



**Asian Soil Partnership Consultation Workshop on Sustainable
Management and Protection of Soil Resources**
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CAMBODIA – SOIL RESOURCES

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Physiography of Cambodia

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Land form:

- Relatively flat
- Lowlands: <50 m
- Uplands: up to >1000 m
- Highest point: 1813 m

Major water resources:

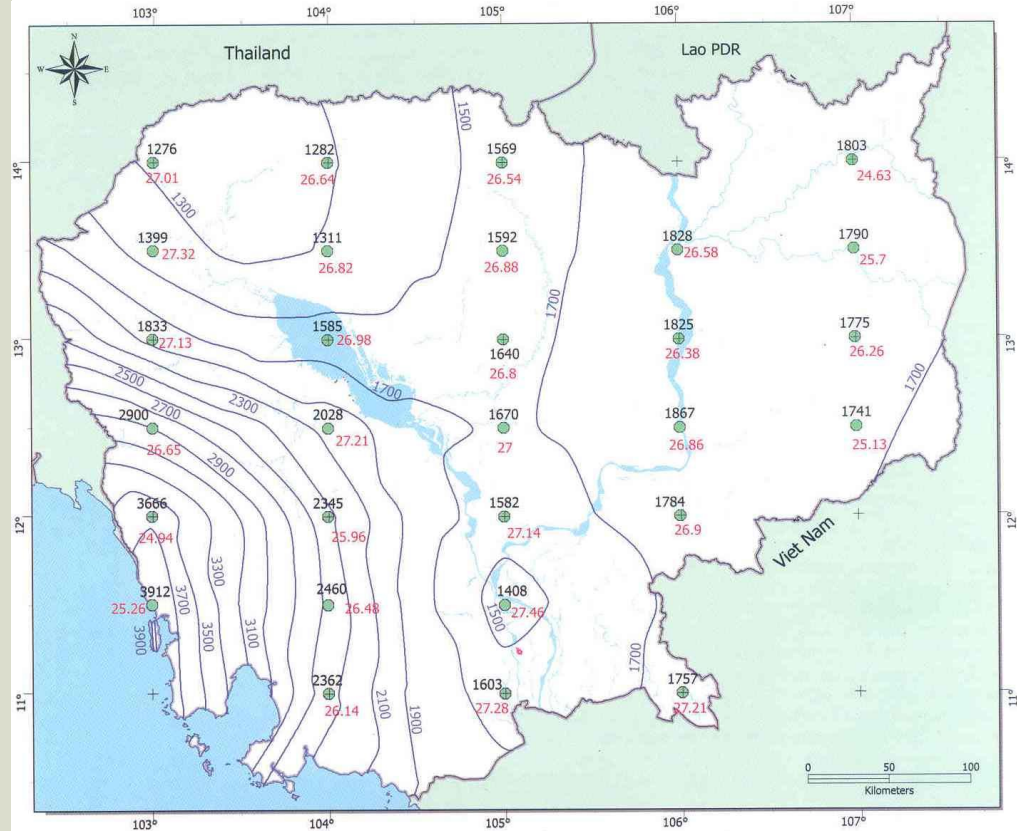
- Great Lake :
(Area: up to 25,000 km²)
- Mekong and Basac river systems



Cambodia - climate

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- ❖ Rainfall: 1 200 – 4 000 mm
 - January : lowest
 - October : highest
- ❖ Humidity: 69 - 80%
 - March : lowest
 - September: highest
- ❖ Day length : 11h - 13h
 - December : shortest
 - June : longest
- ❖ Temperature: 23 – 33°C
 - December : lowest
 - April : highest
- ❖ Evaporation: 2 230 mm/year
 - September : lowest
 - March : highest



