12.1 First Presentation of Session II

Dr. Paul Pavelic, Principal Researcher - Hydrogeology, IWMI, on Practical Efforts to Improve Groundwater Governance in the Challenging Context of Lao PDR

Figure 12.1.1. Water uses in a village.

Thank you very much. Hon. Minister, Chairman, colleagues and friends. Thanks for giving me this opportunity.

Manthri invited me to talk on groundwater governance in Lao PDR because the situation in Sri Lanka might be as bad, I think, as some areas in Lao PDR but at a worse level. We talk about very different kinds of reasons in comparison to the two countries. This is an IWMI-led project, which is 1-year old. The only opportunity in expanding groundwater use in Lao PDR is for agriculture in the country. Only a few people with skills in groundwater aspects were called upon to advise and get involved in other activities of groundwater. Having been in Lao PDR for just 1 year, let us talk about its groundwater use for agriculture there.

Overview of the performance development review of Lao PDR

- Small country in South East Asia but larger in comparison to Sri Lanka, which is called the “landlocked developing country in Asia”.
- Population: 6.5 million (population density very much lower than in Sri Lanka).
- Geographical area: 237,000 km^2.
- Rainfall: 1,300 to 3,700 mm/year (wet country).
- Forest cover: ~50%.
- Main industries: Mining, hydropower, timber, tourism.
- Low-middle income bracket.
- Ranked 22nd most land developing country.
- Gross Domestic Product per capita ~ US$1,300/year (production not sufficient, so that there is a lot more to be done).
- 33% below the International Poverty Line of <US$1.25/day (poverty areas are marked in red in the map (Figure 12.1.3), major economic activities going on in the North and the highland areas).

There are three major millennium development goals. Lao PDR has to do a lot more work on food security.

Figure 12.1.2. Lao PDR.

