



Persistent Infection with Foot and Mouth Disease in Asian Swamp Buffalo (ASB) in South East Asia (SEA)

Blesilda C. Verin, DVM, PhD

Project Officer,  Northern Lao PDR FMD Control Project

Objectives

➤ To assess

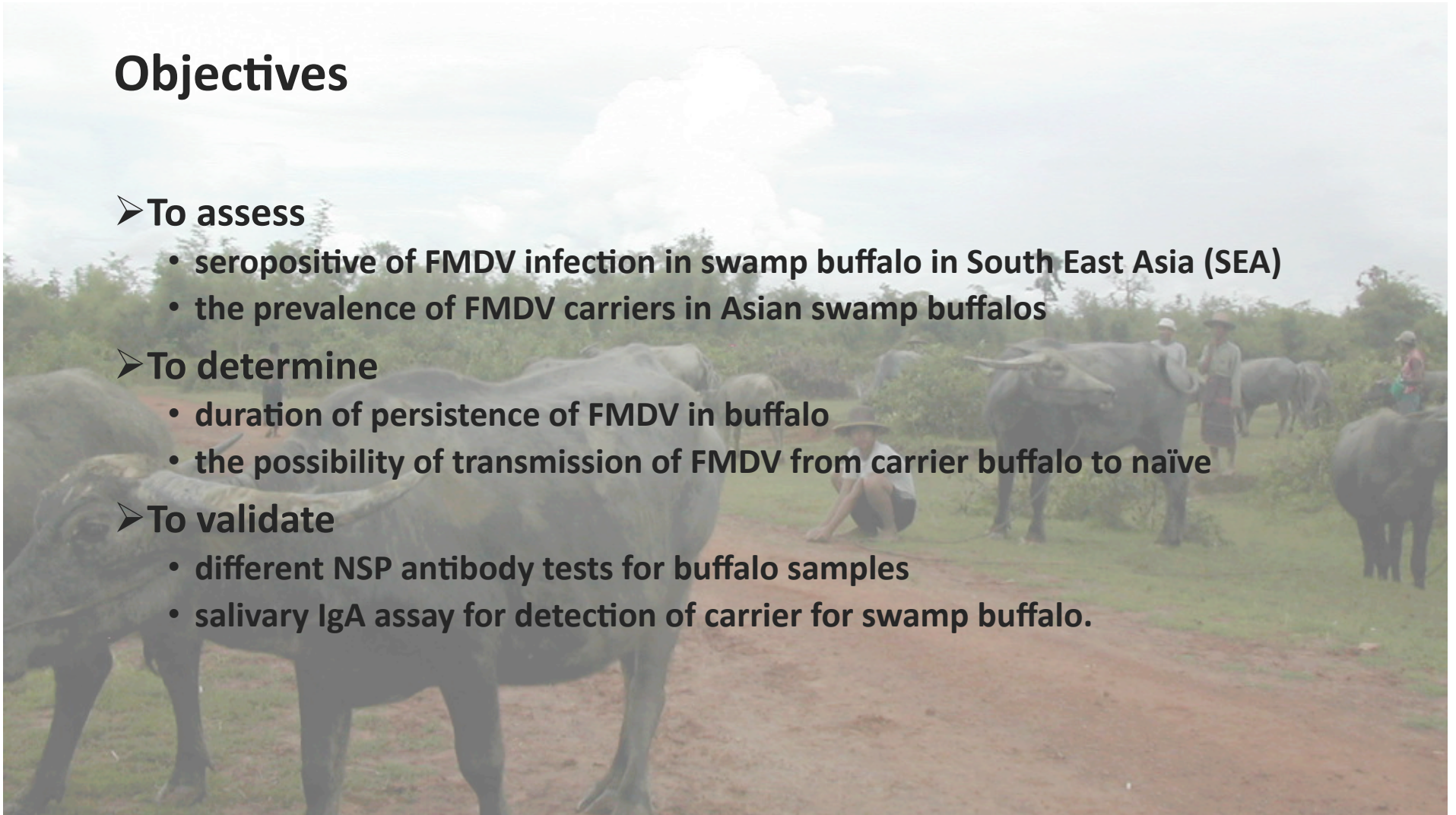
- seropositive of FMDV infection in swamp buffalo in South East Asia (SEA)
- the prevalence of FMDV carriers in Asian swamp buffalos

➤ To determine

- duration of persistence of FMDV in buffalo
- the possibility of transmission of FMDV from carrier buffalo to naïve

➤ To validate

- different NSP antibody tests for buffalo samples
- salivary IgA assay for detection of carrier for swamp buffalo.



