



**GLOBAL
STUDENT
OUTREACH**

TECHNICAL PROPOSAL

GSO Community Cow Bank Program

Pass-On Livestock Model for the Phnom Samkos Wildlife Sanctuary

Prepared for

GLOBAL STUDENT OUTREACH

Food Security • Sustainable Livelihoods • Forest & Wildlife Protection • Climate Resilience — Rural Cambodia

Document Rev. 2.0 — June 8, 2025

Target Cost per Starter Cow Unit: USD \$400–\$600

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1. Executive Summary

This proposal defines a **low-input Cow Bank (Pass-On Gift) Program** tailored for Global Student Outreach (GSO) communities living in and around the **Phnom Samkos Wildlife Sanctuary** in the Cardamom Mountains of western Cambodia. The sanctuary spans 3,307 km² of dense evergreen forest, steep mountainous terrain, and high-rainfall jungle — an environment where conventional open-pasture cattle models fail, but where locally adapted cattle have thrived for generations through tethered grazing, forest-edge browsing, and cut-and-carry feeding.

The program targets **small-framed indigenous Cambodian cows or hardy Brahman-crosses** (200–280 kg mature weight) that are naturally adapted to jungle conditions: heat and humidity tolerance, tick resistance, sure-footedness on steep slopes, and the ability to browse leaves, bamboo shoots, and shrubs when grass is scarce. Each starter cow unit is budgeted at approximately **USD \$400–\$600**, reflecting real on-the-ground costs in remote Cardamom communities where labor is contributed by the family, infrastructure is built from bamboo and thatch, and veterinary inputs are limited to the essentials.

This document covers the pass-on mechanism, jungle-specific challenges and cow adaptations, land and labor requirements tailored to the sanctuary’s community zones, reproduction protocols, a per-cow project data model, and a cost structure validated for rural Cambodian smallholders in protected-area buffer zones.

2. How the Cow Bank Works

2.1 The Pass-On Gift Mechanism

Step	Action	Accountability
1. Selection	GSO and village committee select Recipient Family A from the community zone based on need,	GSO + Village Committee

	shelter readiness, and commitment.	
2. Placement	Family A receives one pregnant cow or cow-calf pair (locally sourced, adapted to jungle conditions).	GSO Field Team
3. Contract	Verbal or simple written agreement: family provides daily care, tethering, and reporting; GSO provides breeding linkage, basic veterinary support, and training for 18 months.	Both parties
4. First Birth	Cow calves. If the first viable offspring is female, it is designated the **Pass-On Heifer** .	Recipient Family A
5. Pass-On	When the Pass-On Heifer reaches ~20–24 months and is confirmed pregnant (via community bull or local AI), it is transferred to **Recipient Family B** .	Family A → Family B
6. Expansion	Family A retains all subsequent calves. Family B enters the same contract. The chain continues.	Village Committee
7. Exit	After 24 months and successful pass-on, GSO transitions to advisory-only; the village committee manages the recipient queue.	Village Committee

2.2 Core Principles

****No cash repayment****: the "repayment" is the live female offspring.

****Community ownership****: a village-level Cow Bank Committee maintains the waiting list and enforces basic husbandry standards.

****Asset retention****: the original recipient keeps the cow and all later offspring.

****Low-input, high-adaptation****: animals must be locally sourced jungle-adapted stock; no high-maintenance dairy breeds or imported genetics.

****Conservation alignment****: cattle are confined to the ****community zone**** and designated forest-edge clearings only; tethering prevents encroachment into core conservation areas.

3. The Phnom Samkos Environment — Challenges & Adaptations

3.1 Sanctuary Overview

The Phnom Samkos Wildlife Sanctuary sits in the northwestern Cardamom Mountains, covering 3,307 km² of mountainous jungle bordering Thailand. The landscape is dominated by three major peaks — Phnom Samkos (1,717 m), Phnom Khmaoch (1,496 m), and Phnom Tumpor (1,250 m) — with terrain ranging from steep forested ridges to narrow river valleys. Mean annual rainfall is **3,000–4,000 mm**, with

a rainy season from May to October and a short, relatively dry period from November to April. Temperatures average **29–32°C** year-round. The sanctuary is home to approximately 30,000 people who rely on subsistence agriculture, cattle raising, and non-timber forest product (NTFP) collection.