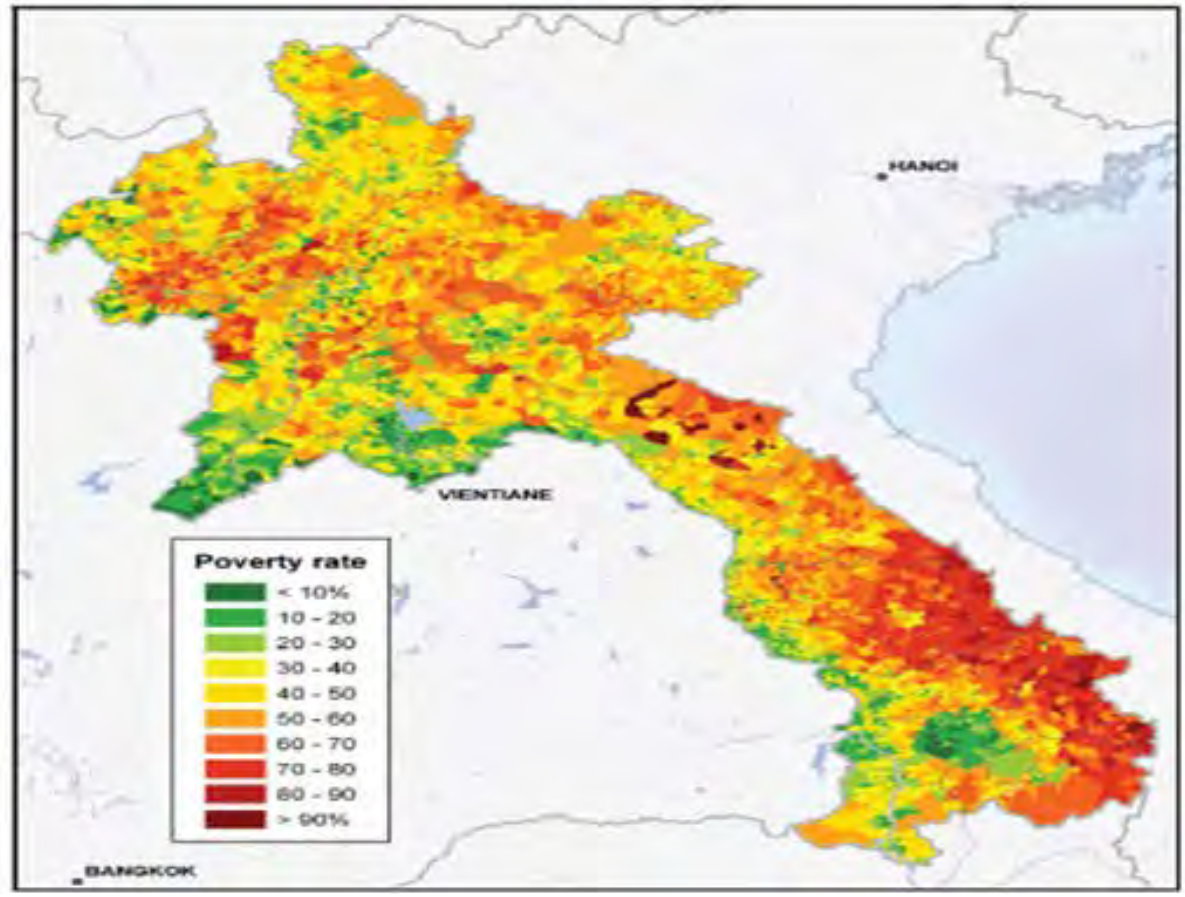

Figure 12.1.3. Map showing poverty areas.

Millennium development goals and challenges

- ► Medium-term goals, short-term goals.
  - Improved water supplies (75% in rural areas by 2015).
  - Food and nutritional security (a lot more to do – more intensified agriculture needed).
- ► Longer-term national development goals.

- Expanding irrigation development is important in contributing to poverty alleviation. and livelihood improvements.

► Climate change and climate adaptation.

- Enhanced water storage, resilience, adaption (storages will be very important for groundwater as in Sri Lanka and anywhere else).

Figure 12.1.4. Improved access to water supply.

Photo credit: Paul Pavelic.

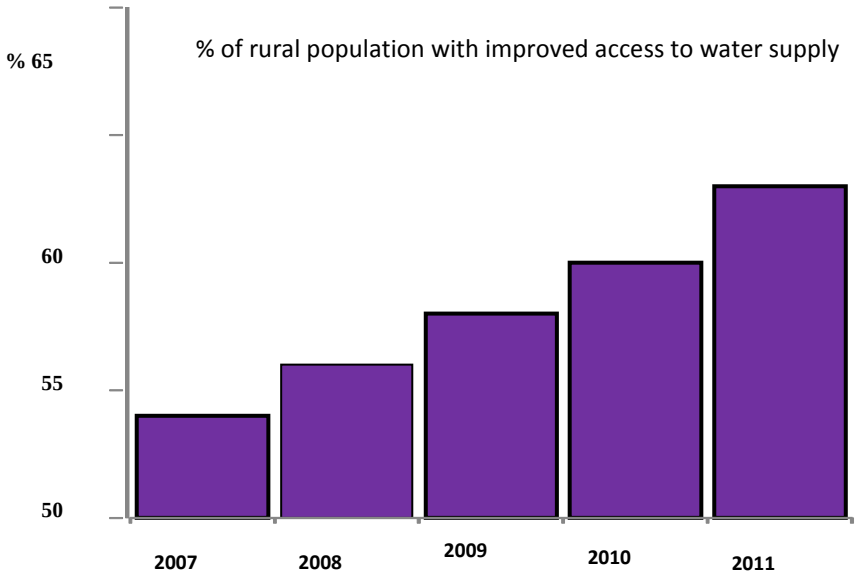

Figure 12.1.5. Improved access to water supply.

Table 12.1.1. Irrigated agriculture in Lao PDR – Countrywise statistics on groundwater irrigation.

Country	GW irrigated area (ha)	Total irrigated area (ha)	Total GW-irrigated area (%)
Cambodia	0	241,823	0.0
Lao PDR	200	271,703	0.1
Myanmar	100,000	2,073,000	4.8
Thailand	481,063	5,279,860	9.1
Viet Nam	32,000	3,200,000	1.0

