

# A New Harvest

Making Cocoa  
a Future for  
Ghana's Next  
Generation



THE  
WEST  
WING  
2025-2026



# Preface

The West Wing is the official youth think tank of and for the Dutch Ministry of Foreign Affairs. We advise the ministry on various areas of Dutch foreign policy. Founded in 2015, The West Wing has grown tremendously in recent years. What began as a think tank for the Western Hemisphere Directorate, hence the name The West Wing, has now grown into a think tank for the entire ministry. We also now collaborate with the Adviesraad Internationale Vraagstukken (Advisory Council on International Affairs). The West Wing consists of a carefully selected group of around 60 young professionals and students from diverse academic and professional backgrounds. Each year, a new cohort volunteers to help make the voice of the younger generation heard in Dutch foreign policy.

This year, the Dutch Embassy in Ghana tasked The West Wing with a policy question on the cocoa sector in Ghana. Specifically, the report addresses the following question: ***How can the Dutch Embassy in Accra strengthen the position of Ghanaian youth in realising a future-proof cocoa sector?***

The report aims to provide Dutch policymakers and public actors involved in Ghana and the cocoa sector with recommendations for a future-proof cocoa policy that is both economically beneficial and sustainable for Ghanaian youth. The research combines news, literature and policy document analysis with semi-structured expert interviews and a comparative analysis of governance structures in Ghana and surrounding countries.

This report was written by the following policy advisors from The West Wing Think Tank: Larissa Aarzen, Fabiënne Blom, Maartje van den Bosch, Wouter Christis, Aniek Grevel, Michelle van Grol, Tijmen Henkes, Juliët Hasselton, Alexander van der Peijl, Lola Rogaar, Fleur de Schepper and Gisela Seye.

This report does not represent the views of the Ministry of Foreign Affairs, the Dutch Embassy in Accra, the Adviesraad Internationale Vraagstukken, or the consulted experts for co-reading this report. This concerns an external advisory report.

The West Wing

© 2025-2026

Commissioned by The Embassy of the Kingdom of the Netherlands in Ghana.

Published: 28th of May 2026

# A Note from the Track Leader

With great honour and pride, I am delighted to write the foreword of this policy advice on behalf of Track Ghana. A track that consists of twelve students and young professionals that devoted 9 months of their time to answer our policy question. It has been a great journey with your enthusiasm as our greatest strength. The opportunity to write policy recommendations as the youth, for the youth, was our greatest inspiration. There are many challenges in the Ghanaian cocoa sector and we acknowledge the challenging conditions under which Ghanaian youth are striving to build their futures within the cocoa sector. So, when I contemplate on the past year, a special thank you to everyone who supported and guided us along the way—your input has been invaluable.

Firstly, we would like to express our sincere gratitude to the Dutch Embassy in Accra for the opportunity to work on this policy question. We greatly appreciated the trust placed in The West Wing and the constructive guidance provided throughout the process. The bi-weekly meeting, continuous feedback and willingness to help steered us in the right direction and was a source of new ideas and perspectives. Thank you.

We are also thankful to all experts, stakeholders, and practitioners who shared their insights and experiences with us. Their contributions have been invaluable in shaping this report and deepening our understanding of the opportunities and challenges within the Ghanaian cocoa sector. Especially, opening doors for us which otherwise would have stayed closed. Our time at Chocoa has had an everlasting impact on the group.

Thirdly, my sincerest gratitude toward the members of Track Ghana. From the first moment we met, the diverse group of young individuals you are, let up the room with relentless energy. Everyone contributed in their own way and has left their mark on this advice. Your creativity and out-of-the-box thinking were remarkable. Besides that, thank you for trusting me with guiding this process and still taking me seriously after everything we have been through. A new friendship has been born and I hope to keep in touch with all of you. Everyone of you will have a great impact on this world. A profound thank you.

Finally, we hope that this report will contribute to meaningful change and leave a positive and lasting impact on strengthening the role of Ghanaian youth in the cocoa sector. We hope you thoroughly enjoy reading this report and are inspired to make an impact.

Jorrit van der Linden

*Track Leader Ghana*

*The West Wing Board Member 2025 - 2026*



# The Authors



Alexander van der Peijl



Aniek Grevel



Fabiënne Blom



Fleur de Schepper



Gisela Seye



Juliët Hasselton



Larissa Aarzen



Lola Rogaar



Maartje van den Bosch



Michelle van Grol



Tijmen Henkes



Wouter Christis



# Abbreviations and Acronyms

AD	Anaerobic Digestion
CAPEX	Capital Expenditure
COCOBOD	Ghana Cocoa Board
CPH	Cocoa Pod Husk
CSSV	Cocoa Swollen Shoot Virus
DGGF	Dutch Good Growth Fund
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortisation
EBRD	European Bank for Reconstruction and Development
ECG	Electricity Company of Ghana
FAO	United Nations Food and Agriculture Organisation
FMO	Dutch Entrepreneurial Development Bank/Financierings Maatschappij voor Ontwikkelingslanden
GTA	Ghana Tourism Authority
HTC	Hydrothermal Carbonisation
IDH	Sustainable Trade Initiative/Initiatief Duurzame Handel
IHE Delft	IHE Delft Institute for Water Education
KNUST	Kwame Nkrumah University of Science and Technology
LBC(s)	Licensed Buying Companies
LCOE	Levelised Cost of Electricity
MASO	Market Access and Skills Orientation (programme of Solidaridad Ghana)
MRV	Monitoring, Reporting & Verification
NGO	Non-Governmental Organisation
OPEX	Operational Expenditure
PPA	Power Purchase Agreement
PURC	Public Utilities Regulatory Commission



RVO	Netherlands Enterprise Agency/Rijksdienst voor Ondernemend Nederland
SME(s)	Small and Medium-sized Enterprises
SNV	SNV Netherlands Development Organisation
USD	United States Dollar
VCS	Verified Carbon Standard
VNO-NCW	Confederation of Netherlands Industry and Employers/Verbond van Nederlandse Ondernemingen - Nederlands Christelijk Werkgeversverbond
WUR	Wageningen University and Research



# Executive Summary

This policy brief answers the central question: *How can the Dutch Embassy in Accra strengthen the position of Ghanaian youth in realising a future-proof cocoa sector?* It concludes that the Embassy can play a catalytic role by enabling diversified, locally grounded opportunities for youth across the cocoa value chain, rather than focusing solely on primary farming. Strengthening youth engagement requires expanding viable economic roles that are more attractive, accessible, and resilient.

To achieve this, the brief recommends three key policy directions, based on feasibility; short-term, mid-term and long-term. First, the Embassy should continue to invest in knowledge sharing and capacity building, including collaboration with existing initiatives such as Cocoa Hubs and training programmes that enhance skills in sustainable agriculture, energy, and business development. Second, the Embassy should facilitate an agritourism pilot in the Eastern Region, leveraging existing infrastructure and tourism assets to create new, higher-value entry points such as guiding, hospitality, and small-scale entrepreneurship. Third, the Embassy should support the development of circular solutions in the Western Region, particularly through technologies that convert cocoa waste into energy and soil-enhancing products, thereby creating jobs in logistics, operations, and technical services.

These recommendations are based on the finding that youth disengagement from cocoa is closely linked to limited economic opportunities, lack of diversification, and restricted access to land and traditional entry structures such as cooperatives. The proposed interventions respond by broadening income streams, enabling value addition, and offering more inclusive entry points. Across all proposals, the emphasis is placed on creating pathways towards viable small enterprises and long-term economic participation.

The analysis draws on literature review, stakeholder analyses, and qualitative interviews. It combines qualitative insights with feasibility considerations, focusing on interventions that can realistically be supported within the Embassy's mandate.

Overall, the brief finds that the Embassy's strength lies in convening stakeholders, enabling pilots, and supporting coordination rather than direct implementation. By doing so, it can contribute to a more dynamic, diversified, and youth-inclusive cocoa sector in Ghana.



# Table of Contents

Preface	1
A Note from The Track Leader	2
The Authors	3
Abbreviations and Acronyms	4
Executive Summary	6
Table of Contents	7
1. Introduction	9
2. Bittersweet Business: No Youth, No Cocoa	11
3. Recommendations	12
3.1. Knowledge Sharing	12
3.1.1 Coordination of Existing Knowledge	12
3.1.2. The Radio Programme	13
3.1.3. Social Media	14
3.1.4. Conclusion	15
3.2. Cocoa Tourism	16
3.2.1. Implementation	17
3.2.2. Conclusion	18
3.3. Upcycling Cocoa Waste	19
3.3.1. Introduction	19
3.3.2. Proposed Solution: Small-Scale Biomass Facility	19
3.3.3. Implementation	20
3.3.4. Conclusion	21
4. Conclusion	23
Appendices	25
Appendix A. Supply Chain Visualisation	25

Appendix B. List of Interviewees	26
Appendix C. Knowledge Sharing	27
C.1. Example of a Knowledge Sharing Website	28
C.2. Radio and Social Media Recommendation	28
C.3. Examples of Social Media Platforms	29
Appendix D. Key Concepts Upcycling	30
Appendix E. Ghana's Infrastructure	31
Appendix F. Technical Analysis	32
F.1. Benefits of a Combined AD-HTC Facility	32
Appendix G. Business Case	34
G.1. Capital and Operational Costs	34
Table 1. Overview of One-time Capital Expenditure Costs	35
G.2. Revenue Streams	36
Table 2. Overview of Annual Operational Expenditure Costs	37
Table 3. Overview of Revenue Streams	38
G.3. Financing Structure	40
Table 4. Proposed Financing Structure	40
Table 5. Profitably Snapshot	41
Appendix H. Stakeholder Mapping and Governance	42
Table 6. Overview of Stakeholders per Phase	42
Appendix I. Ghana's Tourism Sector	44
Endnotes	47



# 1. Introduction

The relationship between the Kingdom of the Netherlands and the Republic of Ghana is longstanding and characterised by strong historical ties and increasing economic cooperation. Ghana is one of the Netherlands' key partners in West Africa, while the Netherlands serves as an important gateway for Ghanaian exports to Europe. Bilateral trade forms a central pillar of this relationship, with cocoa, tropical fruits, and other agricultural commodities playing a major role. The ports of Rotterdam and Amsterdam function as key entry points for Ghanaian goods into the European market. Dutch companies are also active in sectors such as logistics, port infrastructure, agriculture, and water management in Ghana. Cooperation increasingly focuses on sustainable value chains, private sector development, and inclusive economic growth.


The cocoa sector is central to Ghana–Netherlands relations due to its economic and strategic importance. It is one of Ghana's most important export commodities, supporting around 800,000 smallholder farmers and many more indirectly through trade and processing.<sup>1</sup> For the Netherlands, cocoa is a strategic import product, as it is one of the world's largest cocoa importers and processes around 22% of global cocoa beans into products such as cocoa butter and powder.<sup>2 3</sup> These are distributed across European markets, making the Netherlands also a major exporter of cocoa products<sup>4</sup>. This creates a strong interdependence between Ghanaian production and Dutch processing capacity.

Despite its importance, the Ghanaian cocoa sector is under increasing pressure. Ghana remains the world's second-largest cocoa producer with a global market share of around 25%, but production is declining.<sup>5</sup> While global cocoa prices have risen sharply, farmer incomes have improved only marginally due to limited transmission of price gains through the value chain.

This decline is driven by several interrelated factors. Climate change is causing more irregular rainfall, prolonged dry periods, and higher temperatures, all of which reduce yields. In addition, ageing and poorly maintained plantations further reduce productivity and increase vulnerability to disease. A major threat is the Cocoa Swollen Shoot Virus (CSSV), a viral disease spread by mealybugs which affects around 30% of farms, weakens cocoa trees, reduces yields and often requires infected trees to be removed.<sup>6</sup>

Illegal small-scale gold mining (galamsey) is also putting increasing pressure on cocoa-growing areas through deforestation, soil degradation, and water pollution, reducing available arable land and undermining rural livelihoods. At the institutional level, COCOBOD's strong regulatory control provides stability but limits flexibility and private sector engagement, constraining innovation in the sector.

These pressures contribute to a broader structural challenge: cocoa farming is becoming less attractive to young people. This perception is not merely economic in nature, but is deeply rooted in social stigma. Reinforced by the lived experiences of a farming generation that has seen modest returns despite decades of labour, cocoa farming has come to be associated with low social status and limited future prospects.<sup>7</sup> These experiences shape intergenerational dynamics in powerful ways: many parents actively discourage their children from following in their footsteps, steering them towards formal education and urban employment instead.<sup>8</sup> This is embedded in broader cultural narratives in which white-collar work functions as a marker of success while agricultural labour is associated with stagnation. As a result, young people who remain in cocoa-growing areas are often those who lack access to alternative opportunities rather than those who have made an active choice for the sector, further entrenching cocoa farming as a last resort and accelerating generational exit. This perception combined with an ageing farmer population and limited generational renewal, poses a risk to the long-term sustainability of cocoa production in Ghana.