History of Land Resources

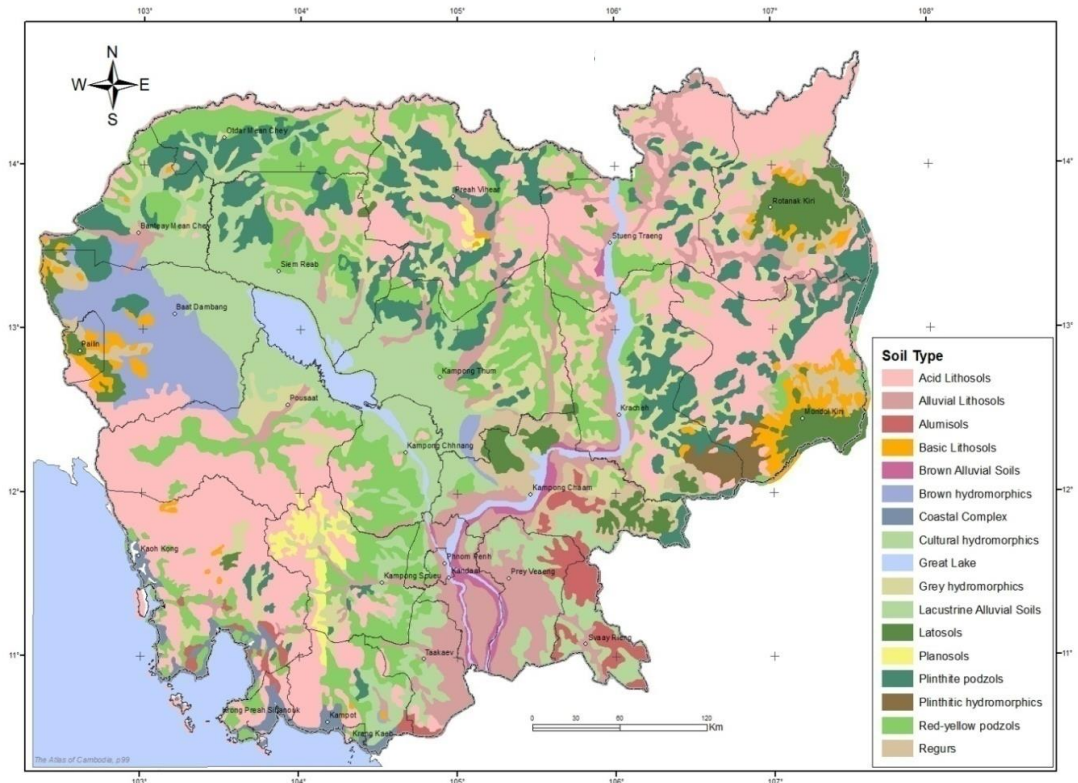
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- ❑ 1961 - Crocker (1962): First national soil survey
- ❑ 1966 - Yasuo (1966): Soil fertility study
- ❑ 1977 - Ceruse (1977): Soil survey, 1:1,000,000 pedogeomorphological map of LMB
- ❑ 1985 - Tran Kim Thach (1985): Soil, agro-ecological and hydrological maps, land use and land suitability maps
- ❑ 1974 - Kawaguchi and Kyuma (1974): Fertility of rice soils, SE Asia
- ❑ 1997 - White et al. (1997). Rice soils of Cambodia – CASC system developed
- ❑ 1970s – 1990 : Civil war, political uncertainty – loss of data, documents, and skill in land resources development.

General soil map of Cambodia

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- Initiated in 1961 by Crocker and then the Ministry of Agriculture of Cambodia, the first national soil survey
- A 1:1,000,000 soil map
- 16 Great Soil Groups
- Country-wide assessment of soil resources
- Foundation for most of the succeeding soil surveys



