

What the evidence supports: a just transition in Ghana's gold sector

Evidence cutoff: 2 October 2026

Status: cross-study synthesis for review before designing the meta-analysis methodology.

Executive answer

No single measure in the reviewed evidence constitutes a just transition. Bans can remove income without eliminating mining; licensing can legitimise and concentrate access without improving conduct; technology can reduce one exposure while expanding production or displacing women's work; alternative-livelihood projects can fail when they do not replace mining's cash, credit, land and market functions; and formal purchasing can redirect gold without changing how it was produced.

The most defensible package to test is therefore sequenced: define non-negotiable environmental limits; map who controls land, labour, finance and gold; protect income and rights before restrictions; offer several viable pathways including safer mining, diversification, restoration work and voluntary exit; make licensing and compliance attainable; bind buyers and financiers to verified corrective support; target enforcement at powerful organisers as well as mine sites; guarantee remedy for affected non-miners; and monitor displacement across districts and borders.

That package is a research-supported working proposition, not a demonstrated Ghanaian effect. No retained study evaluates the complete package against environmental harm, livelihood security, distribution and displacement simultaneously.

How to read the result

The synthesis keeps three outcomes separate: less harmful mining, less mining in absolute terms, and a secure exit from mining. It also distinguishes relatively strong evidence from plausible mechanisms and from propositions that remain untested. The complete underlying extraction record is in [01 — Complete research extractions](#).

Full cross-measure synthesis

Review stage: cross-study conclusions for discussion before the meta-analysis methodology is designed.

Question: Which measures might reduce gold-mining harm while expanding people's real options, and which may instead remove livelihoods, redistribute harm or concentrate gains?

1. Overall conclusion

The evidence does **not** support a single intervention—ban, licence, alternative-livelihood project, cleaner technology, certification, traceability or public buyer—as a just transition on its own. Each addresses only part of the system, and several can make conditions worse when implemented alone.

The most defensible working proposition is a **sequenced package**: protect income and rights before imposing restrictions; create alternatives that reproduce the cash, credit, land access, buyers and risk protection that mining supplies; make legal participation attainable; finance and monitor safer practice

where mining can continue; protect no-go areas through enforcement directed principally at organisers, financiers and equipment networks; provide restoration work and remedy to affected non-miners; and monitor displacement across districts and borders.

This is a mechanism-based conclusion, not evidence that such a complete package has already succeeded in Ghana. No retained study evaluates that package, at scale, against both livelihood and environmental outcomes.

2. Three outcomes that must not be conflated

1. **Less harmful mining:** lower mercury exposure, safer work, controlled tailings, less land and water damage per unit of gold.
2. **Less mining:** a smaller absolute footprint or lower extraction in places where mining is incompatible with water, farming or community rights.
3. **A secure exit from mining:** people can stop mining without losing basic income, food, land, housing, credit or bargaining power.

Formalisation, technology and purchasing may help with the first outcome but do not necessarily deliver the second or third. Higher recovery, machinery, credit or assured purchasing can increase extraction. A ban may reduce visible activity locally but fail on the other two outcomes if work and damage move or households absorb the loss.

3. Ghana livelihood spine: the three questions in Adranyi et al. (2023)

These questions improve the synthesis because they ask about change, mixed livelihood portfolios and unequal trajectories rather than treating “mining” and “farming” as mutually exclusive occupations. The answers below are evidence-bound to three deliberately selected ASGM frontier communities in Afiya West; they are not national estimates.

Q1. What household livelihood portfolios existed before and after the rise of ASGM, and what influenced change?

Before ASGM expanded from about 2010, oral histories and focus groups described portfolios centred on cocoa and arable farming, livestock, fishing and forest resources, with some trade, craft work and migration to towns. During the 2000s, cocoa support, roads, electricity and telecommunications widened some options. After ASGM's rise, agriculture remained important, but mining, agricultural trade and services such as transport, food, rentals, repairs and construction became more prominent. Among surveyed households that mined, ASGM supplied a reported average 76% of household income; participation still varied sharply across the three communities (13%, 17% and 34%).