At the same time, youth represent a major opportunity for innovation and long-term sector resilience, particularly given that young people constitute a significant share of Ghanaian society, with the country's median age projected at just 21.6 years in 2026. Young people are more likely to adopt new technologies, digital tools, and climate-smart practices. In a context of high youth unemployment and rapid demographic growth, the cocoa sector could become an important source of employment, income generation, and rural economic development. However, this requires addressing a wide range of structural barriers, including but not limited to limited access to land, finance, training, networks, market opportunities, and broader challenges related to income insecurity, sector perception, and limited participation in decision-making processes.

The central question of this policy brief is therefore: How can the Dutch Embassy in Accra strengthen the position of Ghanaian youth in realising a future-proof cocoa sector?

To answer this question, we have used a mixed-methods approach combining literature review, stakeholder analysis, and qualitative interviews, complemented by insights from sector events such as the Chocoa conference and the Cocoa Hackathon organised by Van Hall Larenstein University of Applied Sciences.

The analysis focuses on environmental, economic, and social dynamics as interconnected drivers shaping sector resilience and youth engagement. Environmental pressures reduce productivity, which weakens incomes and reinforces negative perceptions of cocoa farming among youth, further accelerating labour shortages. Economic constraints limit investment and innovation, while social dynamics such as an ageing farmer population, limited youth inclusion in decision-making structures, unequal access to land and finance, and ongoing rural–urban migration further reduce resilience and weaken generational renewal in the sector. Social perceptions surrounding cocoa farming also play an important role, as the sector is often associated with physically demanding labour, low social status, and limited future prospects among young people. Together, these factors create a reinforcing cycle of declining attractiveness and structural vulnerability in the cocoa sector.



## 2. Bittersweet Business: No Youth, No Cocoa

This chapter poses an essential question: Is the absence of youth the real problem of the deflating cocoa sector? It is a question we returned to throughout the interviews, inspiring meetings with stakeholders, and one we think deserves an honest answer. This reflection does not question the importance of cocoa to Ghana's economy, nor the concern about an ageing farmer population. It does, however, critically examine whether the focus should be on youth engagement because youth absence is also a rational response to low incomes, insecure land tenure, and deeply unequal value chains. Without addressing these root causes, efforts to attract youth into cocoa risk treating symptoms while leaving the underlying problem intact.

### *The role of the Netherlands*

This issue becomes particularly complex when considering the role of the Netherlands. While the country is one of the world's largest cocoa importers and processors, it is important to recognise that much of the cocoa processing sector operating within the Netherlands consists of multinational companies that benefit from the current low-price system. The combination of consumer demand for affordable chocolate and purchasing strategies that prioritise low costs, as well as institutional constraints imposed by Cocobod, has a direct impact on the amount that Ghanaian farmers ultimately earn. This is only a limited share of the total value created along the supply chain.

As one of the world's largest cocoa importers and processors, the country is deeply embedded in a system characterised by low farmgate prices. It is difficult to promote youth participation in cocoa without simultaneously working towards living income pricing, fairer value chain governance, and stronger regulation of sourcing practices. Without parallel action on the demand side, focusing on persuading young people to stay in the sector risks creating a discrepancy between stated intentions and economic interests.

### *Concluding insight*

Poverty is the problem; youth disengagement is the consequence. Therefore, the central insight from this analysis is to focus on poverty and income, not on youth as a target group. If cocoa farming offers a living income, youth will follow. If it does not, no amount of rebranding, training, or pilot projects will create lasting change. As members of an independent youth think tank, we also acknowledge our own position. Many of us would also pursue opportunities elsewhere if faced with similar choices. Recognising this is essential for credible, effective and honest policy advice. Therefore, our recommendations in the following chapters should be understood in this light: as targeted interventions that can improve information, skills, and visibility, but that cannot, on their own, resolve the structural conditions that drive young people away from cocoa. It is for this reason that our recommendations deliberately focus on solutions that do not depend on the price of cocoa beans, creating value and economic agency for Ghanaian youth independent of global commodity markets.

## 3. Recommendations

The following three recommendations form the practical core of this policy brief. Each is built around a convening role for the Embassy: facilitating rather than funding, connecting rather than implementing. An **agritourism pilot** in the Eastern Region creates new economic entry points for youth that do not require land ownership or cooperative membership; a **circular energy facility** in the Western Region converts cocoa waste into income, electricity and employment; and a **structured knowledge platform** combined with a farmer-led radio programme addresses the fragmentation that keeps existing opportunities invisible to the young Ghanaians who need them most.

### 3.1. Knowledge Sharing

This chapter outlines practical strategies to strengthen knowledge sharing and youth engagement in Ghana's cocoa sector. It highlights the value of stronger stakeholder coordination, clearer access to finance and the use of accessible communication channels such as radio, and social media. By embedding youth as digital facilitators and collaborating with initiatives such as Farmers' Voice Radio and Vice Versa Media, these approaches can improve outreach, increase inclusion, and reshape perceptions of the cocoa sector among young people. Together, they offer a scalable pathway to support the long-term resilience of Ghana's cocoa value chain.

Ghana's cocoa sector faces several interconnected challenges related to the accessibility, coordination, and communication of information and opportunities. Knowledge exchange is essential for building a resilient and future-proof cocoa sector in Ghana, as it enables existing knowledge, innovations, and lessons learned to be shared more effectively across stakeholders. With a young and digitally connected population, social media platforms such as WhatsApp, Facebook, and TikTok offer strong potential for knowledge sharing, while radio remains crucial for reaching less digitally connected communities.<sup>9</sup> Therefore, the following recommendations focus on strengthening coordination and accessibility within the cocoa sector, while also proposing a cocoa-focused radio programme supported by social media to disseminate knowledge, connect stakeholders, and improve youth engagement in the sector.

#### 3.1.1. Coordination of Existing Knowledge

We recommend that the Embassy takes on a coordinating role by initiating a structured online knowledge and initiative platform that consolidates existing programmes, financing streams, and contact points into a single, accessible resource for Ghanaian youth, farmers, and sector actors.

We propose that the Embassy uses this policy brief as a starting point and takes the lead in bringing these parties together, presenting the concept at the next Chocoa roundtable as a concrete joint initiative. The further development and long-term management of the platform should subsequently be handed off to the Embassy and its partners.

**Two implementation routes** are possible:

- The Embassy co-creates a standalone platform (e.g. [cocoayouth.gh](http://cocoayouth.gh)) in partnership with Solidaridad, Orange Corners, IDH, COCOBOD, and other like-minded embassies of cocoa-importing countries

(Belgium, Germany, Switzerland). This option offers flexibility, and long-term scalability. With an adequate promotion strategy, this could lead to more visibility.

- A dedicated, structured subpage on the Embassy's existing website functions as a resource hub. This option would be easier and faster to implement, but may lead to less visibility among Ghanaian youth. There may be less opportunities to upscale this option.

A detailed elaboration of the proposed plan can be found in [Appendix C](#).

### ***Emphasis on access to finance***

Based on the interviews we have conducted<sup>10 11 12 13</sup>, we find that the Ghanaian cocoa sector does not suffer from a shortage of programmes, it suffers from a **shortage of overview**. Young people do not know where to go<sup>14</sup>; financing streams are invisible; initiatives operate in silos. The Dutch Embassy is uniquely positioned to address this, without needing to create new programmes from scratch. A **central knowledge platform**, as a dedicated website developed jointly with like-minded embassies and sector partners, or as a structured Embassy resource page could resolve this. It makes existing initiatives accessible to the right target groups, renders financing streams transparent, and strengthens the Embassy's role as a strategic connector in the transformation of Ghana's cocoa sector.

One of the most concrete barriers to youth entry into the cocoa sector is the opacity of available financing. Young people do not know that funding mechanisms exist; farmers rely on informal networks to find capital. Financing channels such as FMO, IDH, Achmea Foundation, Orange Corners, COCOBOD, and Cargill are active as investors in this sector. However they are not easily accessible to (young) Ghanaians who want to enter the market. Eligibility conditions, target groups and application procedures are spread across websites, reports and personal networks. This creates a self-reinforcing inequality, consequently those who are new to the sector, disproportionately young people and women have trouble finding funding.


The knowledge platform should include a dedicated '**Financing**' section, specifying per financing channel: instrument type (loan, grant, guarantee), minimum and maximum amounts, eligibility requirements (cooperative status, land rights, age, etc.), contact person or application link, and language of communication.

### **3.1.2. The Radio Programme**

In Ghana, community information centers equipped with loudspeakers have already proven effective in expanding access to information and even increasing cooperative membership.<sup>15</sup> **Media and communication efforts** can play a key role in a sustainable transition by connecting isolated farmers, amplifying underrepresented voices, and showcasing relatable role models, especially for those who have limited access to digital tools or literacy-based resources.

We recommend the Dutch Embassy to facilitate and finance the production of a **radio show** that will be **made by and made for Ghanaian farmers and stakeholders** in the cocoa-sector. Firstly, with the aim to spread information, open the discussion with all parties involved, shine a light on role models and create connections. Secondly, the radio program will focus on shining a light on the whole of the supply chain and the different stakeholders, creating visibility of the route of the cocoa-bean. By showcasing actors in the whole of the cocoa chain, the sector can become more transparent and more attractive to Ghanaian youth, hence initiating a change of mindset.

Beyond **changing perceptions** of the cocoa sector, the radio programme could also contribute to broader **economic and environmental goals** within cocoa-producing communities. By sharing practical



knowledge on topics such as sustainable farming methods, climate adaptation, crop diversification, financial literacy, and entrepreneurship, the programme can support farmers in improving productivity and long-term income opportunities. In this way, the initiative can simultaneously strengthen knowledge-sharing, support more sustainable cocoa production, and contribute to improving the long-term resilience of farming communities.

### **Implementation**

Farmers' Voice Radio works with **small grant competitions** in which farmers submit proposals for radio programmes they would like to produce. The Dutch Embassy could facilitate and fund this competition, with the winning proposal receiving a €3,500 grant. A joint jury consisting of the Dutch Embassy, Farmers' Voice Radio, Vice Versa Media, and potentially a Dutch organisation or Ghanaian agro-influencer would select the winner. The radio content would subsequently be promoted through social media, Ghanaian influencers and organisations, and the Dutch Embassy's channels, while Vice Versa Media could support the storytelling and outreach components of the initiative in e.g., the Ashanti region.

Both **Vice Versa Media** and **Farmers' Voice Radio** expressed clear interest in collaborating with the Dutch Embassy to further strengthen these efforts<sup>16 17</sup>. Farmers' Voice Radio is a media initiative that enables farmers to co-create and broadcast radio content, sharing practical knowledge and experiences with rural communities. It is a media organisation focused on **storytelling**, with a strong emphasis on **amplifying underrepresented voices**. They mentioned that it's crucial that at least 50% of participants of the radio programme are women and that a diverse mix of producers is included, particularly tenant farmers who are often excluded from decision-making structures because they are not landowners.


We propose that the Embassy should take on a pivotal role in connecting those two media organisations to each other and to other parties involved, such as the Ghanaian cocoa farmers, Kumasi, MASO, Tony's, Solidaridad, Rainforest Alliance, Fairtrade, Ghana Food Movement, Modern Afrika and COCOBOD. The collaboration with different organisations for knowledge sharing will be an addition to the peer to peer knowledge sharing which, according to Farmer's Voice Radio, has the most effect. While cooperatives remain the primary partner on the ground, the actual target audience consists of the producers themselves, with radio offering a channel that reaches far beyond cooperative membership to include anyone within listening range.

The proposed initiative provides the Dutch Embassy with a **cost-effective** and **accessible** way to achieve **significant impact**. By connecting key organisations and supporting a small grant competition, the Embassy can enable inclusive, farmer-led radio content that reaches cocoa communities across Ghana. This approach extends beyond cooperative networks, ensuring that women, tenant farmers, and youth are actively included and heard, and ensuring the spread of necessary agricultural information.

### **3.1.3. Social Media**

To encourage a shift in mindset among young Ghanaians, we recommend that the Embassy implement a social media campaign focused on **reshaping the narrative around cocoa farming**. Vice Versa Media Ghana uses their expertise in storytelling to reshape perspectives. They actively work to portray the stories of young cocoa farmers in the media, helping to **increase visibility** and reshape the narrative. By engaging with agri-influencers, their already existing platforms can be reached.

Implementing such a campaign would require a communications budget covering content production, coordination with media partners, social media management, and collaboration with local influencers and storytelling platforms. The Embassy could explore a phased or pilot-based approach together with partners such as Vice Versa Media Ghana, who are familiar with the local media landscape and can provide tailored



budget estimations based on the desired reach and level of engagement. In addition, strengthening the use of local languages and youth-oriented formats can therefore significantly increase the Embassy's impact and connection with the next generation.

