G7 CONNEX Initiative International Conference on Capacity Building and Transparency

Session 3: 13:30-14:00, Thursday 15th September, 2016

Japan's Contribution to the capacity building

International Conference Hall, JICA Ichigaya, Tokyo, JAPAN

The Necessary Training for the Resource Management and Contract

Yoshitaka HOSOI, Ph.D.

Hosoi.Yoshitaka@jica.go.jp

Senior Advisor for Natural Resources, JICA

Economist and Exploration/Mining Engineer

Visiting Professor, Akita University

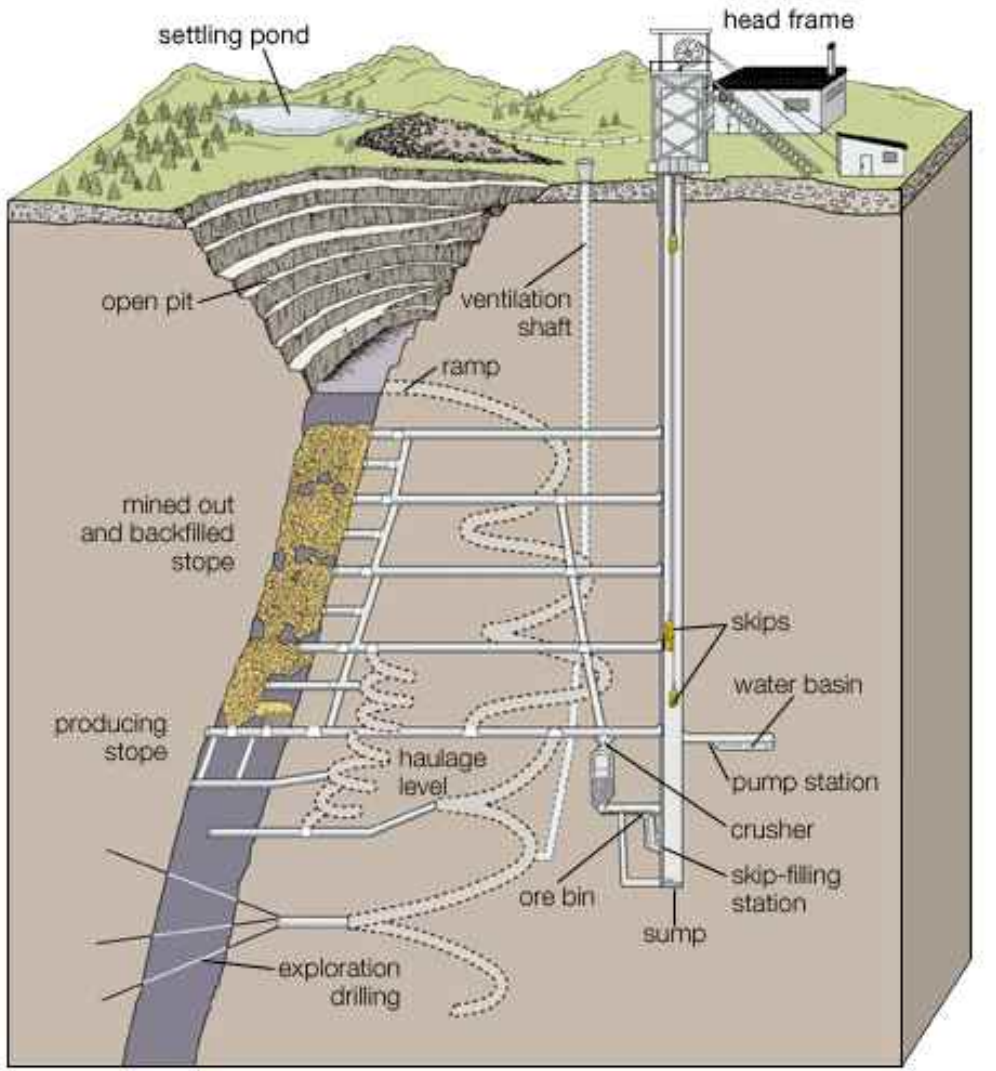
Member of the Association of Mining Analysis, UK

(Former: Japan Oil, Gas and Metals National Corporation)

Mine site Overview

From Yahoo

Mine Section



Source: H. Hamrin, *Guide to Underground Mining Methods and Applications* (Stockholm: Atlas Copco, 1997)

From Yahoo

Mine Overview

Kiruna overview

From Yahoo

Underground Mine

From Yahoo

STEP of Mine Development

1. Exploration (Regional 2-3 Years, Detailed Survey 3-4 Years)

   If deposit was discovered, If it is enough.
2. Feasibility Study (2-3 Years) If it is feasible.
3. Mine Development Construction
4. Operation (Mine site)

   Mining > Concentration
5. Operation (Smelter: mine site or coastal site)

   Refining/Smelting/Electrolysis

Photos of Exploration and Development

Process of Metal Resource Development

Select Regional Area for Resource

Regional Survey

Select Resource Target Area

Detailed Survey

Recognize Size and Grade of Discovered Ore body

FS Survey

Additional Exploration and Feasibility Study

Exploration Area

10km

Development

Production

Field Survey
(Detailed Survey)