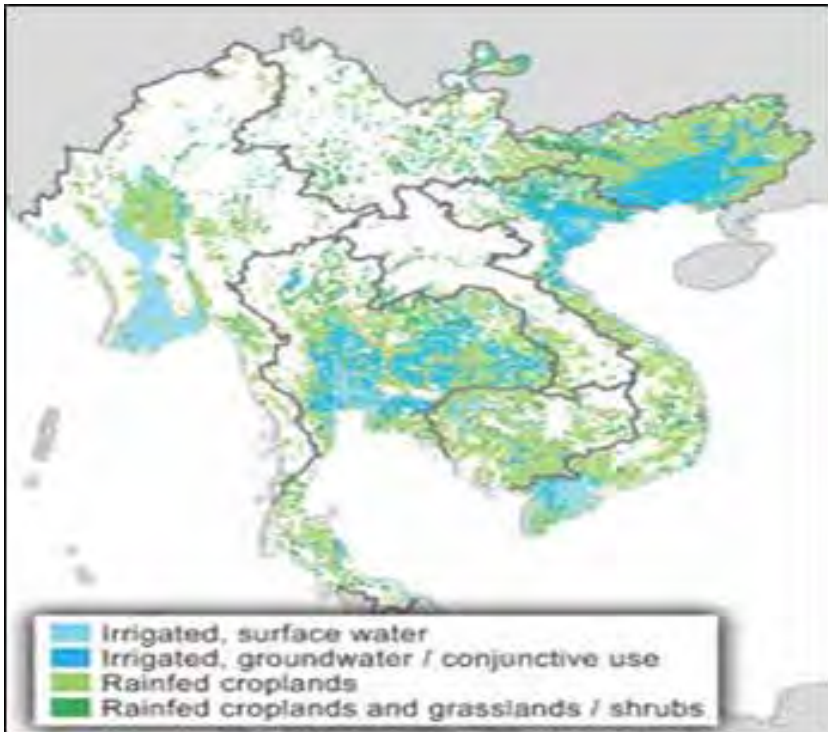

Figure 12.1.6. Irrigated area map.

Groundwater irrigation is very minimal. Government is very keen to boost areas under groundwater irrigation in Lao PDR to 100,000 ha in the coming years. It will depend on research and activities going on now in the country.

