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ADULT ENVIRONMENTAL LITERACY AS A DRIVER OF SOCIO ECONOMIC DEVELOPMENT: A CONCEPTUAL REVIEW AND POLICY AGENDA

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ABSTRACT

Adult environmental literacy is increasingly recognised as a foundational capability for sustainable socio economic development in a world facing climate change, biodiversity loss, pollution, and accelerating green economic transitions. While environmental literacy has often been discussed in relation to children and formal schooling, adults shape most household, workplace, community, and policy decisions that directly affect environmental outcomes and development trajectories. This journal style conceptual review synthesises recent evidence and policy thinking on how adult environmental literacy influences development outcomes through health, livelihoods, productivity, employability, civic participation, and community resilience. It advanced a practical framework linking adult environmental literacy to socio economic development via five pathways: (1) household resource decisions, (2) workforce and enterprise transformation, (3) public health and risk reduction, (4) civic engagement and governance, and (5) innovation and social learning. The article also discusses measurement challenges, equity considerations for marginalised groups, and implementation strategies including community based learning, workplace training, and digital inclusion. It concluded with policy recommendations for governments, employers, civil society and adult learning systems to embed environmental literacy in lifelong learning and skills policies, with emphasis on inclusion, relevance to local livelihoods, and alignment with green transition labour market needs.

Keywords: adult learning, environmental literacy, green skills, lifelong learning, socio economic development, climate change education, sustainability, community resilience.

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INTRODUCTION

Socio economic development is shaped not only by capital, infrastructure, and governance, but also by the capabilities people possess to make informed decisions in complex environments. In the twenty first century, environmental conditions are no longer a background variable in

development. They are central drivers of health burdens, food security, productivity, disaster risk, migration, and inequality. The scale of environmental challenges means that development planning increasingly depends on how populations understand environmental risks, interpret information, and act individually and collectively. These capabilities are captured by the concept of environmental literacy.

Environmental literacy is commonly framed as a mix of knowledge, attitudes, skills, and behaviours that enable individuals to understand environmental systems, evaluate information, and participate in solutions. Adult environmental literacy matters because adults make most decisions affecting consumption, waste, energy use, land management, and political accountability. Adults also occupy roles as workers, employers, community leaders, consumers, voters, and parents. Yet environmental learning initiatives often prioritise schools, leaving adult populations with limited structured opportunities to acquire relevant environmental competencies.

At the same time, labour markets are shifting due to the green transition and the reorganisation of economies around decarbonisation, resilience, and resource efficiency. Skills systems are under pressure to anticipate new occupational requirements, to re skill displaced workers, and to expand adult learning access, particularly for vulnerable groups. Recent OECD work highlights the importance of identifying and developing skills that enable the green transition and designing policies that improve adult learning participation and reduce barriers such as cost, time, and lack of information (OECD, 2023a; OECD, 2025). These pressures create a clear development rationale for strengthening adult environmental literacy.

This article asks a development focused question: How does adult environmental literacy contribute to socio economic development, and what policy and programme approaches can scale its impact? It presents a conceptual review drawing on recent international reports and selected peer reviewed literature. It contributes by (1) linking adult environmental literacy explicitly to development pathways, (2) integrating green skills and adult learning participation evidence, and (3) offering a practical policy agenda grounded in inclusion and measurable outcomes.

CONCEPTUALISING ADULT ENVIRONMENTAL LITERACY IN DEVELOPMENT CONTEXTS

Environmental literacy has multiple definitions across education, psychology, and environmental management. For development purposes, it is useful to treat adult environmental literacy as a capability set with four interacting components:

- Environmental knowledge and understanding: awareness of environmental processes (water, energy, waste, ecosystems) and human impacts.
- Cognitive and information skills: ability to access, interpret, and evaluate environmental information, including misinformation and risk communication.
- Practical action competence: skills to adopt environmentally sound practices at household, workplace, and community levels, including adaptation behaviours.
- Civic and ethical orientation: willingness and capacity to participate in collective action, demand accountability, and support fair transitions.

