OBJECTIVES:
1. Present research outcomes from 3 ACIAR funded cattle research projects
2. Document in ACIAR monograph & Khmer manual

Best Practice Health & Husbandry in cattle, Cambodia
ACIAR Project AH 2005/06
June 2007 - June 2011

Theme 1: Improving Production
❖ Forage quality
❖ Impressive uptake of forages: ‘08-’ 10:
   - 51 to 773 households
   - 26,520 to 327,308 ha’s
❖ Feeding trials (7-9m), show growth rates low, kg/day:
   - 0.33, 0.36kg/day - Simuang, Marandu
   - 0.51, 0.52kg/day - Mulatto 2, Terenos

Recommendation:
❖ Need comparisons of forages with native grass growth rate?
❖ establish ways to improve feed intake: increase CP content with Stylo

Theme 1: Improving Production
❖ Supplementing rice straw (ad lib) with
   - Brachyaria sp grass (15% – 75%) & Stylo (30%)
   - Influence on feed intake (gDM/kg livewt) & microbial CP:
     - 13.5 – 23.5 kg/day
     - 27, 191 (30%grass + 30%Stylo) v 20, 91 (20% grass)
❖ Recommendation
   - Need mix of grass & legume with rice straw:
     - Grass only <30% rumen ammonia constrains growth
     - Need to add >30% grass & <30% Stylo
Theme 1: Improving Production

- Early weaning
  - Traditional: 80% use a bull within village, no weaning or feed supplementation:
    - av. intercalving interval (ICI) = 18.6m (recall data)
  - 3m calf weaning & ad libitum forages & water trial
    - return to oestrus 1-2m after weaning (ICI:13-14m) versus
    - 6-8m after calf stopped suckling at 7-8m (ICI:22-25m)
  - Calf needs high P diet for growth rate to not suffer
- Feed cow-calf during pregnancy & lactation to minimize weight loss (nutritional anoestus) & early wean calf
- Improved reproductive rate: decrease ICI to 13-14m

Theme 1: Improving Production

- Measure of village level weight gains in high (HI) v low (LI) intervention R&E sites
  - comparison of active v passive extension strategy
  - Low growth rates in both but HI always outperformed:
    - at each period: difference of between 0.03 - 0.09 g/day
    - better BCS & improving over time
    - forages spread over the available animals not fattening
  - Recommendation
    - need case studies of feeding trials to encourage feeding for:
      - fattening &
      - reproductive management
  - economic benefits recorded

Theme 1: Improving Production

- Social impact of forage feeding on families, school-aged children
  - Study of 143 families: adopters, exposed, not exposed
  - Less labour for family (mainly men and children):
    - consistent in dry, early wet & in flooding : means of
    - Adopters: 3.6hrs, Exposed: 5.6hrs, Not exposed: 5.6hrs
  - Adoption of forages decreases labour: 2 hrs/d/household
    - A few adopt, some wait & see, some will never adopt
    - Is labour-saving enough of a driver? Need Benefits Costs
    - Probably need to see fattening - importance of extension to adoption
  - BP project: HI v LI families spend 3-4hrs v 4-5hrs cut & carry
  - Recommendation
    - Establish use of extra time available eg more schooling for children, men

Theme 1: Production Recommendations

- Forages give several options (are these drivers for uptake?):
  - Labour saving; ?other enterprises possible
  - Fattening for sale; ?supply & quality, better returns
  - Reproductive improvements, ?more animals for sale
  - How best to extend this & make sustainable?
    - training in fattening & reproduction; case studies, cross visits
    - smallholders don’t understand marketing, needs input
    - disease risks remain a large threat especially FMD, needs addressing
    - need evidence of long term adoption ie follow up after project
    - need evidence of why forage has failed in past?
  - Recommendation
    - Establish cost of feeding & opportunity cost of not feeding
**Theme 2: Improving Health**

- **Infectious & parasitic diseases & interventions**
  - FMD reported outbreaks: ‘08:42; ‘09:41; 10:’ 82
    - 2010: 17 provinces, almost 60,000 large ruminants sick
    - Morbidity high 61%; mortality low 16%
    - Costs high @ $15/hd; minimum >$1.5m
    - Vaccination, biosecurity, farmer education
  - Fasciolosis:
    - prev. range 0-50%, risk around Tonle Sap
    - Reduced wt gain: $21kg/hd (female) to $41kg/hd (male)
    - BP Project: Kandal up to 50% (100% Paramphistomes)
    - Control: storage of faeces, underground water, cut grass above 5cm
    - Treatment: anthelmintics: Fasinex/Dovenix, Dec & May
  - **Recommendation:** increasing farmer training availability

