



‘Assessment of Heavy Metal Contamination in Soil and Water for Safety Crop Production in Myanmar’ Project
4th call MKCF



Mekong-Republic of Korea Cooperation

Established in 2011, The Mekong-Republic of Korea Cooperation represents a dynamic and mutually beneficial partnership between the Republic of Korea (ROK) and the countries of the Mekong region, namely Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam (CLMTV). Strengthened by shared goals of economic development, sustainable growth, and cultural exchange, this collaboration aims to foster regional prosperity, enhance the well-being of the people, narrow the development gap among regional countries, support ASEAN Community building, and address challenges in the Mekong region.

The cooperation is guided by The Plan of Action (PoA) 2021-2025 under the Mekong-RoK Cooperation framework.

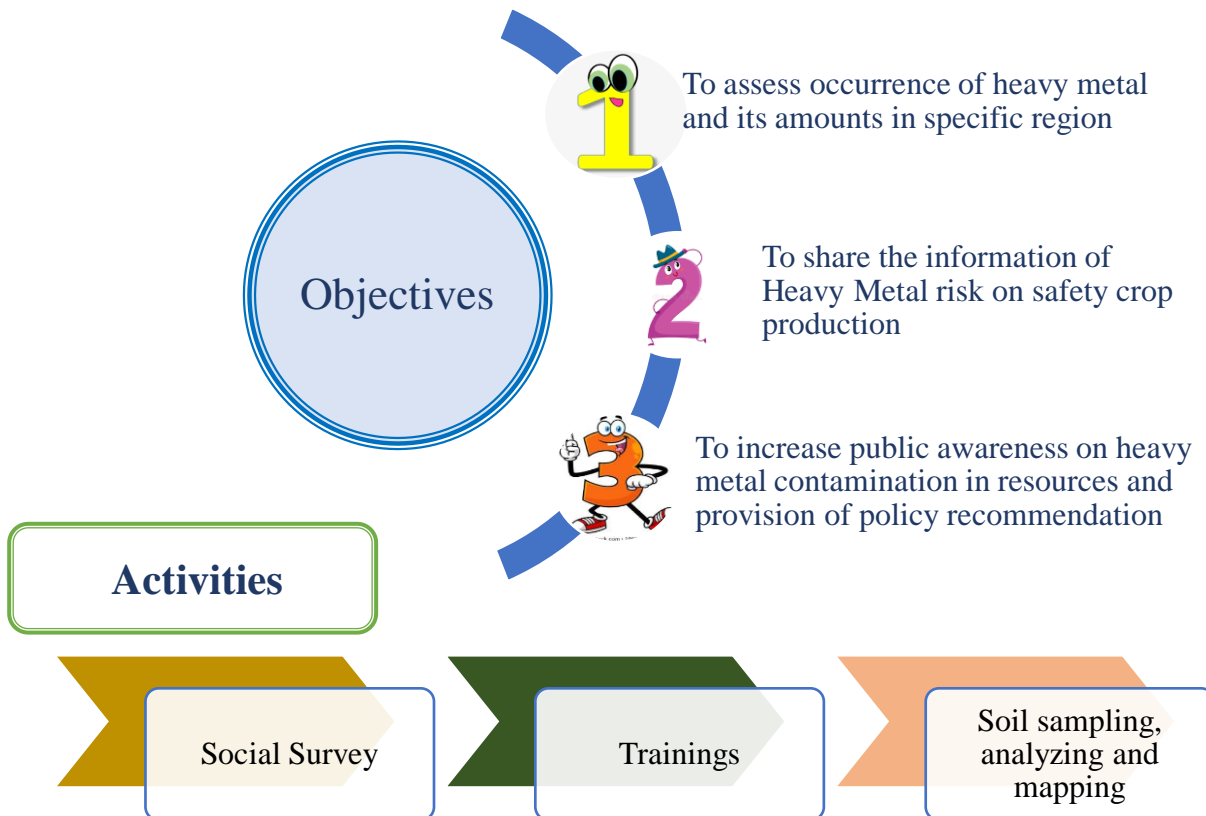


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Background

Heavy metal contamination in soil and water is a significant public concern. Growing crops on contaminated soil for human or livestock consumption can pose serious risks to human health. Given the importance of food security and safety, it is crucial to cultivate crops in safe soils and produce food that is free from contaminants. Soil is a primary source of heavy metals, as plant roots absorb these metals and transfer them to the edible parts, eventually affecting organisms. This project aims to study the contamination of various heavy metals in cultivated soil, such as lead (Pb), chromium (Cr), arsenic (As), zinc (Zn), cadmium (Cd), copper (Cu), mercury (Hg), and nickel (Ni).