Soils, areas, and their fertility potentials in Cambodia

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Fertility Potential	Soil GG (Crocker, 1962)	Areas (ha)	Areas (%)
High	2. Latosols, 6. Grey hydromorphics, 8. Brown hydromorphics, 10. Regurs, 12. Basic lithosols, 15. Lacustrine alluvials	5,082,564	28
Medium	5. Cultural hydromorphics, 9. Alumisols, 13. Alluvials, 14. Brown alluvials	3,404,599	19
Low	1. Red-Yellow Podzols, 3. Planosols, 4. Plinthite podzols, 7. Plinthitic hydromorphics, 11. Acid lithosols, 16. Coastal complex	9,443,663	53
Total	16	17,930,826	100

Classification of N, P, and Org C characteristics of soil samples included in the Cambodian Soils Database

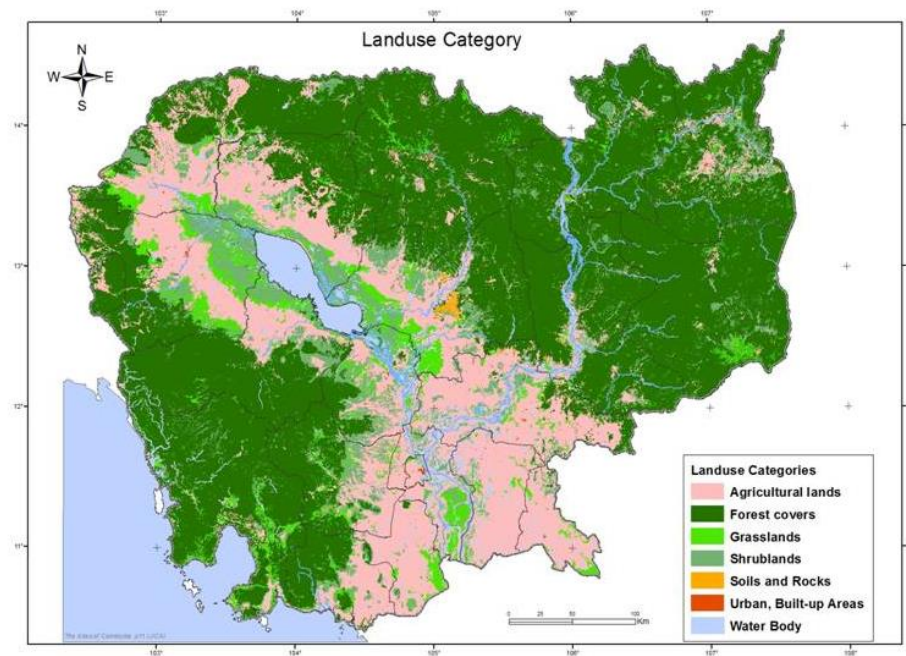
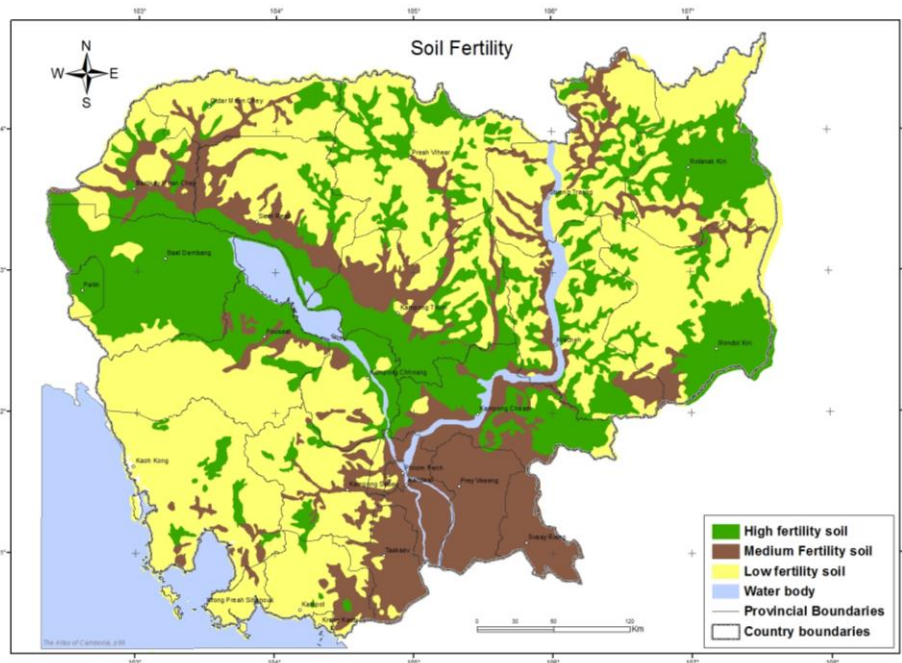
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Soil properties	Classifications [#]				
	VL	L	M	H	VH
Total N (%)	<0.05	0.05-.15	0.15-0.25	0.25-.50	>0.50
% of soils in class	63	34	3		
Olsen P (mg/kg)		0-7	7-15	>15	
% of soils in class		88	5	7	
Org C (%)	<0.06	0.06-1.00	1.00-1.80	1.80-3.00	>3.00
% of soils in class	1	86	11	2	