Adult environmental literacy overlaps with climate literacy, sustainability literacy, risk literacy, and green skills. Its distinctive feature is that it emphasises decision making in adult life roles, including work and livelihoods.

Adult learning systems provide a major platform for building these capabilities. UNESCO frames adult learning and education as central to social, economic, and civic life across the lifespan, including for addressing complex challenges such as climate change (UNESCO, 2023). Adult education research also links literacy policy and provision to broader sustainable development goals, including equity and participation (Boeren et al., 2025). This signals that environmental literacy can be embedded within adult literacy programmes, vocational education, community learning, and workplace training rather than treated as a stand-alone topic.

METHOD AND SCOPE

This is a conceptual review rather than an empirical impact evaluation. It synthesises recent international policy reports and peer reviewed studies to propose a development oriented framework. Key sources include UNESCO's global reporting on adult learning and education (UNESCO, 2023), OECD analyses of green transition skills and adult learning participation (OECD, 2023a; OECD, 2023b; OECD, 2025), the UN World Social Report on contemporary development challenges (UN DESA, 2024), and education and climate change synthesis materials used in international learning policy contexts (UN CC:Learn, 2023). Complementary journal sources are included to ground arguments in adult literacy and development scholarship (Boeren et al., 2025). The aim is to provide a coherent causal logic and policy implications rather than to estimate effect sizes.

PATHWAYS LINKING ADULT ENVIRONMENTAL LITERACY TO SOCIO ECONOMIC DEVELOPMENT

Adult environmental literacy contributes to development through multiple pathways that operate at household, enterprise, community, and national levels. Five pathways are especially salient:

Household resource decisions and poverty dynamics

Households make daily decisions on energy use, cooking fuels, waste disposal, water treatment, sanitation behaviours, and purchasing choices. These decisions affect health costs, time use, and productivity. Adult environmental literacy improves the likelihood that households adopt safe water practices, reduce exposure to pollution, improve waste handling, and make cost saving energy choices. These changes can reduce illness, improve school attendance for children, and lower medical expenditures, all of which feed back into socio economic outcomes.

In many low and middle income contexts, household decisions also include land use and resource extraction, such as firewood collection, small scale agriculture, fishing practices, and informal mining. When adults understand environmental degradation and long term livelihood impacts, they are better positioned to adopt sustainable practices and diversify income sources. This connects environmental literacy to poverty reduction and resilience rather than treating it as a purely ecological objective.

Workforce employability, productivity, and the green transition

The green transition is reshaping occupational demand, requiring new competencies in construction, energy, transport, agriculture, manufacturing, and services. OECD analysis stresses that policy makers need better intelligence on the skills required in sectors with growth potential, and targeted measures to help workers transition and to increase investment in relevant skills (OECD, 2023a). Environmental literacy at adult level functions as a cross cutting foundation for these skills: it supports understanding of energy efficiency, waste minimisation, compliance, and safety standards, as well as readiness to learn technical green skills.

Adult learning participation, however, remains uneven. OECD reporting on adult learning trends highlights persistent access barriers and unequal participation across socio demographic groups, implying that green transition benefits will be unequally distributed unless adult learning systems expand and become more inclusive (OECD, 2025). From a development standpoint, this means adult environmental literacy is not only about awareness campaigns. It is also about employability and economic competitiveness, especially in contexts where youth unemployment and informality are high.

Workplace based environmental learning can raise productivity by reducing material losses, improving maintenance practices, limiting downtime from environmental incidents, and strengthening compliance with environmental and safety requirements. At sector level, these improvements can enhance investment attractiveness and market access, particularly where supply chains require sustainability standards.