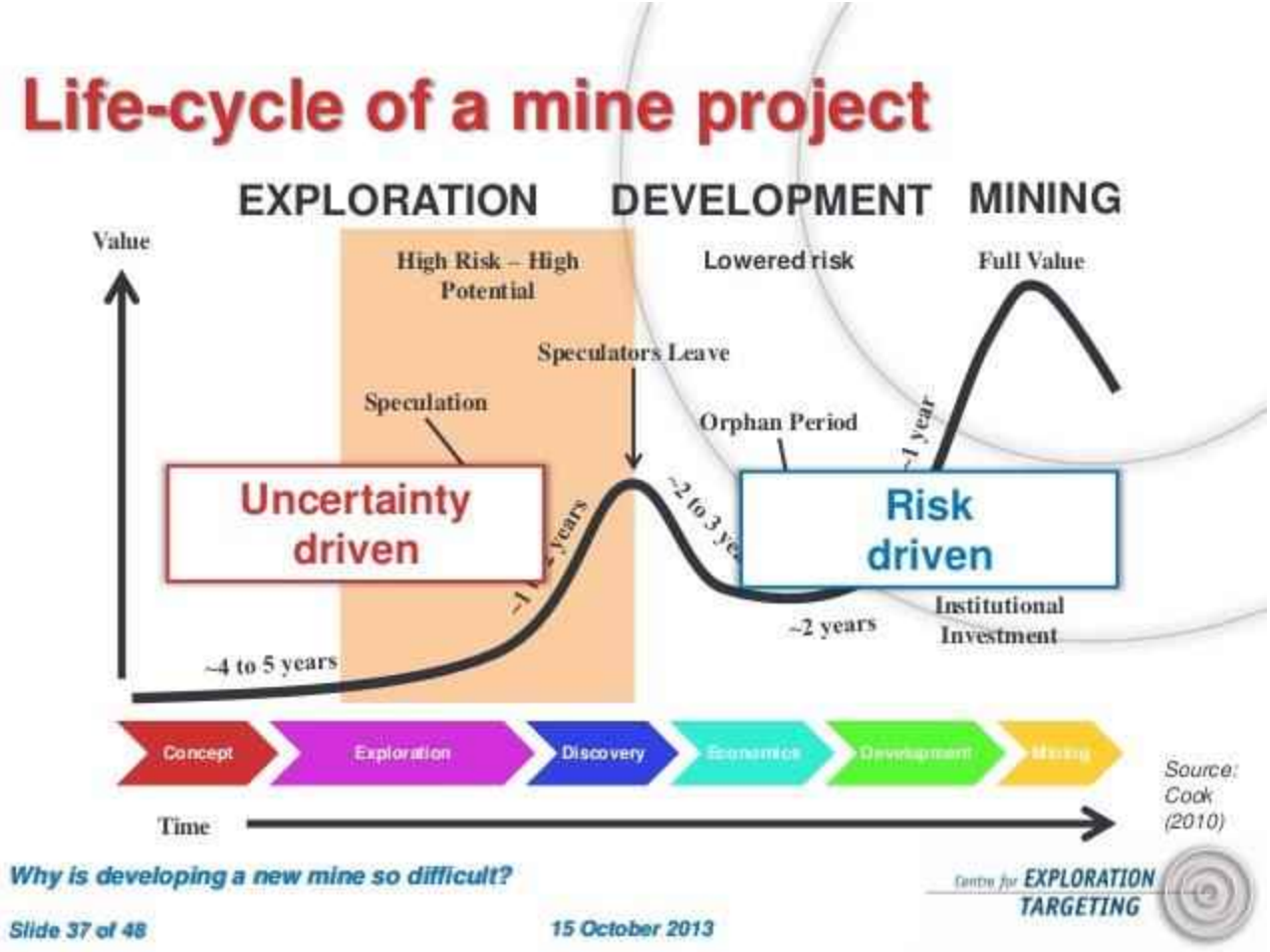
・Drilling Survey

ボーリングコア

Open pit mine

Concentrators, Bolibia　サンクリストバル鉱山選鉱場

Electronic copper　電気銅


Life-cycle of a mine project
EXPLORATION
DEVELOPMENT
MINING
Value
High Risk – High Potential
Lowered risk
Full Value
Speculators Leave
Speculation
Orphan Period
~1 year
Uncertainty driven
Risk driven
~2 to 3 ye
~4 to 5 years
~2 years
Institutional Investment
Concept
Exploration
Discovery
Economics
Development
Mining
Time
Source: Cook (2010)
Why is developing a new mine so difficult?
Slide 37 of 48
15 October 2013
Centre for EXPLORATION TARGETING

From Yahoo

CONNEX Initiative

1. Background

- Launched at the G7 Brussels Summit in 2014
- Aiming to provide developing country partners with multi-disciplinary and concrete expertise for negotiating complex commercial contracts
- To ensure such complex commercial contracts are well-conceived and well-negotiated for a host country's successful and inclusive development

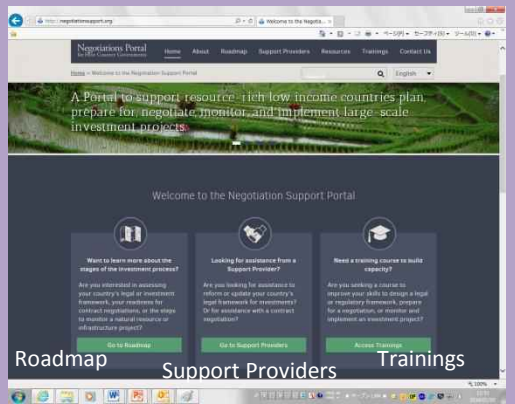
Need to take into account…
- the 2030 Agenda
- the Addis Ababa Action Plan

2. Three Pillars of the CONNEX Initiative and the previous work

Pillar 1

Information integration and accessibility on existing resources

- Established an **open web portal** @CCSI in 2014 www.negotiationsupport.org



Pillar 2

Enhancing existing negotiation support

- Endorsed the **CONNEX Code of Conduct** at the Elmau Summit
- Held a **Negotiation Support Forum** in Dec 2015 @OECD

Setting up Negotiation Support Forum

Pillar 3

Linking to long-term capacity building and increasing transparency

Need to be addressed!!

- **Generating synergy with global efforts**
- **Facilitating the mobilization and effective utilization of domestic public resources**

Sustainable Development for Nation

Mineral Resource Management (MRM) by Government

Definition:

The Management for National Prosperity and Economic Growth by Mineral Resource (national treasure) Development with Long term Operation and without Environmental Load.

Categories needed for MRM

1. Development of Strategy, Law and Administrative Organ
2. Discover and Administration of Mineral Resources
3. Environment Management
4. Development Management
5. Correspondence for Community and Resident
6. Proper management of Resource Revenue
7. Prediction of Economic and Environmental Impact and its Dealing Ways

Issues and Needed Capability for MRM

[1. Development of Strategy, Law and Administrative Organ]

1. Basic Strategy for Mining (Master Plan)
2. System of Law and Related Regulation (Mining Law, Foreign Capital Promoting Law, Land Law, Water Law, Mine Safety Law, Mine Pollution Prevention Law, Mine Environment Law, Law of Mine Closure)
3. Administrative System, Administrative Organ and Human Resources Development

[2. Discover and Administration of Mineral Resources]

4. Remote Sensing for Mineral Exploration and Environment
5. Exploration (Airborne Geophysics, Regional Geological Survey, Geochemical Survey)
6. Collect public and private exploration data
7. Establish and Manage GIS, and Cadastre
8. Making and Maintenance Mineral Inventory (Mineral Cadastre)
9. Monitoring the Balance of Volume of Mineral Resources and Ore Reserves in the country

[3. Environment Management]

[Before Open Mine]

10. Checking Use condition of Rivers and Land
11. Taking Basic data of Environment
12. Making and Management of Environmental Map

[During Mine Operation and After Mine Closure]

13. Environmental Monitoring of Operating Mine
14. Advice and Execution Monitoring for Environmental Contamination and Prevention of Damage
15. Environmental Reclamation during Mine Operating and after Mine Closure

[4. Development Management]

16. Development Permission System and Operation Monitoring System

[5. Correspondence for Community and Resident]

17. Monitoring and Conservation for Living conditions and Society of Community and Resident

18. Monitoring Impact by Mine Development on Surrounding area and State level, and its Sound promotion measures

19. Confirmation and Diffusion about Sharing of roles between State, Local government, Company and Resident

20. Revival and Activation of Mine town after Mine Closure

[6. Proper management of Resource Revenue]

21. Planning Management Method of Resource Revenue

22. Monitoring Proper Management of Resource Revenue

[7. Prediction of Economic and Environmental Impact and its Dealing Ways]