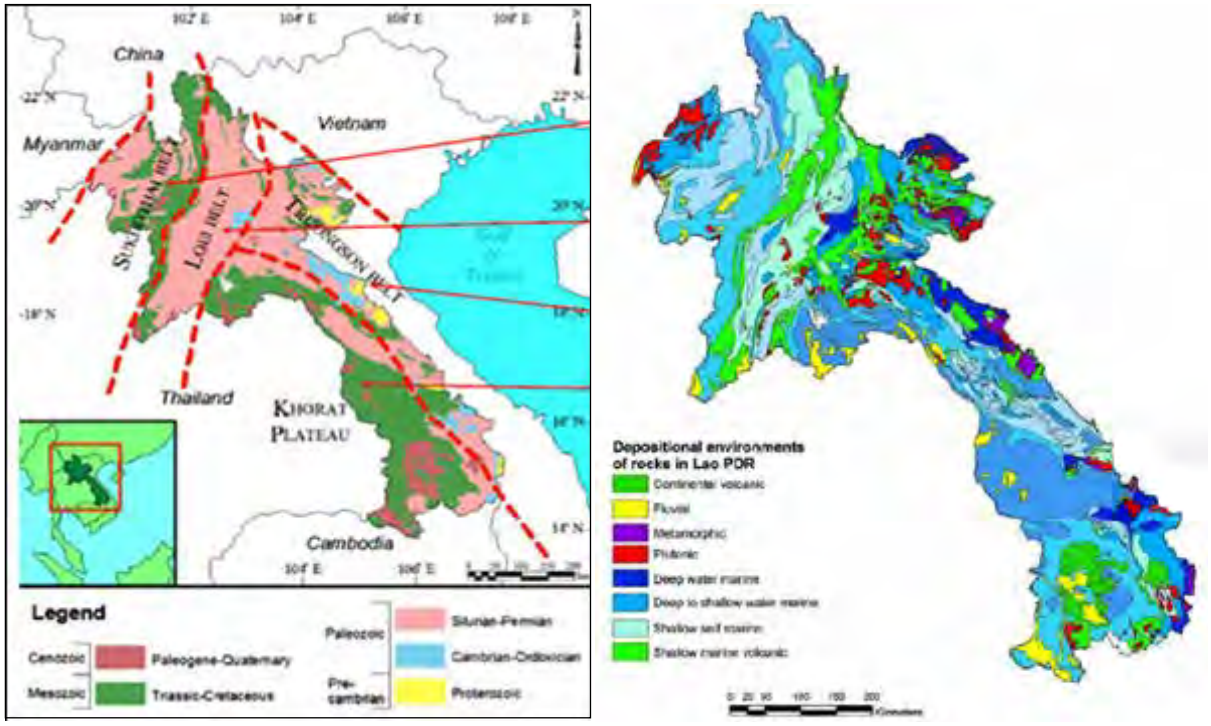

Figure 12.1.7. Geology of Lao PDR.

Hydrogeology of Lao PDR is much more complicated than in Sri Lanka. It is highly variable and highly complex. There are various types of topographic sequences and geological activities there. Crystalline rock formation and consolidated volcanic ashes are present there. So there are four ranges of different types of aquifer possibilities in the country.

The role of groundwater (in a rich country)

Figure 12.1.8. Rural supplies.

Figure 12.1.9. Urban supplies

Figure 12.1.10. Rural freshwater industries.

Photo credit: Paul Pavelic.

In rural areas rural water supplies need to be developed by the use of new boreholes or existing shallow wells. Government and NGOs are involved in the protection of these from contamination. In cities, groundwater is not used for drinking because of the perception of the public. In some smaller cities and towns where surface water is in short supply groundwater is used for water supplies. But most of the industries rely on groundwater as soft drinks, etc. Saline groundwater is productively used for some industries.

There are more activities going on in the field, which are not reflected in the statistics. Some areas (60-70%) have access to groundwater. This is used for domestic purposes, livestock and homeland cultivation. It is being extensively used at the subsistence level. Also, there are more prospective uses of high economic-value, e.g., export agriculture of coffee cultivation.

Figure 12.1.11. Eco system services.

Figure 12.1.12. Agriculture.

Figure 12.1.13. Saltwater industries.

Photo credit: Paul Pavelic.

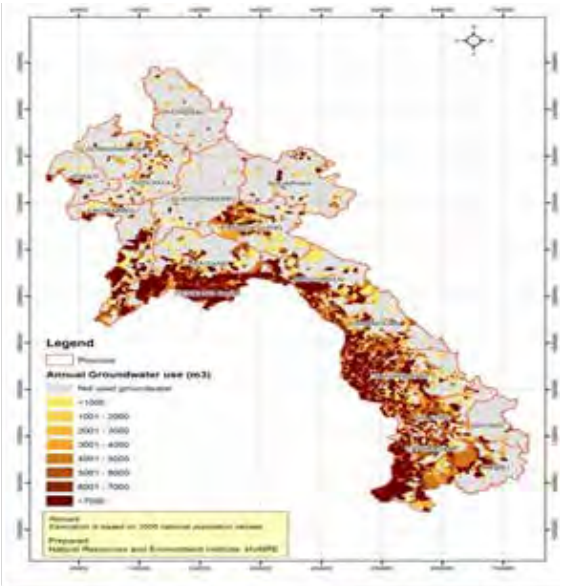

Figure 12.1.14 Extent of groundwater–Spatially.

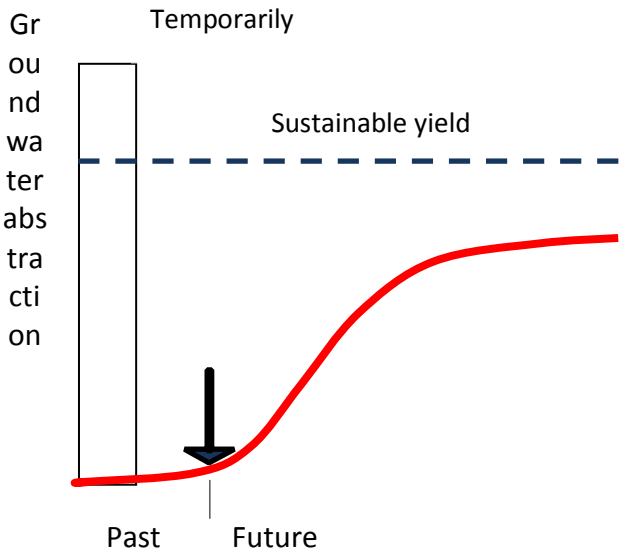

Figure 12.1.15. Pattern of groundwater abstraction.

