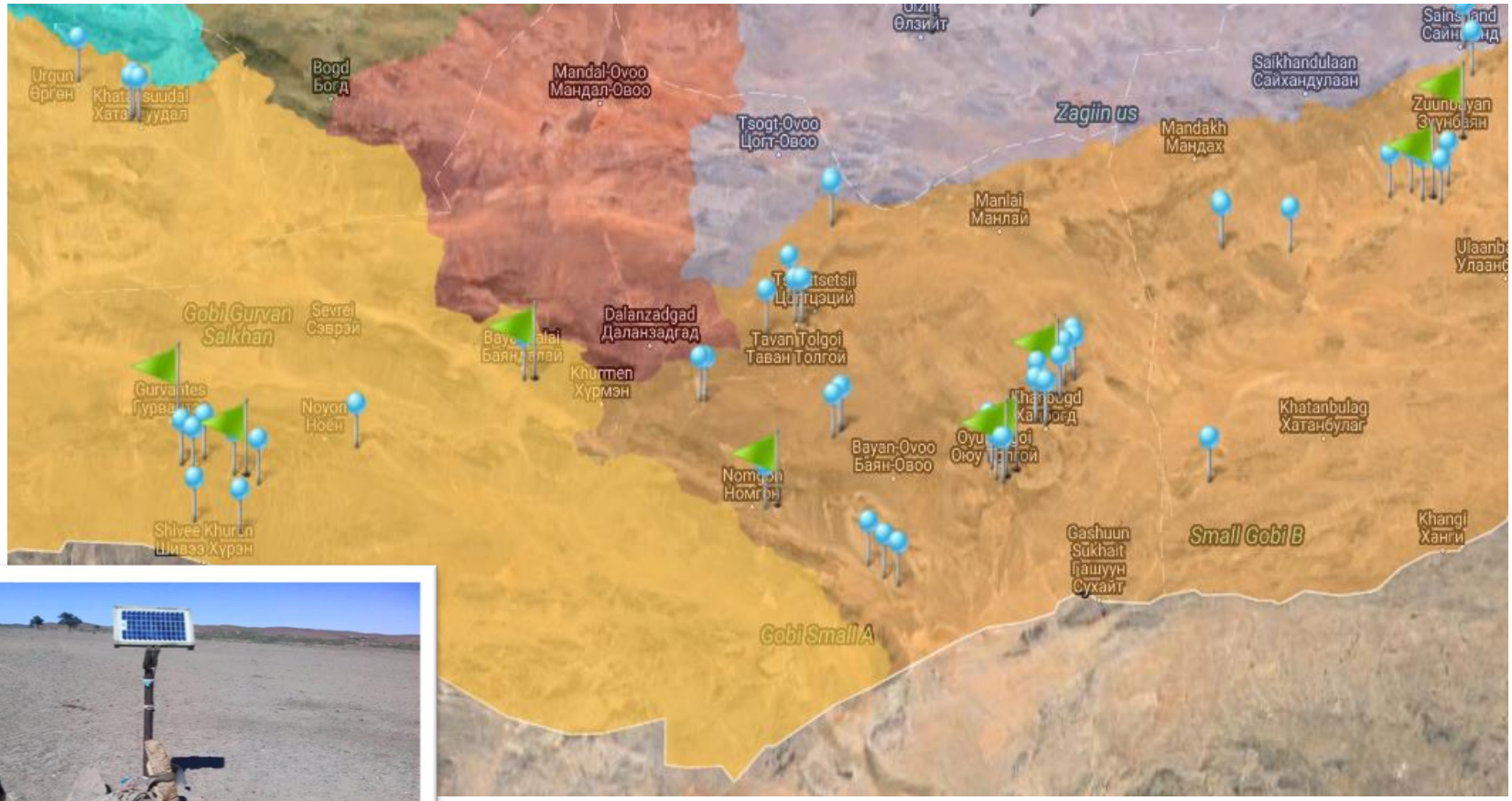
Groundwater monitoring network – First time in Mongolia

Key benefits:

- Study natural fluctuations of groundwater levels and quality
- Monitor water use impacts in high water demand areas
- Long term water management planning at regional level

Understanding the ground water

Establishment of ground water monitoring network in south Gobi



http://groundwater.mn/

Mining Industry Initiatives

Voluntary Code of Practices (VCP) for Minerals Industry and Water Management

- 10 signatories agreed to implement Voluntary code for water management
- Signatories have specific commitments

ENERGY RESOURCES LLC

ERDENES MONGOL

ERDENES-TT

SouthGobi Sands

Erdene Resource Development

Oyu Tolgoi

TERRA ENERGY

BAYAN AIRAG EXPLORATION LLC

MAK MONGOLYN ALT CORPORATION

Mission of the VCP

Mission

We acknowledge that access to water is a basic human right and voluntarily commit to the responsible, legally compliant, and sustainable us of water. We will be efficient in our use of water, transparent in our monitoring, maintain water quality and will provide broad participation in our water management activities.

Vision

We will be responsible companies and build trust by working together to relieve water stress, support the development of sustainable communities and bring benefits to Mongolia.

What are VCP signatories committed to?

Voluntary Code of Practice: Minerals Industry and Water Management

1. Act transparently and with accountability

- 1.1 Publicly report water risks, management activities and performance using recognized metrics
- 1.2 Organize project site visits for communities and vice-versa
- 1.3 Develop a community grievance mechanism and ensure it is accessible for communities

2. Comply with national law and international standards

- 2.1 Comply with Mongolian law, catchment governance requirements (RBAs RBCs) and international standards on water management
- 2.2 Support Government of Mongolia in developing and implementing its legal and regulatory framework for water resources management
- 2.3 Incorporate good international industry practice for mine-water management in business operations

3. Engage proactively and inclusively

- 3.1 Develop participatory monitoring programs for communities adjacent or near to exploration and mining activities
- 3.2 Organize community discussions and information sharing, including the results of any monitoring programs
- 3.3 Support public education and awareness raising through communications materials in a format that is accessible to the given audience

4. Effective water resource management and conservation

- 4.1 Maintain a water monitoring program that respects local customs and monitoring reports will include information on water levels and water quality in wells
- 4.2 Optimize water efficiency and conservation at mine site operations and minimize water waste
- 4.3 Identify, monitor and manage high value biodiversity assets that are dependent on water to ensure their safeguard
- 4.4 Maintain a site water balance to report annually on key metrics pertaining to water performance and that is used to inform long term mine planning and closure plans

5. Create positive impacts

- 5.1 Support impacted local communities to maintain or improve access to water resources
- 5.2 Support local communities to improve traditional ways of protecting wells
- 5.3 Support access to water for livestock in times of stress

6. Support local water infrastructure and services

- 6.1 Rehabilitate or improve impacted water resource infrastructure in pastureland to pre-project status
- 6.2 Engage community members to improve water management practices in pastureland themselves
- 6.3 Support community projects to develop sustainable water supplies in areas of impact

What VCP means for communities?

VCP Companies agreed to:

1. Be open about what they do with regard to water management
2. Show stakeholders what they do (for example site visit or vice-versa)
3. Listen to the stakeholders concerns
4. Engage with other stakeholders and jointly monitor water resources
5. Provide or exchange relevant information
6. Support communities to improve access to water resources
7. Support community projects for sustainable water supplies in impacted areas

VCP Reporting Metrics

Reporting of mine water use

- Extracted water
- Used water
- Recycled water
- Discharged water
- Mine water quality

Monitoring of surrounding water systems

- Water levels
- Rainfall / climate
- Herder wells near mine
- Local drinking water quality
- Water quality around mine site

Would your perception about mine water management be different if you know all of these?

What do you want to know more about?

What is your role for mine water management!

- What is your experience in water management?
- What can you do differently in the future and why?

Questions?

IFC International Finance Corporation WORLD BANK GROUP

Government of Canada Gouvernement du Canada

exim EXPORT BANK INSURANCE

2030 Water Resources Group

THANK YOU FOR YOUR ATTENTION

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