

1

2 **Table 1.** Key input values used to construct Gross Margins, Benefit-Cost Analysis, and Sensitivity Analysis

Input values	VaccNo	VaccYes	Sources
A- General information			
Discount rate (%)	12	12	PC (POAHP)
Exchange rate for US\$1 (Khmer riel)	4200	4200	Actual rate in 2014
Manure (US\$/kg)	0.07	0.07	PC (POAHP)
Transport and marketing cost (US\$/head)	10	10	PC (POAHP)
Value of draught power (US\$/day)	5	5	Assumption
Commission of the stock value (%)	3	3	PC (traders & POAHP)
Price rice straw (US\$/kg)	0.07	0.07	PC (POAHP)
Adult feed-rice straw (kg/day)	2.97	2.97	PC (RUA & POAHP)
Calf feed-rice straw (kg/day)	1.49	1.49	PC (RUA & POAHP)
Price live weight (US\$/kg)			PC (traders & POAHP)
Sick cattle	1.6	1.6	PC (traders & POAHP)
Healthy cattle	2.9	2.9	PC (traders & POAHP)
Cows per farmer (head)	2	2	Assumption
Bull replacement price (US\$)	892	892	PC (farmers & POAHP)
B- Cattle production			
Herd size of breeding cow per household	2	2	Assumption & Miranda et al. (2013)
Age that calves are sold (years)	2	2	PC (POAHP)
Age of first calving (years)	2	2	PC (farmers & POAHP)
Adults used for draught power (%)	29.1	29.1	SFS
Bull percentage (%)	10	10	PC (RUA & POAHP)
Percentage of weight loss when infected with FMD (%)	30	30	SFS & Rast et al. (2010)
Calving rate (%)	60	66	PC (POAHP) & Sath et al. (2008)
Cull rate of bull (%)	10	9.5	PC (POAHP)
Manure (kg/head/year)	730	730	PC (farmers & POAHP)
Live weight of calves-male (kg)	120	156	PC (traders & POAHP)
Live weight of calves-female (kg)	110	130	PC (traders & POAHP)
Live weight of adults-male (kg)	215	280	PC (traders & POAHP)
Live weight of adults-female (kg)	195	254	PC (traders & POAHP)
Increase production due to participation in FMDVP (%)	0	10	PC (traders & POAHP)
C- Disease management and prevention program			
Morbidity rate (%) Calves	32.8	0	SFS
Adults	30.2	0	SFS
Mortality rate (%) Calves	0.7	0	SFS
Adults	0.4	0	SFS
Treatment rate (%)	100	100	SFS
Proportion of treated cattle that still sold sick (%)	0	0	Assumption
Other costs (US\$)	10	10	SFS
Cost of treatment (US\$/head)	15.1	15.1	SFS
Cost of nursing (US\$/head)	25.7	25.7	SFS
Biannual FMD vaccination ¹ (US\$/head/year)	0	4.93	SFS
Total prevention rate by vaccination (%)	0	100	Assumption
Biannual deworming (US\$/head/year)	0	6	PC (DAHP & POAHP)
Cost of FMD vaccination campaign and farmer training on vaccination:			
Cost for 50 farmers (US\$/50 farmers/year)	0	907	PC (POAHP)
Cost for each farmer (US\$/farmer/year)	0	18	PC (POAHP)

3 RUA=Royal University of Agriculture; PC=Personal Communication;

4 VaccNo = Farmer who did not participate in the FMDVP; VaccYes = Farmer who did participate in the FMDVP

5

6

1

¹

7

8 **Table 2.** GM summary for cattle if vaccinating (VaccYes) or not vaccinating (VaccNo) assuming average annual outbreaks