Change was shaped by more than expected gold income. The study identifies age and working capacity; education and health; land tenure; access to finance, machinery and networks; roads, electricity and communications; farm prices and input costs; rainfall variability; gold demand and direct access to buyers; and mining/licensing rules. Landowners could lease land or mine directly, while tenants could lose farms when owners accepted mining. This is why the same gold rush expanded some people's choices and narrowed others'. ([Complete study](#), especially Tables 3–4 and sections 3.1–3.1.2.)

Q2. What were the livelihood impacts of ASGM's emergence?

The study identifies both gains and losses. Reported gains included frequent cash, jobs, business demand, asset accumulation, finance for health and schooling, and funds that could support farming. Reported losses included damaged farms and roads, polluted water, unreclaimed pits, declining fishing

and forest-resource use, higher food prices, labour moving away from farming and unequal compensation. Mining often supplemented or financed agriculture rather than replacing it; some households kept farming for food, identity and protection against mining shocks.

These are heterogeneous local pathways, not an average treatment effect. The environmental observations were transect-based rather than laboratory measurements, income was self-reported, and the 2021 cross-section retrospectively reconstructed change as far back as 1992. The design cannot isolate ASGM from concurrent infrastructure, market, climate or policy changes.

Q3. What opportunities and barriers shaped different livelihood trajectories?

The authors construct three groups. **Consolidating households** already had more land, capital, businesses, skills, influence and networks; they could operate mining, lease land, supply equipment or diversify and accumulate further assets. **Fluctuating households** gained mining or service income and sometimes acquired houses or motorcycles, but limited credit and exposure to site closure or movement made those gains unstable. **Marginalised households**—including land-poor households, some women-headed households, tenants and migrants with weak networks—faced insecure tenure, degraded resources, restricted site access, weak compensation, costly licensing and little credit. Some entered casual mining because farming options had already deteriorated.

The key conclusion is relational: ASGM did not place everyone on the same ladder. Pre-existing assets and power determined access to opportunity, while mining itself could erode the land and resources on which less powerful households depended. However, the groups are analytical classifications built from 12 livelihood indicators and compared using related indicators; they should not be treated as fixed social classes or causal proof that mining produced each trajectory.

4. What the evidence says about each measure

Measure	How it might help	How it can cause harm when used alone	Groups most exposed	Evidence judgment
Blanket bans and criminal enforcement	Can stop activity in a bounded place when enforcement is credible; prohibitions remain necessary in ecologically or socially incompatible areas.	Immediate loss of frequent cash, debt and family strain; concealment, bribery, dangerous work or movement to another place or commodity; selective policing; violence where armed actors and substitute minerals are present. Arrests or a local fall do not prove a net reduction.	Wage workers, women in informal roles, migrants, indebted households and communities receiving displaced activity.	Ghana interviews document hardship and coping among 58 selected former young miners but cannot estimate the ban's net effect (Osei et al.). A Colombian quasi-experiment found very small cultivation reduction relative to spraying intensity (Mejía et al.). A DRC panel study found a bundled mining ban/buyer response redistributed violence towards gold areas, but the conflict setting sharply limits transfer to Ghana (Stoop et al.).