The sanctuary is zoned into four management areas:

Zone	Purpose	Livestock Access
Core zone	Strict protection, research only	**No access**
Conservation zone	Small-scale NTFP collection	**No grazing**
Sustainable use zone	NTFP, fuelwood, ecotourism, agroforestry	Limited, supervised
Community zone	Agriculture, livestock, subsistence use	**Primary grazing / browsing area**

3.2 Jungle-Specific Challenges

Challenge	Impact on Cattle Production	Mitigation Strategy
Dense canopy & limited open pasture	Natural grassland is scarce; traditional grazing models fail	Cattle are **browsers** , not just grazers — they eat bamboo leaves, ficus, shrubs, and liana from forest edges; tethered grazing in clearings; cut-and-carry from forest margins
Steep, rugged terrain	Difficult herding; risk of injury on slopes	Small-framed, sure-footed indigenous cattle; **tethering** rather than herding on slopes; grazing limited to gentler ridges and valley bottoms in the community zone
High rainfall & humidity	Elevated parasite load (ticks, liver fluke); foot rot; rapid shelter decay	Brahman/Zebu genetics (dense sweat glands, tick resistance); elevated pole shelters; dry-season mineral supplementation; basic foot care
Short dry season forage crunch	November–April: natural grasses dry back; stream levels drop	Dry-season cut-and-carry of standing hay from forest edges; rice straw and crop-residue feeding; tethering near water sources
Wildlife conflict	Asian elephants, sun bears, clouded leopards, dhole in the area; snares set for wildlife can injure cattle	Night sheltering in sturdy bamboo pens; tethering prevents wandering into snare lines; community patrol coordination with sanctuary rangers
Poor soil fertility	Core zone is 100% low-productivity soil; community zone is ~81% low-productivity	Cattle do not depend on planted pasture; they browse native vegetation and eat crop residues from existing subsistence plots
Remote location & poor road access	High transport costs for feed, medicine, and stock movement	Source animals **locally** within the sanctuary or adjacent districts; use local herbal remedies; bulk-procure salt/minerals at district market
Monsoon flooding	Seasonal river surges can wash out shelters and contaminate	Shelters sited on well-drained ridges above the flood line;

	water	multiple stream access points
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3.3 Why Cows Thrive Here — Jungle Adaptations

Bos indicus (Zebu) and Brahman-cross cattle are uniquely suited to the Phnom Samkos environment:

****Browsing behavior****: Unlike European breeds, Zebu-type cattle readily consume leaves, bamboo shoots, ficus, rattan tips, and shrubs. In the Cardamoms, this turns the "problem" of dense jungle into a ****feed resource****.

****Heat and humidity tolerance****: Dense sweat glands, a sleek coat, and large ears allow these cattle to thermoregulate in 29–32°C, >80% humidity conditions where other breeds would suffer.

****Tick and parasite resistance****: Thick skin and natural immunity reduce the burden of tropical ticks and tick-borne diseases (Theileria, babesiosis) endemic in the Cardamom forest.

****Low metabolic requirement****: Small-framed indigenous cows (200–280 kg) require roughly 30–40% less dry matter per day than large European breeds, making them viable on the sparse forage of low-fertility jungle soils.

****Sure-footedness****: Generations of grazing on steep slopes have selected for animals with strong hooves and balance — essential on the 10–30° slopes common in the sanctuary.

****Drought resilience****: Indigenous stock can maintain body condition on poor-quality roughage during the short dry season, provided they have access to water and salt.

****Design note****: *The Cow Bank program deliberately avoids high-input, high-yield genetics. The goal is not maximum milk or meat production — it is ****asset durability**** and ****reproductive reliability**** under jungle constraints. A 250 kg cow that calves every 18–20 months on browse and crop residues is more valuable to a Phnom Samkos family than a 500 kg cow that starves in the dry season.*

4. System Overview — Key Design Parameters

Parameter	Specification	Notes
Target breed	Indigenous Cambodian cow or Brahman × local Zebu F1 (small frame)	Sourced within Pursat, Battambang, or Koh Kong districts; no imported stock
Mature live weight	200–280 kg	Lower feed demand; adapted to steep terrain
Starter age at placement	30–42 months (proven fertile, may have first calf at foot)	Older, proven stock is cheaper and hardier than young heifers in this environment
Working land per cow	0.3–0.6 ha community-zone clearing + forest-edge browsing corridor	No dedicated pasture required; tethering on fallow swiddens and forest margins
Daily labor per cow	2.0–3.0 hours/day	Herding/tethering on slopes takes longer than flatland; cut-and-carry adds time
Gestation duration	278–283 days (≈ 9 months)	Bos indicus median; range 270–295 days
First-service conception (natural service)	65–75%	Community bull or local AI; higher than AI under remote conditions

