

### Cost calculation details by the nature of cost

Note: unit cost= total cost/number of animals vaccinated

- Variable cost
- Fixed cost

**Table S13.** Number of animals vaccinated in each level of vaccine distribution

Vaccine distribution level	Central	Regional	Provincial	Communal	Private vets
Number of vaccinated animals	4,445,444	234,122	60,888	11,191	84,272

**Table S14.** Vaccine purchase cost calculation details

Vaccine distribution level	Central	Regional	Provincial	Communal	Private vets
Fixed cost	0	0	0	0	0
Variable cost = a * b	105,846,022	0	0	0	0
Vaccine unit price (a)	23.81	n/a	n/a	n/a	n/a
Number of doses used (b)	4,445,444	234,122	60,888	11,191	84,272

**Table S15.** Details of fixed and variable vaccine transportation cost calculation

Vaccine distribution level		Central	Regional	Provincial	Communal	Private vets
Fixed cost		0	0	0	0	0
Variable cost = sub total1+ sub total2+ sub total3+ sub total4+ sub total5+ sub total6		15,237,453	125,438	85,547	140,199	966,989
	Number of supplies (a)	1	1	2	3	2
<i>Import cost (sub total1) = b*c</i>		12,025,580	0	0	0	0
	<i>Unit import cost (b)</i>	2.45	n/a	n/a	n/a	n/a
	<i>Number of doses used (c)</i>	4,908,400	292,775	63,150	12,017	85,000
<i>Mean of transportation cost (sub total2) = d/(e*360)*f*a + g*f*a</i>		383,333	14,722	29,444	1,550	1,967
	Mean of transportation price (d)	50,000,000	25,000,000	25,000,000	1,500,000	1,500,000
	Mean of transportation ULY (e)	5	5	5	5	5
	Number of days of transportation (f)	12	1	1	1	1
	Mean of transportation maintenance cost per day (g)	4,167	833	833	200	150
<i>Fuel cost (sub total3)</i>		2,052,540	50,000	20,000	3,000	44,000
<i>Personnel cost (sub total4) = i*k*h*a + i*j*h*a</i>		764,000	57,667	33,333	9,500	56,667
	No of people (h)	2	2	2	1	1
	No of days of transportation (i)	12	1	1	1	1
	Per diem (j)	23,500	20,500	0	0	15,000
	Daily salary (k)	8,333	8,333	8,333	6,333	13,333
<i>Field transportation cost (sub total5) = l/(m*360)*p*q + o*p*q + n*p*q</i>		0	0	0	125,250	859,200
	Motorbike cost (l)	n/a	n/a	n/a	1,500,000	1,500,000
	Motorbike ULY (m)	n/a	n/a	n/a	5	5
	Fuel cost per day (n)	n/a	n/a	n/a	1,750	2,000
	Field mean of transportation maintenance cost per day (o)	n/a	n/a	n/a	200	150
	No of days of field transportation (p)	n/a	n/a	n/a	45	48
	No of vaccination teams (q)	n/a	n/a	n/a	1	6
<i>Other cost (sub total6) = r/(s*360)*a*i+t*a*i+u*a*i+v*a*i</i>		12,000	3,049	2,769	899	5,156
	Cold box price (r)	0	35,000	25,000	71,420	20,000
	Cold box ULY (s)	2	2	2	2	2
	Tool fees (t)	0	1,000	400	0	800