- **FMD Case study in Cambodia in Kampong Cham**
- **Lack of biosecurity knowledge & reporting:** esp. VAHW’s
  - **Recommendations:**
    - Basic biosecurity training for VAHW’s:
      - Hygiene, separate healthy & sick
      - Stop movement, esp. communal grazing, trading in meat
    - Biosecurity training materials
    - VAHW’s important to disseminate biosecurity messages
    - Standardise reporting at all levels: VAHW through to DAHP
    - Needs rapid reporting system
    - Inappropriate use of vaccine: dose, cold storage, serotype,
    - Coverage levels low (35%)
    - Education, education, education

- **FMD vaccination options & attitudes of VAHW’s**
  - Can we strengthen field vet services via VAHW’s?
  - Questionnaire study
    - VAHW’s busy, most see >1 animal/day & report monthly
    - FMD common, many VAHW’s treat, report & advise
    - Less movement in outbreak, most hadn’t seen FMD vaccination
    - Conclude that base knowledge exists & should be utilized
  - Vaccination field trials in face of an outbreak
    - Comparing full subsidy, partial subsidy, full cost of vaccine
    - Takeo; risk is timber collection & mixing of animals
    - Only got 65% animals vaccinated; low uptake if no subsidy
    - Conclude that unlikely a private system for FMD vaccine can develop
  - **Recommendation:** better reporting if seek sites for vaccination trials
Theme 2: Improving Health

- FMD epidemiology:
- Serotyping of 10 cattle isolates ex 2008: 9 ‘O’, one ‘A’ isolate
- Post vaccination serology (LPB-ELISA): O, 21, 180 days
  - 60 vaccinated v 60 controls; all sero-negative at Day O
  - Days 21 and 180
    - Only 50% to O if cut-off is 1:320
    - 90% protection is cut-off is 1:80
- Need to clarify titre for protection
  - but immunogenicity appears acceptable
- Recommendation: promote good vaccine practices
  - Good manufacturer, serotype, technique: cold chain, biosecurity
  - Animal movement controls, quarantine
  - Refine FMD education strategy

Theme 2: Health Recommendations

- FMD serotypes, all ‘O Myanmar topotype’ in 2010
  - Trivalent vaccine; lower antibodies to ‘O’
- FMD knowledge gap:
  - DAHP strategies: AH&P Law, Vet Council to improve Vet Services
  - VAHW’s: 14,000 trained but needs are enormous
  - FMD Task Force; lack of coordination between groups involved?
  - BP project shows village-level vaccination is effective
  - Need to spread this intervention?
- Recommendation:
  - HS & FMD farmer training program on biosecurity & vaccination
    - How best to deliver? Kept at provincial level; storage issues?
    - Outbreak response: meeting with DOAHP, biosecurity, ?vaccine
    - ?Cross visits to villages where vaccination prevented infection

Theme 3: Improving Trade

- Trader surveys & workshops to improve knowledge of supply chain
  - 2009, survey of 55 traders ex 5 districts
    - Use BCS/appearance for est. value but increases with weight/age
    - some purchase for re-sale
    - Costs: transportation, slaughter levies, high cost of animals
    - Wants:
      - markets for domestic & border trade & also skins,
      - control of illegal trade (imports), access to better quality animals
  - 2010, assessment of animal values; weigh tape v scales,
    - Visual v actual estimates very variable, trader often underestimates wt
- Recommendations
  - Farmers to ‘target feed’ animals, & target traders for superior quality
  - Improved knowledge of weights eg weigh tapes

Theme 3: Improving Trade

- Trader interviews to identify disease risks
  - 263 traders ex 14 provinces
- Drivers & patterns of animal movement
  - Thailand transit Cambodia to Vietnam: 2 paths in & many walk out, 15hrs
  - High risk trader behavior: mixing & holding stock, high interest loans
  - A few large trading companies; influential stakeholder
  - Critical point: depots close to Vietnam, requires biosecurity training:
    - Quarantine (proposed in Vietnam), separation, cleaning & disinfection
- Recommendations to make trade safer: Feedback meetings
  - to educate traders of interventions to decrease risk, 45% have traded FMD
  - focus on non-regulatory controls eg as above, cleaning trucks
  - avoid use of government staff in interviews
**Theme 3: Improving Trade**