Study Sites ★



The Study:

- Three longitudinal studies with field sample collections at 6 monthly intervals
- Five hundred (500) ASB were randomly selected from specific areas in Lao PDR and Myanmar that had confirmed FMD outbreaks.



Sample collections



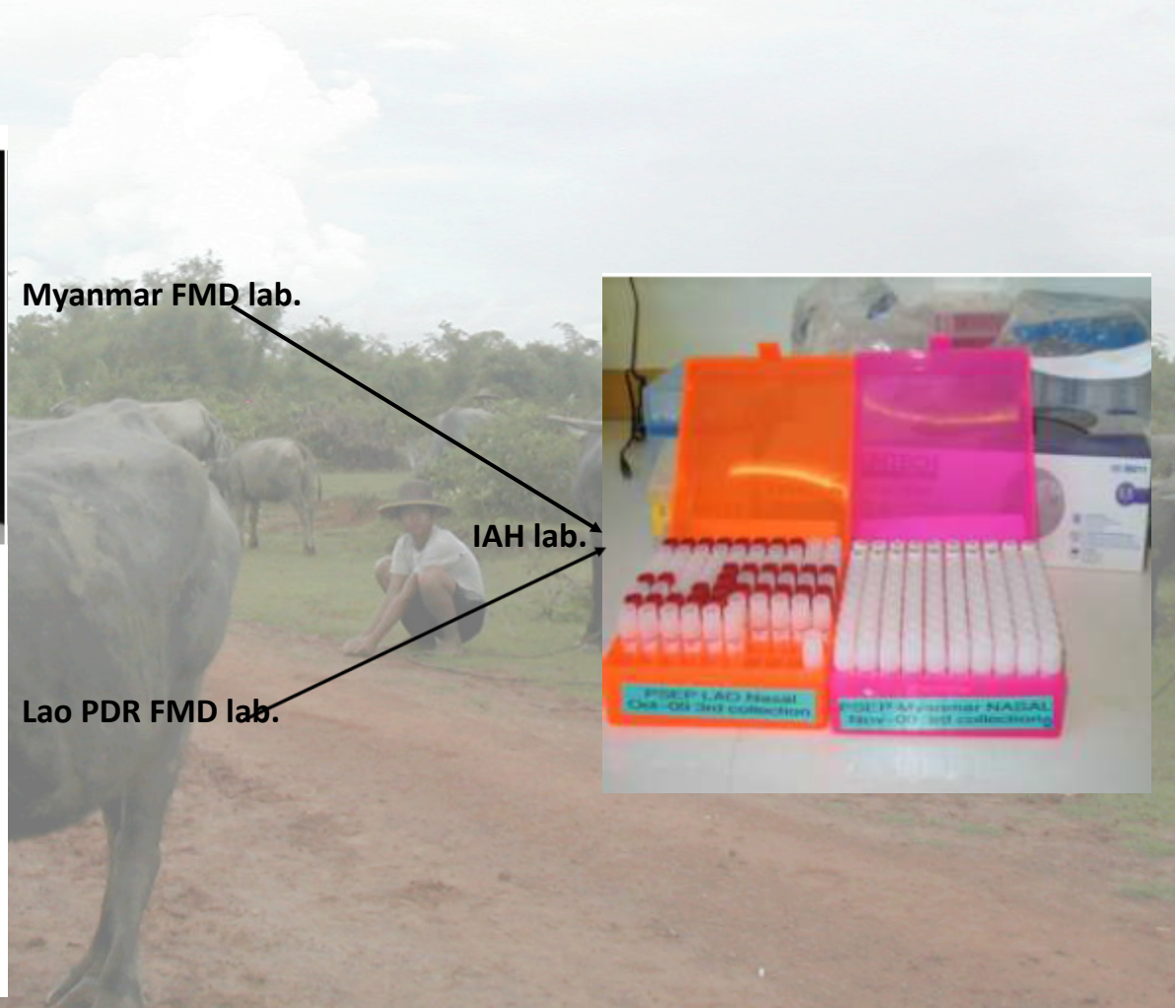
Sample Processing



Myanmar FMD lab.



Lao PDR FMD lab.



IAH lab.