Public health, risk reduction, and human capital

Environmental conditions shape disease burdens via air and water pollution, waste mismanagement, vector ecology, and heat stress. Adult environmental literacy contributes to healthier behaviours, improved household environmental management, and more effective risk responses. It also supports understanding of early warning information and disaster preparedness. As climate impacts intensify, development gains can be undermined by shocks. The UN World Social Report emphasises the evolving nature of social development challenges and the need to adapt policy responses to contemporary risks and inequality dynamics (UN DESA, 2024). Adult environmental literacy strengthens the human capability side of resilience: people who can interpret risk messages and trust credible sources are more likely to take preventive action, cooperate in community responses, and reduce losses. This links literacy directly to human capital protection.

Civic participation, accountability, and improved governance outcomes

Environmental decisions are also political decisions: zoning, enforcement, infrastructure, industrial permitting, waste management, and natural resource governance all depend on public accountability. Adults who can understand environmental impact information and participate meaningfully in local decision processes are more likely to demand transparency and fairness.

UNESCO's adult learning agenda positions adult education as supporting participation, citizenship, and community development (UNESCO, 2023). In practice, adult environmental literacy can strengthen community monitoring of pollution, reporting of illegal dumping, support for conservation, and participation in climate adaptation planning. It can also reduce conflict by

enabling shared understanding of resource constraints and tradeoffs, particularly in fragile contexts where resource competition fuels tension.

Innovation, social learning, and community level transformation

Environmental literacy is not only an individual trait. It can be a community capability built through social learning, peer networks, and local institutions. Communities that learn collectively can experiment with new practices such as climate smart agriculture, community waste enterprises, water user associations, or energy cooperatives. Adult learning approaches that are participatory can foster local innovation, especially when linked to livelihood incentives.

European adult education actors have argued that adult learning is essential for greening societies and that sustainability transitions require adult learning opportunities, not only formal schooling (EAEA, 2022). This idea generalises across contexts: when adult learning systems support shared problem solving and practical experimentation, environmental literacy becomes an engine for local development initiatives rather than a compliance exercise.

EQUITY AND INCLUSION: WHO GETS LEFT BEHIND

The development impact of adult environmental literacy depends on who can access learning opportunities and whose environmental risks are addressed. Marginalised groups often face higher exposure to pollution, climate hazards, and livelihood vulnerability, yet they face greater barriers to adult learning participation. OECD evidence highlights that disadvantaged groups tend to encounter stronger barriers to adult learning, and policies must redesign provision to improve accessibility and effectiveness (OECD, 2025). These barriers include time poverty, cost, caregiving, digital exclusion, low foundational literacy, and limited information about opportunities.

Gender is a key dimension. In many settings, women manage household energy, water, and sanitation, and therefore environmental literacy interventions that reach women can yield large health and welfare gains. However, social norms and workload can limit access. Rural populations, informal workers, displaced persons, and people with disabilities may also be systematically excluded if programmes are designed around formal institutions or online platforms without support.

Inclusion is therefore not an add on, it is central to the socio economic logic: if adult environmental literacy is concentrated among already advantaged groups, it can widen opportunity gaps in green labour markets and weaken community level resilience.

MEASUREMENT AND EVALUATION CHALLENGES

A major barrier to scaling adult environmental literacy in development policy is measurement. Many programmes rely on awareness indicators such as attendance or self-reported attitudes, which are weak predictors of behavioural change or economic outcomes. A development relevant measurement approach should include:

- Foundational knowledge and reasoning: short assessments on local environmental issues, risk interpretation, and misinformation detection.

- Action competence: observed or verified adoption of practices (safe water storage, waste sorting, energy efficiency actions, farm practices).
- Civic participation: engagement in community environmental initiatives, public meetings, reporting systems, or local planning.
- Economic and welfare outcomes: income stability, productivity proxies, reduced health related costs, reduced losses from shocks.

Linking literacy interventions to socio economic metrics requires careful design, realistic causal assumptions, and attention to time horizons. Some outcomes, like reduced household fuel expenditure or improved waste enterprise income, may show relatively quickly. Others, like ecosystem restoration benefits, may be long term.