Table 12.1.2. Participating actors involved.

Role Institution	Development	Research /Investigations	Management
Public	Nam Saat, DHUP	NREI, DOI, DWR, DGM, NAFRI	DWR, RBOs, NREI, PAFOs
International donors	ADB, WB, JICA, UNICEF, SIDA, World Vision, AusAid, SNV, WHO	ADB, ACIAR, Crawford foundation, ICE-Warm, MRC	WB, IFC, ADB
NGOs	DIC, CDEA, ADRA, Save the children, world education		
Academic / Research		NUOL, IWMI, KKU-GWRC, IGES	
Private	HP companies, Mining companies, LB companies, farmers, rural households	THPC, GHD, Nor-Consult, Hydrogeology	

Some of the perceived issues for groundwater development and management

- Limited capacity at central and field level to plan, implement, operate and manage groundwater projects effectively.
- Lack of coordination amongst agencies involved.
- Level of skepticism about groundwater development for rural water supplies.
- Poor water quality in some areas due to natural or human-related pollution (salt, arsenic, microbes) due to poor-yielding, saline or abandoned wells.

The present state of affairs: governance checklist (pragmatic model)

Technical	• Existence of basic hydrogeological maps	N
	• Groundwater body/aquifer delineation	L
	• Groundwater level/quality monitoring network	L
	• Groundwater pollution hazard assessment	N
	• Availability of aquifer numerical models	N
Legal and institutional	• Water well drilling permits and groundwater use rights	N
	• Instruments to reduce over-abstraction of groundwater	N
	• Sanction for operation of illegal water well	N
	• Groundwater abstraction and use charging	N
	• Land-use control/levies on potentially polluting activities	N
	• Government agency as “Groundwater Resource Guardian	Y
	• Community Aquifer Management Organizations	
Cross-sector policy coordination	• Coordination with agricultural development	N
	• Groundwater-based urban industrial planning	N
	• Compensation for protection of groundwater	N
Operational	• Public participation in groundwater management	L
	• Existence of groundwater management action plan	N

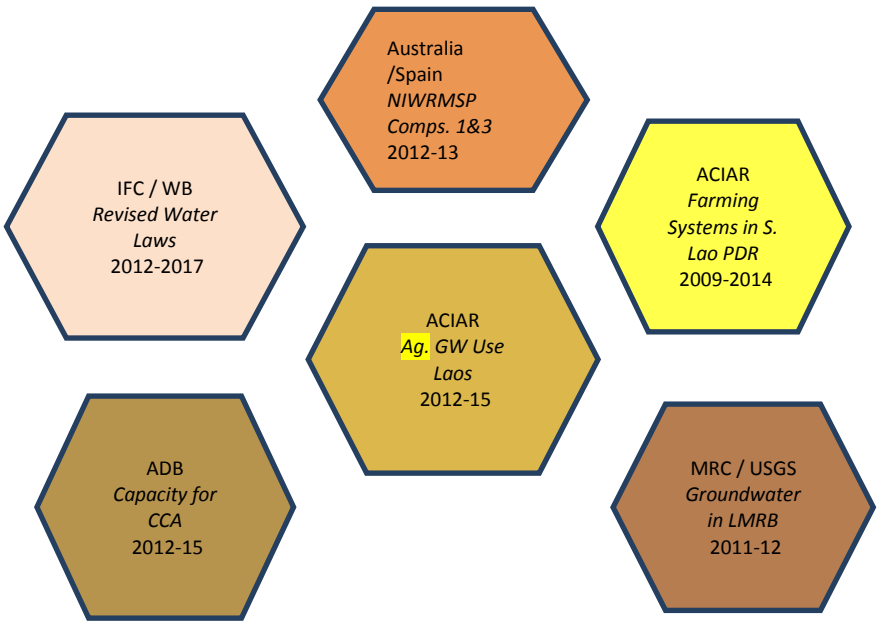

Figure 12.1.16. Critical mass of current activities.