Laboratory tests



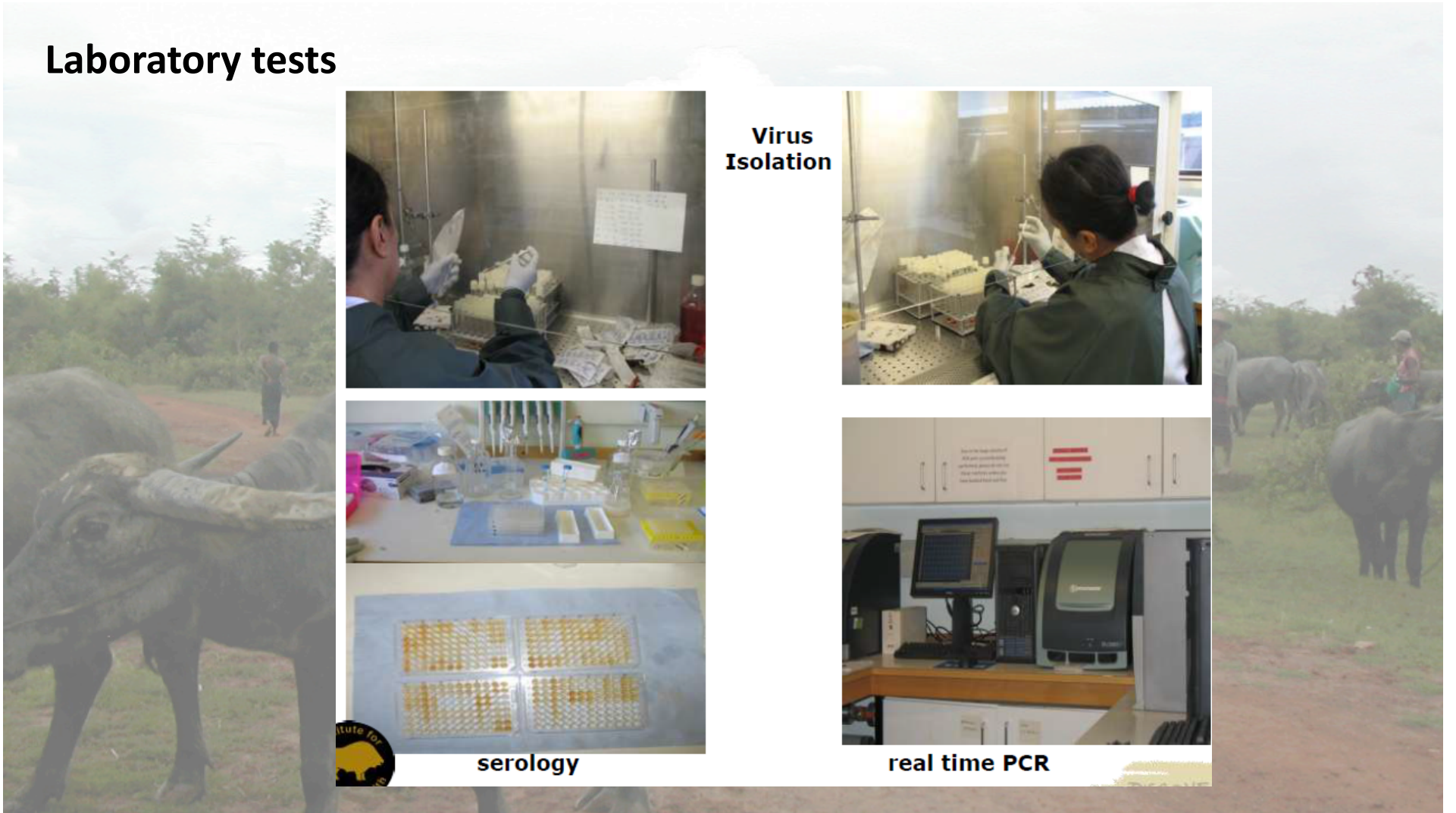
Virus Isolation



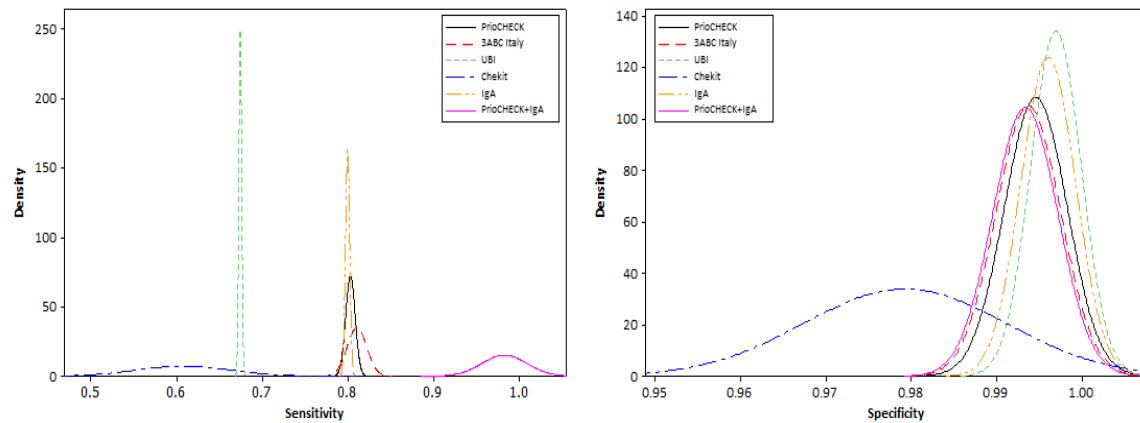
serology