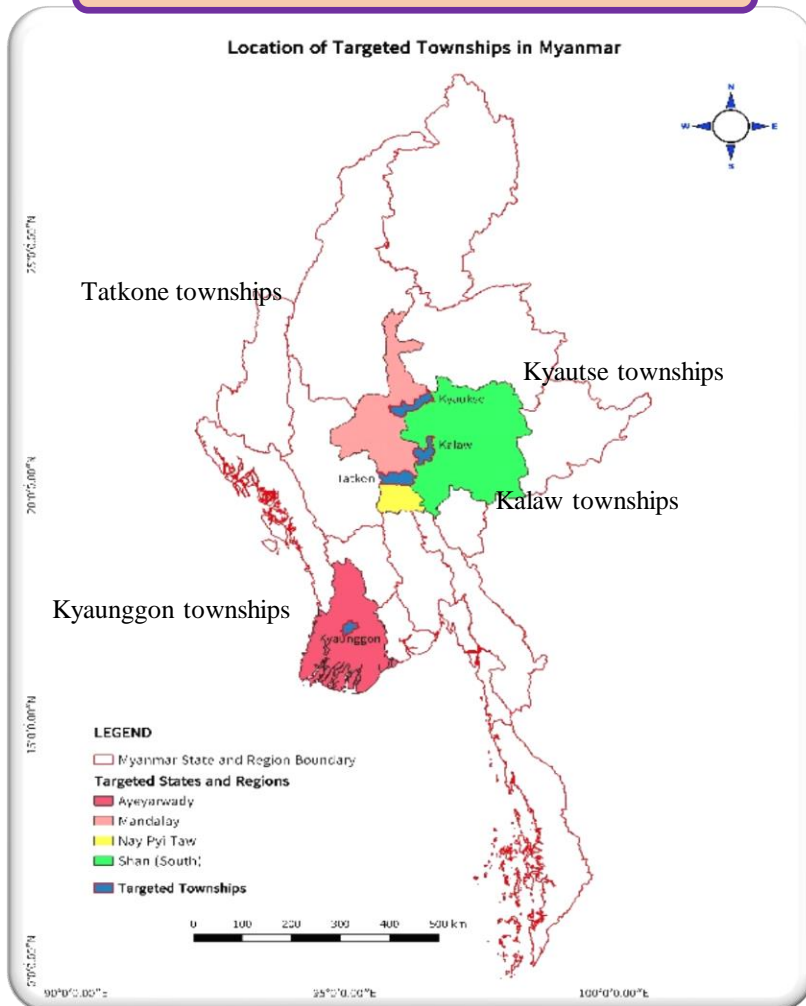
Beneficiaries

Crop producers and government officials from the Department of Agriculture will benefit from the project. The agricultural areas within the project locations will gain valuable insights through the detection results of heavy metals in their fields.

Project Implementation Agency



Project Locations



Socioeconomic Survey

Region/State	Selection Criteria
Ayeyarwaddy	Area located using underground water from tube well for rice growing
Nay Pyi Taw	Area using high use of agrochemicals (fertilizers and pesticides) for vegetable production
Mandalay	Area located near the industrial zone
Southern Shan	Area located near the discharge of mining and using high use of agrochemicals (fertilizers and pesticides) for vegetables and field crops production



Methodologies

- ❖ Survey of 8 Townships in 4 project areas and 814 sampled households is chosen by using stratified and simple random sampling.
- ❖ Descriptive Statistics and Comparative Analysis by ANOVA (using SPSS software)

Results

- ❖ Awareness of heavy metal contamination and risk aversion is more significant at educated level of all sampled households. Knowledge on the causes of heavy metal contamination, relation with agro chemical use and remedial measures is very low. Knowledge of Good Agricultural Practices (GAP) and adoption rate is higher in target group of farmers after training.

Trainings

The training aims to

- increase awareness on heavy metal contamination in cultivated soil and its risk for safety crop production.

