

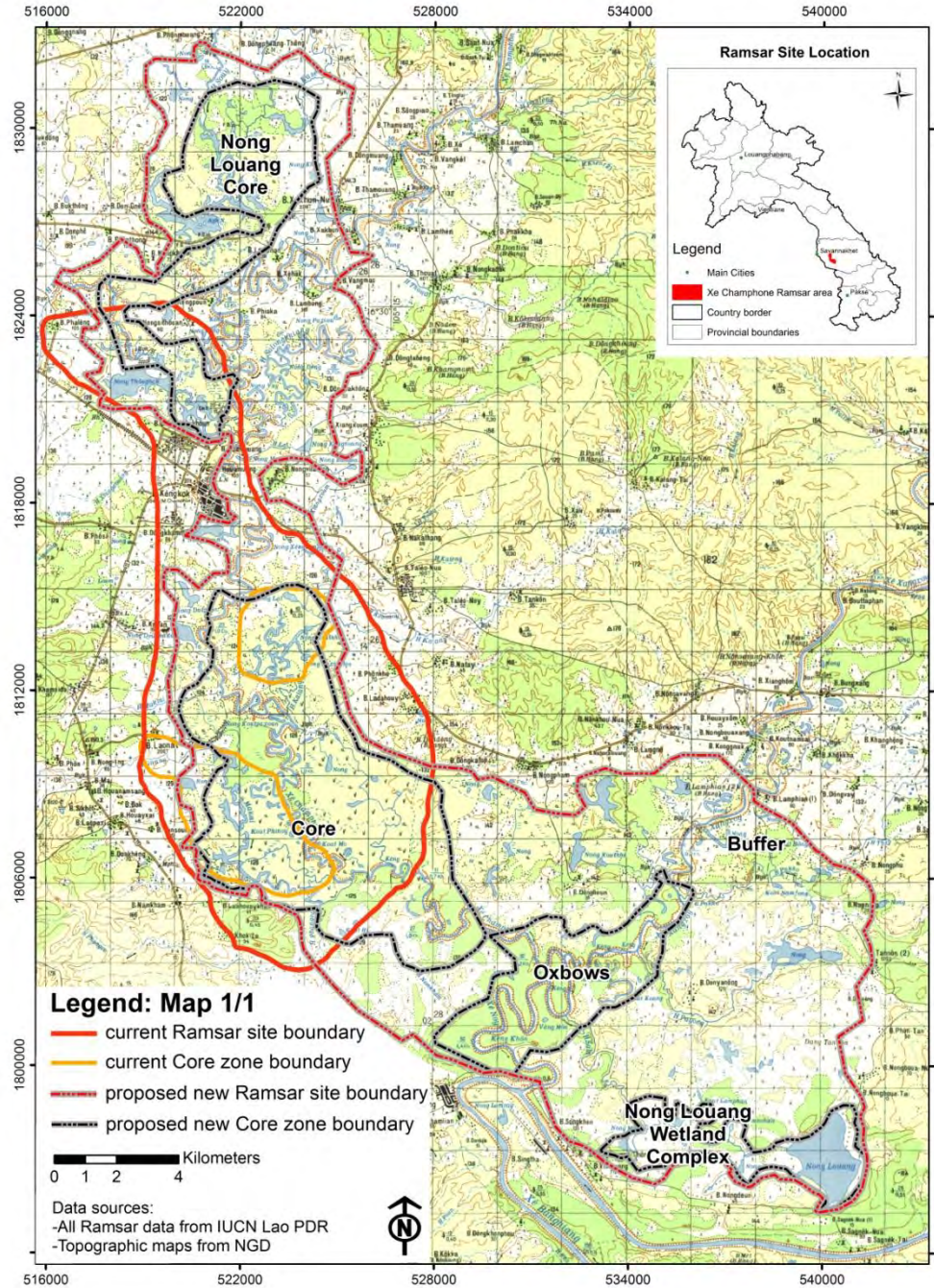
Climate Change Adaptation in Wetlands Areas (CAWA) Lao PDR.

Regional training on the use of Drone , satellite imagery and GIS for Agriculture

Asian Institute of Technology, Thailand 4-8 June 2108
Xavier Bouan CTA FAO



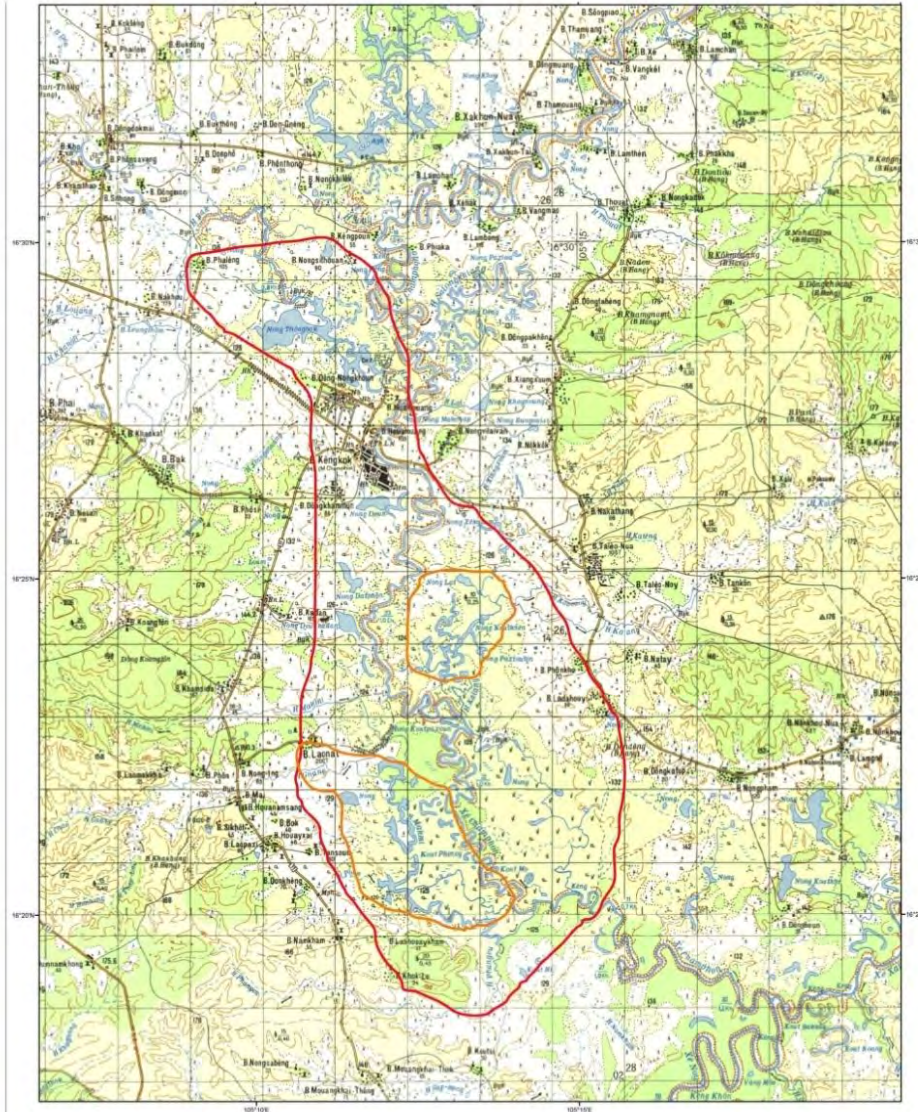
Proposed Revision of the Xe Champhone Ramsar Site Boundary