Measure	How it might help	How it can cause harm when used alone	Groups most exposed	Evidence judgment
Agricultural and alternative-livelihood support	Could make exit or diversification credible if it provides timely income, affordable credit, secure land, buyers, acceptable risk and work at the scale mining households need. A portfolio may fit better than one replacement occupation.	Standard crop, poultry or training packages can pay too little or too late, reach few people, lack markets, or target “communities” without reaching miners. Inputs can finance mining or increase harmful production. Land-intensive alternatives can displace tenants and sharecroppers. Improved farming may coexist with mining rather than replace it.	Land-poor farmers, tenants, workers without assets, women whose work and care constraints are ignored, and people needing daily or weekly cash.	Ghanaian qualitative evidence identifies poor fit, delayed returns, small reach and weak participation, but is not an impact evaluation (Hilson & Banchirigah). Afghanistan's long-run evidence shows why replacing a crop without replacing its credit, labour, land and risk functions can fail or displace land-poor workers; its synthesis is not a pooled evaluation (Mansfield).
Licensing and formalisation	Can make operations visible to regulators, create more secure tenure, enable investment in safety and environmental staff, and improve wages, insurance and work schedules when an organisation has capital and professional capacity.	High cost, delay and unsuitable land can exclude smaller operators. A licence can concentrate rights in landowners, politically connected operators or male cooperative leaders while workers remain informal underneath it. Credit and machinery obtained after titling can accelerate extraction. Formal status can coexist with unauthorised conduct and environmental damage.	Poorer operators, workers rather than owners, customary users, women, tenants and people outside authorised corridors.	Ghana studies consistently identify access and legitimacy barriers but do not estimate effects (Kumah; Adu-Baffour et al.). One selected Peruvian cooperative showed credible process improvements but no measured pollution reduction or comparison group (Martinez et al.). Peruvian spatial evidence shows zoning and provisional titles did not ensure containment and were associated with expansion mechanisms (Álvarez-Berrios et al.).
Cooperatives, savings and lawful finance	Can pool compliance services, improve bargaining, replace predatory advances, finance safety and give members access to savings or working capital.	Leadership may capture prices and profits; membership can exclude women, migrants and casual workers. Finance may purchase machinery that expands extraction rather than improves practice. Removing informal traders without replacing their credit, supplies and proximity pushes gold back into informal channels.	Non-members, wage and casual workers, women in ancillary roles, informal traders and indebted miners.	The DRC Just Gold project provides rich implementation evidence: transparent prices, nearby buyers and savings groups helped, but leaders withheld gains, informal finance caused leakage and donor subsidy remained essential; there is no counterfactual impact estimate (IMPACT).
Cleaner technology and occupational-health measures	Correctly used retorts, gravity methods, protective equipment, water recirculation and tailings systems can reduce particular exposures and improve safety.	Equipment can be unaffordable, abandoned, badly maintained or incorrectly used. Mercury may be replaced by unmanaged cyanide. Mechanisation can remove women's processing work. Better recovery can make mining more profitable and expand extraction unless absolute environmental limits also apply.	Processing workers, women displaced by machinery, workers' families and downstream communities exposed to substituted toxins.	A systematic review found only ten eligible occupational-health interventions and no demonstrated human-health benefit across the technology studies (Tsang et al.). An independent GEF evaluation found equipment abandonment, maintenance failures and toxin substitution as well as some sustained improvements (GEF IEQ). A two-run Bolivian demonstration establishes feasibility, not sustained adoption (Appel et al.).