real time PCR



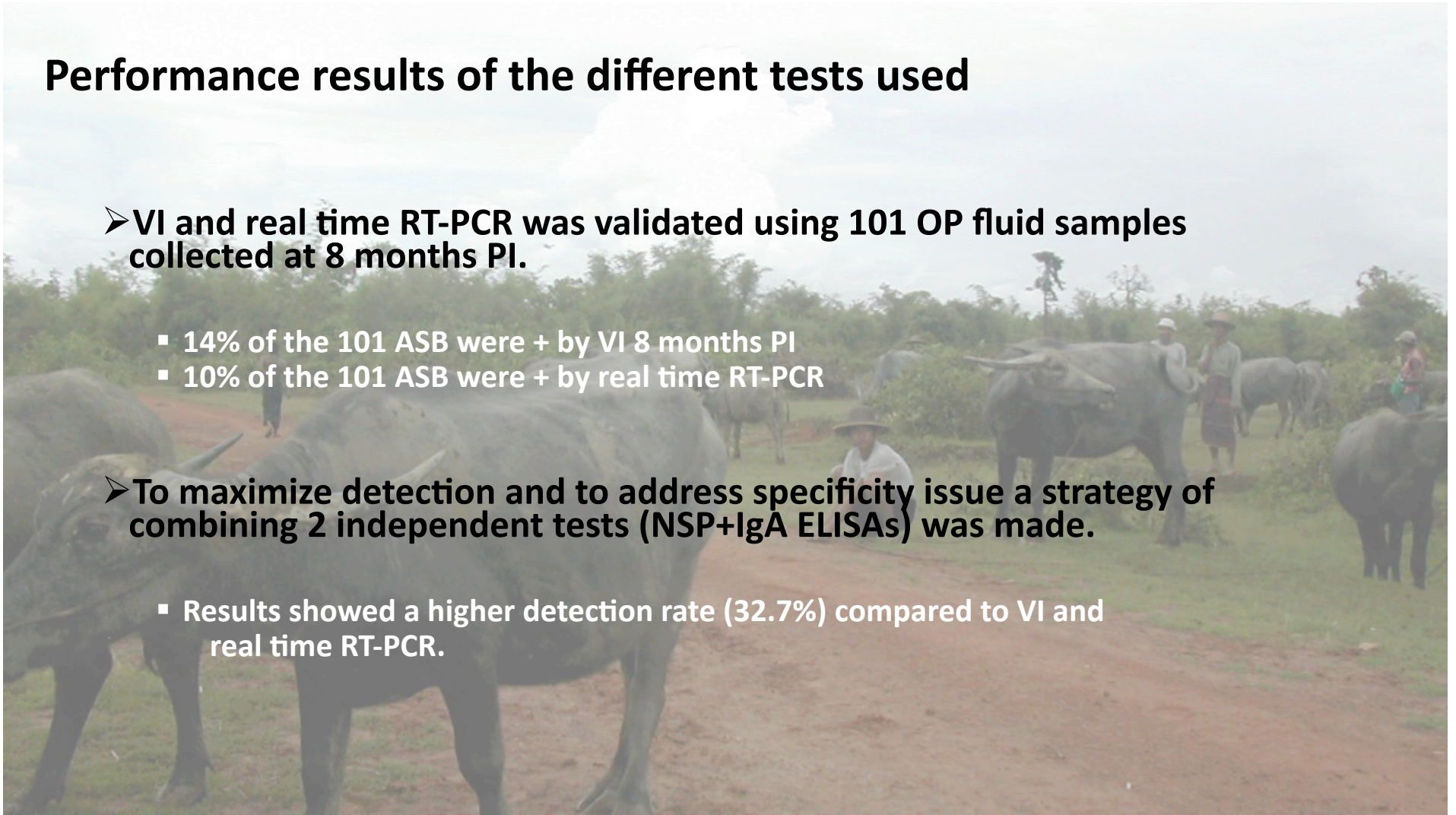
Characterisation of test performances by Bayesian framework in buffalo population in SEA