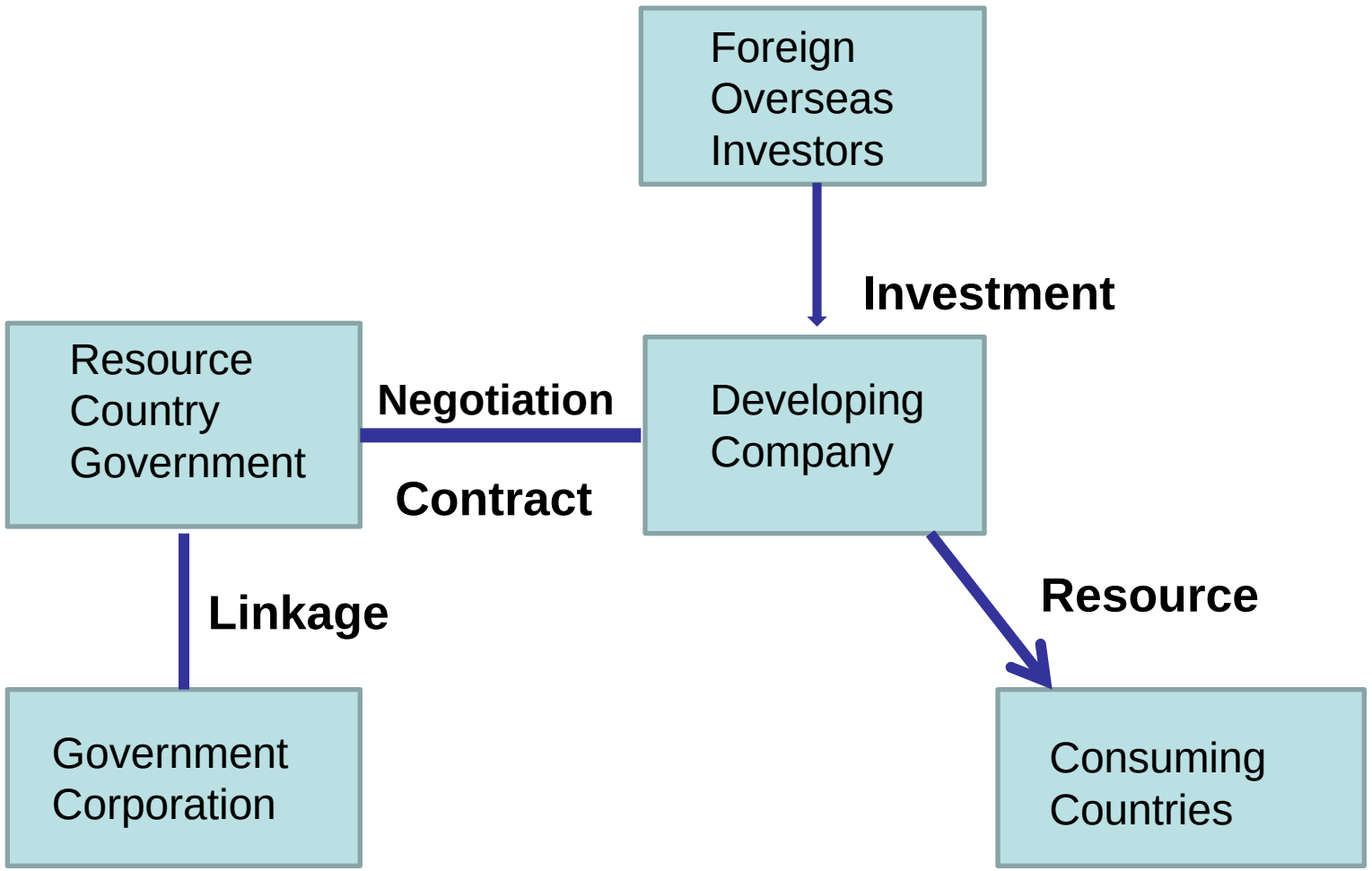
23. Prediction of Economic and Environmental Impact affected on Other sectors by Mining sector and its Dealing Ways

24. Planning Measures for Promotion of Industrial Economy in whole Nation

25. Technology Upgrade and Human Resource Development for Private Companies in home country

What kind knowledge do they need for Resource Contract ?

Relationship



Key Factors for Contract (1/3)

1. Relationships in the Concession Process
   Bargaining Models, Mutuality of Interests, Industrial Structure
2. Mining Codes and Ad Hoc Agreements
   Royalties, Taxation, (modern) Equity-Sharing, Production Sharing, Work and Service Contracts

Key Factors for Contract (2/3)

3. Financial Provisions

   Potential Financial Implementation, Production Sharing, Tax Incentives, Local Incorporation

4. Economic Development Provisions

   Local Purchasing, Employment, Infrastructure

Key Factors for Contract (3/3)

5. Dispute Settlement and Contract Revision
   Reduction of Concession Area, Equity Ownership, Periodic Revision
6. Organizing for Negotiation
   Government side, Company side, Negotiating team
7. Search for Stability
   Producing countries, Consuming countries

Road Map of Contract (from Columbia Center on Sustainable Investment)

1. Setting the Legal & Policy Framework
2. Pre-Negotiation Stage
3. Contract Negotiation Stage
4. Implementation & Monitoring Stage

From Columbia Center on Sustainable Investment

Stage 1. Setting the Legal & Policy Framework satge

- Government Polices and Strategies
- Legislative and Regulatory Frameworks
- Sector-Wide Analysis

Necessary Knowledge for Stage 1

Various Data of Mining Sector in the World and Domestic, Supply and Demand of Commodities, Tendency of Prices of Commodities, National Resources Inventory, Mining Law, FDI Law, Master Plan of Resource Development, Focusing Mining Sector, Impact Analysis

Stage 2. Pre-Negotiation Stage

- Feasibility Studies
- Impact Assecssments
- Tender Process and Financial Structure

Necessary Knowledge for Stage 2

Geology, Exploration, Ore Volume Estimation, Mine Development Construction, Mining Method, Concentrating Method, Finance, FDI, Feasibility Study of Mine Development and Operation, Environmental Impact Analysis, Economic Impact Analysis, Resource Economics (Macro and Micro), Tender System, Commodity Price and Its Tendency

Stage 3. Contract Negotiation Stage

- Prepare for the Negotiation
- Assemble a Negotiation Team
- Develop a Negotiation Position
- Contract Negotiation

Necessary Knowledge for Stage 3

Profit Sharing, Framework of Contract, Law farms and Lawyers(Negotiation Team),

Stage 4. Implementation & Monitoring Stage

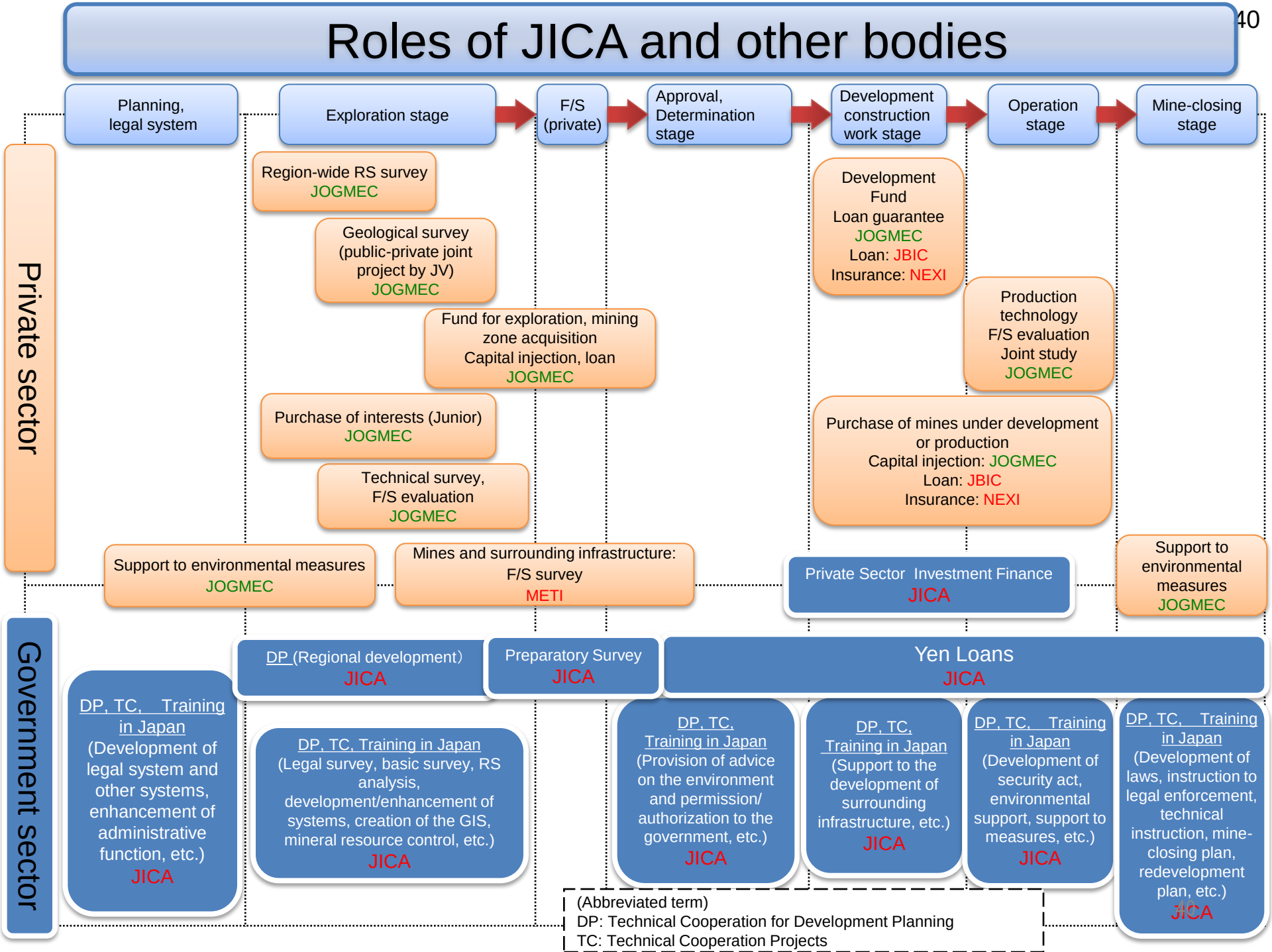
- Transparency
- Monitoring
- Implementation
- Grievance Mechanism