[#] VL-very low, L – low, M – medium, H – high, VH – very high

Extracted from: Blair and Blair (2010).

Generalized soil fertility potential and land use maps of Cambodia



Source: MPWT/JICA (2002)

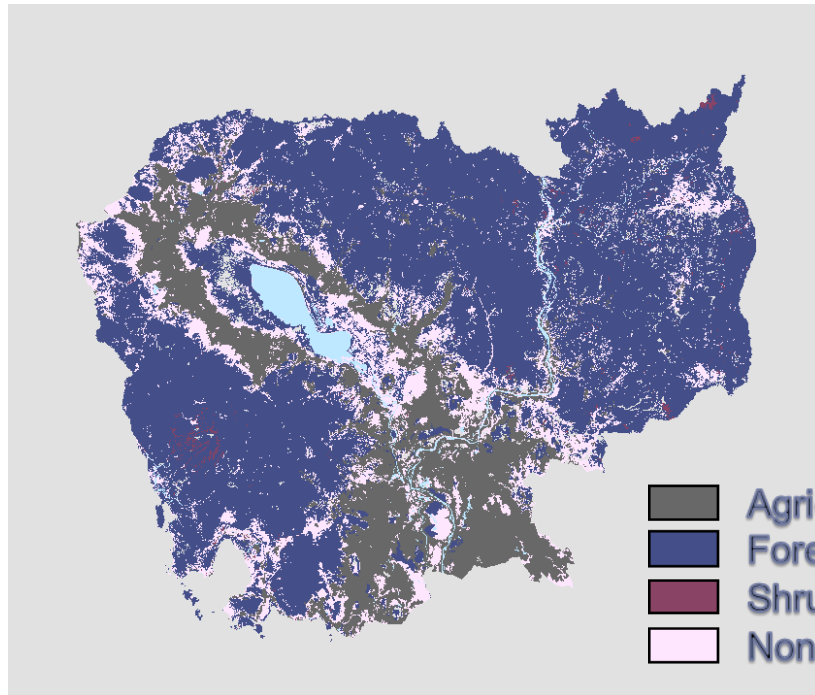
Selected land-use categories under agricultural land cover