Ice (u)	0	1,500	200	0	500
Phone call cost per day (v)	1,000	500	750	500	1,250

**Table S16.** Details of fixed and variable vaccine storage cost calculation

Vaccine distribution level	Central	Regional	Provincial	Communal	Private vets
Variable cost	0	0	0	0	0
Fixed = sub total1+ sub total2+ sub total3+ sub total4+ sub total5+ sub total6	23,474,285	30,603	19,127	51,918	87,551
<i>Sub total1 (Cold room cost) = <math>b/(d*360)*a*e*f + c*a*e*f</math></i>	5,580,000	0	0	0	0
No of cold room (a)	2	n/a	n/a	n/a	n/a
Cold room building cost (b)	25,000,000	n/a	n/a	n/a	n/a
Maintenance cost per day (c)	1,667	n/a	n/a	n/a	n/a
Cold room ULY (d)	10	n/a	n/a	n/a	n/a
Storage time in days (e)	360	n/a	n/a	n/a	n/a
Percentage of use for PPR (f)	1	n/a	n/a	n/a	n/a
<i>Sub total2 (Refrigerator cost) = <math>h/(j*360)*g*k + h*g*k</math></i>	84,375	22,222	13,889	18,056	43,750
No of Refrigerators (g)	1	2	1	1	2
Refrigerator price (h)	1,500,000	500,000	500,000	500,000	500,000
Refrigerator maintenance cost per day (2.5%) (i)	104	0	0	0	35
Refrigerator ULY (j)	5	5	5	5	5
Storage time in days (k)	90	40	50	65	70
<i>Sub total3 (Electricity cost for central) = <math>l*m*e*a*0.29 + l*n*e*a*0.71</math></i> <i>Sub total3 (Electricity cost for other levels) = <math>l*m*k*g</math></i>	17,809,910	8,381	5,238	6,809	14,666
No of Kwh/day (l)	224.2	0.97	0.97	0.97	0.97
Cost of Kwh (peak moment) (m) <sup>1</sup>	165	108	108	108	108
Cost of Kwh (full moment) (n)	88				
<i>Sub total4 (Gas cost) = <math>p/(360*q)*k + o*k</math></i>	0	0	0	27,053	29,134
Gas recharging cost per month (o)	0			400	400

<sup>1</sup> For the central level, the cost is Kwh depends on the electricity consumption moment in the days. It is estimated that 29% of electricity consumed is done during the peak moment (10:00AM -2:00PM and 4:00 PM – 7:00 PM) and 71 percent during the full moment (other hours).

Gas bottle price (p)	0	1	1	17,500	17,500
Gas bottle ULY (q)	1	1	1	3	3

<sup>1</sup> For the central level, the cost is Kwh depends on the electricity consumption moment in the days. It is estimated that 29% of electricity consumed in done during the peak moment (10:00AM -2:00PM and 4:00 PM – 7:00 PM) and 71 percent during the full moment (other times).

**Table S17.** Details of fixed and variable Vaccine field delivery cost calculation

Vaccine distribution level	Central	Regional	Provincial	Communal	Private vets
Fixed cost = $e*b*a$	0	0	0	300,000	0
Variable cost = sub total1 + sub total2 + sub total3	0	0	0	967,275	4,541,361
<i>Sub total1 (Vaccinators cost for communal) = <math>d*c*b*a + e*b*a</math></i> <i>Sub total1 (Vaccinators cost for private vets) = <math>(d*c*b*a) + e</math></i>	0	0	0	870,000	4,213,600
No of vaccination teams (a)	n/a	n/a	n/a	1	6
No of people per team (b)	n/a	n/a	n/a	2	2
No of working per team (c)	n/a	n/a	n/a	45	48
Daily salary (d)	n/a	n/a	n/a	6,333	-
Per diem (e)	n/a	n/a	n/a	150,000	4,213,600
<i>Sub total2 (Vaccination material cost) = <math>(f/g + h/I + j/k + l/m)*n</math></i>	0	0	0	34,133	214,894
Vaccination syringe price (f)	n/a	n/a	n/a	30,000	30,000
No of doses supported (g)	n/a	n/a	n/a	15,000	25,000
Needle price (h)	n/a	n/a	n/a	250	250
No of doses supported (i)	n/a	n/a	n/a	1,000	1,000
Spare glass price (j)	n/a	n/a	n/a	3,000	3,000
No of doses supported (k)	n/a	n/a	n/a	10,000	5,000
Marking clamp (l)	n/a	n/a	n/a	10,000	10,000
No of animal supported (m)	n/a	n/a	n/a	20,000	20,000
No of animal vaccinated (n)	n/a	n/a	n/a	11,191	84,272
<i>Sub total3 (Other field cost) = <math>o/(p*360)*a*c + q*a*c + r</math></i>		n/a	n/a	n/a	95,533
Cold box price (o)	n/a	n/a	n/a	71,420	20,000
Cold box ULY (p)	n/a	n/a	n/a	3	3

Ice price per day (q)	n/a	n/a	n/a	150	275
Phone call cost (r)	n/a	n/a	n/a	33,750	11,000
<i>Sub total4 (Vaccine wastage)= s-t-u</i>	8,755,675	1,396,528	53,858	19,667	17,334
No of doses delivered (s)	7,356,800	300,100	65,000	12,725	85,000
No of vaccinated animal (t)	4,445,444	234,122	60,888	11,191	84,272
No of doses available (u)	2,448,400	7,325	1,850	708	0