We propose a follow-up of the programme and a new separate programme. As a follow-up of the radio programme, the social media campaign will build on the discussions, organisations, and topics addressed during the radio show. In addition, we propose a separate programme focused on direct stories of young Ghanaian cocoa farmers, with special attention to women farmers, highlighting their daily lives, financial realities, agricultural techniques, achievements, and challenges. Content can be co-created with cocoa farmers, cooperatives, LBCs, COCOBOD, NGOs, and other stakeholders such as Solidaridad, Rainforest Alliance, Fairtrade, JS COCOA, Modern AfriQa, and Tony's Chocolonely. The campaign can further collaborate with existing platforms and influencers, including Plentyplenty.africa, Ghana Food Movement, African Cocoa Stories, and Alex Afari.

By bringing together media partners and various sector stakeholders along the whole of the cocoa value chain, the Dutch Embassy can **facilitate a continuous flow of engaging, relatable, and locally relevant content**. In doing so, the Embassy can help position cocoa farming as an innovative, viable, and future-proof career path for the next generation, while simultaneously being transparent and opening discussions. Moreover, the campaign can support the dissemination of knowledge on sustainable cocoa production, helping to strengthen the long-term resilience of cocoa farming communities.

### 3.1.4. Conclusion

By strengthening coordination among existing stakeholders, leveraging already widely used communication channels such as WhatsApp and radio, and embedding youth as digital facilitators within trusted structures, knowledge can be disseminated more effectively and inclusively. In addition, the proposed radio approach, developed in collaboration with initiatives such as Farmers' Voice Radio, serves as a key instrument to reach underserved communities while also reshaping perceptions of the cocoa sector among young people. Complementing this, social media can amplify these messages, engage younger audiences, and create continuous interaction across the value chain. Together, these approaches provide a practical and scalable pathway to strengthen the future of Ghana's cocoa sector.

## 3.2. Cocoa Tourism

This chapter outlines how cocoa agritourism can strengthen youth engagement and income diversification in Ghana's Eastern Region. By convening private sector actors, connecting tour operators with farm experiences, and using digital media to reshape perceptions of the sector, the Dutch Embassy can act as a convener and connector rather than a funder. Together, these steps initiate a self-reinforcing cycle in which tourism income funds farm investment, better-maintained farms attract more visitors, and the cocoa sector becomes an increasingly viable and attractive prospect for young Ghanaians.

Agritourism is defined - following the international consensus synthesised by the FAO-EBRD, (Food and Agriculture Organisation of the United Nations - European Bank for Reconstruction and Development) - as the practice of welcoming guests onto agricultural operations to purchase local farm goods and promote agricultural literacy, combining outdoor activities, hands-on agricultural education and recreation with immersion in rural life and farming practices.<sup>18</sup> The global agritourism market was estimated at \$45.4 billion in 2021 and is projected to reach \$141 billion by 2030, a compound annual growth rate of 13.4%, which implies that the market opportunity is substantial and growing.<sup>19</sup> The underlying driver is a structural shift in traveller preferences toward **authenticity, immersion and sustainability** that accelerated after the COVID-19 pandemic.<sup>20</sup> Demand is mostly self-directed rather than incidental: illustratively, more than 80% of tourists in the Dominican Republic who book cocoa experiences plan their visit in advance.<sup>21</sup> Supply-side appetite is equally strong. A survey of 583 Ghanaian cocoa farmers found that 81% expressed willingness to participate in agritourism, with reduced dependence on volatile cocoa prices cited as the primary motivation.<sup>22</sup> Moreover, the Ghana National Tourism Development Plan 2013–2027 identifies cocoa farms as priority agritourism assets, and stakeholders across the relevant ministries recognise agritourism as a niche with the potential to become a market leader for Ghanaian tourism.<sup>23</sup>

The case for agritourism rests on two **self-reinforcing dynamics**. First, it creates new and highly visible roles for young people that likely carry **higher social status** than primary cultivation. By bringing paying visitors onto farms and creating roles in hospitality, education, and tourism services, agritourism reframes cocoa farming as an **entrepreneurial and service-oriented activity** rather than purely the physically demanding farm labour.<sup>24</sup> Young people from cocoa-growing communities who did not inherit land, and who have either migrated to urban areas or remained in rural communities without a clear economic role, could find a viable path back into the cocoa economy through agritourism, without requiring land ownership as a prerequisite.<sup>25</sup> This is particularly relevant for young women, who face additional barriers to land inheritance in many cocoa-growing communities.<sup>26</sup> <sup>27</sup> Beyond the farm, the skills developed through agritourism, in customer service, business management, and digital marketing, have value across the broader economy, making it a more attractive career entry point than primary cultivation alone.

Second, agritourism generates **supplementary household income**, reducing dependence on a single volatile commodity. Academic evidence from comparable smallholder contexts in India suggests agritourism can generate household income uplifts of 20–30%, though gains vary significantly by location and the degree of institutional support in place.<sup>28</sup> For many smallholder cocoa farmers in Ghana, this income stabilisation is valuable in itself: a more **diversified income base** reduces the household vulnerability. However, what makes agritourism particularly relevant to the Embassy's core objective of a future-proof cocoa sector is the potential for a self-reinforcing dynamic. Supplementary income from tourism is not only an end in itself: farmers who earn more may also **invest more in their farms**, improving maintenance, agroforestry practices and equipment. Critically, this dynamic is not purely financial. For instance, at Adjeikrom Cocoa Tour Facility in Ghana's Eastern Region, 84% of residents

reported an increase in cocoa production following the introduction of agritourism, with farmers explicitly citing personal motivation - the pride and visibility that comes from a farm becoming a tourism asset - as a contributing factor.<sup>29</sup> As such, this virtuous cycle does not depend on sustained external subsidy to perpetuate itself. Each rotation of the loop strengthens the farm's commercial position across both the cocoa and tourism dimensions simultaneously.

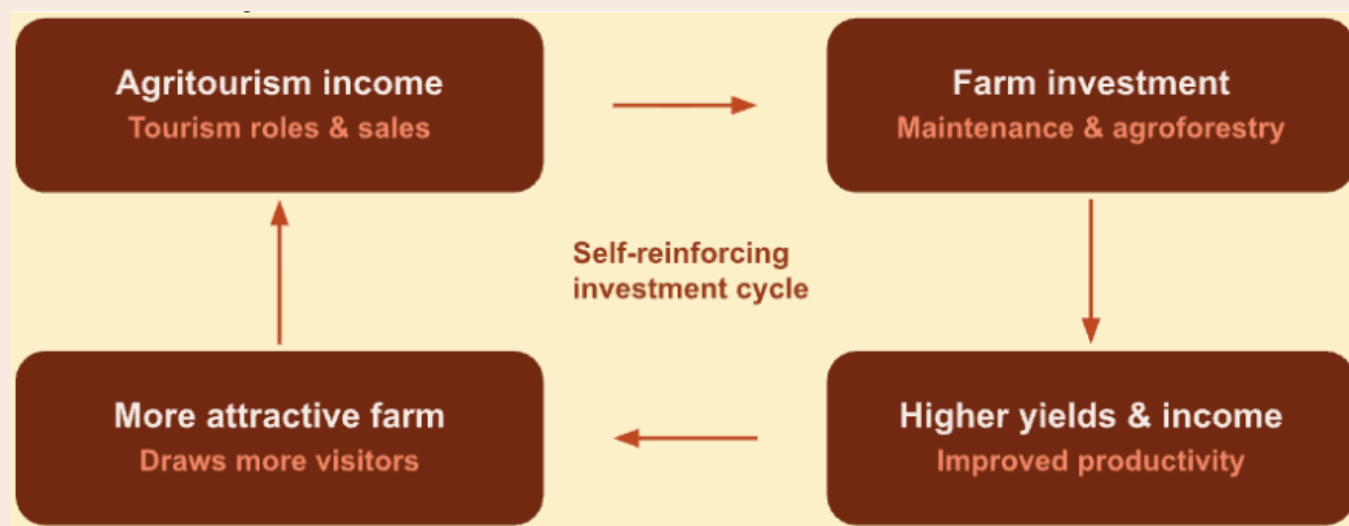


Figure 1. Infographic depicting the self-reinforcing agrotourism cycle

### 3.2.1. Implementation

Scaling cocoa agritourism in Ghana faces two structural barriers that any serious pilot must confront. The first is physical infrastructure: the African Centre for Economic Transformation documented that Ghana's tourism attractions are disproportionately located in rural areas while road quality, accommodation, and basic financial services remain concentrated in Accra and Kumasi, meaning that without adequate access infrastructure, farm enterprises become structurally dependent on organised tour operators running single-day trips from the capital.<sup>30</sup> The second is institutional fragmentation. A multi-stakeholder study of 35 tourism and agriculture actors found that not one respondent could categorically state that agritourism was a priority in their organisation's policy, and the last national coordination attempt dates to a committee inaugurated in 2004 that produced no sustained follow-through.<sup>31</sup> Scaling beyond a pilot therefore requires not only investment in farm-level readiness, but an inter-agency coordination mechanism that treats agritourism as a joint portfolio of tourism and agriculture rather than a marginal activity of either.

The Dutch Embassy in Accra, without assuming an operational or financing role, is well-placed to catalyse a 12- to 18-month pilot in the Eastern Region - demonstrating what coordinated support can deliver in practice, and making the case for replication in the Ashanti and Western Regions where the majority of Ghana's cocoa is produced but infrastructure deficits are steeper. The Eastern Region presents the strongest conditions for a pilot of this kind. A primary road corridor between Accra and Koforidua, identified by the Ghana Highway Authority as one of the better-maintained routes in southern Ghana, ensures reliable access, while Koforidua provides sufficient accommodation and services as documented in the Ghana Tourism Authority's register. The region is also home to the country's most advanced cocoa agritourism operations, including Fairafric's farm-to-factory-to-chocolatier experience in Suhum and established visitor sites such as the Tetteh Quarshie Cocoa Farm, Bunso Eco Park and the Aburi Botanical Gardens, all of which offer trained guides and basic visitor infrastructure according to Forestry Commission and GTA records. Concentrating the pilot here allows it to build on existing assets rather than establish them



from scratch.

The first step is to bring the relevant private sector actors together. Tour operators, farm-based experience providers, destination marketing specialists and community-facing organisations are all operating in the Eastern Region cocoa space but, as the sector research consistently showed, doing so in almost complete isolation. A **roundtable** or **working dinner**, co-organised with an operator, such as Jolinaiko Eco Tours would cost the embassy very little and carry meaningful convening weight. Critically, recruitment into the pilot must not route through farming cooperatives or COCOBOD-affiliated farmer groups, which is the default entry point for most youth programmes in the sector and structurally excludes young people without land or family ties to farming. Concrete alternatives exist: HOTCATT enrolls participants on an open basis and community-level outreach through radio and social media can reach young people who would never appear on a cooperative membership list.

The second step is to organise a **familiarisation trip for Accra-based tour operators** to the Eastern Region. A study by Garwi shows that tour operators are the primary distribution channel through which rural experiences reach international leisure visitors, but they will only promote farm experiences once they have personally assessed them.<sup>32</sup> The trip should be anchored at a farm explicitly developed for tourism, such as the Ohene Cocoa Eco-Tourism Farm, which is developing internationally marketed experiences in partnership with the Know Your Cocoa Foundation around child-labour-free and sustainability-certified production. The intended outcome is a working arrangement with at least one established inbound operator to incorporate cocoa farm visits into existing Eastern Region itineraries.

The third step is a **short-form content series** produced by a Ghanaian media partner with experience in the cocoa sector. Interview research confirmed that TikTok, Instagram and WhatsApp are the effective distribution channels for reaching youth audiences. The target audience is not only young people already on farms but those who have migrated to cities and whose connection to cocoa communities remains active but economically unanchored.

### 3.2.2. Conclusion

The expected impact extends beyond income. Women stand to benefit in particular from roles in hospitality and small-scale processing, which carry fewer of the gendered barriers associated with land ownership and cooperative membership. Poor road access and absent wayfinding have been shown to be structural barriers to visitor numbers even when the underlying product is internationally attractive, as the experience of the Adjeikrom Cocoa Tour Facility in the Fanteakwa District demonstrates. Routing visitors to the community edge and bringing them to the farm by local transport, as operators like Modern AfriQa have done through impact visits to the PlentyPlenty farm, addresses this directly and turns a logistical constraint into part of the experience rather than an obstacle to it. Research on the same facility found that 84% of residents observed an increase in cocoa production after the introduction of agritourism, with farmers attributing this to the motivation that comes from a farm becoming a tourism asset with a visible audience<sup>33</sup>. At the community level, Sabao, Chikwape and Mugoni argue that agritourism, when properly embedded, generates a sense of pride, identity and ownership among community members that reinforces participation and local investment in the sector.<sup>34</sup> Better-maintained farms tend to support better agronomic practices, but this is a co-benefit of the model rather than its purpose, and should be presented as such.