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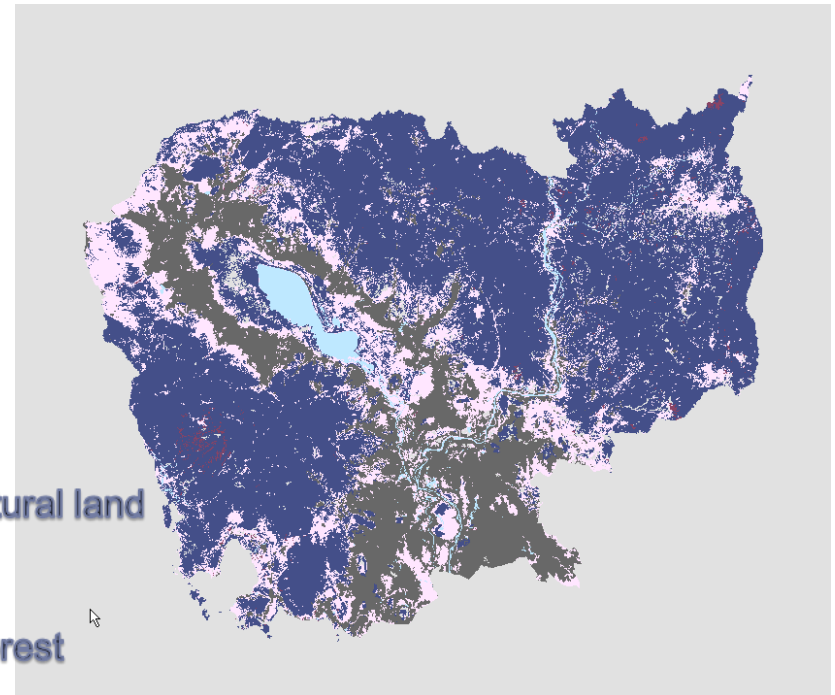
No.	Land-use categories*	Land area (ha)	Percentage	Note
1	Paddy field (Included villages)	3,356,278	78	2002 mapped data
2	Field crops	260,145	6	
3	Garden crops	311,031	7	
4	Orchard	8,179	0.2	
5	Others (Slash & burn)	349,636	8	
Total agricultural land, mapped (2002)		4,285,269	24	Based on total land area
Land under crop cultivation		3,825,306	89	2011 data
Total Unused		459,963	11	
Land-population ratio (ha/person)		1.23		
Agricultural land-farmer ratio (ha/farmer)		0.55		

Sources: JICA dataset (2002), MAFF (2012), NIS (2011). *Rubber not included.

LU Changes in 2002



LU Changes in 2006



Forest cover (1965) : 13.227 mil ha (73%)

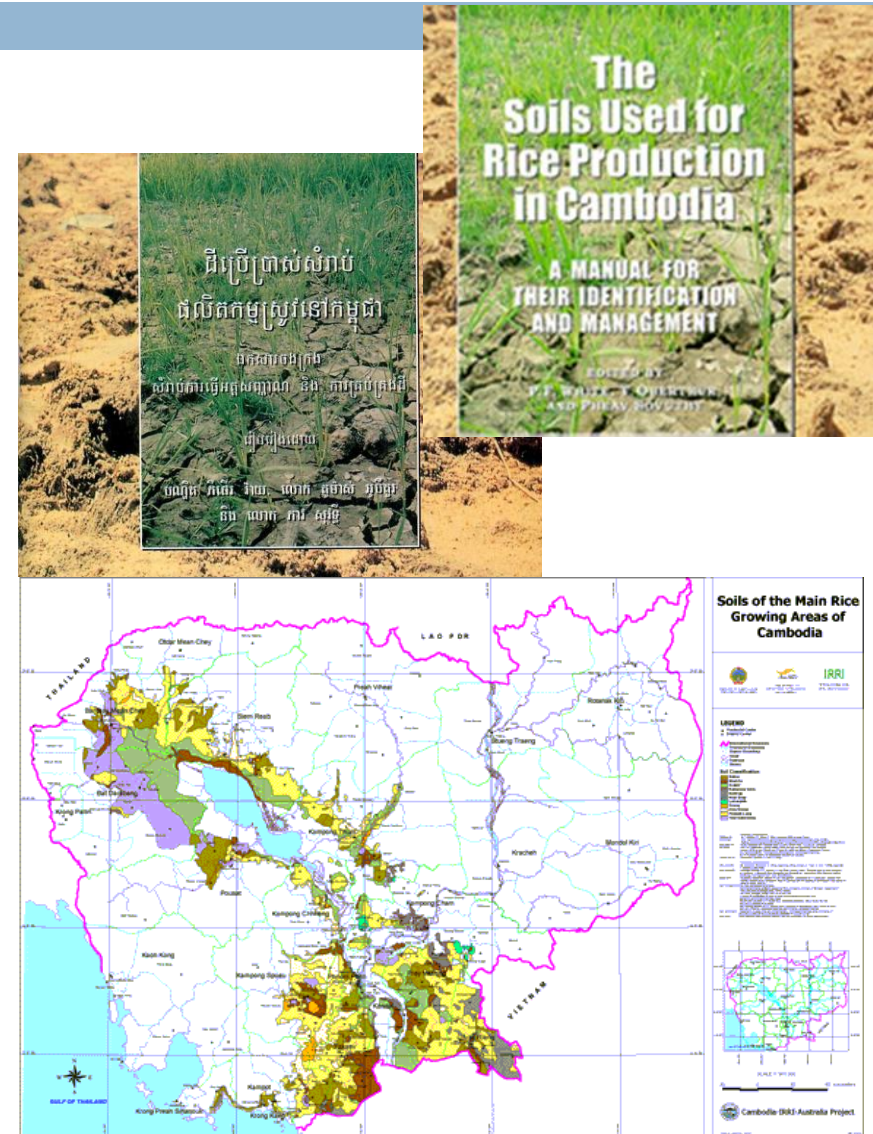
Forest cover (2010) : 10.363 mil ha (57%)