**Table S18.** Details of fixed and variable sensitization cost calculation

Vaccine distribution level		Central	Regional	Provincial	Communal	Private vets
Variable cost		0	0	0	0	0
Fixed cost = sub total1 + sub total2 + sub total3		33,181,356	0	162,611	233,600	634,450
Personnel cost	<i>Sub total1 (central)= a*c*b*e + d</i> <i>Sub total1 (provincial)= a*b*c*e + d*c*a</i> <i>Sub total1 (communal and private vets) = a*b*c*e + d*a</i>	10,775,500	0	113,333	161,333	274,667
	No of people involved (a)	100	n/a	2	2	2
	No of days per session (b)	1	n/a	1	1	1
	No of sessions (c)	1	n/a	2	8	13
	Per diem (d)	9,775,500	n/a	20,000	30,000	55,000
	Daily salary (e)	10,000	n/a	8,333	6,333	6,333
Material and other costs	<i>Sub total2 (central) = i/(360*j)*c*b*k + l + h + g + f + m</i> <i>Sub total2 (others) = l/(360*j)*c*b + l*c*b + h*c*b + g*c*b + f*c*b + m</i>	9,350,856	0	49,278	56,267	194,783
	Refreshment for farmers per session (f)	3,310,000	n/a	0	3,500	2,500
	Phone call per session (g)	100,000	n/a	0	500	1,500
	Fuel cost (h)	2,822,000	n/a	10,000	2,000	10,000
	Mean of transportation price (i)	50,000,000	n/a	25,000,000	1,500,000	1,500,000
	Mean of transportation price ULY (j)	5	n/a	5	5	5
	Mean of transportation No (k)	38	n/a	1	1	1
	Mean of transportation maintenance cost per day (15%) (l)	11,139	n/a	750	200	150
	Other materials (m)	1,640,000	n/a	0	0	0
Sub total3 = n + o + p + q + r		13,055,000	0	0	16,000	165,000

Media broadcast costs	Town crier cost (n)	30,000	0	0	16,000	65,000
	Radio cost (o)	12,000,000	0	0	0	100,000
	Television cost (p)	600,000	0	0	0	0
	Newsletter cost (q)	250,000	0	0	0	0
	Other cost (interpreter and hostess) (r)	175,000	0	0	0	0

**Table S19.** Details of fixed and variable supervision cost calculation

Vaccine distribution level		Central	Regional	Provincial	Communal	Private vets
Variable cost		0	0	0	0	0
Fixed cost = sub total1 + sub total 2 + sub total 3		8,095,361	424,194	257,590	0	178,167
Personnel cost	<i>Sub total1 (central) = <math>b*a*d*e + c*a*d*e</math> Sub total1 (others) = <math>b*a*d*e + c</math></i>	4,440,000	275,000	143,333	0	133,333
	No of days (a)	5	1	1	n/a	1
	Daily salary (b)	10,000	8,333	8,333	n/a	13,333
	Per diem (c)	27,000	150,000	60,000	n/a	0
	No of people involved (d)	4	3	2	n/a	1
	No of sessions (e)	6	5	5	n/a	10
Transportation cost	<i>Sub total2 (central) = <math>f/(360*g)*a*e + h + i</math> Sub total2 (others) = <math>f/(360*g)*a*e+h/360*e*a+i*e*a</math></i>	3,193,651	144,194	108,257	0	34,833
	Mean of transportation cost (f)	50,000,000	25,000,000	25,000,000	n/a	1,500,000
	Mean of transportation cost ULY (g)	5	5	5	n/a	5
	Mean of transportation maintenance cost (15%) (h)	307,868	702,000	364,500	n/a	54,000
	Fuel cost (i)	2,052,450	13,000	6,750	n/a	2,500
Other costs	<i>Sub total 3 = <math>j + k</math></i>	461,710	5,000	6,000	0	10,000
	Phone call cost (j)	61,710	5,000	6,000	n/a	10,000
	Vaccine shipment (k)	400,000	0	0	n/a	0