## 3.3. Upcycling Cocoa Waste

This chapter demonstrates how transforming cocoa waste streams in Ghana's Western Region can contribute to a more circular, resilient, and sustainable cocoa sector. By converting cocoa pod husks into biogas, electricity, and hydrochar through integrated waste-to-energy solutions, underutilised biomass can become a valuable source of energy, income, and soil improvement. The approach also creates employment and entrepreneurship opportunities for rural youth through training, facility operations, and sustainable energy activities, while providing cocoa farmers with additional income streams and improved farm resilience. At the same time, the system supports climate mitigation, soil regeneration, biodiversity protection, and improved rural energy access, strengthening the long-term sustainability of the cocoa value chain.

### 3.3.1. Introduction

Ghana has set a target of 10% renewable energy in the national mix by 2030 and aims to achieve net-zero energy-related carbon emissions by 2060.<sup>35 36</sup> Currently, the country's energy supply is largely dependent on hydropower and thermal energy.<sup>37</sup> Despite a gradual rise in renewables, approximately 80–90% of households still rely on biomass fuels such as firewood and charcoal as their primary cooking energy source.<sup>38 39</sup> Prolonged exposure to indoor smoke and open fires causes serious health impacts, including acute respiratory illnesses, heart disease, and cancer, while also driving deforestation and broader environmental degradation.<sup>40</sup>


Against this backdrop, **cocoa waste streams** present a **promising and largely untapped opportunity**. Across Ghana's Western Region, **cocoa pod husks**, the thin, fibrous outer shells of the cocoa bean, are routinely left on the land after harvest. This practice contributes to soil degradation, greenhouse gas emissions, and the spread of fungal diseases that negatively affect yields. As a result, potentially valuable resources are treated as waste, leading to both environmental harm and lost economic value for farmers.

This recommendation proposes to change that by **recycling cocoa waste streams** into valuable resources, offering a **sustainable alternative** to firewood and charcoal while simultaneously generating **additional income** for farming communities.

### 3.3.2. Proposed Solution: Small-Scale Biomass Facility

The proposed solution centres on establishing a **small-scale biomass facility** that combines **anaerobic digestion** and **hydrothermal carbonisation** to convert cocoa pod husks and other agricultural residues into **biogas, electricity, and hydrochar**. In doing so, the project creates a sustainable system in which agricultural waste is transformed into renewable energy, **soil-enhancing products**, and new economic opportunities, with **agroforestry practices** ensuring a stable, year-round supply of feedstock.

The project responds to several interconnected challenges at once. By converting cocoa waste into biogas and electricity, it provides a **sustainable energy source** that reduces reliance on wood-based fuels and supports clean cooking solutions. The application of hydrochar enriches the soil, reducing the need to clear new, nutrient-rich land, while agroforestry integration **enhances biodiversity and climate resilience** on cocoa farms.<sup>41</sup>



Within the proposed system, **youth can play a key role**. They can be involved in biomass collection and transport, as well as in the operation and maintenance of the facility, **creating employment and supporting skills development** in rural areas. Young farmers can also receive training in sustainable agricultural practices, including the productive use of cocoa husks rather than discarding them as waste. In this way, the proposal combines social, economic, and environmental benefits while positioning young people as drivers of a future-proof cocoa sector.

The integrated benefits of the system span three dimensions. **Socially**, it generates **employment** for rural youth across biomass collection, transport, facility operations, and technical maintenance, while improving access to reliable, cleaner energy in rural communities. **Economically**, it provides farmers with **additional income** from cocoa waste, diversifies revenue streams through energy and by-product sales, and reduces input costs through locally produced fertilisers and energy. **Environmentally**, it reduces greenhouse gas emissions from decomposing cocoa husks, limits reliance on firewood and charcoal, improves soil quality through bio-based fertilisers, and supports more climate-resilient land use practices.

For the pilot location, we propose the **Wassa Amenfi East district** in the Western Region. Its relatively high density of paved roads and railways ensures accessibility, while the Western Region more broadly hosts a high concentration of cocoa farms and benefits from a comparatively well-developed electricity network and key infrastructure connections (see [Appendix E](#)). The presence of the Mesu Akompi Technical Institute in the district further strengthens the case, as it enables local technical education and training for young Ghanaians involved in facility management.<sup>42 43</sup>

### 3.3.3. Implementation

The West Wing Track Ghana proposes that the Dutch Embassy in Accra **facilitate a pilot project** in the Western Region comprising two parallel workstreams:

First, the **establishment of a small biomass plant** supporting anaerobic digestion to produce biogas and electricity. This would provide jobs for unemployed rural youth to operate the facility and generate additional income for cocoa farmers, making the sector financially more attractive to young people. At the same time, it would supply clean electricity to farmers within a 30-kilometre radius. Anaerobic digestion is a well-proven, cost-effective method already in use across Africa, and its implementation here could provide an initial revenue source and a basis for technological scalability. A comparable, though larger, project in Côte d'Ivoire has generated additional income for 36,000 farmers, supplies 1.4 million people with clean electricity, and avoids 300,000 tonnes of CO<sub>2</sub> emissions annually.<sup>44</sup> For the integrated process flow, see Figure 2.

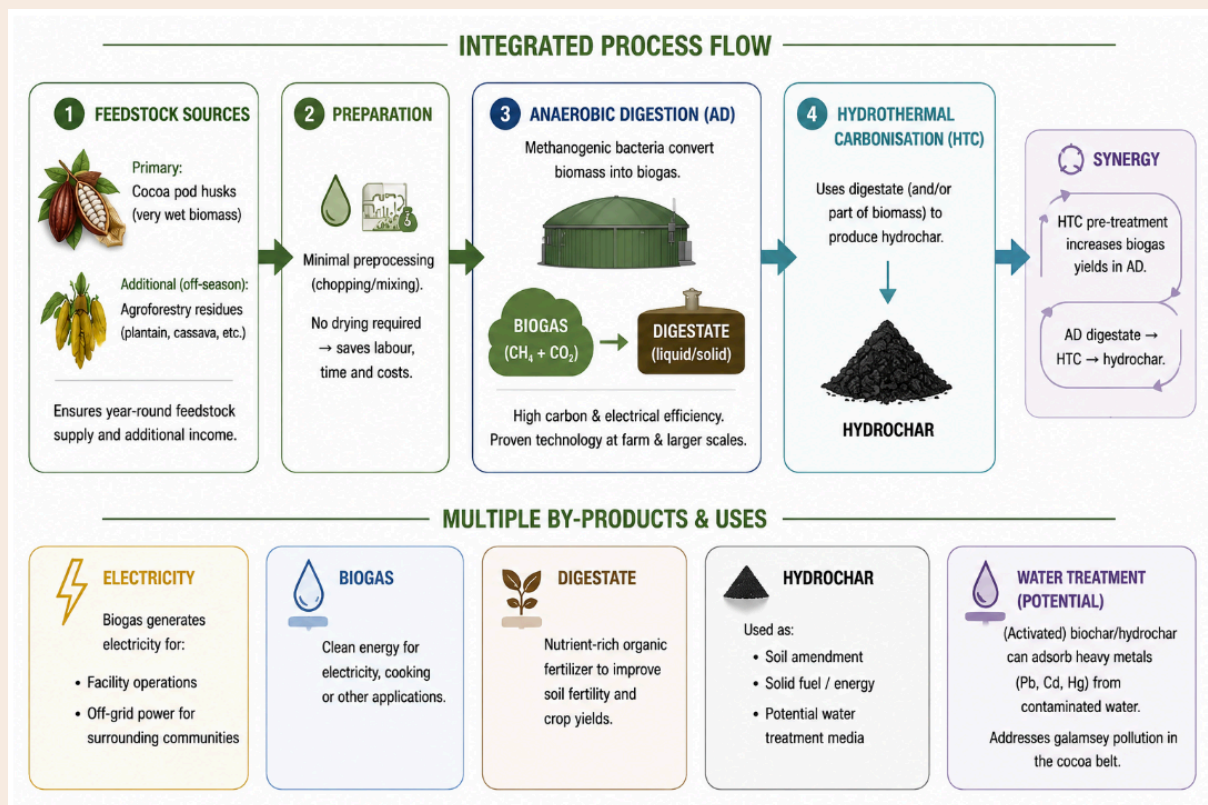


Figure 2. An overview of the proposed integrated process flow


Second, an investigation into the feasibility of integrating anaerobic digestion and hydrothermal carbonisation in a rural Ghanaian setting, drawing on Dutch funding and technical expertise.

For the development of a small biomass plant, we recommend to work closely together with Dutch partners who have the technical ability to help with these projects, examples of potential partners can be found in [Appendix H](#) where an overview of all potential partners is given categorised by the different phases needed for the development of a small biomass plant. We highly recommend working closely together with local contractors in Ghana, to boost the local economy and create job opportunities. We recommend a blended FMO/DGGF/RVO finance structure (see [Appendix G.3.](#)) to facilitate the funding for this project. While initial investment costs of \$7.6 million USD are high (especially relative to Ghanaian context), the plant can reach a positive net cash flow in its first full year of operation. The investment has a payback period of approximately 3.4 years, after which the plant becomes profitable (see [Appendix G](#) for the business case).

### 3.3.4. Conclusion

This recommendation demonstrates that **transforming cocoa waste streams** in Ghana's Western Region offers a **feasible and strategically relevant pathway** towards a more **circular and resilient cocoa sector**. By integrating anaerobic digestion and hydrothermal carbonisation, cocoa pod husks and other agricultural residues can be converted into biogas, electricity, and hydrochar, turning a currently underutilised waste stream into a source of energy, income, and soil improvement.

Despite high upfront investment costs (8.2 million USD), the combination of proven technologies, multiple revenue streams, and strong synergies between energy production and agricultural benefits supports the viability of a phased pilot approach. Integrating biogas production with soil-enhancing outputs such as digestate and hydrochar contributes to both environmental restoration and improved agricultural productivity in cocoa farming systems.



From a **socio-economic** perspective, the project creates meaningful opportunities for rural youth through employment in biomass collection, logistics, and facility operations, alongside skills development in renewable energy, sustainable agriculture, and business management. Training programmes, hands-on experience, and income-generating activities foster entrepreneurship and long-term career prospects within the cocoa sector. Cocoa farmers, meanwhile, benefit from additional income streams and improved farm resilience, strengthening the long-term attractiveness of the sector.

**Environmentally**, the system reduces emissions from unmanaged biomass decay, decreases reliance on firewood and charcoal, and supports soil regeneration in degraded cocoa landscapes, contributing collectively to climate mitigation, biodiversity protection, and improved rural energy access.

In addition to the core recommendation, opportunities exist for collaboration with the Cocoa Hubs Project, implemented by Fairtrade Africa and Tropenbos Ghana, which supports 19 Rural Service Centres in deepening institutional capacity, strengthening digital infrastructure, improving access to finance, and scaling value addition. As no Cocoa Hubs are currently present in Ghana's Western Region, we also recommend establishing a 'Cocoa Campus' where aspiring cocoa farmers are taught sustainable farming and agroforestry methods, cooperatives are formed, financial opportunities are explored, and waste is converted into energy. Collaboration with the Ghanaian Energy Commission — particularly through its Energy Academy Programme — could further strengthen this initiative by offering additional platforms for youth engagement, education, and entrepreneurship. This element has not been developed further in the present document, as it largely represents an extension of the Embassy's existing programmes.

The technical analyses, business case (CAPEX, OPEX, revenue streams, financing structure), and stakeholder mapping supporting this recommendation are included in the accompanying [Appendices D-H](#).



## 4. Conclusion

This policy advice has outlined a set of targeted interventions aimed at strengthening the sustainability and long-term viability of Ghana's cocoa sector, with a particular focus on creating opportunities for youth engagement. While the proposals presented are not exhaustive, they reflect realistic and actionable contributions that align with the facilitating role of the Dutch Embassy in Accra.

Across the three thematic areas - agritourism, circularity, and knowledge sharing - a consistent insight emerges: ***The challenge is not just to bring more people into the cocoa sector, but to make it a place where diverse and sustainable livelihoods are genuinely possible.*** Rather than focusing exclusively on primary production, the report highlights the importance of expanding roles along the broader value chain, including services, processing, waste valorisation, and entrepreneurship.


The first recommendation responds to a straightforward but important finding: the need for more coordination and knowledge sharing in Ghana's cocoa sector. Financing mechanisms exist, training opportunities are available, and successful initiatives have been documented, yet this information remains scattered across websites, reports, and informal networks, leaving many young people, women, and tenant farmers unable to access what is already there. A coordinated knowledge platform, combined with a farmer-led radio programme, would address this by consolidating existing resources into a single accessible point and reaching communities beyond cooperative networks. Given its convening role and diplomatic networks, the Dutch Embassy is well placed to take the lead without needing to build new programmes from scratch.