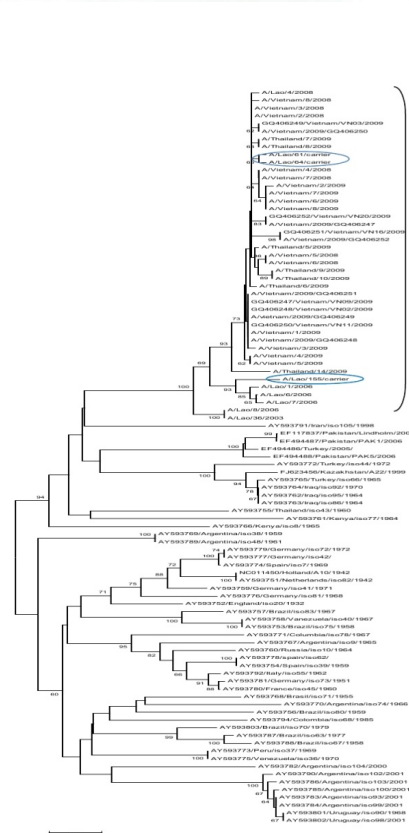
	Se [95% BPI]	Sp [95% BPI]	PPV [95% BPI]	NPV [95% BPI]	LR+ [95% BPI]	LR- [95% BPI]
PrioCHECK	0.803 [0.797-0.818]	0.995 [0.987-1]	99.65% [99.18%-100%]	72.64% [71.32%-74.28%]	9175.5 [63.68-3988]	0.1981 [0.1833-0.1997]
3ABCItaly	0.811 [0.798-0.839]	0.994 [0.987-1]	99.61% [99.19%-99.99%]	72.95% [70.11%-76.48%]	747.4 [63.21-2889]	0.1907 [0.1610-2039]
UBI	0.674 [0.673-679]	0.997 [0.990-1]	99.67% [99.13%-100%]	62.01% [61.52%-62.41%]	2047 [60.72-8660]	0.3266 [0.322-0.330]
Chekit	0.608 [0.524-0.716]	0.979 [0.960-0.999]	98.91% [97.39%-99.95%]	44.43% [27.80%-64.02%]	160.5 [14.34-574.6]	0.4001 [0.2882-0.4879]
IgA	0.800 [0.797-0.806]	0.996 [0.988-1]	99.74% [99.22%-100%]	72.57% [71.98%-73.27%]	5344 [68.21-6970]	0.2011 [0.1945-0.2044]
PrioCHECK + IgA	0.983 [0.894-0.999]	0.993 [0.987-0.999]	99.68% [99.36%-99.99%]	96.33% [76.13%-99.99%]	1707 [76.32-2953]	0.017 [0-0.1072]

Performance results of the different tests used

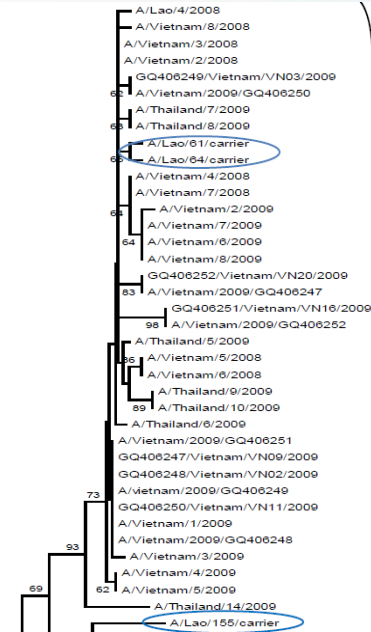
- **VI and real time RT-PCR was validated using 101 OP fluid samples collected at 8 months PI.**
 - 14% of the 101 ASB were + by VI 8 months PI
 - 10% of the 101 ASB were + by real time RT-PCR
- **To maximize detection and to address specificity issue a strategy of combining 2 independent tests (NSP+IgA ELISAs) was made.**
 - Results showed a higher detection rate (32.7%) compared to VI and real time RT-PCR.