Ramsar Site Boundary



Xe Champhone Ramsar site



- 12,500 ha designated as a **Ramsar site** in September 2010
- Includes 12 core villages
- Management under the Ramsar Provincial Committee of Savanhaket Province.
- **Habitats** include mosaic of different wetland types, comprising perennial and seasonal rivers, freshwater lakes, ponds, oxbows, marshes, rice paddy fields

Beung Kiat Ngong Ramsar site



- **2,360 ha** in Pathoumphone district in the southern Lao province of Champasak.
- Designated as a **Ramsar site** on 16 June 2010 and lies partly within the **Xe Pian National Protected Area (NPA)**.
- Includes 8 core villages
- Management under the **Xe Pian NPA authorities** and the **Ramsar Provincial Committee of Champasak Province**.
- **Habitats** include complex of peatlands, marsh, open water ponds, swamp forests and seasonally flooded grasslands

Challenge: Conservation + Livelihood



Strategy & Objectives

- **Project strategy and approaches**

Centred on Ecosystem Based Adaptation involving local communities to manage wetland in a way they can buffer impact of Climate Change. (absorbing /smoothing river flows, diversified and resilient livelihood option)

- **Project objectives**

To reduce climate change vulnerability of communities and the fragile wetland eco-systems upon which they depend

The use of Drone will contribute to

- CC adaptation and disaster management measures well integrated into planning process. Lessons learned and evaluated and pilot project replicable to other wetlands



Expected use of drone to monitor/survey/manage

- Fishery. FCZ
- Invasive plant
- Hydrology and water management
- Wetland management plan (land use plan- small holders)
- Livestock and grazing
- Erosion and forestry
- Ecotourism sites

Process in using Drone technology for CAWA

since January 2017

- Choice of drone (portability- price- functionality)
- learning to use drone (youtube)
- use of app: drone deploy , Pix 4 d
- Collecting data and developing manual for users
- Processing data and integration into GIS

http://Philipknight.xyz/cawa_portal/

- Direct feed back and interaction with villagers. (use for demarcation , encroachment, illegal fishing....)
- Training of users in district. (keep it simple)
- Knowledge management tools: maps/video/photos/database

Drone is cheap

-Phone/tablet 200\$

-Drone <1000\$ (decrease every month)

-Spare batteries (2) 200\$

-Carrying case waterproof. Free

Total investment < 1500\$



ວິສາຫະກິດສ່ວນບຸກຄົນ ຮ້ານ ເອັນຈີໂອ
Asean mall F9, Ban Phonthan, Saysettha District, Vientiane
Tell: 9811-5003 Website: www.olaa.la

ໃບສະເໜີລາຄາ / QUOTATION

ເລກທີ: QO17-0068 R2

ບໍລິສັດ/Company : ອົງການ FAO	ວັນທີ : 17/10/2017
ຜູ້ຕິດຕໍ່/Contact : ນ.ປະກາຍດາວ	ການລຳລະເງິນ : ໃອນ ຫຼື ສົດ
ທີ່ຢູ່/Address : ນະຄອນຫຼວງວຽງຈັນ	ກຳໜົດສິ່ງ :
ເບີໂທ/Phone : 7729-7711 / 7729-7744/030-5450665	ຢັ້ງຢືນລາຄາ : 2 ອາທິດຈາກວັນທີ່ສະເໜີ

We are please to submit you the following described here in at price, items and terms stated : ຂໍສະເໜີລາຄາແລະເງື່ອນໄຂດັ່ງນີ້

#	ລະຫັດ	Items / ລາຍການສິນຄ້າ	ຈຳນວນ	ໜ່ວຍ	ລາຄາ/ໜ່ວຍ	ລາຄາລວມ
1		Mavic Pro ຊຸດປະກອບທີ່ມາໃນເຊັດ	1	set	8,900,000	8,900,000
		Aircraft Body (Battery and Gimbal cover includeed)	1	pc.	-	-
		Remote controller	1	pc.	-	-
		propellers * 3 pair (6 pcs.)	3	ຄູ່	-	-
		charger	1	pc.	-	-
		power cable	1	pc.	-	-
		Gimbal clamp	1	pc.	-	-
		RC cable	3	pcs.	-	-
		Micro USB cable	1	pc.	-	-
		Micro SD card 16GB	1	pc.	-	-
		RC cable Slider	1	pc.	-	-
		Manuals	1	PC.	-	-
2		ຊຸດປະກອບທີ່ສັ່ງຊື້ເພີ່ມ				
		Intelligent Flight Battery for Mavic DJI	2	pcs.	740,000	1,480,000
		propellers * 2 pair (4 pcs.)	2	ຄູ່	80,000	160,000
		Battery Charging HUB for Mavic DJI	1	PC	350,000	350,000
		Battery to power bank Adaptor	1	pc.	180,000	180,000
3		Free Hard-case	1	pc.	390,000	Free
4		Redmi Note 4X Xiaomi 3GB + 32GB	1	PC.	1,470,000	1,470,000