It covers

- Catching up the basic needs of soil management for crop productions and risk of heavy metal contamination and its remediation. It includes general knowledge on importance of soil health.
- Introduction of theory and practical application of Digital Survey Collection methods (Kobo Toolbox),
- Hazard of agrochemical inputs and proper management
- Increase awareness on good agricultural practices (GAP)



Numbers of Trainees

Region/State	Farmers	DoA staffs	Total Trainees
Ayeyarwaddy	65	40	105
Nay Pyi Taw	70	25	95
Mandalay	70	30	100
Southern Shan	70	30	100
Total	275	125	400

Soil Sampling, Analyzing and Mapping

Soil Sampling

- Preliminary field survey - actual ground condition
- Taking necessary information - digitized maps and secondary data of the Township
- Kobo data collection system

Kobo data collection system

- ✓ sampling code no.
- ✓ sampled date
- ✓ village name & village tract
- ✓ location of sampling point
- ✓ cropping pattern
- ✓ land use and land cover
- ✓ fertilizer application
- ✓ some information of heavy metal contamination sources



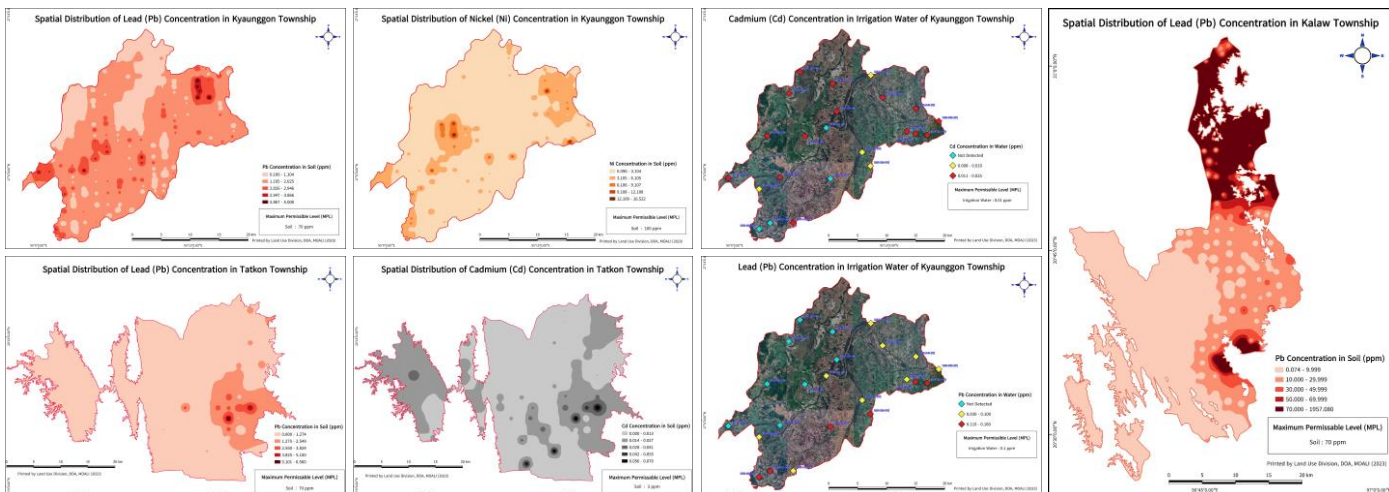
Analyzing

- Analysis of Heavy Metal contents in soil and water samples at Yangon Central Analytical Laboratory, Land Use Division, Department of Agriculture, MOALI, Myanmar
- Analysis of soil physical properties (pH, EC, Organic Matter) of soil samples
- Data analysis and statistical analysis



Mapping

- Digital Elevation Model (DEM)- topography
- Spatial distribution maps – As, Cd, Cr, Ni and Pb - Inverse Distance Weighted (IDW) interpolation
- IDW - Quantum Geographic Information System (QGIS) software version 3.28.6.