Phylogenetic tree based on capsid sequences of FMDV showing relationships between Lao PDR serotype A FMDV isolates and other type A representatives in the world. Viruses from the FMD carriers in ASB are highlighted by the blue circles



South east Asian isolates



South east Asian isolates

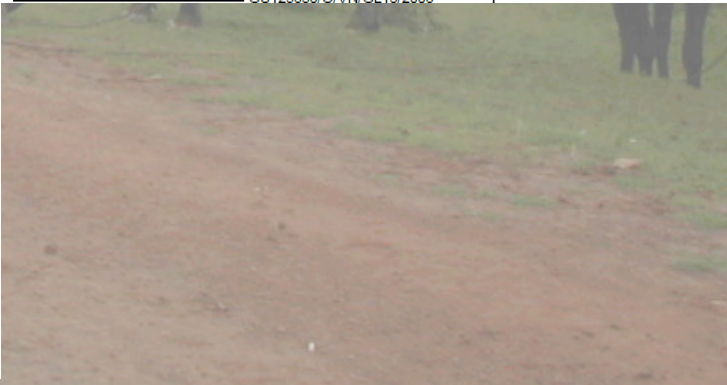


Phylogenetic tree based on capsid sequences of FMDV showing relationships between Myanmar serotype O FMDV isolates and other type O representatives worldwide. Viruses from the FMD carrier in ASB are highlighted inside the green circle.

Fig 1: Phylogenetic tree based on capsid sequences of FMDV showing relationships between Myanmar serotype O FMDV isolates and other type O representatives worldwide