Measure	How it might help	How it can cause harm when used alone	Groups most exposed	Evidence judgment
Conditional environmental payments and restoration employment	Paying people for verified conservation, restoration or a temporary pause could replace income while tying public support to observable environmental results. Restoration work could provide a bridge out of extraction.	Payments routed only through titled owners can exclude users and tenants and restrict poorer people's access to land or resources. Behaviour may resume when payments end. Temporary or underfunded jobs can postpone rather than secure transition, and payment can entrench contested rights.	Tenants, neighbouring resource users, landless workers, women without title and future land users.	In a 121-village Ugandan randomised trial, two years of payments roughly halved short-run forest loss, but only 32% of eligible owners enrolled and poorer neighbours may have lost firewood access (Jayachandran et al.). Randomised follow-up found rapid clearing resumed after payment, although the forest-cover gap persisted (World Bank follow-up). This is strong evidence for the payment mechanism, not a tested Ghana mining intervention. No retained study evaluates durable restoration employment for exiting miners.
Public buying, traceability and certification	Competitive prices, prompt cash and nearby buyers can redirect sales; mine-level records can make some transactions inspectable; purchasing commitments and compliance finance could reward improvement.	Official purchase can formalise a transaction without changing extraction. Uncompetitive prices or delays cause diversion. Documentation costs can exclude the least-resourced, while "clean" buyers withdraw and gold moves to less accountable channels. Closed chains can remove traders who supply credit. Cooperative leaders can retain the premium.	Unlicensed and remote producers, women and workers without organisational power, informal traders, and communities absent from certification audits.	Ethiopia provides associational evidence that incentives alter official deliveries, not mining practice (Molla & Gebrewolde). DRC traceability pilots show low coverage and heavy support needs (BGR; IMPACT). The only retained Fairmined comparison found a small well-being association that became non-significant after full adjustment and did not measure pollution or excluded producers (Uribe Martínez et al.).
Buyer, refiner and financier accountability	Moves responsibility and compliance cost upstream from vulnerable producers to actors with greater leverage; can reduce the marketability and finance of destructive gold. Corrective engagement and pre-finance can make improvement possible.	If the response is buyer exit rather than remediation, production may continue through different buyers, routes or commodities. Due-diligence costs passed down to miners can cause exclusion. Liability without credible origin systems can reward paperwork rather than conduct.	Small producers unable to pre-finance compliance, workers in abandoned supply chains and communities in destination areas.	Brazil's difference-in-differences study links a rule weakening first-buyer checks to more mining-related deforestation and about 11 additional homicides per 100,000 in more-exposed municipalities; exposure is a geological/spatial proxy rather than observed transactions, so the purchasing mechanism remains indirect (Pereira & Pucci). Bolivian evidence shows slower payment and weak custody can redirect trade and launder origins, but it is interview-based institutional analysis (Brugger et al.).

Measure	How it might help	How it can cause harm when used alone	Groups most exposed	Evidence judgment
Land-use limits and community rights	No-go zones, watershed limits, consent, restoration liability and community monitoring can protect people who receive damage but little mining income.	Zoning without livelihoods, tenure resolution and landscape monitoring can concentrate mining inside a corridor while hotspots expand outside it. Compensation channelled through owners or customary authorities can exclude tenants, women and downstream users.	Neighbouring and downstream communities, Indigenous/customary users, tenants, women and future users of damaged land.	Peruvian spatial analysis provides strong evidence on incomplete containment but not household welfare (Álvarez-Berrios et al.). Ghanaian land and livelihood studies document unequal access and unreclaimed land but do not evaluate community-rights interventions (Adranyi et al. 2023 ; Adranyi et al. 2024).
Regional coordination	Coordinated taxes, customs intelligence, mine-origin information, equipment and financial investigation, environmental monitoring and migrant protection could reduce arbitrage and displacement across borders.	Harmonising restrictions without harmonising support and rights could regionalise exclusion. Customs coordination may change routes without changing extraction. A regional system can also concentrate power in opaque enforcement institutions.	Cross-border miners and traders, migrants, border communities and countries with weaker enforcement capacity.	West African studies document pre-existing miner mobility, tax-driven trade diversion and large trade discrepancies, but no retained study evaluates an ECOWAS intervention (OECD ; Bolay). Regional coordination is therefore a well-founded hypothesis, not a demonstrated solution.

5. Gender and other unequal effects

The clearest gender conclusion is not simply that women are “vulnerable.” It is that reform is usually channelled through assets and institutions—land title, mining licence, equipment, teams and cooperatives—that men are more likely to control.

Across six mine areas covering gold and 3T minerals in DRC, Rwanda and Uganda, a mixed-method study surveyed 878 people, deliberately over-represented women, ran 60 focus groups and collected 28 life histories. Women were concentrated in carrying, grinding, washing and service work; 14% of women versus 64% of men reported digging, and almost no licence holders were women. Women reported lower mine-site earnings, yet mining paid substantially more than their non-mining work in Rwanda and Uganda. This means abrupt exclusion can harm women even when their mining roles are low-paid, while licence- or cooperative-centred support can bypass them. The income figures were self-reported and highly dispersed, and the study describes likely formalisation mechanisms rather than evaluating a reform ([Buss et al.](#)).