Forest cover changes: 1965 – 2010 est. -0.35% (FA, 2011)

Rice-growing soils of Cambodia

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- Agronomic classification for rice soils in Cambodia (CACs)
- Aims to allow non-soil specialists to classify soils for agronomic purposes
- A practical tool for soil identification and management in the rainfed lowland rice environment.
- There are 11 soil groups divided into 20 phases in the rice growing areas

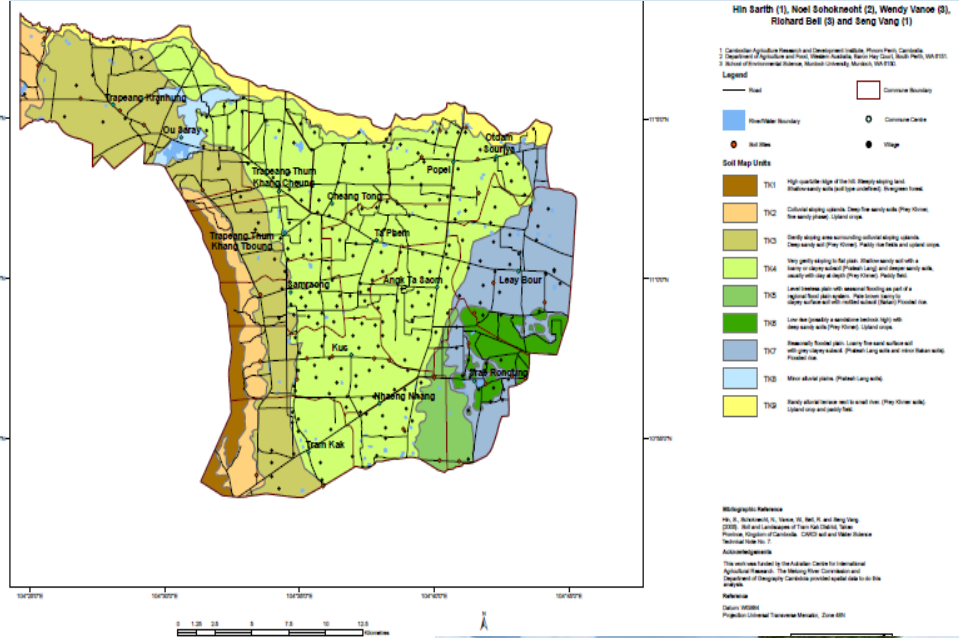


Most recent land suitability assessment (Non-rice crops) – ACIAR funded SMCN2001/051 Project