**Table S20.** Details of fixed and variable training and meetings cost calculation

Vaccine distribution level		Central	Regional	Provincial	Communal	Private vets
Variable cost		0	0	0	0	0
Fixed cost = sub total1 + sub total2		34,560,054	0	0	0	
Review workshops	$Sub\ total1 = b + d + e + f + g + h + I + c*a*k + j/(360*m)*l*k + n$	12,007,122	0	0	0	
	No of people (a)	80	n/a	n/a	n/a	n/a
	Per diem (b)	2,877,000	n/a	n/a	n/a	n/a
	Daily salary (c)	10,000	n/a	n/a	n/a	n/a
	Cocktail (d)	594,000	n/a	n/a	n/a	n/a
	Phone call (e)	200,000	n/a	n/a	n/a	n/a
	Fuel cost (f)	1,986,000	n/a	n/a	n/a	n/a
	Material (g)	2,730,000	n/a	n/a	n/a	n/a
	Room rent (h)	-	n/a	n/a	n/a	n/a
	Media broad cast cost (i)	1,000,000	n/a	n/a	n/a	n/a
	Mean of transportation price (j)	50,000,000	n/a	n/a	n/a	n/a
	No of days (k)	2	n/a	n/a	n/a	n/a
	Mean of transportation No (l)	13	n/a	n/a	n/a	n/a
	Mean of transportation ULY (m)	5	n/a	n/a	n/a	n/a
	Mean of transportation maintenance (15%) (n)	297,900	n/a	n/a	n/a	n/a
Animal marking training	$Sub\ total2 = b + d + e + f + g + h + I + c*a + j/(360*m)*l*k + n$	22,552,932	0	0	0	
	No of people (a)	163	n/a	n/a	n/a	n/a
	Per diem (b)	16,369,000	n/a	n/a	n/a	n/a
	Daily salary (c)	6,333	n/a	n/a	n/a	n/a
	Cocktail (d)	1,978,000	n/a	n/a	n/a	n/a
	Phone call (e)	32,000	n/a	n/a	n/a	n/a
	Fuel cost (f)	1,935,400	n/a	n/a	n/a	n/a
	material (g)	252,000	n/a	n/a	n/a	n/a
	Room rent (h)	275,000	n/a	n/a	n/a	n/a
	Media broad cast cost (i)	-	n/a	n/a	n/a	n/a
	Mean of transportation price (j)	50,000,000	n/a	n/a	n/a	n/a
	No of days (k)	14	n/a	n/a	n/a	n/a

	Mean of transportation No (l)	1	n/a	n/a	n/a	n/a
	Mean of transportation ULY (m)	5	n/a	n/a	n/a	n/a
	Mean of transportation maintenance (15%) (n)	290,310	n/a	n/a	n/a	n/a

**Table S21.** Details of fixed and variable coordination cost calculation

Vaccine distribution level		Central	Regional	Provincial	Communal	Private vets
Variable cost		0	0	0	0	0
Total cost = sub total1 + sub total2 + sub total3		4,509,630	155,167	122,875	0	548,625
Personnel cost	<i>Sub total1 = d*b*a*c</i>	800,000	125,000	93,750	0	450,000
	No of people in the coordination (a)	4	2	1	n/a	1
	No of working days (b)	40	20	30	n/a	45
	Percentage time spent on PPR vaccination (c)	0.50	0.38	0.38	n/a	0.75
	Daily salary (d)	10,000	8,333	8,333	n/a	13,333
Reporting cost	<i>Sub total2 = g*e*h + f*e*h + i</i>	3,680,000	20,000	11,000	0	19,750
	No of people in reporting (e)	11	n/a	n/a	n/a	n/a
	Per dem (f)	5,000	n/a	n/a	n/a	n/a
	Daily salary (g)	10,000	n/a	n/a	n/a	n/a
	No of working days (h)	22	n/a	n/a	n/a	n/a
	Phone call cost (i)	50,000	n/a	n/a	n/a	n/a
Other costs	<i>Sub total3 = p*q*j + r*s*j + m/(360*n)*a*b*o + k + l</i>	29,630	10,167	18,125	0	78,875
	Campaign duration (j)	90	90	90	n/a	60
	Transportation cost (k)	0	6,000	10,000	n/a	333
	Phone call cost (l)	0	0	5,000	n/a	10,000
	Computer cost (m)	400,000	300,000	300,000	n/a	300,000
	Computer ULY (n)	3	3	3	n/a	3
	Computer percentage use for PPR (o)	0.50	0.38	0.38	n/a	0.75
	Room rent (p)	n/a	n/a	n/a	n/a	2,067
	PPR vaccination % in the room rent (q)	n/a	n/a	n/a	n/a	0.25
	Taxes dues (r)	n/a	n/a	n/a	n/a	1,250
	PPR vaccination % in the turnover (s)	n/a	n/a	n/a	n/a	0.18