Necessary Knowledge for Stage 4

Study from EITI (Extractive Industries Transparency Initiative), Monitoring Standard, Environmental Monitoring, Mine Closure and Reactivate Mine town

JICA's Role and Human Resource Development in Mining Sector

Roles of JICA and other bodies



JICA's Four Pillars for Mining Sector Development

Strategic Target:
(1) Investment Climate and Infrastructure Development
(2) Human Resource Development

➢ Infrastructure and Regional Development

- Developing infrastructure; electricity, water and transportation
- Developing communities around mines
- Regional promotion, and measures for closing/ed mines, etc.

➢ Policy Support and Legal System Development

- Formulating mining sector master plan
- Organizing the laws and regulations related to mining exploration development, etc.
- Human resource development

➢ Mineral Resource Management

- Better estimation by advanced technology
- Establishing appropriate management systems, etc.
- Human resource development

➢ Mine Safety and Environmental Measures for Mines

- Improving technology for mine pollution prevention and environmental restoration
- Organizing the law related to mine safety
- Human resource development

Technical Cooperation Scheme

- Target:
  Governmental/Public Organizations

- Concept:
  Enhancing problem-solving capacities of the partner countries

- Input from Japanese Side:
  - **Training Program in Japan**
    - Short-Term Training (1-3 months)
    - Long-Term Training (2-5 years) at graduate school in Japan
  - **Dispatch of Japanese experts** to support and advise (OJT);
    - to strengthen the Capacity
    - to strengthen the Governmental / Institutional system
  - **Provision of Equipment**
    - to improve facilities for capacity development

Training
(JICA Knowledge Co-Creation Program)

- Long term Training (over 1 year)
- Short term Training
  - ✓ Country focus
  - ✓ Group focus (Issue base)

Hundreds of courses in variety of sector
Over 10,000 participants / year

Kinds of Training Course & Program in Mining Sector

- On the Job Training within implementing Technical Cooperation Program
- Short/Long term training in Japan within implementing Technical Cooperation Program
- Theme Focused group training course in Japan
- Country Focused group training course in Japan
- Region Focused group training course in Japan
- **Long term training in Japan (Human Resources Development)**

“Shigen no Kizuna”(in Japanese)=“Bond in Mineral Resource Filed” (in English)

Training Program in Japan: Sustainable Mining Development

1. Objective

To enhance the participants' capacity on policy development, planning, and implementation of promotion of exploration and exploitation of non-ferrous metals and environmental pollution control by providing basic knowledge and skills through lectures and site visits on Japanese mining experience.

2. Target & Duration

Target: Officers of mineral resources sector in the government
Duration: 1 month (in Japan)
Implementing Partner: Japan Mining Engineering & Training Center (JMEC)

3. Contents

(1) To understand relation between metal mining and global economy,
(2) to understand mineral exploration and related technologies,
(3) to understand necessary measures of mine pollution control, and
(4) to enhance the capacity on policy development, planning, and implementation of mining development.

Training Program in Japan: CD for RS technology on Africa

1. Objective

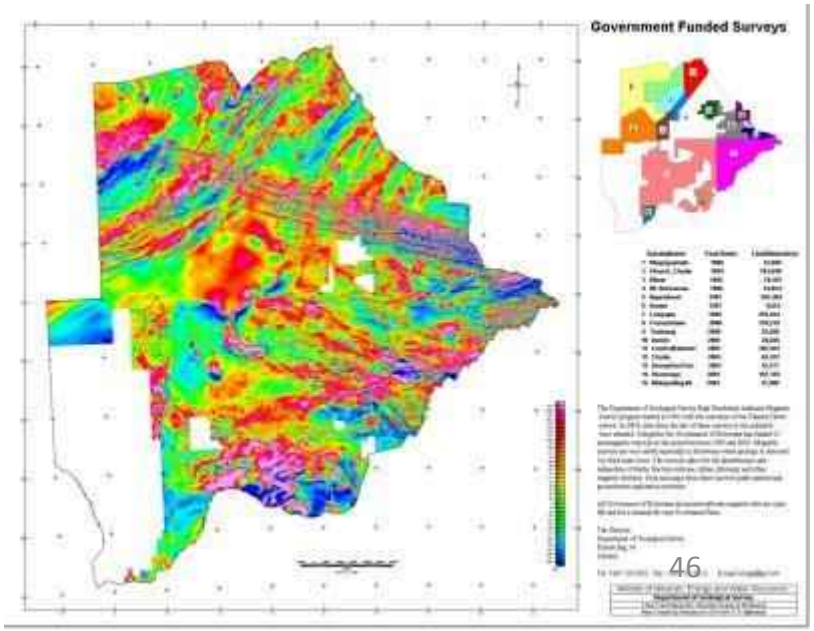
To enhance the participants' knowledge and skills for mineral exploration on non-ferrous metals. This training course will cover remote sensing technics such as satellite image processing, geophysical survey, geochemical survey, and geological investigation for comprehensive understanding of geological setting and mineral resource potential

2. Target & Duration

Target: Officers of mineral resources sector in the government of Africa
Duration: 1 month (in Japan)
Implementing Partner: Japan Mining Engineering & Training Center (JMEC)

3. Contents

(1) To understand satellite image processing geophysical survey, and geochemical survey
(2) to understand interpretation of geological data
(3) to enhance the capacity on planning of further geological study based on the analysis
(4) to enhance the capacity on estimation of mineral potential and economical evaluation
(5) to enhance the capacity on integration of geological information for further mineral exploration.



Training Program in Japan: CD for management of ASEAN DB

1. Objective

ASEAN Mineral Resources Databese is enhanced on its contents and fully utilized. Through this program, relations among researchers of Japan and ASEAN countries are strengthened.