Services per conception	1.0–1.3 (natural) / 1.3–1.8 (AI)	Budget 1.5 for planning if AI is used
Calving interval (target)	18–20 months	Realistic on jungle browse + crop-residue supplement
Age at first calving (heifer)	30–36 months	Locally raised replacements on village nutrition
Pass-on timeline	24–30 months from placement	Allows weaning, re-breeding, and pregnancy confirmation
Target mortality (calf to weaning)	< 12%	Slightly higher than flatland due to wildlife and terrain risks
Milk offtake	0.5–2 L/day (incidental)	Not a dairy program; calf gets priority

5. Animal Specification & Sourcing

5.1 Breed Profile

Recommended: Indigenous Cambodian cow (Bos indicus type) or small-frame Brahman × local Zebu F1.

****Sourcing zone:**** Pursat, Battambang, or Koh Kong provincial markets — within 50 km of the sanctuary to minimize transport stress and cost.

****Avoid:**** Large-frame Brahman purebreds, dairy crosses, or any stock requiring concentrate feeding. These animals will lose condition in the dry season and become a liability.

5.2 Sourcing Criteria

Check	Standard
Age	2.5–4 years (dentition: 6–8 permanent incisors)
Body condition score	Minimum 2.0 / 5 (ribs visible but not sunken; hip bones rounded)
Pregnancy status	Proven fertile — calf-at-foot preferred, or confirmed pregnant by local vet
Health	No chronic cough; no severe lameness; no ocular/nasal discharge; minimal external parasites
Vaccination history	FMD and HS at minimum; if unknown, vaccinate at purchase
Horn status	Polled or dehorned preferred for tethering safety and community handling
Foot condition	Strong, well-shaped hooves — critical for steep terrain
Temperament	Docile, accustomed to tethering and human handling

5.3 Ear Tags & Tracking (Nice-to-Have)

Item	Status	Cost (USD)
Plastic ear tags (numbered)	Nice-to-have; not mandatory	\$1–\$2 per tag
Passbook / village record book	**Mandatory** — low-cost, effective	\$2–\$3 per family
Basic photo ID	**Recommended** — phone photo of cow + recipient	\$0 (GSO staff phone)

GPS tracking collars	Not required; cost-prohibitive and impractical in dense canopy	N/A
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****Cost-saving note:**** At the \$400–\$600 budget, ear tags are optional. A village-level ****Cow Bank Register**** maintained by the committee (cow description, recipient name, breeding dates, calving dates) is sufficient for accountability. If external grant funding allows, plastic ear tags can be added later as a program upgrade.

6. Inputs — Annual Requirements Per Cow

6.1 Feed & Nutrition — Phnom Samkos Specific

The Phnom Samkos environment provides abundant natural forage during the wet season but requires strategic supplementation during the short dry season. Cattle in this program rely on **browsing, tethered grazing in clearings, and cut-and-carry** rather than planted pasture.

Input	Annual Quantity	Source / Notes
Forest-edge browsing (wet season)	Daily access to forest margins in community zone	Bamboo leaves, ficus, rattan tips, liana, native shrubs — **zero cost**
Tethered grazing on fallow swiddens & clearings	0.2–0.4 ha	Community-zone land rotated after rice/maize harvest; **zero cost**
Cut-and-carry natural grass	3–5 kg/day dry season (Nov–Apr)	Collected from forest edges, stream banks, and grassland patches in dry dipterocarp areas; **zero cost** (family labor)
Rice straw	200–400 kg (dry season)	From household rice plots in community zone; **zero cost**
Crop residues (maize stover, peanut haulm)	100–200 kg (post-harvest)	Seasonal availability May–June and Oct–Nov; **zero cost**
Urea-molasses block or salt lick	10–15 kg	Purchased at district market; critical on low-fertility sanctuary soils
Water	20–40 L/day	Stream, river, or spring within 200 m; **zero cost**

****Feed cost summary:**** With the exception of the salt/mineral block, ****all feed is sourced from the sanctuary environment or household crop residues****. This is the primary driver of the low \$400–\$600 unit cost. The cow is not "fed" in the conventional sense — it is ****managed to harvest jungle forage****.