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Properties (KSm, cal.)	Unit	Depth (cm)			
		0-8	8-30	30-45	45+
Organic C	g/kg	13	9	6	1.9
pH	CaCl ₂	7.2	7.3	7.6	7.7
Total N	g/kg	1.2	0.9	0.6	0.2
Olsen P	mg/kg	18	6	3	3
Exch. Ca		41.1	44.2	39	16.1
Exch. Mg		4.13	0.96	0.39	0.08
Exch. Na	cmol(+)/kg	0.03	0.04	0.03	0.02
Exch. K		0.35	0.14	0.13	0.05
ECEC		45.7	45.3	39.5	16.3

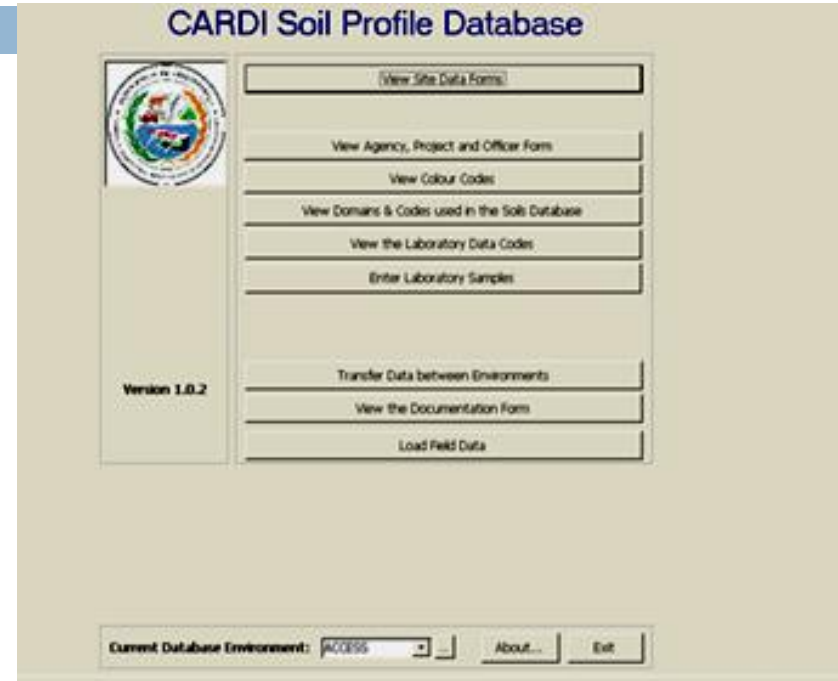
Detail land suitability maps for non-rice crops



Land resources information

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- Established by CARDI with funding support from ACIAR and technical support from WADAF
- The first national land resources database in Cambodia. It uses the international standards and codes of the World Reference Base which are transferable to other users internationally
- It contains about 2,000 soil profile data country-wise
- At present, the database is held and maintained by CARDI



On-going activities

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- NAP (National Action Programs): Goal highlights poverty reduction, agriculture development through sustainable use, management, and conservation of land resources.
- Specific-purpose research on soils (Project based)
 - ▣ soil constraint management for non-rice crops,
 - ▣ soil erosion,
 - ▣ soil identification and mapping using CASC,
 - ▣ land suitability to support local LU plan
- Soil conservation (Oxfarm, MJP, CIRAD)



RGC - Priorities for sustainable soil management

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- Land reform program (land management, distribution, land use) – secure land ownership, avoid unused land, and illegal grabbing, SLCs.
- Development vs. conservation – green cover, forest & wildlife protection, sustainability of ecosystems (Protecting biodiversity, wetlands and coastal areas)
- Agricultural land law
- National soil information system
- Develop CASC for Sustainable management of upland soils
- Research to develop soil management techniques for various crops.



Thank you,...