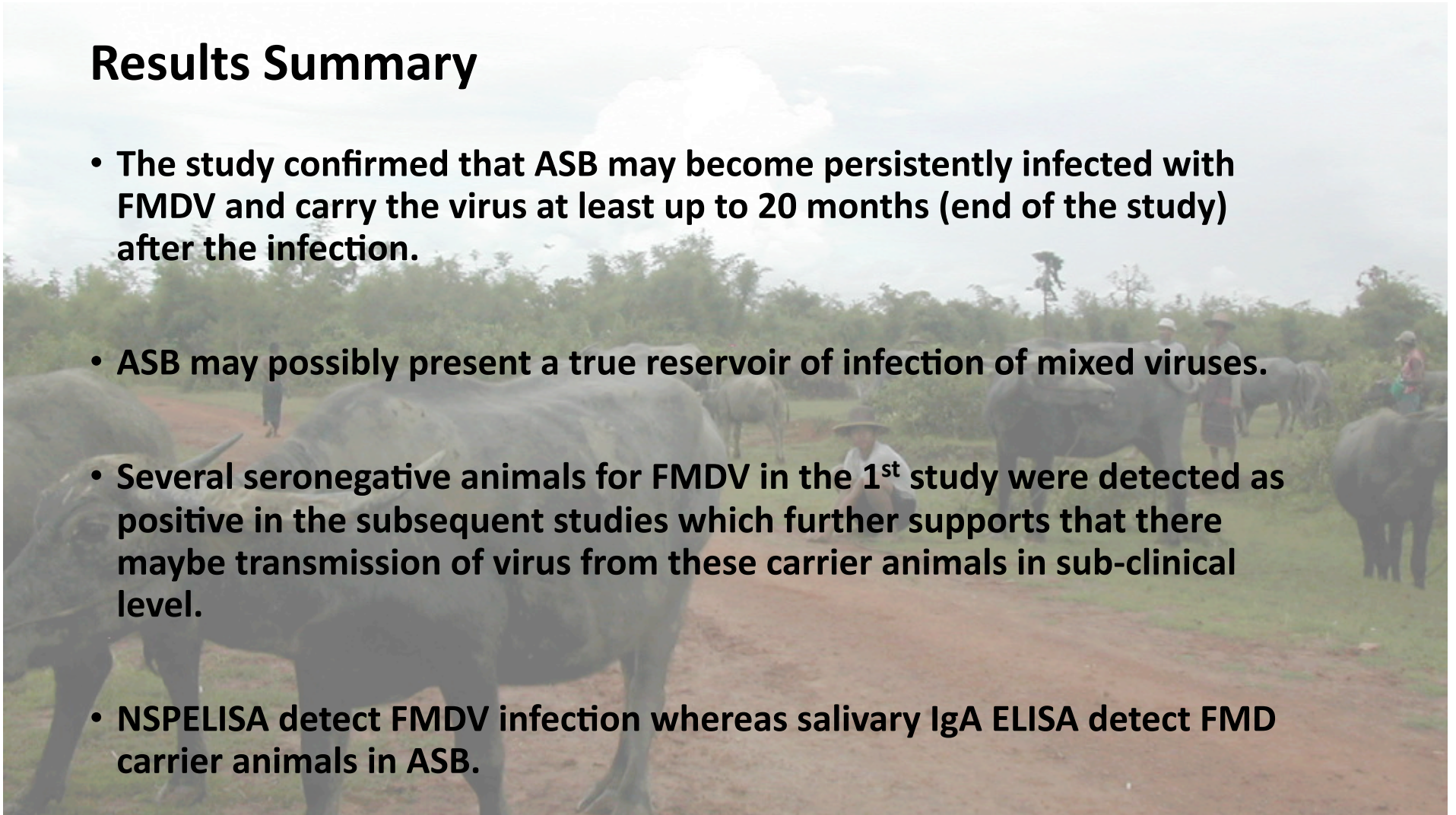


South East Asia topotype



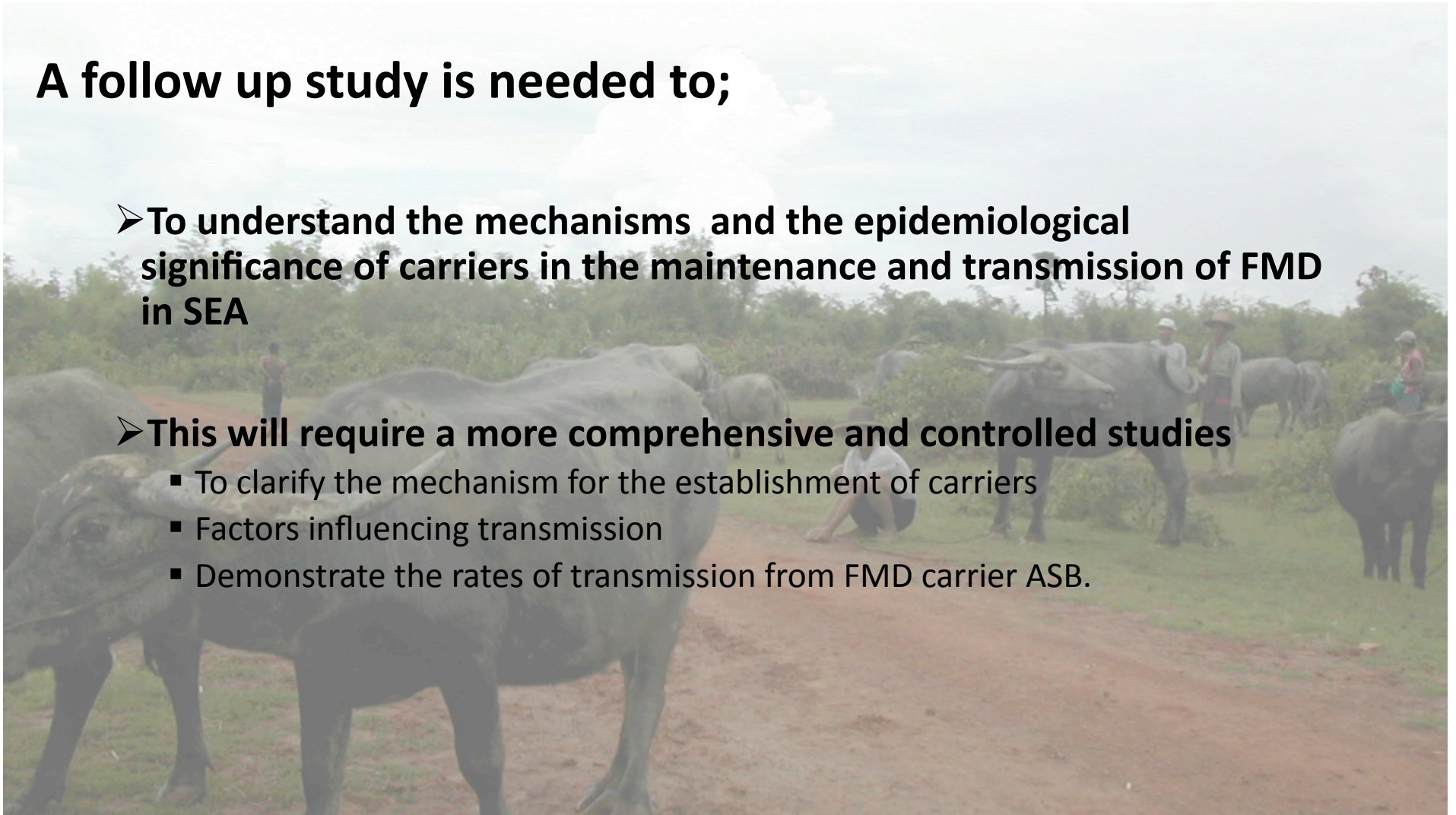
Results Summary

- The study confirmed that ASB may become persistently infected with FMDV and carry the virus at least up to 20 months (end of the study) after the infection.
- ASB may possibly present a true reservoir of infection of mixed viruses.
- Several seronegative animals for FMDV in the 1st study were detected as positive in the subsequent studies which further supports that there maybe transmission of virus from these carrier animals in sub-clinical level.
- NSPELISA detect FMDV infection whereas salivary IgA ELISA detect FMD carrier animals in ASB.