Condition/ເງື່ອນໄຂ	Total ລວມ(ກີບ)	12,540,000
1. ສິ່ງ PO ຫຼື ເຊັນສັ່ງຊື້ສິນຄ້າ ພ້ອມຈຳກວດບໍລິສັດ ສັ່ງກັບມາໃຫ້ທາງຮ້ານ	Discount ສ່ວນຫຼຸດ	170,000
2. ຫາກສິນຄ້າມີໃນສະຕ້ອກ ໃອນລຳລະເງິນ 100% ນະ ວັນສົ່ງມອບສິນຄ້າ	Total ລວມ(ກີບ)	12,370,000
3. ຫາກສິນຄ້າບໍ່ມີໃນສະຕ້ອກ ມັດຈ່າ 50% ຖ້າຂອງ 10-14 ມື້ ບໍ່ລວມເຂົ້າ-ອາທິດ		

(ຜູ້ອະນຸມັດສັ່ງຊື້ ວັນທີ)	(ນ ວຽງມາລາ) ຜູ້ອະນຸມັດສັ່ງຊື້ ວັນທີ 17/10/17	 ຮ້ານ ເອັນ ຈີ ໂອ Siriporn T. ຜູ້ອະນຸມັດສັ່ງຊື້ ວັນທີ 17/10/17
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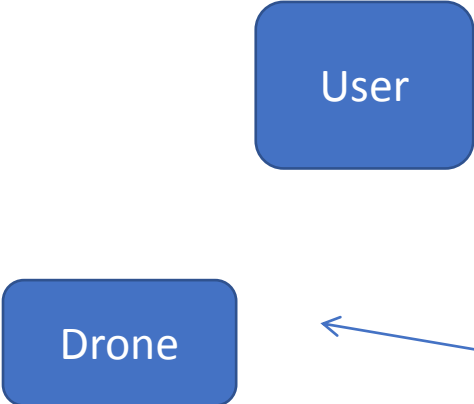
Small and portable.



Drone for Spray in Canada < 5000\$



Get a supporting document (license- permit)



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ກະຊວງ ໄປສະນີ, ໂທລະຄົມມະນາຄົມ ແລະ ການສື່ສານ
ກົມຄຸ້ມຄວາມຖີ່

ເລກທີ 0111 /ກຄຖ
ນະຄອນຫຼວງວຽງຈັນ, ວັນທີ 31 ມັງກອນ 2018

**ໃບຢັ້ງຢືນການຂັ້ນທະບຽນ
ເຄື່ອງບິນບໍ່ມີຄົນຂັບ (Drone)**

- ອີງຕາມ ກົດໝາຍວ່າດ້ວຍ ຄຸ້ມຄວາມຖີ່ວິທະຍຸສື່ສານ ສະບັບເລກທີ 17/ສພຊ, ລົງວັນທີ 05 ພຶດສະພາ 2017;
- ອີງຕາມ ຂໍ້ຕົກລົງຂອງລັດຖະມົນຕີ ກະຊວງ ໄປສະນີ ໂທລະຄົມມະນາຄົມ ແລະ ການສື່ສານ ວ່າດ້ວຍ ການຈັດຕັ້ງ ແລະ ການເຄື່ອນໄຫວ ຂອງກົມຄຸ້ມຄວາມຖີ່ ສະບັບເລກທີ 1683/ປທສ, ລົງວັນທີ 05 ເມສາ 2017;
- ອີງຕາມ ຂໍ້ຕົກລົງວ່າດ້ວຍ ການນຳໃຊ້ເຄື່ອງບິນບໍ່ມີຄົນຂັບ ສະບັບເລກທີ 3374/ປທສ, ລົງວັນທີ 14 ພະຈິກ 2017;
- ອີງຕາມ ໜັງສືສະເໜີ ຂອງ Mr. Xavier Bouan, ລົງວັນທີ 15 ມັງກອນ 2018.

ກົມຄຸ້ມຄວາມຖີ່
ເຫັນດີອອກໃບຢັ້ງຢືນການຂັ້ນທະບຽນເຄື່ອງບິນບໍ່ມີຄົນຂັບ (Drone)ໃຫ້:

Mr. Xavier Bouan

1. ທີ່ຢູ່: ບ້ານ ວັດນາກາ, ເມືອງ ສີສັດຕະນາກາ, ນະຄອນຫຼວງວຽງຈັນ, ໂທ: 020 2223 5604;
2. ເຄື່ອງບິນບໍ່ມີຄົນຂັບ ຍີ່ຫໍ້: DJI, ລຸ້ນ: Mavic Pro Specs, ເຄື່ອງບິນບໍ່ມີຄົນຂັບ ຍີ່ຫໍ້: DJI, ລຸ້ນ: Spark, ໝາຍເລກປະຈຳເຄື່ອງ: 08QE6S0120ST4, ນຳໜັກ: 743 g, ຈຳນວນ 01 ເຄື່ອງ;
3. ຄຸ້ມຄວາມຖີ່ນຳໃຊ້: 2.4 - 2.483 GHz, ກຳລັງສົ່ງ: ບໍ່ເກີນ 100 mW;
4. ອຸປະກອນທີ່ຕິດຕັ້ງມາພ້ອມກັບເຄື່ອງບິນບໍ່ມີຄົນຂັບ: ກ້ອງຖ່າຍຮູບ;
5. ຈຸດປະສົງ: ຖ່າຍຮູບພາບ ແລະ ຖ່າຍທຳ ເພື່ອຕິດຕາມວຽກງານການຄຸ້ມຄອງເຂດດິນເຂດບໍລິເວນນ້ຳຮຳຊາ;
6. ສະຖານທີ່ນຳໃຊ້: ແຂວງສະຫວັນນະເຂດ ແລະ ແຂວງຈຳປາສັກ;
7. ອາຍຸການນຳໃຊ້ໃບຢັ້ງຢືນ: ເລີ່ມແຕ່ວັນທີ 26/01/2018 ໝົດອາຍຸນຳໃຊ້ 25/01/2019;
8. ຜູ້ຄວບຄຸມເຄື່ອງບິນບໍ່ມີຄົນຂັບ: Mr. Xavier Bouan.