6.2 Veterinary & Breeding Inputs

Input	Frequency	Annual Cost (USD est.)
FMD vaccine	Every 6 months	\$3–\$5
HS vaccine	Annual booster	\$2–\$3
Deworming (broad-spectrum)	Every 4–6 months	\$3–\$5
Tick control (pour-on or hand-picking)	As needed; wet season weekly	\$3–\$5
Salt / mineral block	Continuous	\$8–\$12
**Community bull service or local	Per breeding	\$0–\$5 (community bull often

AI**		shared gratis; AI \$3–\$5)
Emergency vet reserve	As needed	\$5–\$10
Subtotal — Veterinary / Breeding		**\$25–\$45 / year**

Cost-saving note:** Many villages in the Cardamoms already maintain a *community bull****. Leveraging existing village breeding stock eliminates AI costs entirely. If AI is used, it should be batched (5–10 cows synchronized per technician visit) to share transport costs from Pursat town.*

6.3 Infrastructure Inputs (One-Time, Per Cow Unit)

Item	Specification	Estimated Cost (USD)
Shelter / night pen	2.5 m × 2 m bamboo pole shed, thatch or palm-leaf roof, slatted or compacted earth floor, elevated on 300 mm stilts for monsoon drainage	\$25–\$40
Tethering stake + swivel + rope	Hardwood stake 1.2 m deep; 5 m nylon rope; swivel clip	\$4–\$8
Water container	20–40 L recycled plastic drum or split bamboo trough	\$2–\$5
Feed rack / manger	Bamboo construction for dry-season roughage	\$2–\$4
Subtotal — Infrastructure		**\$35–\$60**

Cost-saving note:** No fencing is required. *Tethering**** is the standard practice in the Cardamoms and costs a fraction of perimeter fencing. Bamboo and thatch are available locally at near-zero material cost — the expense is primarily family labor.*

7. Land & Housing Requirements — Phnom Samkos Context

7.1 Land Required Per Cow

System	Land per Cow	Notes
Forest-edge tethered browsing + fallow swidden grazing	0.3–0.6 ha community-zone land	No dedicated pasture; cow rotates across family fallows and forest margins
Cut-and-carry corridor	200–500 m linear forest edge	Family collects browse and grass from stream banks and clearing edges

GSO Planning Standard: budget **0.5 ha per cow** within the **community zone** only. This is typically fallow swidden land or forest-edge margin that is already under the family’s customary use. No forest clearance is required.

7.2 Shelter / Night Pen Specification

****Location:**** well-drained ridge or slope bench, above the monsoon flood line, within 50 m of the family house for security against wildlife theft

****Dimensions:**** 2.5 m (length) × 2.0 m (width) × 1.8 m (ridge height)

****Structure:**** locally harvested bamboo poles; palm-leaf or thatch roof; no tin required

****Floor:**** compacted earth with 50 mm sand layer, or slatted bamboo 150 mm above ground for drainage and dung fall-through

****Stilts:**** 300 mm elevation on hardwood posts to prevent monsoon flooding and snake entry

****Yard:**** optional 3 m × 3 m bamboo-fenced yard for calf exercise and daytime shade

****Why this matters:**** *In Phnom Samkos, a simple bamboo pen is sufficient because the cow spends most of the day ****tethered in shade**** or ****browsing forest edges****. The pen is primarily for night security (predators, theft) and monsoon shelter. A \$25 bamboo pen is functionally equivalent to a \$100 tin-roof shed in this climate.*

8. Time & Labor Budget

8.1 Daily Hours Per Cow — Phnom Samkos Reality

Labor data from NW Cambodia (Samlout and Sala Krau districts, adjacent to the Cardamoms) shows the following typical labor profile for smallholder cattle:

Activity	Hours per Day	Frequency	Notes
Tethering / moving to browsing spot	0.3–0.5	Daily	Morning: move cow to forest-edge clearing; evening: return to pen
Cut-and-carry (wet season — minimal)	0–0.5	Daily	Only if tether spot is depleted; often unnecessary in wet season
Cut-and-carry (dry season)	1.0–1.5	Daily	Collect grass and browse from forest margins; peak labor Nov–Feb
Watering	0.2–0.3	Daily	Stream or spring within 200 m; may involve carrying water in dry months
Pen cleaning / dung collection	0.2	Daily	Dung collected for rice-field fertilizer or biogas
Feeding supplements / salt	0.1	Daily	Break mineral block into pen
Health check / tick removal	0.1	Daily	Visual scan; hand-pick ticks if pour-on unavailable
Herding (if communal grazing used)	2.0–3.5	Seasonal (Dec–Jan only)	Only during post-harvest communal grazing on rice stubble
Total daily labor per cow	**1.5–2.5 hrs** (wet season) / **2.5–3.5 hrs** (dry season)		

****Labor synergy:**** *The dry-season cut-and-carry peak overlaps with the ****aquaponics tank maintenance low season**** (rainy season is when the aquaponics system is most productive). Families can reallocate labor seasonally between the two GSO assets.*

8.2 Seasonal Labor Calendar

Month	Season	Cattle Tasks	Labor Intensity
May–Oct	Wet season	Minimal cut-and-carry; abundant forest browse; tick control intensifies; calving common	Low–Moderate
Nov–Feb	Cool dry	Daily cut-and-carry; rice straw feeding; watch for weight loss; breeding season	**High**
Mar–Apr	Hot dry	Water carrying; seek shade early; mineral supplementation critical; foot care	Moderate–High

9. Reproduction & Breeding Protocol

9.1 Gestation Duration

Parameter	Value
Median gestation length	**278 days** (range 270–295 days for <i>Bos indicus</i>)
Heifers (first calf)	Often 2–4 days longer
Seasonal pattern	Calving concentrated in wet season (May–Aug) when forage is abundant

9.2 Pregnancy Success Rates — Natural Service in Jungle Conditions

Metric	Target	Conservative	Notes
First-service conception (community bull)	65–75%	60%	Natural service avoids AI transport costs and technician dependency
Overall conception after 2 services	90–95%	85%	Community bull typically runs with 10–15 cows
Services per conception (natural)	1.0–1.3	1.5	Budget 1.5 for planning
Abortion / early loss	5–10%	12%	Higher in mineral-deficient or parasite-burdened cows
Calving rate	88–93%	85%	Accounts for late abortion and stillbirth

****Breeding recommendation:**** ****Community bull sharing**** is the default model. Most Cardamom villages already maintain 1–2 bulls. GSO should map existing bulls, verify health/vaccination status, and establish a ****breeding roster**** rather than importing AI services. If AI is desired for genetic improvement, batch 5–10 cows for a single technician visit from Pursat to share transport costs.

9.3 Calving Interval Targets

Nutrition Level	Achievable Calving Interval
Poor (browse only, no mineral)**	20–24 months
Moderate (browse + crop residue + salt block)	18–20 months
Good (browse + crop residue + strategic dry-season supplement)	15–17 months

GSO Program Target: 18–20 months — achievable with a salt/mineral block and basic dry-season roughage.

9.4 Replacement Heifer Timeline

Milestone	Age	Action
Birth	0 mo	Weigh; navel dip; ensure colostrum within 2 hrs; shelter calf at night
Weaning	6–8 mo	Separate from dam; tether on lush forest margin
Puberty	20–26 mo	First estrus; begin monitoring (Zebu puberty earlier than European breeds)
First breeding	26–32 mo	Expose to community bull or AI
First calving	34–40 mo	Monitor closely; assist if needed
Pass-On Transfer	**42–50 mo**	Heifer confirmed pregnant; transferred to Recipient Family B

10. Project Data Per Cow — 5-Year Model

Year	Event	Calf Born	Offspring Retained	Pass-On Event	Cumulative Calves for Family A	Notes
0	Cow placed (proven fertile, 36 mo old)	—	—	—	—	GSO investment: cow + basic inputs
1	First calving (Month 4–8)	1	0	—	0	Calf = Pass-On Heifer (if female)
2	Second calving; Pass-On Heifer weaned & bred	1	0	**Heifer passed to Family B**	0	Family A now "debt-free"
3	Third calving	1	1	—	1	Family A keeps calf
4	Fourth calving	1	1	—	2	Male calf can be sold for \$150–\$250
5	Fifth calving; cow culled or retained	1	1	—	3	Cow culled at 8–9 years if fertility drops; sold

						for \$200–\$300
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10.1 Biological Summary Per Starter Cow (5 Years)