2. Target & Duration

Target: Officers/Researchers of Geological Survey of ASEAN countries
Duration: 1 month (in Japan) and 2 weeks (Field survey)
Implementing Partner: Geological Survey of Japan(GSJ) / AIST

3. Contents

(1) Understand outline of ASEAN Mineral Resources Database
(2) Understand what kind of information/data should be on the DB
(3) Understand how to maintain the DB
(4) Find the needed contents to enhance the DB
(5) Create an action plan for enhancing and utilizing the DB

Capacity Building on the Natural Resource and Mining Sector in Mongolia

1. Project Objective

To develop capacity and skills for efficient and environment-friendly mining for development and promotion of the mineral resource sector in Mongolia

2. Outline of the Project

Duration: 2013-2018

C/P Agency: Ministry of Mining, Economic Research Institute of Mongolia National University

(1) To recognize the importance of mineral resources
(2) To obtain the knowledge and technologies for efficient mineral resource development
(3) To understand the technologies and laws for environment protection, recycling and mine safety
(4) To enhance capacity of planning and skills for development and utilization of mineral resources
(5) To disseminate the output of training in Japan and to promote appropriate mining development through implement workshops in Mongolia

3. Activity

Long-term and Short-term training in Japan (collaboration with KIZUNA program)

Consultant team with Japanese expert has research work with Mongolia Researchers

Capacity Building of Institute of Geology (IGEO) of ANGOLA

1. Outline of the Project

Training in Japan and Dispatch expert (wide range of knowledge on mininig such as Exploration technology, RS technology, GIS, Geochemistry, etc)

2. Outline of the Follow-up Project

Dispatch expert and had a seminar in Angola

- To make geological map (including RS seminar, field survey)
- To update the knowledge on management of mineral resources, mine safety, and environment.

Long Term Training

“Shigen-no-Kizuna”= “Bond in Mineral Resource Filed”

Objective

To educate governmental officials, educators and researchers who contribute to promote mine development in the developing countries.

The Expected Outcome

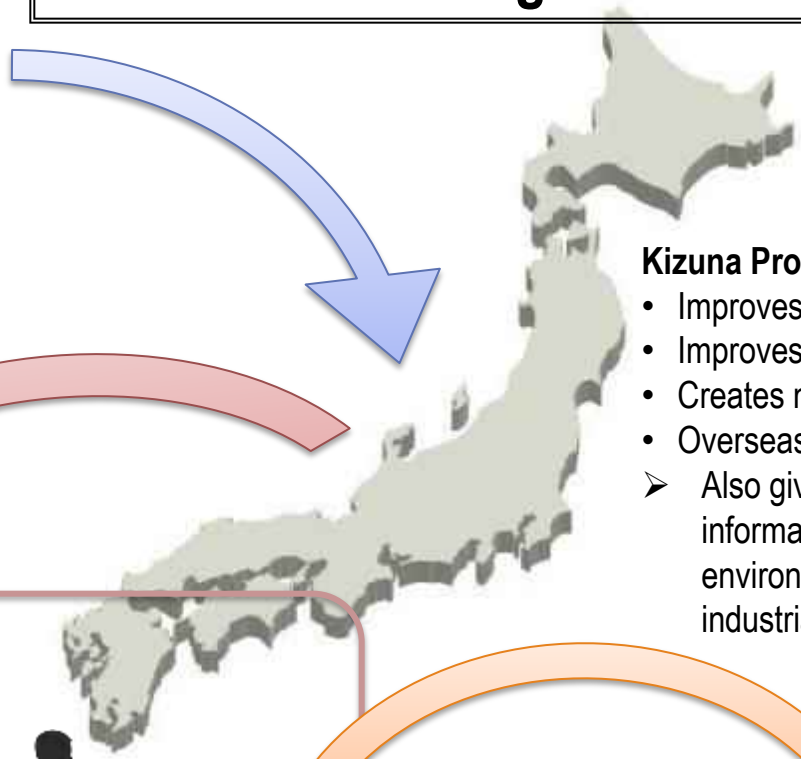
To establish a network of potential contributors to promote mine development in the development countries.

The Kizuna Program for HRD: Concept

Mining administrators

University faculty and researchers

Kizuna Program targets



Kizuna Program for HRD

- Improves academic skills
- Improves practical skills
- Creates networks and contacts
- Overseas field surveys

➢ Also gives participants information on Japan's environmental technologies and industrial diversification

Mining administrators

Fair and highly transparent mining administration activities

University faculty and researchers

Develop talent in line with the demands of private companies and the mining industry

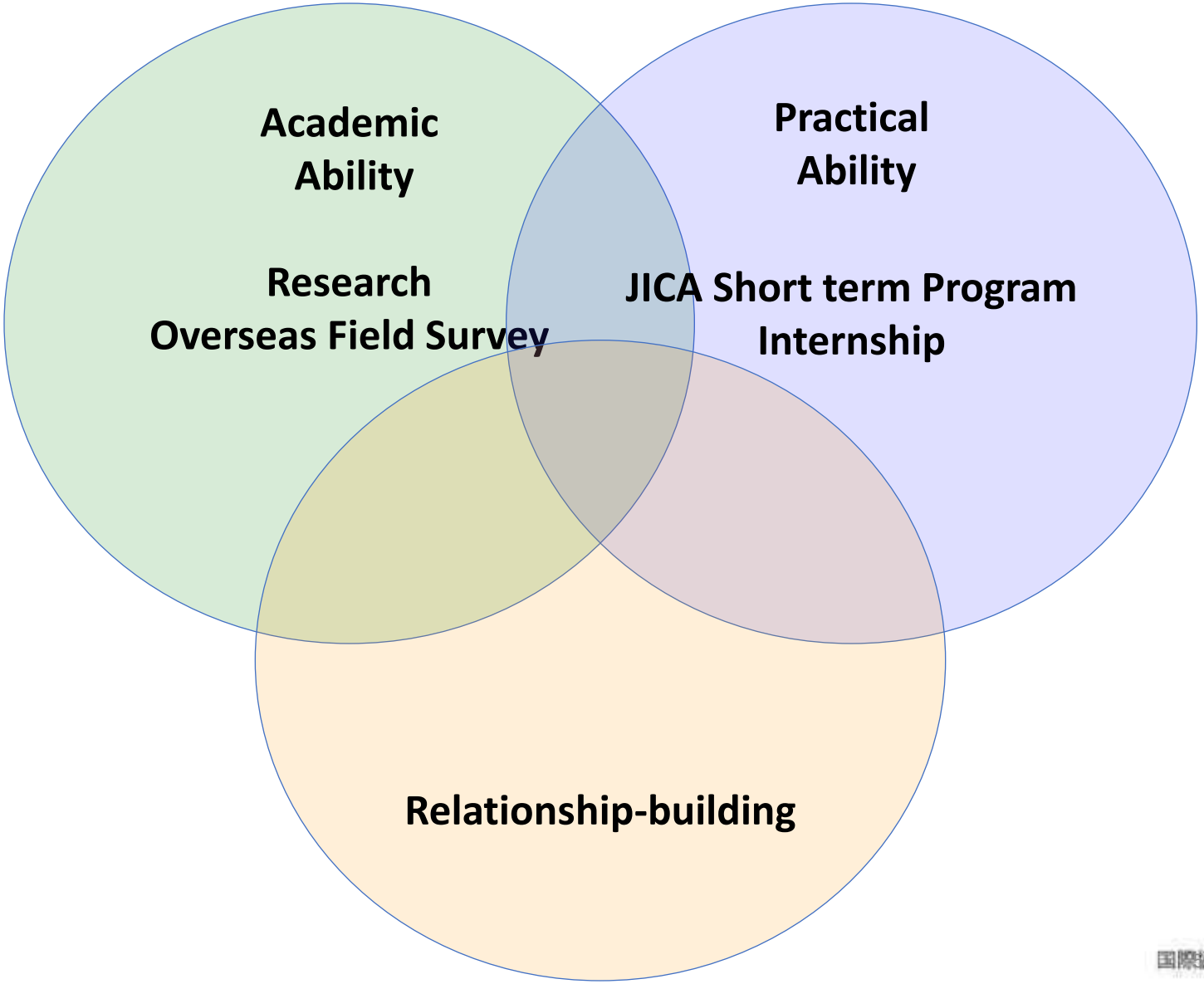
Serve as key contacts for related Japan agencies