ຫົວໜ້າກົມ

Field work and Interaction with villagers

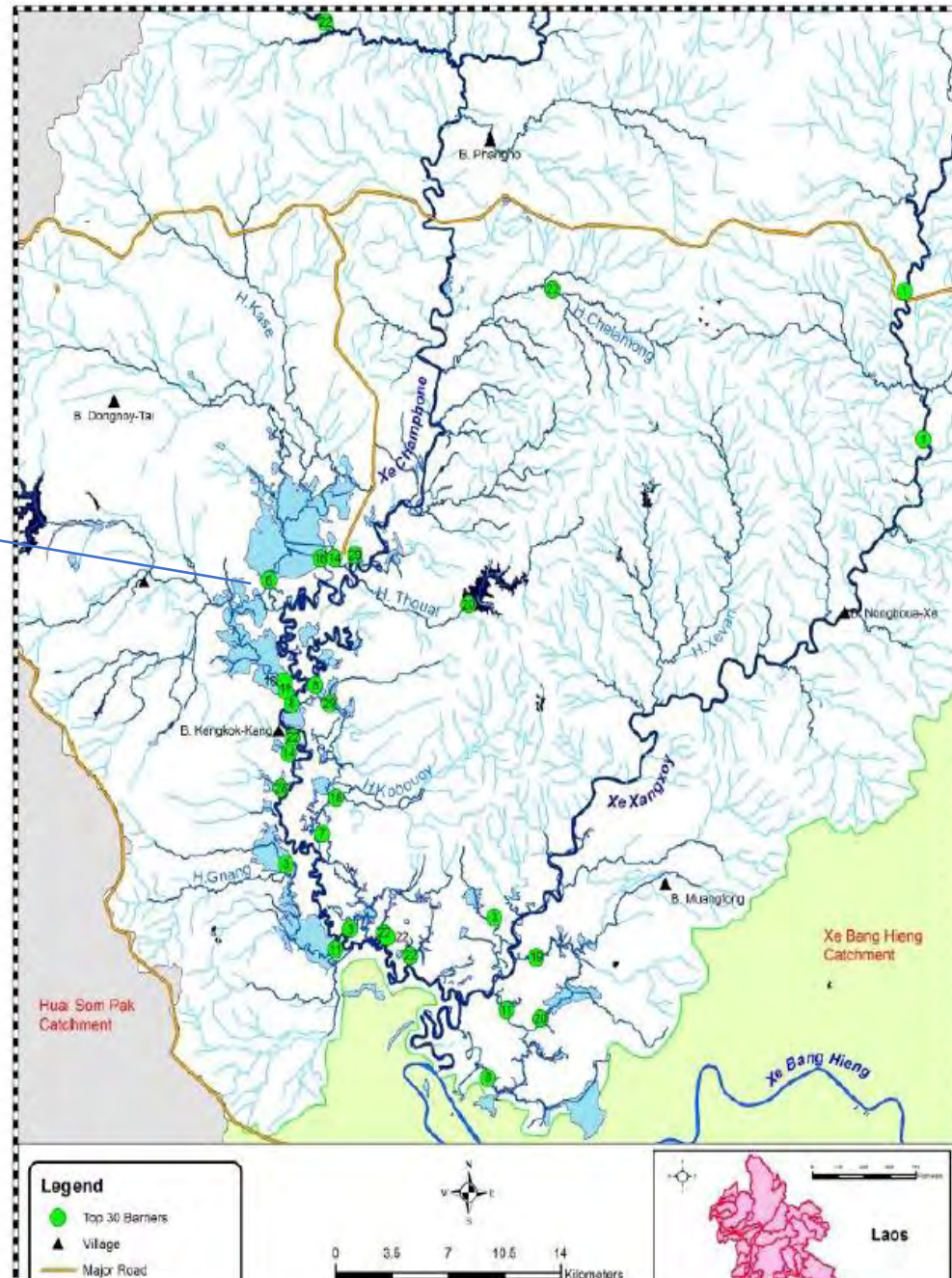


Counting Lumpa system (adaptation to CC)



Fish barriers identified with drone use integrated into GIS

Blockade
of
stream



Hydrology and water management

- Measuring extent of flooding areas in wet season
- Measuring drawdown zone area during dry season
- Controlling water extraction (canal , water pump)
- Water quality / erosion control along river bank
- Seed for Small holder in case of rice flooding/draught /salinity

Former irrigation canal



Outlet of the wetland



Livestock and grazing

- Measuring pasture areas within wetland
- Measuring livestock density. (Vaccination campaign)
- Mapping area of higher elevation in case of flood for animal refuge
- Animal health (foot and mouth disease)