Output	Quantity
Total calvings	4–5
Total live calves weaned	3–4 (assuming 10–15% mortality)
Pass-on heifers produced	1 (mandatory first female)
Calves retained by Family A	2–3
Calves sold / consumed by Family A	1–2

10.2 Estimated Economic Flow Per Starter Cow (USD)

Item	Cost / Revenue (5-yr total)
Initial asset value (cow)	\$280–\$400
Initial inputs (vet, transport)	\$30–\$50
Annual operating cost (vet, minerals, bull fee)	\$25–\$45/yr × 5 = \$125–\$225
Infrastructure (bamboo pen, tether, trough)	\$35–\$60 (one-time)
Total 5-year program cost	**\$470–\$735**
Value of 2–3 retained calves (sold at 20–24 mo, 180–220 kg)	\$300–\$600
Value of draft power / manure for swidden fields	\$100–\$200
Value of incidental milk	\$50–\$100
Carcass value of culled cow (Year 5)	\$200–\$300
Total 5-year household benefit	**\$650–\$1,200**
Net position at Year 5	Family A owns a mature cow + 1–2 young stock; net positive

***Important:** The Cow Bank is an **asset-building and resilience program**, not a rapid income generator. The jungle environment means slower growth rates than flatland systems, but also **lower input costs**. The family's primary return is a self-replicating herd, organic fertilizer for swidden rice, draft power, and an emergency liquidity asset.*

11. Implementation Phasing — Phnom Samkos

A single Cow Bank cohort (10–15 starter cows) can be rolled out over **4 months**, with GSO field staff providing support for the first 18 months.

Phase	Scope of Work	Duration	Responsible
Phase 0 — Site Selection & Community Agreement	Identify village in community zone; establish Cow Bank Committee; sign MOU; assess existing cattle and community bull availability; map forest-edge browsing areas.	2–3 weeks	GSO + Village Committee
**Phase 1 — Recipient	1-day workshop:	2–3 days	GSO Field Team

Training**	tethering techniques, jungle browsing management, dry-season feeding, record keeping, pass-on contract.		
Phase 2 — Animal Procurement	Source cows from Pursat or Battambang market (within 50 km); veterinary inspection; transport by truck or motorbike trailer; placement.	1–2 weeks	GSO + Local Trader
Phase 3 — Infrastructure	Families build bamboo night pen and tethering point using local materials; GSO provides salt block and rope only.	3–5 days	Families (labor) + GSO (materials)
Phase 4 — Breeding Linkage	Connect recipient family to community bull or arrange batch AI from Pursat; establish breeding calendar.	Ongoing	Village Committee
Phase 5 — Calving & Pass-On	GSO assists first calving; monitor heifer growth; at ~20–24 months, confirm pregnancy and arrange pass-on to Family B.	Month 18–24	Community Committee + GSO
Phase 6 — Monitoring & Exit	Quarterly visits reduce to bi-annual; committee manages queue; GSO shifts to advisory and breeding linkage only.	Months 24–36	GSO (advisory)

12. Bill of Materials & Cost Summary — Per Starter Cow Unit

Category	Item	Qty	Unit Cost (USD)	Total (USD)
A. Animal Asset	Proven fertile indigenous cow / small Brahman-cross (220–280 kg)	1	\$280–\$400	**\$280–\$400**
B. Initial Veterinary	FMD + HS vaccination; deworming; tick treatment; pregnancy check	1 set	\$20–\$35	**\$20–\$35**
C. Transport	Shared truck / motorbike trailer from district market	1 share	\$15–\$25	**\$15–\$25**
D. Infrastructure	Bamboo night pen (family labor); tether stake + 5m	1 set	\$35–\$60	**\$35–\$60**

	rope; plastic drum trough; bamboo manger			
E. Initial Inputs	Salt / mineral block (2×); rope backup; navel dip iodine	1 set	\$10–\$18	**\$10–\$18**
F. 12-Month Operating Reserve	Deworming × 2; tick control; salt blocks; community bull fee; emergency vet	1 yr	\$25–\$45	**\$25–\$45**
G. GSO Field Support	Staff time, transport, training (amortized per cow, 10-cow cohort)	1 share	\$15–\$25	**\$15–\$25**
			TOTAL	**\$400–\$608**

Target: USD \$400–\$600 per starter cow unit.