The DRC Just Gold programme also observed mechanisation displacing women from processing before creating women-only teams and assigning adapted equipment. This is useful implementation evidence, not proof that the corrective measure restored income or power.

Ghana-specific gender evidence remains much thinner. One qualitative case reports that mechanised partnerships pushed women towards lower-value tailings work, but the small retrospective design cannot estimate prevalence or income effects ([Crawford & Botchwey](#)). Other Ghana studies include women but rarely analyse control of income, assets, exposure or policy effects by gender. That absence should be recorded as an evidence gap, not interpreted as gender neutrality.

Gender-sensitive evaluation must therefore measure, separately:

- individual—not only household—income and control over that income;
- ownership of licences, land, equipment and savings;
- paid and unpaid work time, including care;
- access to training, teams, finance and decision-making;

- exposure to mercury, dust, violence and enforcement;
- job loss caused by mechanisation or supply-chain exclusion; and
- whether women shape the intervention and can use grievance and remedy systems.

The same principle applies beyond gender. Owners cannot represent tenants; cooperative leaders cannot represent wage workers; miners cannot represent downstream communities; and household heads cannot establish intra-household distribution. Migrants, children, informal traders, neighbouring farmers, downstream residents and future land users remain major evidence gaps.

6. Ghana's current response: policy architecture versus outcome evidence

Ghana is not relying on one instrument. The current policy architecture combines enforcement, alternative livelihoods, cooperative mining, shared processing, restoration, licensing, centralised purchasing and planned traceability. The evidence problem is that official descriptions establish design and implementation status, not environmental or livelihood effect.

Measure	What is documented	What is not yet established by the retained evidence
2017–2018 ASM ban and security operations	The ban interrupted work for the selected young miners interviewed by Osei et al.; participants described income loss, debt, family strain and coping.	Net environmental change; national livelihood incidence; displacement; distribution of enforcement; or whether harms returned after the ban.
NAELP (launched 25 October 2021)	The Ministry describes a five-year, six-module programme intended to create alternative livelihoods, restore degraded land and promote responsible mining for people affected by anti-illegal-mining operations (official programme page).	Independent estimates of coverage, targeting, income adequacy, sustained employment, return to mining, land/water restoration or effects by gender, tenure and mining role.
rCOMSDEP (Cabinet approval announced 4 August 2025)	The official design transitions CMS and NAELP into six linked pillars: cooperatives, mine support, skills, rehabilitation, agricultural value chains and community infrastructure, including shared mercury-free processing (official two-page release).	Whether legal land is viable; who controls cooperative membership and revenue; whether women, workers, tenants and migrants benefit; whether mercury is eliminated without rebound or toxin substitution; and measured environmental and livelihood outcomes.
GoldBod purchasing and traceability	GoldBod announced a pilot involving about 600 ASM operations in January 2026 and reported in April 2026 that procurement of a national mine-to-export traceability system was under way (pilot announcement ; procurement status).	That a national system is operational; coverage as a share of production; origin accuracy; improvement at mine level; effects on excluded producers and traders; or reduction in land, water, labour or community harm.
Licensing and permitting	Studies map cost, delay, centralisation, customary legitimacy and the legal distinction between a mineral licence and the additional permits/authorisation required to operate.	A credible causal estimate that licensing improves environmental conduct, welfare or total extraction; current evidence is mainly process mapping and licence-holder report.

The evaluation rule is simple: programme existence, participants trained, equipment distributed, licences issued and gold exported are implementation indicators. Success requires independent evidence that absolute harm fell, real options improved, gains and losses were fairly distributed, rights were respected and activity did not move elsewhere.

7. The package most consistent with the evidence

This is a **provisional architecture to test**, not a proven prescription.

1. **Define the environmental objective and protected areas first.** Measure absolute land, water, mercury and restoration outcomes—not licences, arrests or official exports as proxies.