Outputs and Outcomes

Activities	Output	Outcome
<p><i>Socioeconomic survey</i></p> <ol style="list-style-type: none"> 1. Baseline survey of (4) different project areas for heavy metal contaminated situation, crop production practice, agro chemical usage, awareness of heavy metal and adoption of GAP 2. End line survey to the interviewee farmers for adoptability 	<ul style="list-style-type: none"> • Baseline data of heavy metal contamination and demographic information of four project areas • Baseline data set (socio economic condition, crop production practices, awareness of heavy metal and GAP) of 814 households in four project areas • Adoptability and evaluation for interviewee farmers 	<ul style="list-style-type: none"> • A training package for taking soil sample (for extension staff) and technology needs (for farmers) to reduce/ averse the risk of heavy metal contamination in their crop production. • Identification of the key challenges of farmers can shape policy recommendations for government.
<p><i>Meetings and Trainings</i></p> <ol style="list-style-type: none"> 1. Three numbers of expert meetings 2. Eight numbers of trainings at (4) different regions 	<ul style="list-style-type: none"> • Proper guidance to the project • 275 farm household head and 125 DoA staffs have accessed the trainings • Increased awareness on heavy metal contamination, remedial measures for heavy metal contamination and effective management on fertilizer and pesticide use, irrigation and soil conservation practices for safety crop production. 	<ul style="list-style-type: none"> • Improving capacity building of DOA staffs • Increasing awareness of crop producers on risk of HM contamination in soil, thereafter they will try to adopt safety practices for their crop productions and health care. • Safety practices ensure long term productions • Safety crops in Market guarantee to consumers’ benefits
<p><i>soil sampling and analysis and production of Maps</i></p> <ol style="list-style-type: none"> 1. Soil and water sampling at 4 different townships 2. Analyzing the samples at the laboratory 3. Producing Maps in accordance with analyzed data 	<ul style="list-style-type: none"> • Assessment of heavy metal contamination in soil and water; developing soil maps (spatial interpolation maps) of heavy metal concentration in relative regions. • Recommendations for soil fertility restoration amendments and precaution measures for soil fertility degradation and policy recommendations will be developed. 	<ul style="list-style-type: none"> • Well informed soil maps showing the risk and possibility of heavy metal contamination will be developed in four project areas of Myanmar. • policy makers and planners will have valuable data for promoting sustainable use of soil resources, decrease soil degradation and expend the safety crop production.

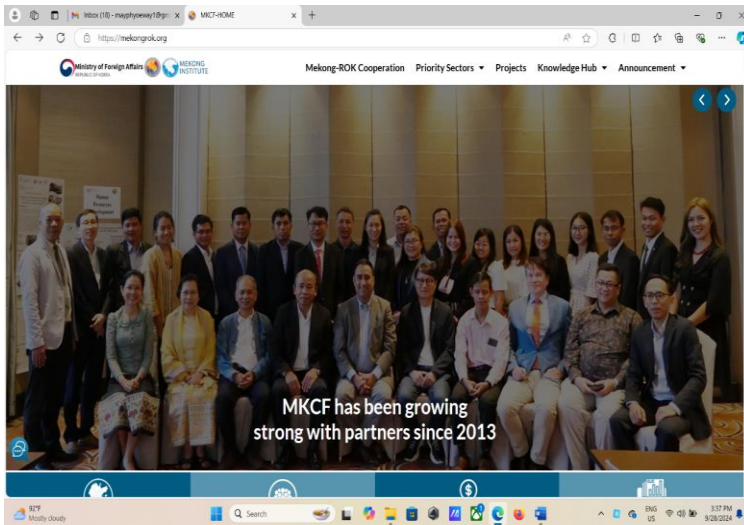
Impact

Ensuring the safety and sustainable crops productions for human health

Monitoring and Evaluation

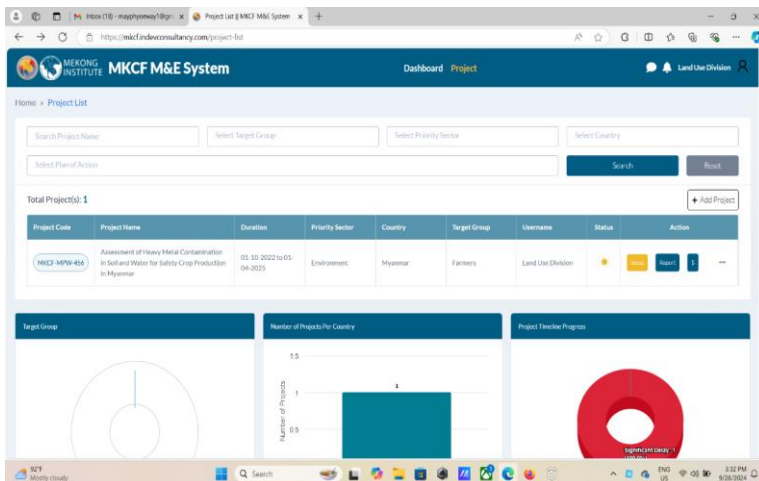
- ❖ Round Table Meeting hosted by Mekong Institute on 14th December 2024 at Bangkok, Thailand

[MKCF-HOME \(mekongrok.org\)](https://mekongrok.org)



- ❖ Developed Monitoring and Evaluation System for all MKCF projects

<https://mkcf.indevconsultancy.com/>



- ❖ Developed and Effective Financial Control System for all MKCF projects

<https://www.appsheets.com/>