IMPLEMENTATION STRATEGIES FOR DEVELOPMENT ORIENTED ADULT ENVIRONMENTAL LITERACY

Integrate environmental literacy into adult literacy and foundational learning

Adult literacy programmes can embed environmental content in reading, numeracy, and problem solving tasks using local examples such as water safety, flood risks, or waste management. This builds foundational skills while improving practical environmental decision making. Evidence that adult literacy policy and provision connects to sustainable development goals supports the logic of integration rather than parallel programmes (Boeren et al., 2025).

Use workplace and sector based training aligned to green skills

Employers and industry bodies can incorporate environmental literacy into occupational training, compliance, safety, and continuous improvement systems. OECD work on skills for the green transition underscores that targeted skills policies and better information are needed to align training with sector needs (OECD, 2023a). For development, this suggests partnerships with firms, unions and vocational institutions to embed literacy in up skilling and re skilling.

Community based learning and extension models

Community learning centres, cooperatives, faith based organisations, and local NGOs can deliver participatory learning linked to local problems. This is especially effective for informal workers and rural livelihoods. Programmes should emphasise practical experimentation, peer learning and locally relevant knowledge rather than abstract environmental science.

Digital inclusion and risk communication

Digital tools can broaden reach through mobile learning, radio plus SMS reinforcement, and community WhatsApp learning groups. However, digital inclusion requires attention to connectivity, cost, language and trust. Climate and environmental risk communication must be designed so adults can interpret warnings and take action, consistent with international education and climate change synthesis that points to capacity gaps and the need for supportive frameworks (UN CC:Learn, 2023).

Policy coherence across education, labour, environment, and social protection

Adult environmental literacy sits at the intersection of ministries and mandates. Effective scale requires coordination: education systems provide learning infrastructure; labour ministries align training to jobs; environment agencies provide content and standards; social protection can support participation through stipends or time release for vulnerable groups. The social development framing in UN reporting reinforces that complex challenges require integrated policy responses rather than siloed interventions (UN DESA, 2024).

CONCLUSION

Adult environmental literacy is a development capability with practical relevance for household welfare, labour market transitions, public health, governance, and community resilience. As environmental pressures intensify and economies reorganise around the green transition, adult populations cannot be treated as passive recipients of policy. They are active decision makers whose knowledge, skills, and civic capacities shape development outcomes.

This review argues that adult environmental literacy influences socio economic development through five connected pathways and that its impact depends on inclusive access to adult learning opportunities and alignment with livelihood realities. International evidence on adult learning participation gaps and green skills needs highlights urgency: without deliberate investment in adult learning systems, transitions risk becoming unequal and socially fragile (OECD, 2025; OECD, 2023a). Embedding environmental literacy across adult education, workplace training, and community learning can strengthen development resilience and expand opportunities, especially when measurement focuses on real world behaviour and socio economic results.

Future research should prioritise rigorous evaluations that quantify development outcomes of adult environmental literacy interventions across diverse contexts, including urban informal settlements, rural livelihood zones, and transitioning industrial sectors. For policy makers and practitioners, the key message is straightforward: improving environmental outcomes and improving socio economic development can be mutually reinforcing when adults are equipped to understand environmental challenges and act effectively within their daily roles.

Policy Recommendations

- Embed adult environmental literacy in national lifelong learning strategies with explicit links to employment, health, and resilience objectives (UNESCO, 2023).
- Target inclusion and remove barriers by offering flexible scheduling, childcare support, micro credentials, and subsidies for disadvantaged learners, consistent with evidence on unequal adult learning participation (OECD, 2025).
- Align programmes with green transition skills needs using sector skills councils, labour market intelligence, and employer partnerships (OECD, 2023a; OECD, 2023b).
- Adopt measurable outcome frameworks that track action competence and socio economic benefits, not only awareness.
- Support community institutions to deliver localised, participatory learning that connects literacy to livelihoods and risk reduction.

- Invest in educator capacity so adult facilitators can teach environmental content through problem based methods and culturally relevant examples.
- Strengthen public communication ecosystems to counter misinformation and improve adult risk interpretation, using trusted local channels and clear messaging.

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