12.1 Cost Reduction Strategies

Strategy	Saving
Source locally (Pursat/Battambang market, not Phnom Penh)	\$50–\$100 vs. imported stock
Tethering instead of fencing	\$30–\$80 vs. perimeter fence
Bamboo / thatch shelter vs. tin roof	\$30–\$50 vs. tin-roofed shed
Community bull vs. AI	\$10–\$20/year vs. individual AI services
Ear tags optional	\$1–\$2 saved (use village register instead)
Family labor for all construction	\$40–\$60 saved vs. hired labor
Feed from jungle / crop residues	\$40–\$80/year saved vs. purchased concentrate

13. Operations & Maintenance (Community-Level)

13.1 Routine Checks

Frequency	Task
Daily	Move tether to fresh browsing spot; water check; visual health scan; tick check on legs and udder; dung removal from pen
Weekly	Inspect tether rope for wear; check mineral block; observe cow for estrus signs if due
Monthly	Record entry (weight estimate, body condition, any illness); inspect bamboo pen for monsoon damage
Quarterly	Deworming; thorough tick treatment; review with village committee
Annually	FMD + HS booster; pen repair or rebuild; committee review of pass-on queue

13.2 Record Keeping (Minimum Data)

Each recipient family maintains a simple **Cow Bank Passbook** (paper, \$2–\$3):

1. Cow description (color, markings, horn status) + photo
2. Date of placement
3. Breeding dates and bull used
4. Calving date, calf sex, birth weight estimate
5. Vaccination and deworming log
6. Pass-on transfer date and recipient name
7. Death / sale / cull events with reason

****Ear tags:**** *If funding allows, numbered plastic ear tags (\$1–\$2) can be added as a program upgrade. They are ****not required**** for program integrity.*

13.3 Risk Mitigation — Phnom Samkos Specific

Risk	Mitigation
Theft	Night pen near family house; village watch; community committee tracking
Elephant crop-raiding / conflict	Tether cow away from elephant corridors (identified with sanctuary rangers); do not graze in known elephant paths
Snare injury	Tethering prevents wandering into snare lines; coordinate with ranger patrols to remove snares from community-zone edges
Dry-season feed shortage	Pre-position rice straw; identify 2–3 backup stream-bank grass patches; early weaning protocol if cow loses condition
Disease outbreak (FMD)	Strict 6-month vaccination; movement control; immediate isolation and reporting to district vet
Monsoon shelter failure	Bamboo pens are cheap and quick to rebuild; site on well-drained ridge; inspect before monsoon
Prolonged infertility	Cull protocol after 3 failed services; replace from local market if GSO funds allow
Calf mortality (predation)	Night pen for calf; tether cow and calf together for first 3 months; monitor for dhole or leopard signs

14. Alignment with GSO Mission & Sanctuary Conservation

The Cow Bank program is designed to **reduce pressure on the sanctuary's core forest** while improving household resilience:

****Alternative to forest clearance:**** A productive cow provides income and manure that reduces the need to clear additional forest for swidden agriculture. The program explicitly targets ****existing community-zone fallows****, not primary forest.

****Manure → soil fertility:**** Cattle dung is composted and applied to low-productivity swidden rice plots, improving yields without chemical fertilizer and reducing the swidden cycle length (less forest cleared).

****NTFP complementarity:**** Cattle browsing time overlaps with NTFP collection (rattan, resin, wild vegetables), allowing families to diversify income without increasing labor hours.

****Wildlife coexistence:**** Tethering and night pens prevent cattle from wandering into core zones or snare lines. The program ****rewards**** families who report snares or illegal logging to sanctuary rangers.

****Climate resilience:**** Livestock provide a liquid asset (saleable calf) during drought or crop-failure years — a critical buffer in a sanctuary where 81% of community-zone soil is low productivity.

****Gender equity:**** Women manage tethering, feeding, and record-keeping; the Cow Bank Committee mandate for female representation ensures women control the asset queue.

15. Revision & Contact

This is a planning-stage proposal (Rev. 2.0) tailored for the Phnom Samkos Wildlife Sanctuary context. Animal prices, community bull availability, and dry-season forage conditions should be validated on the ground in Pursat or Battambang province before pilot deployment. The \$400–\$600 cost target reflects real smallholder economics in the Cardamom Mountains and should be treated as a ceiling, not a floor.

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