The second recommendation, the agritourism pilot in the Eastern Region, illustrates how existing infrastructure and tourism assets can be leveraged to introduce new economic activities linked to cocoa. By building on established sites and bringing together private sector actors who currently operate in isolation, the pilot creates pathways for young people to develop as tour guides, hosts, and small-scale entrepreneurs. Importantly, its success should not be measured by visitor numbers alone, but by whether participants are able to transition into viable income-generating enterprises within the cocoa value chain.

Lastly, the circularity proposal in the Western Region addresses the underutilisation of cocoa waste streams by introducing a system that converts biomass into energy and soil-enhancing products. Although associated with significant initial investment, the approach demonstrates strong economic potential through its multiple revenue streams and environmental co-benefits. It contributes to climate mitigation, improved agricultural productivity, and new employment opportunities in logistics, operations, and technical roles, all of which are particularly relevant for young people entering the labour market in rural areas.

Taken together, these interventions emphasise income diversification, value addition, and access to information as main principles for strengthening the cocoa sector. They also highlight the importance of inclusive access. The role of the Dutch Embassy is therefore best understood as catalytic rather than operational. By convening stakeholders, supporting pilot initiatives, and facilitating knowledge exchange, the Embassy can help overcome coordination challenges and enable locally driven solutions to emerge. This approach allows for meaningful impact while remaining within institutional constraints. At the same time, it is important to recognise the limits of these proposals. While they provide practical pathways for improving livelihoods and enhancing sector resilience, they do not fully address broader structural challenges such as price volatility and unequal value distribution within global supply chains. These issues require coordinated action beyond the scope of individual projects.

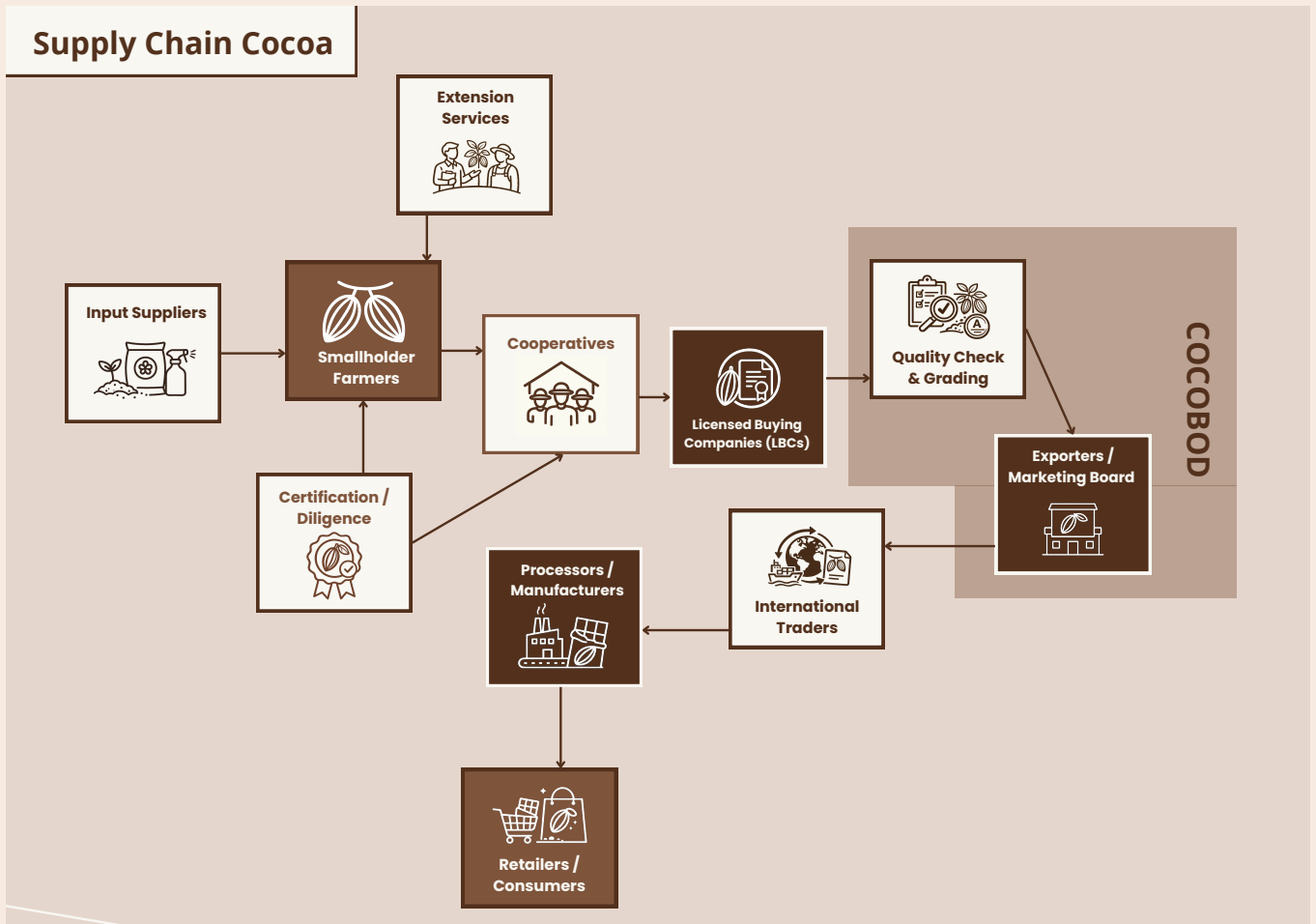
In conclusion, the future of Ghana's cocoa sector depends on its ability to adapt to changing economic, environmental, and social conditions. The interventions outlined in this report demonstrate that there are



viable opportunities to make the sector more dynamic, inclusive, and attractive, particularly for young people. However, their success will depend on sustained collaboration, careful implementation, and a continued focus on creating tangible economic value at the local level.

# Appendices

## Appendix A. Supply Chain Visualisation



## Appendix B. List of Interviewees

<b>Job</b>	<b>Organisation</b>
Country Representative West Africa & Programme Coordinator Cocoa	Solidaridad
Creative Director, Sustainable Cocoa Value Chain Expert - KIT	Sustainable Cocoa Value Chain Expert Chocoa
Country Coordinator	Vice Versa Global
Policy Officer Cocoa and Business Development	Embassy of the Kingdom of the Netherlands in Ghana
Doctor in Ghana	-
Members	Youth Sounding Board
Managing Director at BEO	Nestlé Confectionary BENELUX
Development Manager & Development Manager	Farmers' Voice Radio
Fair Value Chains Advisor	Oxfam Novib
Country Lead Ghana & Programme Manager	Centre for the Promotion of Imports from Developing Countries (CBI)
Agricultural Counsellor	Embassy of the Kingdom of the Netherlands in Ghana
Founder and Director	Modern Afrika
Managing Director	JS Cocoa

## Appendix C. Knowledge Sharing

### *Platform structure*

The platform should be structured around the practical questions a young farmer or entrepreneur actually has. For each listed initiative or partner, the platform specifies:

- Name of the organisation, nationality, and type of actor (NGO, private sector, government, research)
- What they contribute: type of support (training, financing, market access, legal aid, digital tools, extension services)
- Who they are for: target group by age, gender, region, cooperative membership status, and educational background
- How to apply: eligibility conditions, application procedure, contact person or link, language of communication (English / Twi / Dagbani)
- Lessons learned: short summary of results, what worked, what did not, and what the initiative recommends

Beyond individual initiative pages, the platform includes a searchable overview by theme (training, financing, market access, gender, environment) and region, a 'Starter Guide' for young people new to the sector, and a section on available financing (see Section 4).

### *Communication and reach*

A platform only creates value if it reaches the right people. Recommended communication channels:

- Monthly LinkedIn post from the Embassy account: 'Initiative of the Month', targeting both Ghanaian youth and Dutch partners.
- WhatsApp broadcast or IVR integration via Viamo<sup>45</sup>, to reach farmers without smartphone access in local languages.
- Annual update of the platform in collaboration with COCOBOD, IDH and partner organisations.
- Presentation and live demonstration during the Amsterdam Cocoa Week / Chocoa, where RVO and the Dutch Ministry of Foreign Affairs already facilitate roundtables with Ghanaian stakeholders.

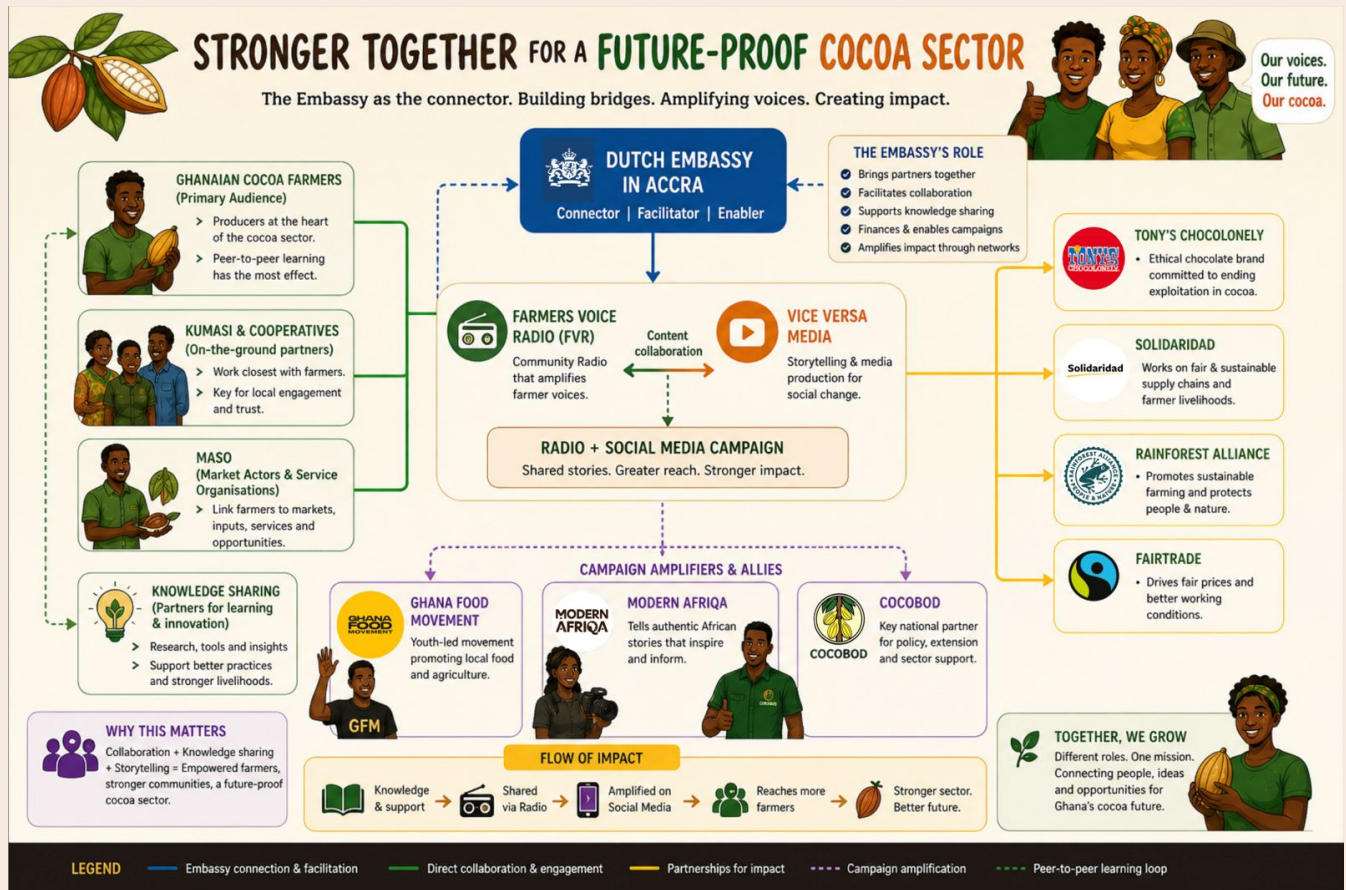
### *Partner roles and collaboration*

The Embassy does not need to build or maintain this platform alone. A realistic division of roles:

- Embassy: coordinating role, diplomatic convening power, launching the initiative, and hosting the platform (or co-hosting with a lead NGO).
- Solidaridad / Orange Corners / IDH: contributing programme data, lessons learned, and updating their own entries.
- COCOBOD: providing official sector data and serving as Ghanaian institutional anchor.
- Like-minded embassies (Belgium, Germany, Switzerland): co-funding and contributing programmes from their respective country partners.
- Private sector (Cargill, Olam, Mondelez): contributing programme descriptions and financing options; co-legitimising the platform.

## C.1. Example of a Knowledge Sharing Website

## C.2. Radio and Social Media Recommendation



### C.3. Examples of Social Media Platforms



# YOUTH. COCOA. FUTURE.

**A NEW NARRATIVE FOR GHANA'S COCOA SECTOR**

Inspiring stories. Real conversations. A future we grow together.