Livestock monitoring in wetland . Buffalo counting



Erosion and forestry and land management

Monitoring along river bank and in wetland

Monitoring deforestation

Monitoring encroachment of agricultural land in wet land

Support demarcation of Ramsar boundary / zoning

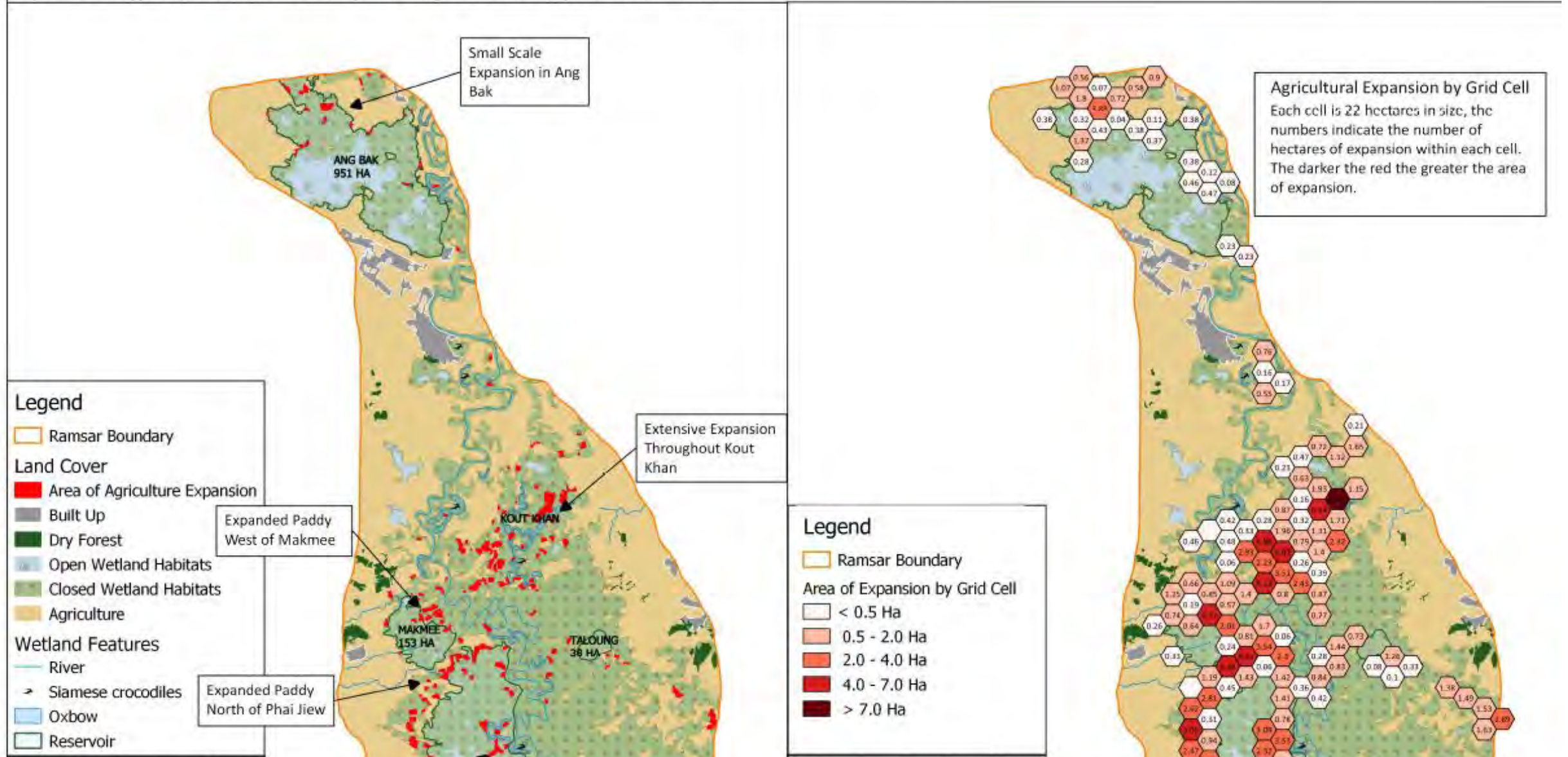
Pasture in Ramsar site in flooded forest area



Ground truthing with satellite imageries

Expansion of Agricultural Activity Xe Champhone Ramsar Wetland 2011 to 2015

The area of expansion of agricultural activities within the Xe Champhone Ramsar boundary was identified by manual comparison of orthophotography with a Ground Sample Distance of 0.5m². The baseline data was collected between November 2010 and January 2011 by aerial survey by the National Geographic Department Digital. This was compared with Google Earth Satellite Imagery collected in October 2015.