After returning

- Develop sustainable mining industry that makes use of Japan's superior environmental technologies
- Develop the mining sector as a means of developing the partner country
- Ensure a stable supply of mineral resources (diversify supply sources)

Ultimate goals

“Shigen-no-Kizuna” Concept of the Program



The Kizuna Program: Outline

1. Objective

①Human Resource Development in Mining Sector
②Network building among Developing countries and Japan

2. Contents

①Obtain the Master/Doctor Degree
- -Research Students Program (6 month)
- -Graduate Course Program (2-3 years)

②Internship Program
③Practical Training Course (short term program)
- - Mining Policy and management Course (in summer)
- - Mining value chain in Japan (in spring)

④Overseas Field Research Program

Overseas Field Research（Image）

3. Target Number of Trainee

- 22 trainees , including 13 trainees from Africa countries, are under the Program as of May 2015
- 20-30 trainees will join the program every year
- Target number of trainee is over 200 for coming 10 years

The Kizuna: Practical training course (short term program)

JICA sets up training programs that teach practical abilities in addition to university education with the goal of creating favorable investment climates and building networks

Program	Resource policy and management course	Resource industry value chains
Aims	● Offer the **practical knowledge** that is difficult to come by in graduate school programs, with a particular focus on reinforcing **policy and management skills** (mining policy interest negotiations, mine operations, etc.) ● Provide opportunities to **build relationships with Japanese personnel**	● Teaches participants about **value chain expansion** in resource industries, covering the entire upstream and downstream process ● Promotes an understanding of Japan's **private companies and government agencies** while strengthening participant networks ● **Enhances lateral networks** among participants
Details	● **Various lectures and discussions** Resource sector legal systems, financing, economics, project evaluation, development case studies, management, contracts, and income management (including income from taxes and FDI policies), shuttering mines and revitalizing communities, resource negotiation demonstrations ● **Presentations and social gatherings** Related Japan personnel also attend for the purpose of building relationships with participants	● **Tours of related Japanese facilities** Three separate courses targeting coal, metal, and geothermal resources
Period	Summer vacation (two weeks)	Spring vacation (one week)

➢ **The resource policy and management course is scheduled for conversion to issue-focused training (contributes to CONNEX)**

Introduction on JICA short-term Program in Summer 2016

Title	Resource policy and management Course
Theme	Practical Mining Industry Management in International Trend
Schedule	Mid-end of August (2 weeks)
Contents	✓ Mining Law ✓ Resource Investment / Finance ✓ Resource Economics ✓ Analysis for Impact by Mine Development ✓ Evaluation of Mine Development Project ✓ Oil price and Economy ✓ Resource Contract ✓ Mine Closure and Pollution Control ✓ Mine Closure and Activation of Mine Town, etc.

The Kizuna Program: Internships

- Designed to improve practical skills and strengthen networks with related agencies
- Held regularly after the completion of academic training (at least every six months for the master's program) and can be coordinated to fall during extended breaks
- In addition to private companies, intern positions are currently being considered at agencies like JOGMEC and AIST

Trainee (six months)	Master or doctorate student (2–3 years) (Internships also available during extended breaks)	Intern

Example

Internship Plan for Participant Jack (expected master's program graduation date: September 2016)

Educational goals

■Learn how to evaluate oil and natural gas prospecting results and, as a government administrator, gain the skills needed to properly analyze and evaluate data and information submitted by private companies.

■Get a good understanding of value chains in the oil industry through plant tours and similar activities. Use short-term programs to gain complementary insights in strategic planning from a marketing and management perspective.

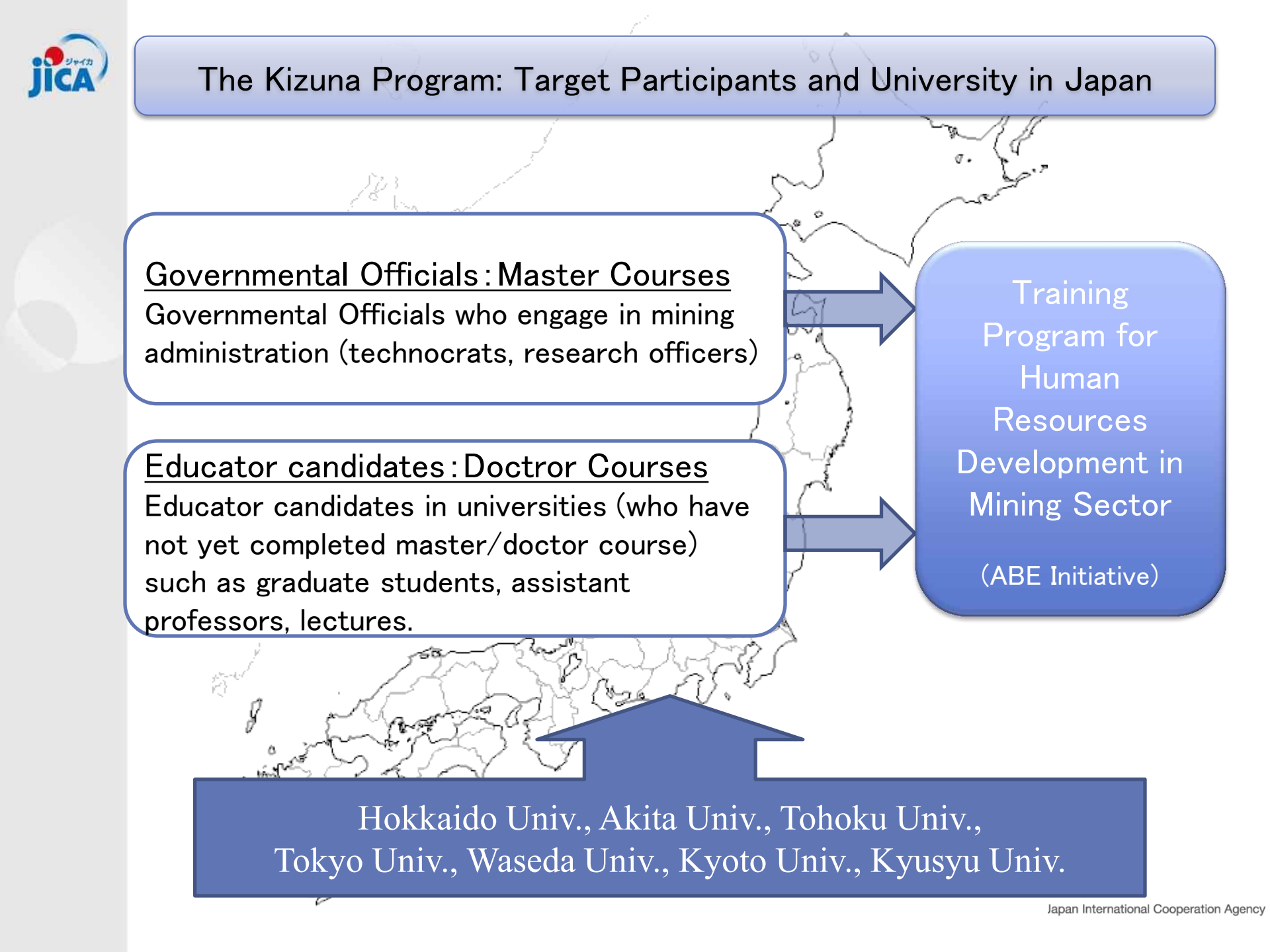
Internship plan (coordination in progress)