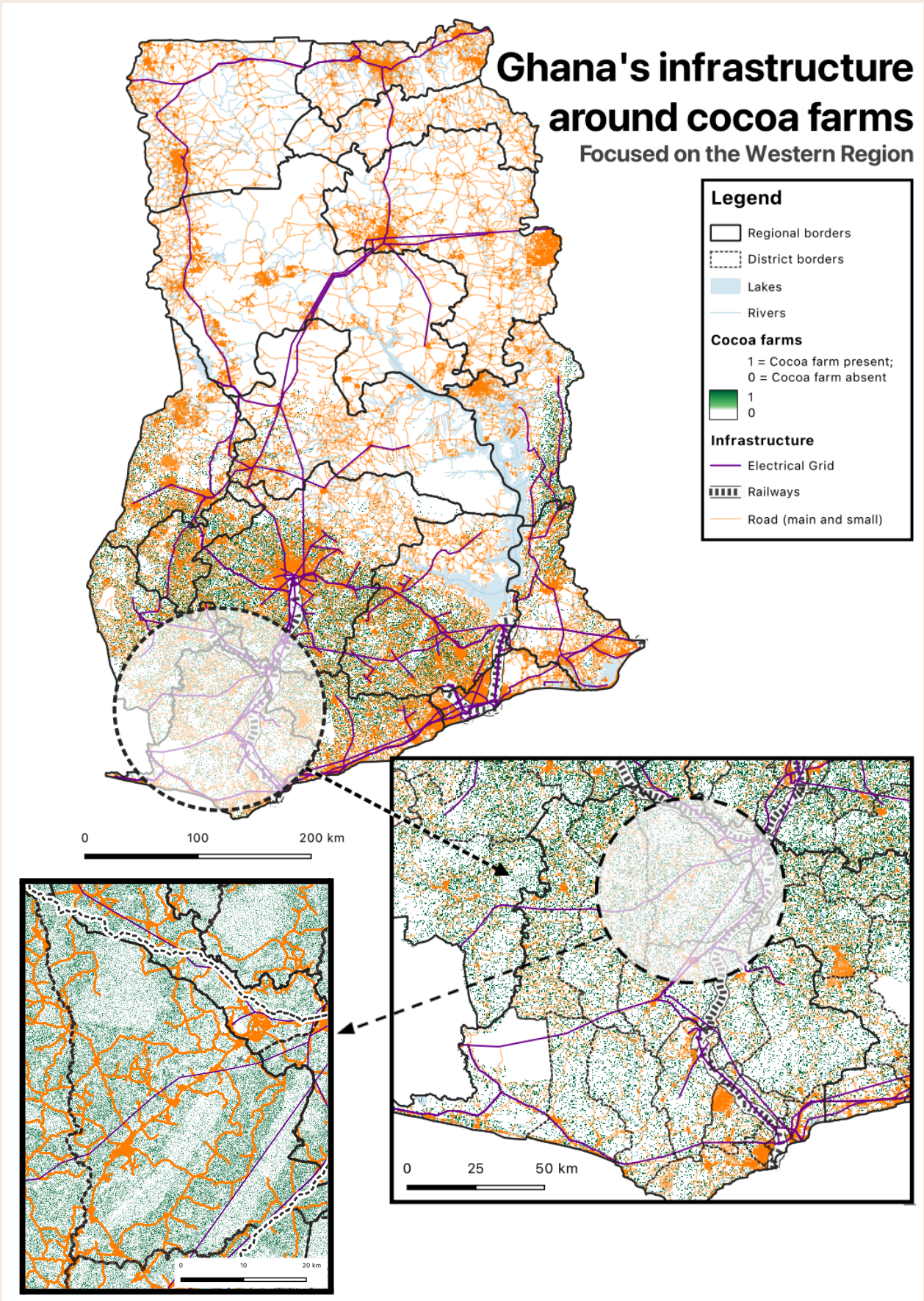
Cocoa is more than a crop. It's our future!

f FACEBOOK	TikTok	Instagram	WhatsApp	
<p>Stories that inform. Conversations that inspire.</p> <p><b>YOUNG VOICES. STRONGER SECTOR.</b> Real conversations with the people shaping Ghana's cocoa future.</p> <p><b>CONVERSATION WITH A SUCCESSFUL FEMALE COCOA FARMER</b></p> <p>"Cocoa gave me a future. Now I'm creating one for others."</p> <p>#HerFarmHerFuture</p> <p>1.2K 45 Comments 300 Shares</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p><b>FORMAT</b> Interviews, stories, infographics, photos</p> </div> <div style="width: 45%;"> <p><b>KEY MESSAGE</b> Cocoa is opportunity. Youth are the future.</p> </div> </div>	<p>Short. Real. Relatable. Made for young Ghanaians.</p> <p><b>COCOA ISN'T OLD SCHOOL. IT'S THE NEW GOLD.</b></p> <p>CONVERSATION WITH A COCOA PROCESSOR</p> <p>5,432 128 321</p> <p>From beans to brands. We add value. We create jobs. We build the future.</p> <p>#CocoaIsTheFuture #YoungAndProud #MadeInGhana</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p><b>FORMAT</b> Short videos (15-60 sec), behind-the-scenes, youth challenges</p> </div> <div style="width: 45%;"> <p><b>KEY MESSAGE</b> Cocoa is innovative, profitable, and cool.</p> </div> </div>	<p>Visual stories. Bold messages. Built for engagement.</p> <p><b>STRONG PARTNERS. STRONGER SECTOR.</b> CONVERSATION WITH COCOBOD</p> <p>Better policies   More support for youth   A future-proof cocoa sector</p> <p>1,045 likes dutch_embassy_accra Working together today for a better tomorrow. #CocoaFuture #YouthPower #Partnerships</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p><b>FORMAT</b> Carousels, quotes, illustrations, reels</p> </div> <div style="width: 45%;"> <p><b>KEY MESSAGE</b> Partnerships unlock progress.</p> </div> </div>	<p>Shareable. Local. Impactful. In languages that connect.</p> <p><b>Cocoa Future Network</b> Together for Ghana's Cocoa Future</p> <p><b>DID YOU KNOW?</b> Over 60% of Ghana's cocoa is produced by farmers under 35.</p> <p>We are growing more than cocoa. We are growing opportunity!</p> <p><b>UP NEXT ON OUR CHANNELS</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Conversation with LBCs</li> <li><input checked="" type="checkbox"/> Conversation with COCOBOD</li> <li><input checked="" type="checkbox"/> Conversation with Cocoa Processors</li> <li><input checked="" type="checkbox"/> Success story: Female Cocoa Farmer</li> <li><input checked="" type="checkbox"/> Voices of Young Cocoa Farmers</li> </ul> <p>11:30</p> <p><b>FOLLOW. SHARE. INSPIRE.</b> Let's change the story. Let's grow the future.</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p><b>FORMAT</b> Broadcast messages, infographics, voice notes, short videos</p> </div> <div style="width: 45%;"> <p><b>KEY MESSAGE</b> Stay informed. Get involved. Be the change.</p> </div> </div>	
<p>PLATFORMS WE ENGAGE:    </p>			<p>POWERED BY: Dutch Embassy in Accra x Vice Versa Media Ghana x Partners in the Cocoa Sector</p>	<p><b>#CocoaIsOurFuture</b></p>

## Appendix D. Key Concepts Upcycling

Key concept	Definition
<b>Biomass</b>	Organic material of biological origin, such as agricultural residues, wood, or animal waste, that can be used as a renewable source of energy or materials.
<b>Biochar</b>	A carbon-rich solid produced by heating biomass under low-oxygen conditions, commonly used for soil improvement, carbon sequestration, or energy applications.
<b>Hydrochar</b>	A carbonaceous material produced through hydrothermal carbonisation (HTC), which converts wet biomass into a coal-like product using hot compressed water.
<b>Digestate</b>	The nutrient-rich residue remaining after anaerobic digestion of organic matter is typically used as an organic fertiliser or soil amendment.
<b>Anaerobic digestion (AD)</b>	A biochemical process that uses bacteria to break down organic waste in the absence of oxygen (Maleka, 2018; 41).
<b>Hydrothermal Carbonisation (HTC)</b>	A thermal-chemical process that converts biomass into a solid, carbon-rich fuel known as hydrochar (similar to biochar), which can also be used for energy purposes and as a soil amendment (Maleka, 2018: 29).
<b>Pyrolysis</b>	A thermochemical process that decomposes biomass at high temperatures in the absence of oxygen, producing biochar, bio-oil and syngas.

# Appendix E. Ghana's Infrastructure



*Note.* Overview of the Ghanaian infrastructure with a focus on the Western Region and Wassa Amenfi East District (railways, electricity grid, roads) and the cocoa farm density. The map is compiled by authors with QGIS software based on various datasets: district/border regions<sup>46</sup>, cocoa farm density<sup>47</sup>, infrastructure (roads, water, railways etc.)<sup>48</sup>, electricity grid<sup>49</sup>.

## Appendix F. Technical Analysis

While many studies already examine the feasibility of converting agricultural waste (and cocoa pod residues in particular) into bioenergy or by-products, these efforts typically focus on a single output, such as biochar or biogas. Building on existing initiatives, including the Dutch Embassy's involvement in biochar production through the Farms of the Future model farm, we propose an integrated facility that converts cocoa waste into multiple byproduct streams. This fully circular approach (Figure 2) aims to deliver broader environmental and socio-economic benefits for cocoa farmers in the region. The context and implementation steps are outlined below.

Cocoa waste, and especially cocoa pod husks (CPH), is extremely wet biomass. As a result, low-tech conversion methods such as pyrolysis, while relatively easy to implement and maintain in rural Ghana, generally produce lower yields and fewer by-products than more advanced processes<sup>50</sup>. Research identifies anaerobic digestion (AD) and hydrothermal carbonisation (HTC) as the most suitable conversion technologies for cocoa waste.<sup>51</sup> Hydrochar is preferable over biochar, an older but widely used technique that requires biomass to be dried first. Whereas hydrochar is made via HTC, a process through which biomass is heated in water through relatively low temperatures (around 180-250 degrees Celsius). Because HTC can process wet biomass without energy-intensive pre-drying, it avoids the drying step that would otherwise consume much of the energy recovered from the cocoa waste. Hydrochar thus improves the net electricity output and overall efficiency of the plant compared to biochar.<sup>52 53</sup>

In AD, methanogenic bacteria convert CPH into methane and carbon dioxide, which can be used to generate electricity. Although AD produces similar by-products to pyrolysis, it achieves significantly higher carbon and electrical efficiency than other thermochemical processes.<sup>54</sup> Both AD and HTC are well-suited to processing high-moisture feedstocks such as cocoa waste, in contrast to more commonly used pyrolysis.<sup>55</sup>

Anaerobic digestion is a proven, widely used technology in Africa and can be implemented at both farm and larger scales. It is also a more cost-effective option than HTC.<sup>56 57</sup> HTC, by contrast, is more technically and economically complex and maintenance-intensive, which has limited its deployment in rural contexts.<sup>58</sup>

Nevertheless, a pilot project in Senegal under the Bio4Africa programme (implemented by Université Assane SECK de Ziguinchor and IHE Delft) has demonstrated the strong potential of HTC for agricultural waste valorisation, particularly when combined with AD.<sup>59</sup> Using both technologies together maximises energy and resource recovery: HTC pre-treatment can increase biogas yields in AD, while digestate from AD can be further converted into hydrochar through HTC.<sup>60 61 62</sup>

Despite promising results, only a limited number of projects have assessed the feasibility of integrating AD and HTC to enhance the valorisation of cocoa waste in Ghana. This is largely due to the high upfront investment costs of these technologies. Existing research demonstrates the strong efficiency and high potential of integrating HTC with AD for cocoa waste management and valorisation. However, practical applications of this integrated approach in rural Africa remain scarce, with the Bio4Africa HTC pilot project in Senegal representing one of the few ongoing initiatives exploring HTC and its coupling with AD.<sup>63 64</sup>

### F.1. Benefits of a combined AD + HTC Facility

- A biomass facility combining AD and HTC could generate multiple social, economic and environmental benefits.