2. **Map livelihoods and rights before restricting activity.** Separate landowners, tenants, operators, workers, financiers, traders, women in ancillary work, migrants and affected non-miners. Identify which mining functions each group actually depends on.
3. **Put protection in place before the restriction.** Provide time-limited income support, debt protection and food/basic-service continuity where work will be stopped; do not rely on promised future training.
4. **Offer several real pathways.** These can include safer mining on viable authorised land, farming support with secure land and buyers, non-farm work, paid restoration and voluntary exit. Test actual earnings, payment timing, risk and durability rather than enrolment or stated interest.
5. **Make compliance attainable and continuous.** Proportionate licensing should be paired with technical support, finance, maintenance, worker protections, transparent cooperative governance and independent environmental verification. A licence is a starting condition, not the outcome.
6. **Make purchasing conditional on verified improvement.** Public and private buyers should provide prompt competitive payment and help finance corrective action, while tracing gold to mines and reporting coverage against estimated production. They should not count withdrawal from a difficult area as harm reduction.
7. **Direct enforcement up the chain as well as at mine sites.** Prioritise organisers, abusive financiers, equipment networks, fraudulent licence holders and buyers of unverifiable gold, alongside enforceable no-go zones. Protect due process and monitor selective or gendered enforcement.
8. **Give affected non-miners rights and remedy.** Downstream and neighbouring communities need independent water and health monitoring, participation, restoration guarantees, compensation and accessible grievance routes even when they receive no mining income.
9. **Track displacement regionally.** Monitor extraction, workers, equipment, finance, trade routes, violence and environmental indicators in likely destination districts and countries. Regional cooperation should include labour and livelihood safeguards, not only customs and policing.
10. **Review and adjust the package publicly.** Continue, redesign or stop components based on joint livelihood, distributional and environmental outcomes over several years.

8. What can be concluded with what confidence

Comparatively well supported

- Mining and farming can coexist, and mining supplies unusually accessible cash; removing it is therefore not equivalent to moving a person from one occupation to another. Ghana evidence is local and descriptive, not nationally representative.
- Conditional payment can change environmentally relevant behaviour in the short run, but eligibility and resource-access effects can make it regressive. This comes from a strong cross-sector RCT, not Ghanaian mining.
- Weak first-buyer accountability can increase local environmental and violence harm. This comes from a comparatively strong Brazilian quasi-experiment.
- Formal, licence- and cooperative-centred systems can reproduce male control and exclude women from benefits. This is supported by substantial mixed-method descriptive evidence, not a reform impact evaluation.
- Technology, traceability and formal status are not self-executing: finance, incentives, maintenance, governance and monitoring determine whether they persist.

Plausible but not yet demonstrated as a Ghana package

- Income protection and viable alternatives delivered before restrictions will reduce harmful coping and resistance.
- Corrective buyer engagement with compliance finance will outperform simple exclusion.
- Targeting organisers, financiers and equipment networks will protect livelihoods better than indiscriminate worker criminalisation while still reducing harm.
- Regional coordination will reduce displacement rather than merely redirect routes.

Not established by the retained evidence

- That Ghana's 2017–2018 ban produced a net environmental gain once livelihood loss and displacement are included.
- That formalisation, certification, traceability or public purchasing reduces total mining, pollution or community harm at scale.
- That a named alternative-livelihood programme has durably enabled Ghanaian miners to exit while maintaining household welfare.
- That restoration employment, income protection or an ECOWAS package has been evaluated for this transition.
- That any available intervention distributes benefits and costs fairly across women, tenants, workers, migrants and downstream communities.

9. Implication for the next research step

The eventual synthesis should not calculate one average effect for “formalisation” or “alternative livelihoods.” It should compare intervention components by pathway and record at least four outcomes together: **absolute environmental harm, livelihood security, distribution within and between groups, and displacement over time and space**. A policy should not count as successful if it improves one of these by worsening another invisibly.