- Risk analysis of movement
- Risks: transferring disease cattle, holding areas, vehicles
  - About 6 in a thousand animals infected
  - About 8 FMD animals per year to Vietnam
- Recommendations
  - Minimize time in holding facilities
  - Rapid transport: transit can be as short as 15hrs
  - Make inspections: count vs surveillance for disease
  - Vaccination prior to transport; vaccine strategy & identification system
  - Education for traders & producers:
    - Biosecurity, cleaning,
    - Preferred suppliers

**Theme 3: Trade Recommendations**

- Educate traders to minimize risky behaviors
- Ensure cattle from Thailand are certified vaccinated for FMD
- Encourage more rapid transit of animals through Cambodia
  - Is Cambodia expected by OIE guidelines to develop a quarantine station & hold at border for 21 days for legal transport?
  - Not unless there is a difference in risk between countries
  - However, 21 days quarantine is in an MOU so regulation in Cambodia
  - Different risk between animals for retention and animals for slaughter
  - Should facilitate rapid transit for animals for slaughter
  - Quarantine station seen as an important facility to facilitate legal trade

**Theme 4: Improving Knowledge & Capacity**

- Trader education to lower risks of spreading disease
- 5 steps: before, arrival, departure, between farms, get home
  - 1. check no disease, if vaccinated (certified), cleaning equipment
  - 2. park outside until know healthy
  - 3. check before purchase; not salivating, lame, wt loss, swellings
  - 4. clean before leaving, don’t stress animals
  - 5. separate from other livestock, clean truck & clothing, disinfect
- Develop: booklet, digital story, posters
- Trials: will this change behavior & will this change disease spread?
- What else required? dissemination strategy, campaign approach
- Feedback: interest in digital stories in Cambodia, local images, radio
  - Hook for traders: reputation, improved incomes, obligation to nation
- Recommendation:
  - Translate digital stories & develop booklets & posters in Khmer

**Theme 4: Improving Knowledge & Capacity**

- Farmer knowledge change, 2008-2010
- Questionnaire, 45 questions, 25-20 households
- Measure impact of 3 training inputs: staff visits, on the job & formal
- Clear evidence of initially low but increased knowledge in HI in:
  - Infectious disease
  - Internal parasites
  - Combined scores
- Strengths: staff capacities, application of knowledge,
- Weaknesses: knowledge gap still remains
- Recommendations: address knowledge gaps, formal training in LI villages, conduct KAP assessment & case studies esp. on financial impacts
3 Groups Workshop: list of priorities

- **Group 1: Knowledge gaps**
  - Describe the key areas we need more research information to improve extension messages, and how to achieve

- **Group 2: Extension manual (in Khmer)**
  - Describe the key messages we need to include in a manual to enable VAHW and farmer training, and how to deliver

- **Group 3: Engaging stakeholders**
  - Describe the key stakeholders we need to engage more deeply with, and how to do this

Recommendations ex presentations

**Theme 1**

- Compare growth rates of forages v native grass/straw
- Need mix of grass & legume with rice straw; add >30% grass & <30% Stylo
- More case studies of financial benefits of feeding for fattening & reproduction
- Establish how extra time available is used; schooling for children, men?
- Establish cost of feeding & opportunity cost of not feeding

**Theme 2**

- Increase availability of farmer disease knowledge training
- HS: extend study beyond 6months ie still protection at 9months?
- FMD: Biosecurity training for VAHW’s, vaccine care & coverage etc
- VAHW knowledge exists & should be utilized for reporting, response
- FMD vaccine practices need improvement, training: serotype, cold chain
- Farmer training program on biosecurity, vaccination, response: PO level

**Theme 3**

- Farmers to ‘target feed’ animals, & target traders for superior quality
- Improved knowledge of weights eg weigh tapes
- Non-regulatory ways to make trade safer: Feedback meetings
- Educate traders of interventions to decrease risk
- Minimize time in holding facilities
- Rapid transport; transit can be as short as 15hrs
- Make inspections count ie surveillance for disease
- Vaccination prior to transport; vaccine strategy & identification system
- Education for traders & producers
Recommendations

Theme 4
- Trader education critical to lowering risks of spreading disease
  - translate digital stories, develop booklets & posters in Khmer
  - dissemination strategy

- address knowledge gaps by training:
  - on the job versus formal training in LI villages,
  - conduct KAP assessment
  - case studies esp. on financial impacts

Papers & Recommendations

Program Themes

Day 1
- 1: Improving Production
- 2: Improving Health

Day 2
- 3: Improving Trade
- 4: Improving Knowledge and Capacity

Discussions

Thankyou and Farewell