Some important research and development questions

In the context where greater groundwater utilization is necessary and certain:

- How can use be encouraged without unduly compromising long-term sustainability and environmental services?
- Can the level of risk/failure associated with new development be reduced?
- Does significant and irreversible groundwater exploitation pose an imminent threat for a country characterized by high rainfall and low population density?
- What is the right level of knowledge and governance sufficient to sustainably manage the resource?

Improving the Understanding of the Resource

Figure 1a. Hydrogeological map of Charuratna and Phu (1992), digitized and rectified by MRC, 2011.

- Acquire data from relevant agencies (government, NGOs, private sector, etc.)
- Construct a database and information system
- Assess existing groundwater potential maps against independent data in focal areas
- Develop methodology for assessing groundwater potential and generate final groundwater potential maps for focal areas

Figure 12.1.17. Hydrological map of Charuratna and Phu (1992)

Source: Digitized by Mekong River Commission, 2011.

Limited monitoring of the resources

- No regional/ongoing monitoring of groundwater.
- Existing monitoring at the research project level.
- Opportunities to build groundwater into existing hydro-meteorological network.

Figure 12.1.18. Groundwater monitoring network.

Source: Mekong Committee 1993

Capacity building was done extensively locally and also with assistance of Australia.

Postgraduate scholarship support

Figure 12.1.19. Capacity-building assisted by Australia.

Photo credit: Paul Pavelic.

Figure 12.1.20. Capacity-building.

Photo credit: Paul Pavelic.

Figure 12.1.21. Capacity-building.

Photo credit: Paul Pavelic.

Institutional Changes

New division of groundwater management formed in 2012 under the Division of Water Resources (DWR)

- Mandate is clear but operationalization is starting slowly.

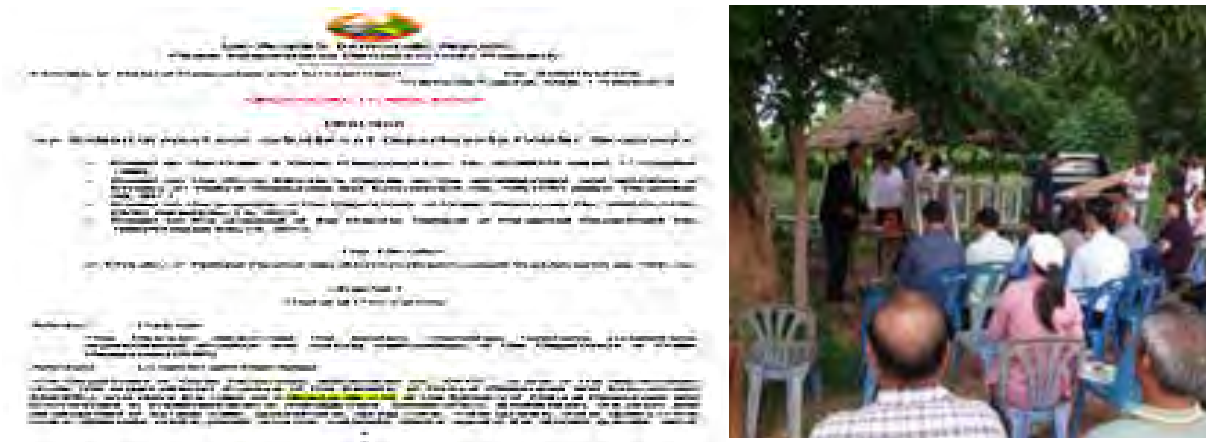

Figure 12.1.22. New division of groundwater management was formed.

Photo credit: Paul Pavelic.

Figure 12.1.23. National water laws under revision with stronger emphasis on groundwater.

Photo credit: Paul Pavelic.

Main messages

- Groundwater is vitally important even in a water-rich country such as Lao PDR.
- The major challenge for groundwater governance is to build the necessary human and institutional capacity which requires concerted efforts and extended time frames.
- Groundwater governance is very much in its infancy in Lao PDR but efforts to improve it are underway.

Figure 12.1.24. Making communications and linkages.

Photo credit: Paul Pavelic.

Communications and linkages

- Stakeholder consultation.
- National groundwater orientation workshop (shortly).
- Working with industry.
- Project brochure (Lao and English).
- Project website (shortly).
- Media release.
- Radio interviews.