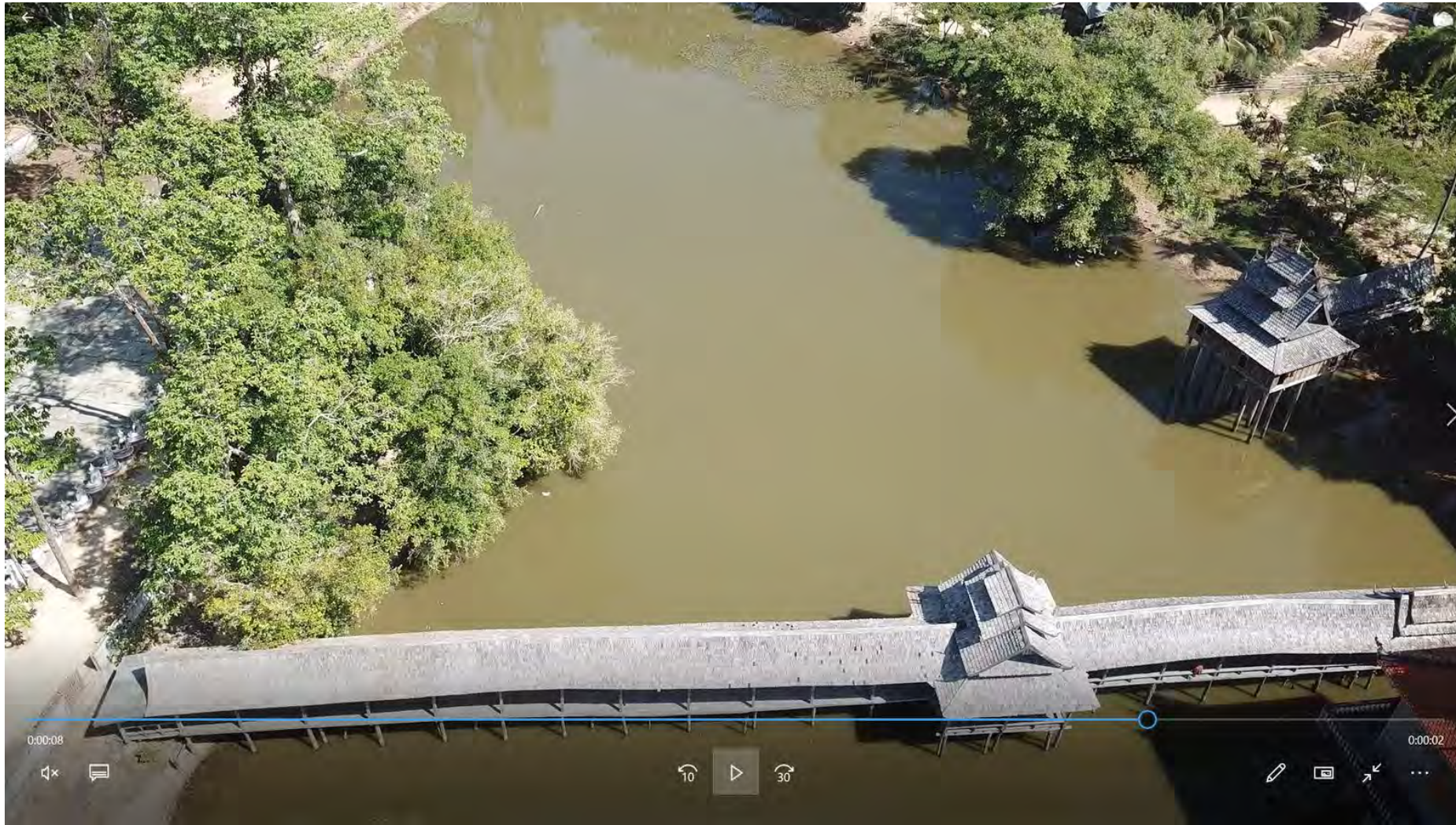


Erosion control along river bank in Xe Champhone



Ecotourim

- survey sites of interest
- Reconnaissance of parcours of interest for ecotourism



Monitoring and control of invasive plants

- Mapping and surveying extent of Mimosa Pigra and Water Hyacinth
- Monitoring of removal of invasive plants
- Monitoring expansion areas of invasive plants