- Cocoa farmers could sell CPH as an additional source of income. As drying would not be required, farmers would avoid the labour demands and financial risks associated with this process.
- Cocoa pod husks pose both environmental and economic risks when left to decay. By utilising them as biomass, these risks could be averted.
  - Environmentally, decomposition leads to CO<sub>2</sub> emissions and soil degradation.<sup>65 66</sup>
  - Economically, decaying husks contribute to the spread of cocoa tree diseases and further soil degradation, reducing yields and farmer incomes.<sup>67</sup>
- Because cocoa is harvested seasonally, the facility would require additional feedstock during the off-season.<sup>68</sup> Farmers engaged in agroforestry (or diversified agricultural production) could supply alternative residues, such as plantain and cassava, thereby ensuring year-round input availability while providing additional income, and helping mitigate biodiversity loss.<sup>69</sup>
- The collection and transport of cocoa and other agricultural waste could create employment opportunities for unemployed rural youth, both during and outside the cocoa harvest season.<sup>70</sup> Organising these activities through farmers' collectives would strengthen local ownership and stakeholder engagement.
- Given the technical complexity of HTC, targeted training for rural youth in plant operation, maintenance and administration could further expand employment opportunities.
- Biogas-derived electricity could supply energy to the facility itself and provide off-grid electricity to surrounding rural communities. In addition, hydrochar produced via HTC can be used for both energy production, AS, and as a soil amendment.<sup>71</sup>

Finally, it is recommended that the Dutch Embassy in Accra encourage the Netherlands Enterprise Agency (RVO) to conduct a feasibility study on the use of cocoa-derived biochar or hydrochar for water treatment. Recent studies show that (activated) biochar has strong adsorption properties and can remove heavy metals such as lead, cadmium and mercury from contaminated water.<sup>72</sup> Given that galamsey mining has polluted many water sources in Ghana's cocoa belt, this application could provide an additional pathway to mitigate environmental degradation and protect human and ecological health.



## Appendix G. Business Case

### G.1. Capital and Operational costs

We have conducted a general economic analysis to provide the Embassy with an overview of the potential expenditure costs of our proposed biogas facility. The costs are divided into two groups:

- Capital expenditure costs (CAPEX), such as building materials, equipment and safety systems;
- Operational expenditure costs (OPEX), such as labour costs, facility maintenance and the collection of cocoa pod husks.

To do so, we have utilised the capital and operating expenditure figures introduced by Dimitra Maleka in her 2016 doctoral thesis, *Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks*. Even though the thesis is ten years old, the data and information in her work remain the most recent, site-specific techno-economic treatment of cocoa pod husk energy conversion in West Africa in the literature. However, to ensure our assessment reflects the current economic state and technical progress since 2016, we have projected Maleka's original cost data forward. This was made possible by using AI to help adjust for these changes.

So, Maleka's original cost data has been inflated forward using cumulative US Consumer Price Indices to account for inflation and cross-checked against industrial equipment price benchmarks published in IRENA's *Renewable Power Generation Costs* series.<sup>73</sup> The numbers below reflect a small-to-medium rural hybrid plant (150-300 kiloWatt electricity output) with approximately 15,000-20,000 tons/year Cocoa Pod Husk feedstock capacity. This produced the following for the proposed 1 Megawatt electric anaerobic digestion and hydrothermal carbonisation facility:<sup>74 75</sup>

- A 2026 CAPEX of USD 7,826,000
- An annual OPEX of USD 822,500

We have created a detailed table (see Table 1) that summarises Maleka's 2016 data and the (projected) CAPEX costs for 2025, 2026, 2030, and 2040, to support a more in-depth economic analysis, which we present below. This includes a breakdown of CAPEX costs per component and uses the US dollar as a basis. These costs are assumed to be one-time.

Cost Component	2016 <sup>76</sup>	2025 (USD)	2026 (USD)	2030 Projected (USD)	2040 Projected (USD)
AD reactor + digester tanks (1 MWe)	1,250,000	1,675,000	1,725,000	1,825,000	2,150,000
CHP gas engine + generator set	720,000	965,000	994,000	1,030,000	1,150,000
Feedstock pre-treatment (shredder, mixer, hydrolysis tank)	310,000	415,000	428,000	455,000	545,000
Biogas upgrading & cleaning unit (H <sub>2</sub> S, moisture)	185,000	248,000	255,000	265,000	305,000
HTC reactor (high-pressure, ~200°C, 20 bar) [extrapolated]	890,000	1,193,000	1,228,000	1,300,000	1,520,000
HTC heat-recovery & dewatering system [extrapolated]	245,000	328,000	338,000	360,000	425,000
Heat-integration loop (AD↔HTC cascade)	95,000	127,000	131,000	138,000	162,000
Grid-interconnection & step-up transformer	175,000	235,000	242,000	255,000	295,000
Civil works & site preparation (Western Region)	380,000	509,000	524,000	555,000	660,000
Buildings, control room, weighbridge	220,000	295,000	304,000	322,000	385,000
Storage (CPH bunker, digestate lagoon, hydrochar silo)	165,000	221,000	228,000	240,000	285,000
Instrumentation, SCADA, safety systems	140,000	188,000	193,000	205,000	240,000
Engineering, procurement & construction (EPC) margin (~12%)	470,000	630,000	649,000	685,000	810,000
Contingency (10%)	425,000	569,000	587,000	620,000	735,000
<b>TOTAL CAPEX</b>	<b>5,670,000</b>	<b>7,598,000</b>	<b>7,826,000</b>	<b>8,255,000</b>	<b>9,667,000</b>

Table 1. Overview of One-time Capital Expenditure Costs

We have also created a detailed table (see Table 2) that summarises Maleka's 2016 data and the (projected) OPEX costs for 2025, 2026, 2030, and 2040, to support a more in-depth economic analysis, which we present below. This includes a breakdown of OPEX costs per component and uses the US dollar as a basis. These costs are assumed to be annual costs.

## G.2. Revenue Streams

The revenue projections are diversified across six different streams, namely 1) grid electricity sales; 2) rural mini-grid supply; 3) process heat; 4) hydrochar; 5) digestate fertiliser; and 6) carbon credits. By diversifying revenue streams, market uncertainties are spread across multiple streams, reducing risk. This hybrid facility design is in line with the principle that no single offtaker should determine financial viability, an idea supported by IEA's *Outlook for Biogas and Biomethane: Prospects for Organic Growth* (2020), which establishes production cost ranges and investment threshold benchmarks for biogas projects at the scale proposed here and by the precedent set by the Atmosfair distributed biochar programme in Ghana for a more diversified and locally embedded revenue approach.<sup>77 78</sup>

Our proposed facility would initially require substantial investment, which may seem risky. However, as various researchers have noted, a hybrid AD and HTC Cocoa Pod Husk Facility would quickly become profitable. To demonstrate this, we have made a table (see Table 5) showing our revenue projections, again utilising AI modelling. We suggest that this facility would be able to become profitable through six diversified streams of income, namely:

1. Sales of generated electricity to the Ghanaian national grid;
2. Sales of generated electricity to a rural mini-grid, supplying electricity to local rural villages and (cocoa) farmers;
3. Extra process heat is generated through the AD and HTC processes, which can be used to power the plant;
4. Sales of hydrochar to local farmers or farming cooperatives to improve soil and water quality on cocoa farms;
5. Sales of the remaining solid waste after processing (digestate fertiliser) to local cocoa farmers and farming cooperatives to sustain cocoa trees;
6. Sales of carbon credits to big companies wishing to offset their carbon footprint, as generating electricity through biowaste can earn this facility carbon credits.

By diversifying revenue streams, market uncertainties are spread across multiple streams, reducing risk. This hybrid facility design is in line with the principle that no single offtaker should determine financial viability, an idea supported by IEA's *Outlook for Biogas and Biomethane: Prospects for Organic Growth* (2020), which establishes production cost ranges and investment threshold benchmarks for biogas projects at the scale proposed here and by the precedent set by the Atmosfair distributed biochar programme in Ghana for a more diversified and locally embedded revenue approach.<sup>79 80</sup>

<b>Cost Component</b>	<b>Maleka 2016 (USD/yr)</b>	<b>2025 (USD/yr)</b>	<b>2026 (USD/yr)</b>	<b>2030 Projected (USD/yr)</b>	<b>2040 Projected (USD/yr)</b>
<b>Feedstock collection &amp; transport (CPH from farms)</b>	145,000	194,000	200,000	215,000	260,000
<b>Labour (plant operators, ~12 FTE — youth-focused hires)</b>	96,000	129,000	133,000	152,000	195,000
<b>Plant maintenance (mechanical, AD line)</b>	78,000	105,000	108,000	113,000	130,000
<b>HTC maintenance (high-pressure components) [extrapolated]</b>	62,000	83,000	85,500	88,000	99,000
<b>Consumables (enzymes, chemicals, lubricants)</b>	41,000	55,000	56,500	60,000	71,000
<b>Electricity self-consumption / parasitic load</b>	28,000	38,000	39,000	40,000	45,000
<b>Water supply &amp; treatment</b>	18,000	24,000	25,000	27,000	32,000
<b>Digestate &amp; ash handling/disposal</b>	22,000	30,000	30,500	32,000	38,000
<b>Insurance &amp; permits</b>	35,000	47,000	48,500	51,000	60,000
<b>Administrative overhead</b>	30,000	40,000	41,500	44,000	52,000
<b>Monitoring, MRV &amp; reporting (carbon credits)</b>	12,000	16,000	16,500	18,000	22,000
<b>Contingency / unplanned repairs (5%)</b>	28,000	38,000	39,000	42,000	50,000
<b>TOTAL OPEX</b>	<b>595,000</b>	<b>799,000</b>	<b>822,500</b>	<b>882,000</b>	<b>1,054,000</b>

Table 2. Overview of Annual Operational Expenditure Costs

Revenue Stream	Unit	Volume / Year	Unit Price 2026	Annual Revenue 2026 (USD)	2030 Projected (USD)	2040 Projected (USD)	Basis / Source
Electricity to national grid (ECG PPA)	kWh	6,500,000	0.115 USD/kWh	747,500	825,000	1,050,000	PURC 2025 bulk feed-in tariff for biomass; 1 MWe × 7,500 op. hrs × 87% availability
Electricity to rural mini-grid (cooperative offtake)	kWh	800,000	0.18 USD/kWh	144,000	165,000	215,000	Premium rural tariff; reflects willingness-to-pay studies in off-grid Western Region
Heat sale (cocoa drying, neighbouring LBC depots)	kWh-th	2,400,000	0.04 USD/kWh-th	96,000	112,000	150,000	Displaces LPG/diesel currently used for cocoa bean drying
Hydrochar — soil amendment grade	tonnes	1,800	220 USD/t	396,000	475,000	640,000	Atmosfair / Cocoa-Biochar Göttingen project benchmarks; CPH-derived char
Hydrochar — solid fuel grade (industrial offtake)	tonnes	600	145 USD/t	87,000	105,000	145,000	Replaces imported coal in cement / brick kilns; lower-grade fraction
Digestate — liquid fertiliser	m <sup>3</sup>	8,500	12 USD/m <sup>3</sup>	102,000	122,000	165,000	Sold back to cocoa cooperatives; Koa / IDH precedent
Digestate — solid compost	tonnes	1,200	65 USD/t	78,000	95,000	130,000	COCOBOD compost roadmap pricing (2026 reference)

<b>Carbon credits (verified removals — hydrochar)</b>	tCO <sub>2</sub> e	2,100	95 USD/tCO <sub>2</sub> e	199,500	280,000	420,000	Puro.earth / Atmosfair biochar removal credits; durable storage premium
<b>Carbon credits (avoided emissions — methane capture)</b>	tCO <sub>2</sub> e	1,400	18 USD/tCO <sub>2</sub> e	25,200	35,000	55,000	Verra VCS methodology for AD methane avoidance
<b>Tipping fees (waste reception from LBCs)</b>	tonnes	4,000	8 USD/t	32,000	38,000	50,000	LBCs pay nominal fee to dispose of pod husks rather than burn/dump
<b>Training &amp; site-visit fees (youth academy, knowledge hub)</b>	events/yr	—	—	18,000	25,000	40,000	Embassy-aligned youth capacity component; modest but symbolic
<b>TOTAL ANNUAL REVENUE</b>				\$1,925,200	\$2,277,000	\$3,060,000	

Table 3. Overview of Revenue Streams

Note. 1 MWe installed capacity, ~15,000–20,000 tonnes CPH/yr feedstock, Western Region of Ghana. All figures in USD. Revenue streams are diversified across electricity, hydrochar, digestate, and carbon credits — a deliberate design choice to reduce dependence on any single offtaker.

### G.3. Financing Structure

We propose a blended FMO/DGGF/RVO financing structure to facilitate the funding for this project (see Table 4). This proposed financing structure (also developed with AI modelling) is shown in the table below. Through the proposed blended FMO/DGGF/RVO financing structure, the project reaches positive net cash flow in its first full year of operations, with sponsor equity recovered in approximately 3.4 years. This is in line with the bankability thresholds that the FMO has applied to agri-waste energy projects in West Africa.<sup>81 82</sup>

Line Item	Value (USD)	Notes
<b>RVO grant (20%)</b>	1,565,000	Tied to youth training, MRV, and feasibility
<b>FMO senior debt (40%)</b>	3,130,000	8.5% interest, 10-yr tenor, 1-yr grace
<b>DGGF subordinated debt (25%)</b>	1,957,000	6% interest, 12-yr tenor, 2-yr grace
<b>Sponsor equity (15%)</b>	1,174,000	Cooperative + Dutch EPC partner (e.g., HoSt, Bright Biomethane)
<b>Annual blended debt service</b>	~755,000	Manageable against projected revenues
<b>Levelised cost of electricity (LCOE)</b>	0.14 USD/kWh	Marginally above grid tariff; closeable with PPA premium
<b>Total financing cost over project life</b>	~2,810,000	Mid-range; bankable structure

Table 4. Proposed Financing Structure

Below, we provide a table (Table 5) with a profitability snapshot that summarises the second and third tables into a concise overview. This shows the profitability of our proposal for the years 2026, 2030, and 2040.