■Tour heavy industries and plant manufacturers in order to get a clear understanding of corporate activities relevant to to the petroleum industry as well as build relationships with Japanese companies

■Participate in simulation and evaluation training on petroleum storage tanks held by JOGMEC/JAPEX (currently confirming training program schedule)

■Observe oil field development at the JAPEX Akita District Office to learn about project management, security, environmental conservation, and similar topics

The Kizuna Program: Target Participants and University in Japan



Governmental Officials : Master Courses

Governmental Officials who engage in mining administration (technocrats, research officers)

Educator candidates : Doctror Courses

Educator candidates in universities (who have not yet completed master/doctor course) such as graduate students, assistant professors, lectures.

Training Program for Human Resources Development in Mining Sector

(ABE Initiative)

Hokkaido Univ., Akita Univ., Tohoku Univ.,
Tokyo Univ., Waseda Univ., Kyoto Univ., Kyusyu Univ.

Africa Business Education Initiative for the Youth (ABE Initiative)

Master's Degree and Internship Program Implementation Image (Technical Corporation)

Africa Business Education Initiative for the Youth (ABE Initiative)

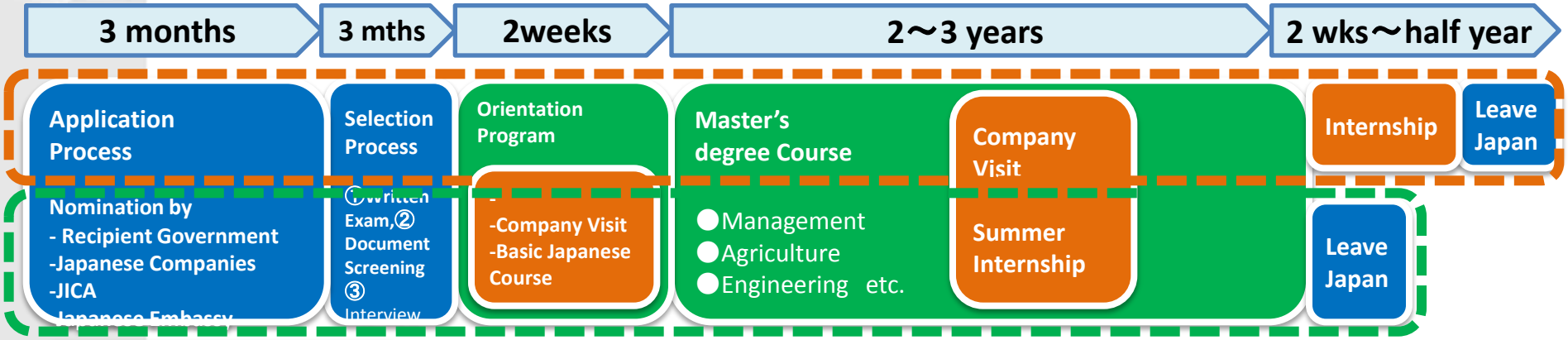
Master's Degree and Internship Program Implementation Image (TC)

Target Countries

- FY2014～2017 54 African Countries (10 large batch countries)

Target Participants

① Private Sector Personnel Persons who should play a guiding role to strengthen the tie between Japan and Africa 60%
② Government Official Young Officers who are in key positions for Industrial Development 30%
③ Academic Personnel Instructors of higher education institutions who contribute to the development of future industrial personnel 10%



Feature

- Combination of Master's course and Internship
- Development of African Industrial Personnel who have deep understanding on Japanese Society after the long stay in Japan

- **Strengthening Network between African Industrial Personnel and Japanese Private Sector**
- **Possibility of Recruitment by Japanese Companies**
- **Capacity Development of African higher education Institutions developing Industrial Personnel**

Contribution to Industrial Development by making use of the vitality of Japanese Private Sector

Implementation Structure

1. Advisory Committee（Tokyo・Once a year） : MOFA, MEXT, METI, KEIDANREN, JICA
2. Steering Committee（each country） : Japanese Embassy, JETRO, Japan Chamber of Commerce , Recipient Country, JICA
3. Secretariat : JICA
4. Support Organization : Support Organization (agency) will be recruited by JICA

59

Africa Business Education Initiative for the Youth (ABE Initiative)
Master's Degree and Internship Program

- **Schedule**:
  Nov. 2013～Oct. 2021 (Arrival: September 2014-2017)
  (1st Batch: Sep. 2014, 2nd: 2015, 3rd: 2016, 4th (final): 2017)
- **Target Number of Participants:**
  1st Batch 156 (actual), 2nd Batch 317(actual),
  3rd Batch 300(plan), 4th Batch 100(plan)
- **Target Countries**:
  All African Countries (54 countries)
- **Target Participants**:
  Young personnel from private, public, and education sector
- **Accepted Field**:
  All academic field.
  (when the research theme matches the concept of ABE initiative)
- **Cooperating University in Japan**
  70 Universities, 148 graduate courses

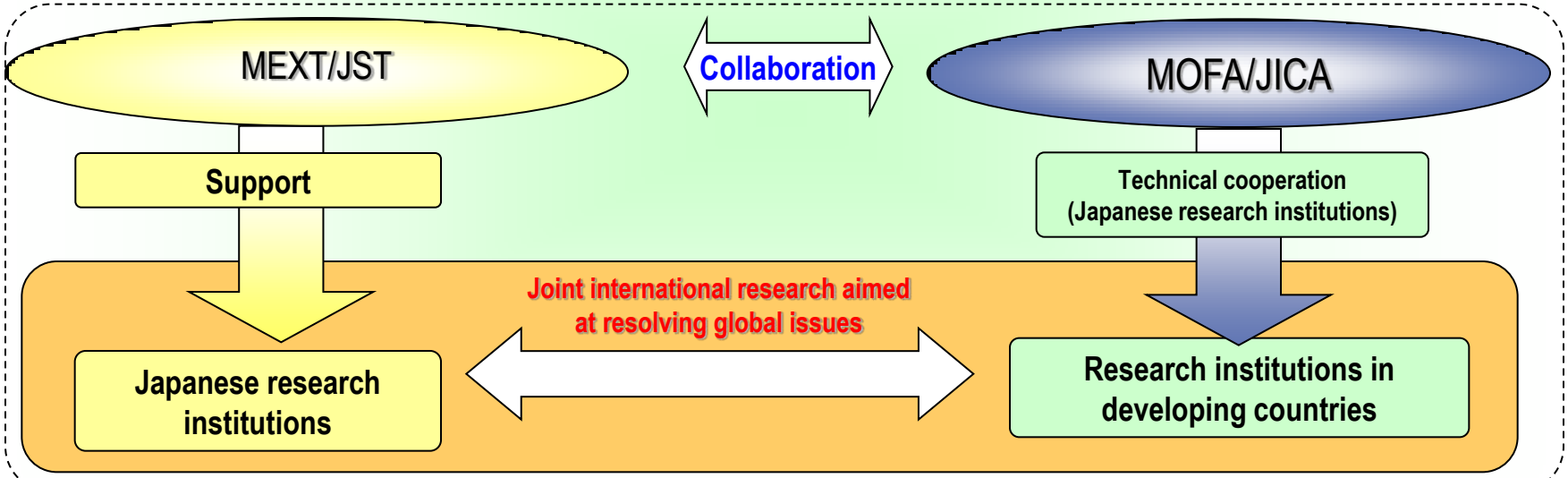
60

SATREPS and HRD

Example of JICA-university collaboration: Science and technology partnerships to resolve global issues