Monitoring Extent of Water Hyacinth in wetland

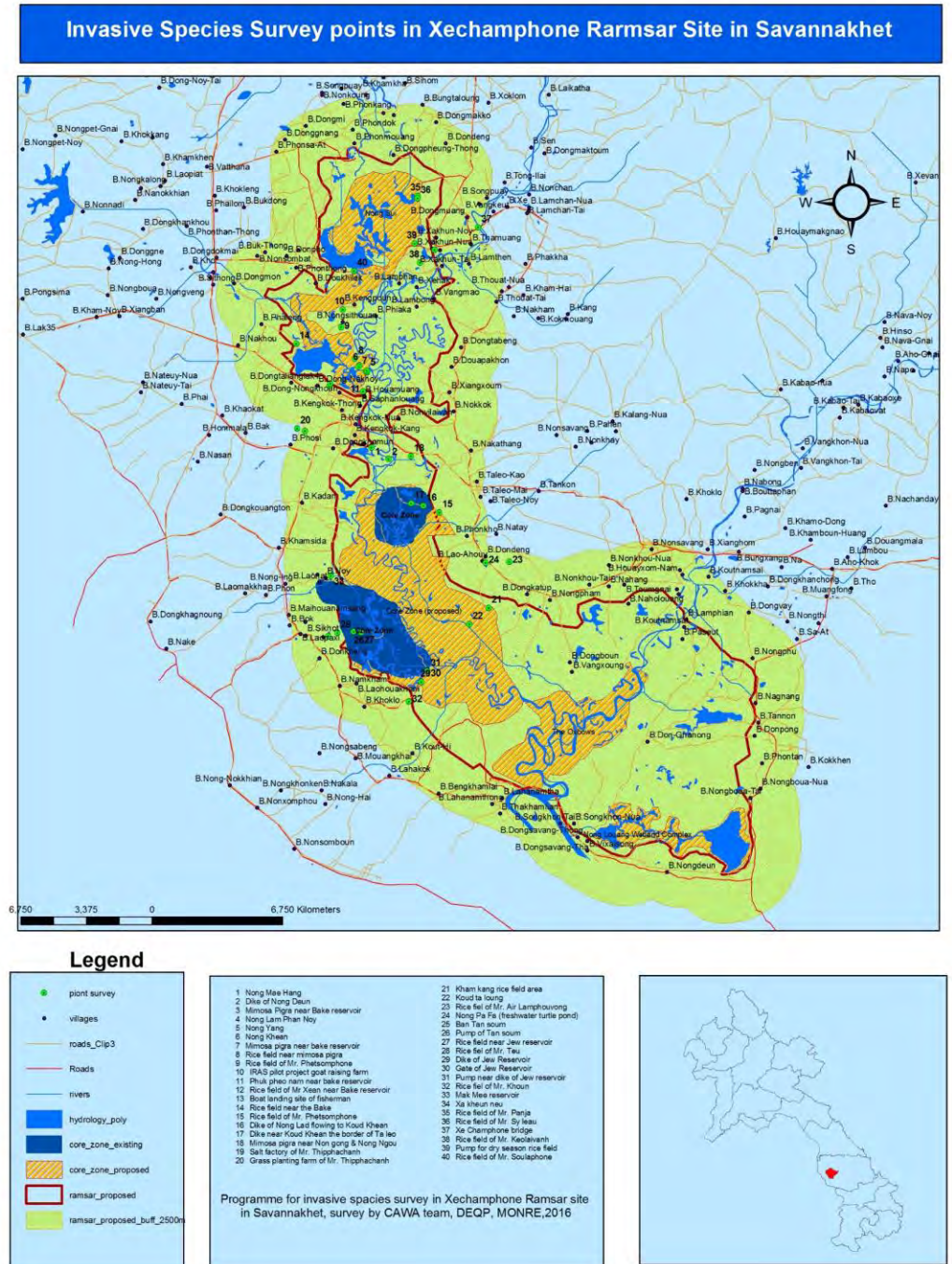


Measurement of invasive plants *Mimosa Pigra*



Mapping invasive plants

Control strategy developed



Aerial Photograph 2011

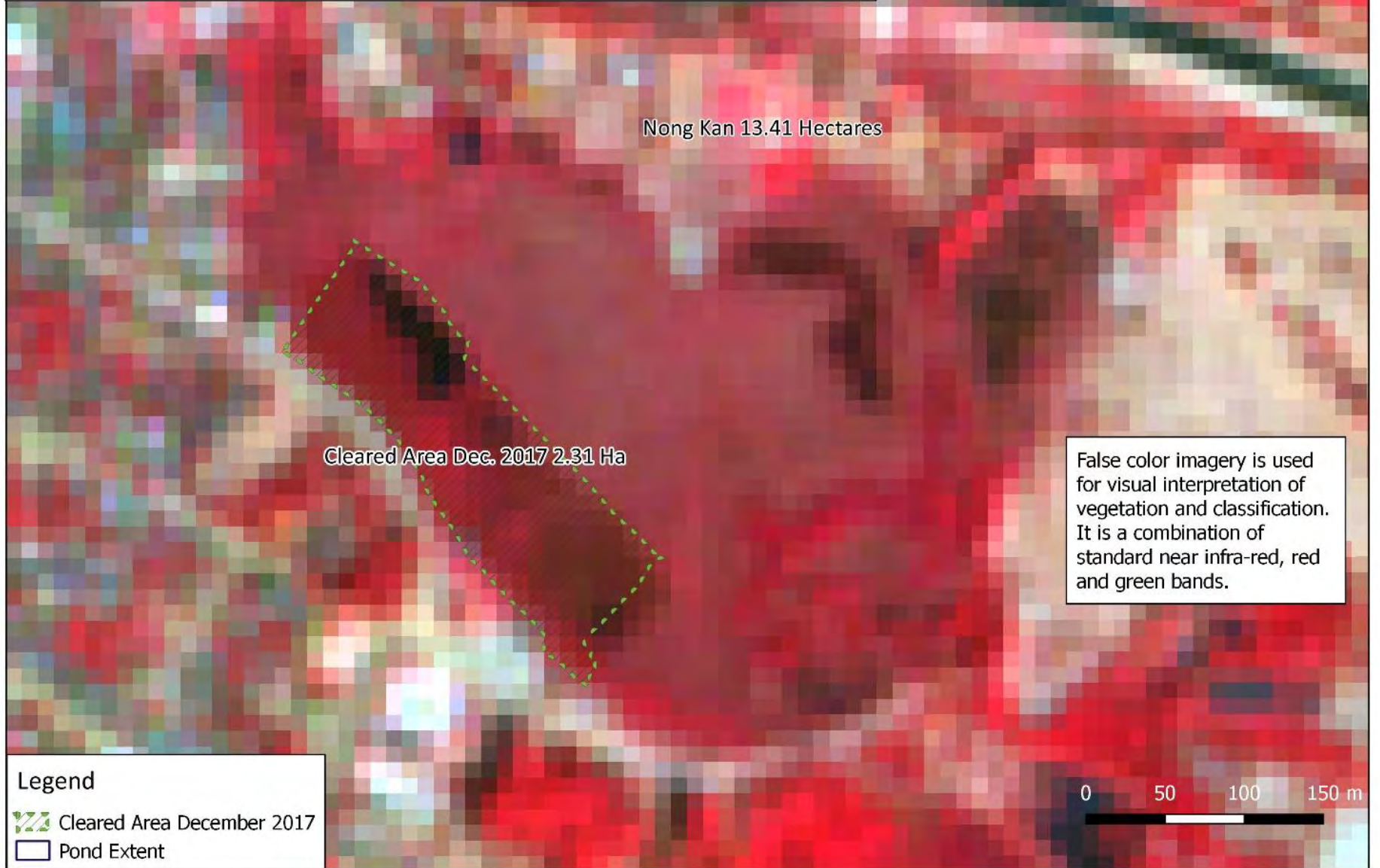


Satellite Image 2015



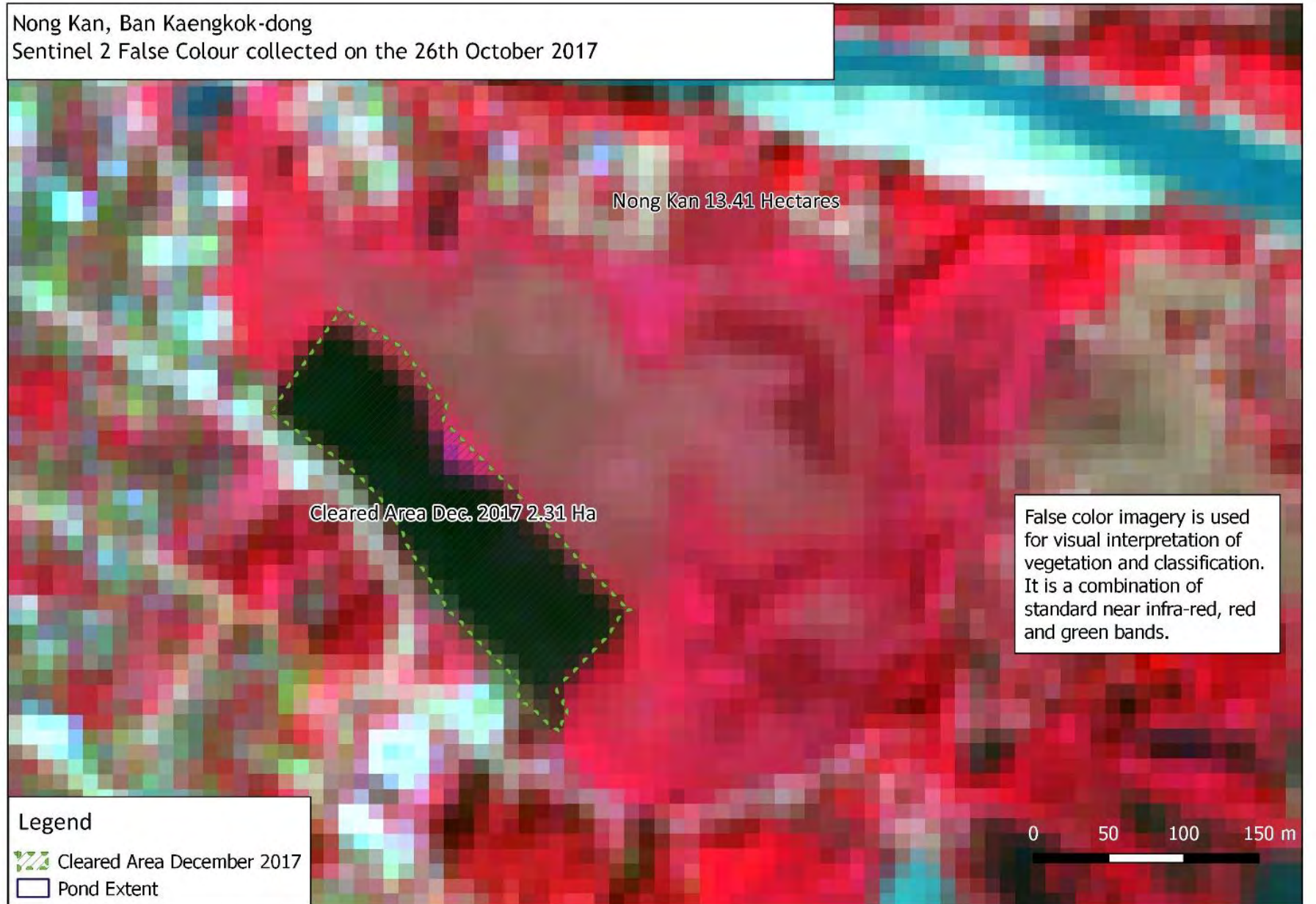
Sentinel 2 Satellite Image BEFORE Clearance Activities March 2017