	Number of cattle			US\$/head			Total US\$		
	VaccNo FMDNo	VaccNo FMDAvg	VaccYes	VaccNo FMDNo	VaccNo FMDAvg	VaccYes	VaccNo FMDNo	VaccNo FMDAvg	VaccYes
1. Costs									
Transport and marketing	1.2	1.2	1.3	10	10	10	12	12	13
Other	4.6	4.6	4.8	10	10	10	46	46	48
Treatment	0	1.4	0	15	15	15	0	22	0
Nursing	0	1.4	0	26	26	68	0	37	0
Replacements:									
Bull	0.02	0.02	0.02	811	892	892	16	16	17
Cow	0.00	0.00	0.00	377	415	415	0	0	0
Biannual FMD vaccination	0	0	4.8	0	0	5	0	0	24
Biannual deworming	0	0	4.8	0	0	6	0	0	29
Commission							15	15	18
Feed cost (rice straw/kg/year):									
Adult	2.20	2.20	2.20	75.92	75.9	75.9	167	167	167
Calves	2.40	2.40	2.64	38.03	38.0	38	91	91	100
Total annual costs							347	406	417
2. Income									
Sale stock:									
Cull cows	0.22	0.22	0.22	377	377	377	80	80	84
Cull bull	0.02	0.02	0.02	452	452	452	9	9	9
Heifer calves	0.44	0.36	0.44	415	377	415	139	136	182
Steer calves	0.66	0.60	0.66	498	452	498	271	270	328
Cull sick cows	0	0	0	312	312	312	0	0	0
Cull sick bull	0	0	0	344	344	344	0	0	0
Sick heifer calves	0	0	0	160	160	160	0	0	0
Sick steer calves	0	0	0	192	192	192	0	0	0
Sale manure (kg)	730	730	730	0.07/kg	0.07/kg	0.07/kg	102	102	102
Total annual income							602	596	705
3. Gross margin (2 cows)							255	190	288
4. Gross margin/cow							127	95	144

9 **Table 3.** GM summary for herds that do not vaccinate with major annual outbreaks

	Number of head			US\$/head			Total US\$/head		
	VaccNo FMDNo	VaccNo FMD50%	VaccNo FMD75%	VaccNo FMDNo	VaccNo FMD50%	VaccNo FMD75%	VaccNo FMDNo	VaccNo FMD50%	VaccNo FMD75%
1. Costs									
Transport and marketing	1.2	1.19	1.19	10	10	10	12	12	12
Other	4.6	4.59	4.59	10	10	10	46	46	46
Treatment	0	2.30	3.44	15	15	15	0	35	52
Nursing	0	2.30	3.44	26	26	26	0	59	89
Replacement:									
Bull	0.02	0.02	0.02	811	811	811	16	16	16
Cow	0.00	0.00	0.00	377	377	377	0	0	0
Biannual FMD vaccination	0	0	0	0	0	10	0	0	15
Biannual deworming	0	0	0	0	0	10	0	0	12
Commission (3%)							15	15	15
Feed cost (rice									
Adult	2.20	2.20	2.20	75.92	75.92	75.92	167	167	167
Calves	2.40	2.39	2.40	38.03	38.03	38.03	91	91	91
Total annual costs							347	440	487
2. Income									
Sale stock:									
Cull cows	0.22	0.21	0.21	377	377	377	80	79	79
Cull bull	0.02	0.02	0.02	452	452	452	9	9	9
Heifer calves	0.44	0.36	0.36	415	377	377	139	136	136
Steer calves	0.66	0.60	0.60	498	452	452	271	270	270
Cull sick cows	0	0	0	312	312	312	0	0	0
Cull sick bull	0	0	0	344	344	344	0	0	0
Sick heifer calves	0	0	0	160	160	160	0	0	0
Sick steer calves	0	0	0	192	192	192	0	0	0
Sale manure (kg)	730	730	730	0.07/kg	0.07/kg	0.07/kg	102	102	102
Total annual income							602	596	596
3. Gross margin (2 cows)							255	156	109
4. Gross margin/cow							127	78	55

Table 4. BCA comparing participating in the FMDVP with not participating under various outbreak scenarios during 5 years

	NPV	BCR	IRR
Average FMD outbreak every year	109*	1:1.16	49
No FMD outbreaks	-118	1:0.85	-27
FMD outbreak in Yr 2 with a morbidity rate of 50%	-39	1:0.95	-4
FMD outbreak in Yr 2 with a morbidity rate of 75%	-2	1:1.0	11
FMD outbreak in Yrs 2&4 with a morbidity rate of 50%	24	1:1.03	19
FMD outbreak in Yrs 1&3 with a morbidity rate of 50%	36	1:1.05	30
FMD outbreak in Yrs 2&4 with a morbidity rate of 75%	91	1:1.13	39
FMD outbreak in Yrs 1&3 with a morbidity rate of 75%	111	1:1.16	93

*NVP baseline analysis