Science and Technology Research Partnership for Sustainable Development (SATREPS)

- The SATREPS program carries out international joint research involving research institutions in Japan and developing countries working in partnership with MOFA, JICA, MEXT, and JST to resolve global issues in the areas of environment and energy, disaster management, and infectious disease.
- The joint research is designed not only to generate problem-solving outcomes, but also to strengthen the capacity of research institutions in developing countries.



MEXT: Japan Ministry of Education, Culture, Sports, Science and Technology
JST: Japan Science and Technology Agency
MOFA: Japan Ministry of Foreign Affairs

Strengthen the ability of developing nations to resolve issues on their own

SATREPS in Serbia: Project for Research on the Integration System of Spatial Environment Analyses and Advanced Metal Recovery to Ensure Sustainable Resource Development

Project years: 2015–2020

- Serbian research institution: Institute for Mining and Metallurgy, Bor, Serbia
- Japanese research institution: Center for Geo-Environmental Science, Akita University, Japan

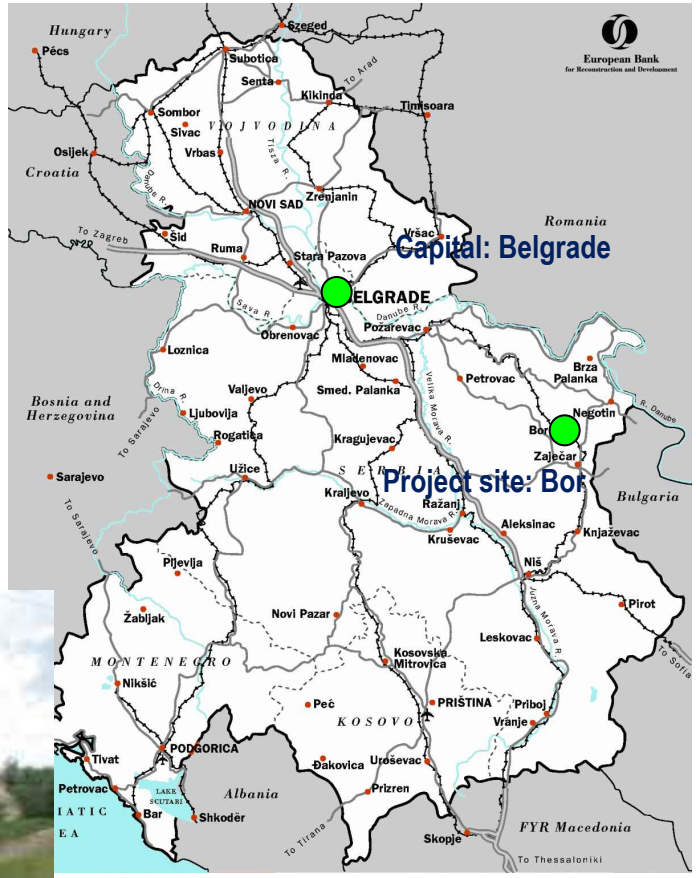
Background/aims

As a result of over a century of mining activities, Serbia is

- Potentially scattering pollutants from the downstream Danube to the Black Sea
- Having difficulty properly evaluating and restoring its environment using its existing technologies

Expected outcomes

1.Remote sensing technologies used over a wide area (thousands of kilometers) to evaluate the scattering of mining waste and environmental pollution
2.Advanced metal recovery technologies
3.Research on neutralizing and/or recycling mining waste products and wastewater
4.Overall system for environmental recovery



SATREPS in Zambia

Background

- In October 2013, activities aimed at symbolic ODA project formulation were launched for the African mining and environment sector.
- Information collection and confirmation surveys (2013–2014) confirmed a strong need for measures to address lead contamination in Kabwe, deemed one of the ten most environmentally polluted regions in the world (according to a 2007 report by the Blacksmith Institute).
- The lack of a scientific basis proving the cost effectiveness of lead decontamination measures was determined to be one reason for the delay. A request was made to Hokkaido University, which had previously done studies in Zambia, to conduct further research.
- The effort was launched this year as a SATREPS project.

Targets

- The initial target was training human resources involved in environmental measures.
- Connections were made with environmental administrative agencies through the SATREPS project.
- An educational and research framework for the mining and environment sector was set up at the University of Zambia.

Lead and zinc mine/former tailings dam/slag removal accumulation grounds

Progress/future development

- In addition to surveying the effects of lead pollution, the project also pushed for stronger proposals in countermeasure projects. Financing projects to fund cleanup efforts were put together with a focus on cooperation with the World Bank and the African Development Bank. The goal was to set up a mining and environment project led by Japan.
- One participant has already been accepted into the Kizuna Program for HRD from the University of Zambia. Another participant from the Ministry of Mines is scheduled to join the program this fall (Hokkaido University, environmental studies).

2013–2014	2015–2020	2020 onward
Needs survey Collect information and conduct a confirmation survey on mining environments and security in Africa. Survey the entire African region and confirm the strong need for lead decontamination measures in Zambia.	**Detailed survey/present countermeasures** SATREPS Study the scientific evidence on the impact of lead pollution and propose countermeasures based on the result of this research.	**Implement countermeasures** Joint financing from the World Bank and others? Implement the required countermeasures based on SATREPS results. Coordinate financing schemes and the like.

SATREPS in Zambia

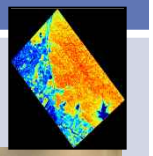
ZAMBIA : Visualization of impact of chronic / latent chemical hazard and Geo-Ecological Remediation in Zambia (in preparation)

1. Background

- Kabwe City has been ranked among 'the ten most polluted places in the world'（BLACKSMITH Institute）
- Blood lead levels in children are over the level that clinical symptoms of Pb toxicity become visible.
- It is necessary to raise the level of environmental research and education as well as to develop social systems and technologies for environmental remediation

2. Project Activities

Research Group	Contents
①Elucidating a pollution mechanism to an ecological system, a person and an animal from ground	a. Integrated evaluation of soil environment b. Wide area investigation (remote sensing and the ground) c. Migratory inspection and shift to an animal of lead and a person of lead in the ground
②Follow up study to the harmful metal pollution in the child of the deposit area	a. Risk assessment of the hazard with lead b. Economic assessment of the hazard with lead
③Development and evaluation of the on-demand environmental remediation technology	a. Physical remediation b. Chemical remediation c. Bio-remediation and fight remediation



3. Remarks

- Collaboration with many department of Hokkaido Univ. (veterinary medicine, Economy, Science, Engineering, Agriculture, Information Science, Environmental Sienece)
- Cooperate with WB in the sector of environmental remediation in future

Thank you for your kind attention.

JICA's Support

for HRD in Mining Sector

Hosoi.Yoshitaka@jica.go.jp
JICA