Nong Kan, Ban Kaengkok-dong
Sentinel 2 False Colour collected on the 5th March 2017



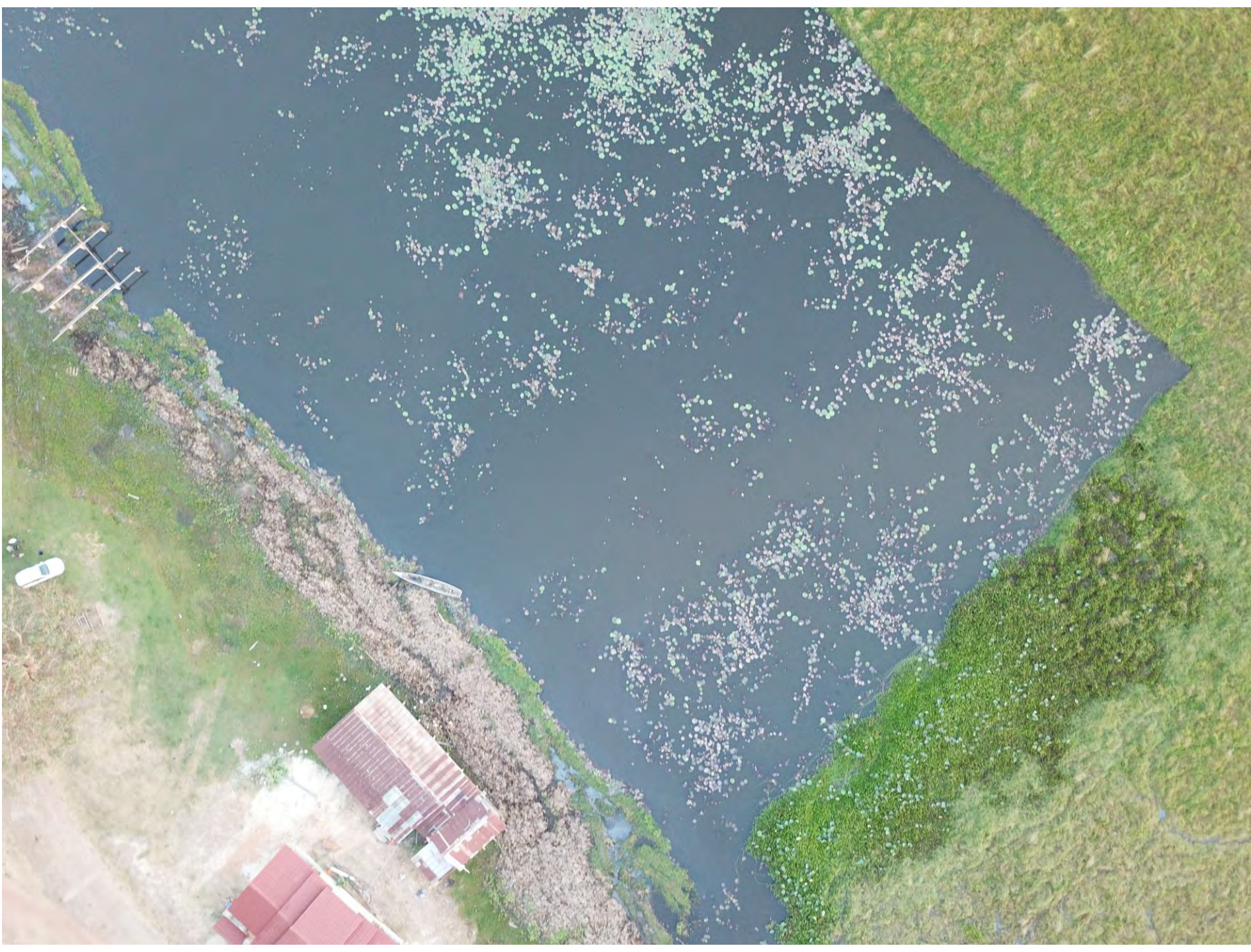


Sentinel 2 Satellite Image AFTER Clearance Activities March 2017





2 uses :
Mapping
exercise
Pictures/
movies



Drone Survey Image AFTER Clearance Activities December 2017



Lot of data collected: Record your data for use

Recommendations

- USE Separate HD for data storage
- Carry powerbank for phone charging/ remote control
- File your flights systematically. Process in cloud (PIX4D or dronedeploy)
- Collect metadata and record as below
- example of file name for raw images :
Drone/Champassak province/ Donmeung village/20180613_1126/Images .
- example of file name for images processed
Drone/Champassak province/ DonMeung village/20180613_1126/Images/D2 M

Conclusion

- Keep it simple and affordable
- Like the best camera is the one you have with you, the best drone is the one you have with you
- Train others and share your experience with all. GIS expert, Agronomist, Statistician , Manager, Extensionist







Have a good flight using
your drone !