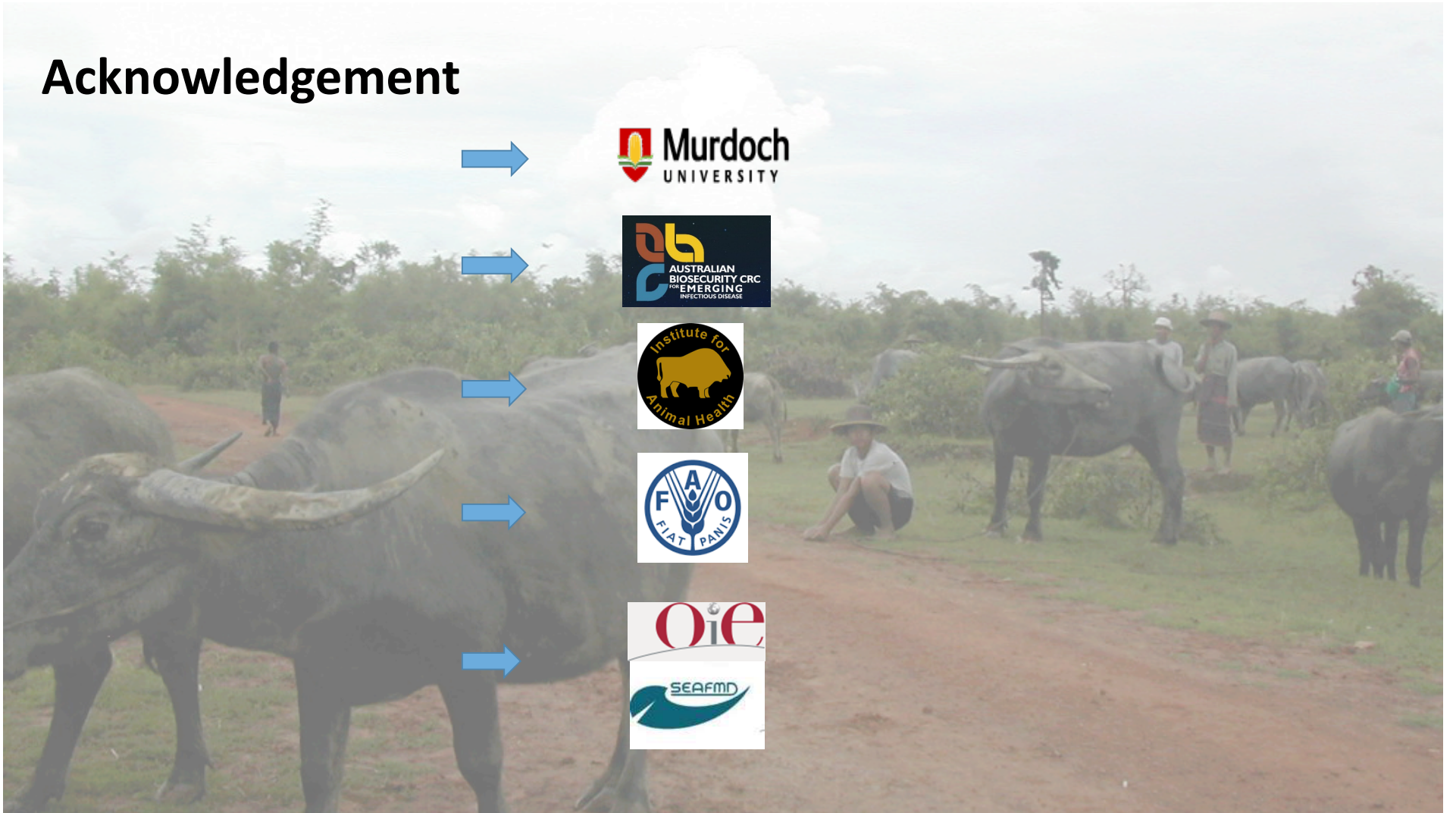


A follow up study is needed to;

- **To understand the mechanisms and the epidemiological significance of carriers in the maintenance and transmission of FMD in SEA**
- **This will require a more comprehensive and controlled studies**
 - To clarify the mechanism for the establishment of carriers
 - Factors influencing transmission
 - Demonstrate the rates of transmission from FMD carrier ASB.



Acknowledgement



Thank you for your attention..