Metric	2026	2030	2040
Total annual revenue	1,925,200	2,277,000	3,060,000
Total annual OPEX	822,500	882,000	1,054,000
EBITDA (gross operating margin)	1,102,700	1,395,000	2,006,000
EBITDA margin	57%	61%	66%
Annual debt service	755,000	755,000	— (loan retired by 2038)
Net cash flow after debt service	347,700	640,000	2,006,000
Simple payback on sponsor equity	~3.4 years	—	—

Table 5. Profitably Snapshot

### **Reflection on the Business Case**

The business model presented is based on the in-depth framework developed by Dimitra Maleka.<sup>83</sup> However, it relies on outdated data and does not adequately reflect Ghana's current economic context, particularly given the severe crises experienced over the past three years. Post-COVID inflation peaked at approximately 44% in early 2023, making prices highly unpredictable and challenging the reliability of cost and revenue assumptions in the model.<sup>84</sup> Despite these limitations, the analysis highlights the potential strategic value of developing adaptive approaches that integrate recent market dynamics and inflationary pressures into business planning. By updating assumptions with current data and contextualising financial projections, stakeholders can design a more resilient and responsive business model to navigate Ghana's rapidly changing economic landscape.

## Appendix H. Stakeholder Mapping and Governance

The Embassy should use its convening power to connect stakeholders and align all actors into a meaningful, functioning pilot system. By facilitating coordination across sectors, the Embassy can help reduce fragmentation, de-risk collaboration and ensure that the pilot delivers tangible outcomes (Table 6). However, it should be considered that COCOBOD is currently supplying farmers with more traditional fertilizers and chemicals, which makes their involvement essential. If the proposal is implemented, collaboration with COCOBOD will be necessary to help scale and mainstream biochar adoption among farmers.

Phase	Objective	Key Activities	Potential Partners	Role of Dutch Embassy in Ghana
1. Scoping & Initial Assessment	Identify viable regions, local cocoa yields, and stakeholders	<ul style="list-style-type: none"> <li>• Mapping cocoa-producing regions</li> <li>• Quantifying cocoa rest streams</li> <li>• First technical &amp; socio-economic analysis</li> <li>• Stakeholder consultations</li> </ul>	NL: Wageningen UR, SNV Knowledge Centre, IHE Delft* Ghana: COCOBOD, Energy Commission	<ul style="list-style-type: none"> <li>• Convene stakeholders</li> <li>• Facilitate entry of Dutch expertise</li> <li>• Align project with Dutch development, and Sustainable Development Goals.</li> </ul>
2. Feasibility Study	Prove technical & financial viability	<ul style="list-style-type: none"> <li>• Feedstock analysis</li> <li>• Technology selection</li> <li>• CAPEX / OPEX modelling</li> <li>• Business model design</li> <li>• Risk assessment</li> </ul>	NL: HoSt Bioenergy, Paques, Desah, Shell Biogas. Ghana: Local engineering firms, energy regulators, Kwame Nkrumah University of Science and Technology	<ul style="list-style-type: none"> <li>• Support access to funding for studies (e.g. RVO)</li> <li>• Link NL companies to local counterparts (make use of DHI Subsidy scheme)</li> <li>• Ensure regulatory alignment</li> </ul>
3. Partnership & Financing	Secure implementation-ready consortium	<ul style="list-style-type: none"> <li>• Public-private partnership setup</li> <li>• Financing structure (blended finance)</li> <li>• Grant / subsidy applications</li> <li>• Memoranda of Understanding with cooperatives</li> </ul>	NL: FMO, RVO, Invest-NL Private: SNV Netherlands <sup>85</sup> , Dutch Good Growth Fund <sup>86</sup> , Partners for International Business (PIB), Starters for International Business, Young Expert Programmes Energy (YEP Energy), Orange Corners Innovation Fund, PUM, FMO Tony's Chocolonely, Barry Callebaut, Cargill, Olam Agri Ghana: Municipalities, Ghana Energy Commission	<ul style="list-style-type: none"> <li>• Broker partnerships</li> <li>• Advocate project to financiers</li> <li>• Support grant applications (DGGF, SDG funds)</li> </ul>
4. Pilot Implementation	Demonstrate technical & social proof	<ul style="list-style-type: none"> <li>• Construction of pilot biogas plant</li> <li>• Local capacity building</li> <li>• Testing of energy use &amp; digestate</li> <li>• Monitoring &amp; evaluation</li> </ul>	NL: WUR, SNV, IHE Delft, impact consultants Ghana: Farmers, rural youth, COCOBOD, Energy Commission	<ul style="list-style-type: none"> <li>• Visibility &amp; diplomacy (site visits)</li> <li>• Risk buffering via policy support</li> <li>• Promote lessons learned within donor community</li> </ul>

5. Evaluation & Optimization	Improve performance & prepare scale-up	<ul style="list-style-type: none"> <li>• Technical optimization</li> <li>• Financial performance review</li> <li>• Social &amp; environmental impact assessment</li> </ul>	NL: Olam, Solidaridad, carbon market actors Ghana: Regional authorities	<ul style="list-style-type: none"> <li>• Ensure learning is documented</li> <li>• Share results with Dutch ministries &amp; EU partners</li> <li>• Position project as best practice</li> </ul>
6. Scale-up & Replication	Expand to multiple regions	<ul style="list-style-type: none"> <li>• Roll-out to other cocoa regions</li> <li>• Replication with additional cooperatives</li> <li>• Carbon credits</li> </ul>		
* Part of the Bio4Africa project.				
** Farms of the Future project (in collaboration with the Embassy), Project coordinator & technical + commercial partner in Côte d'Ivoire with regards to cocoa by-products.				
*** Pilot projects (community-based approach) in Senegal and present in Northern Ghana (HTC).				
**** Farms of the Future project (in collaboration with the Embassy).				

Table 6. Overview of Stakeholders per Phase

# Appendix I. Ghana's Tourism Sector: Current State, Structural Gaps and Private Sector Opportunities

## *The sector in numbers*

Ghana's tourism sector has passed its post-pandemic inflection point and entered a phase of consolidation. Ghana welcomed 1,148,002 international visitors in 2023, a 25% increase on 2022 and a marginal rise above pre-COVID figures, confirming a full structural recovery. By 2024 the momentum accelerated further: arrivals reached 1,288,804, a 12% increase, generating USD 4.82 billion in receipts, a 27% jump on the previous year and the highest figure since the pandemic shock. Tourism is the country's fourth-largest source of foreign exchange, behind gold, cocoa and oil and gas, and the sector supported over 735,000 jobs in 2021, with its direct contribution to employment standing at 5.7% in 2022. The World Travel and Tourism Council projects that figure will grow to nearly 964,000 jobs by 2032.

The visitor base is structurally dominated by three markets. In 2024 the United States remained the largest source with 137,862 arrivals, followed by Nigeria (111,581) and the United Kingdom (52,845). Together these account for roughly a quarter of all arrivals. The remainder is split between African neighbours and a smaller but high-value contingent of European, Asian and diaspora visitors. The three leading purposes of visit were broadly equal in 2024: business (22.43%), visiting family and friends (22.29%) and holidays and vacations (22.15%), a distribution that reflects a sector still heavily reliant on diaspora travel and business trips, with leisure tourism a growing but underdeveloped third stream. European and Asian visitors stay the longest — up to 28 nights compared to West Africans who average 1–3 nights, making European arrivals disproportionately valuable on a per-visitor revenue basis.


The December in Ghana (DiGH) campaign is the clearest window into the high-value European segment and provides the first official data point on Dutch visitors specifically. Among DiGH respondents surveyed at Kotoka International Airport in 2024, the Netherlands accounted for 4% of country of residence, placing it fifth after the USA (45%), UK (17%), Nigeria (11%) and Germany (5%). DiGH visitors stayed an average of 22 nights in 2024 and spent USD 722.60 per day on accommodation alone, with total average expenditure per trip reaching USD 3,742.98. Notably, a cruise tourism survey conducted by the GTA in 2024 found that 22% of cruise respondents spontaneously named cocoa as a defining feature of Ghana, the only commodity mentioned, the only sector commodity cited unprompted, indicating genuine international awareness of the agricultural heritage that cocoa agritourism would draw on.

On the supply side, licensed tourism enterprises reached 6,702 in 2024, up from 5,786 in 2023, with 5,210 in accommodation and 678 in travel trade. Five-star hotel occupancy reached 72.25% in 2024, its highest recorded level. Cruise tourism also expanded, with 12,634 passengers arriving via Takoradi and Tema, a 38% increase on 2023. Domestic tourism continued its upward trajectory: total visitation to selected sites reached 1,681,985 in 2024, a 19% increase on 2023's already-strong figure of 1,407,709. This sustained domestic growth signals a maturing market with demand for structured experiences beyond Accra, a dynamic that rural and agritourism products are well placed to capture.

## *The Dutch market: small in volume, strategic in character*

Disaggregated Dutch visitor data for Ghana is not published at the country level in recent GTA reports, meaning a precise headline figure is not available. What the evidence does show is that the Netherlands is consistently identified as a recognised European source market for Ghana's tourism sector, alongside Canada, Germany and South Africa. Historical GTA data captured by CEIC shows Germany — the Netherlands' closest comparable European market in terms of trade ties with Ghana — recorded around 41,400 arrivals in 2014, providing a rough order-of-magnitude anchor for the continental European segment before it was disaggregated in more recent reporting.

The more strategically relevant figure is not tourist arrivals but trade-linked travel. The Netherlands



processes more cocoa than any other country in the world, and cocoa dominates trading relationships between the two countries. Dutch cocoa exports reached €12.4 billion in 2025, and the Dutch Embassy in Accra maintains an active programme of sector visits, farm assessments and supply chain reviews under the Dutch Initiative on Sustainable Cocoa (DISCO). These visits generate a steady flow of Dutch professionals — company representatives, NGO staff, sustainability auditors, journalists — who travel to Ghana's producing regions and represent a capturable high-value visitor segment that standard tourism statistics do not count. Jolinaiko Eco Tours, the Ghana-based operator run by a Ghanaian-Dutch couple and positioned as a preferred partner for European specialised travel agencies, already serves this Dutch market segment and represents the clearest existing private sector bridge between Dutch demand and Ghanaian rural destinations. The strategic argument is not that the Netherlands sends mass tourism to Ghana — it does not — but that Dutch sector-linked travel represents a quality niche that is already present, already motivated by Ghanaian rural landscapes and agricultural communities, and currently leaving almost no economic footprint in those communities because the product does not yet exist to receive it.

### ***What the sector looks like structurally***

Ghana's tourism infrastructure is heavily concentrated along a single corridor. In 2023, 88.64% of all international arrivals entered through Kotoka International Airport in Accra. The accommodation market reflects the same pattern: 5-star hotels, exclusively located in Accra, reached an occupancy rate of 71% in 2023, while the majority of Ghana's over 4,600 licensed accommodation enterprises operate below international service standards outside the capital. Fewer than 60 of 255 tour operators hold IATA licenses, fewer than 10 of 91 car rental companies hold top ratings, and fewer than 50 of 360 licensed restaurants and nightclubs meet top quality benchmarks. International hotel brands are entering the market — Hilton and Aleph Hospitality both made their Ghana debuts in Accra in 2023 — but investment remains almost entirely capital-city focused.


The most common reasons for visiting Ghana are visiting friends and relatives, followed by business and professional activities and holiday leisure. This structure reflects a sector that is still primarily driven by diaspora travel and business visits, with leisure and cultural tourism a growing but underdeveloped third stream. 95% of tourists organise self-arranged tours, which means most visitors bypass formal tour operators entirely — a signal both of weak packaged product availability outside Accra and of the potential for direct-booking digital products to capture demand that currently passes through no formal channel.

### ***What needs to be developed***

Three structural gaps define what the sector needs to become a mature, geographically distributed tourism economy. The first is rural accessibility. The ACET diagnostic study documented that tourism attractions are disproportionately located in rural areas while road quality, accommodation stock and basic financial services remain concentrated in Accra and Kumasi. This mismatch is the single largest structural barrier to diversifying Ghana's visitor economy beyond the capital. Infrastructure investment — rural roads, reliable power and mobile payment capacity — must precede product development; without it, operators in rural areas are entirely dependent on Accra-based day-trip logistics and cannot capture overnight spend.

The second is service quality at scale. In 2023 MoTAC announced a training and skills development scheme targeting 6,000 hospitality workers to improve service delivery, acknowledging that workforce quality is a binding constraint on sector growth. The World Bank's 2018 assessment estimated that up to 50% of Ghana's tourism workforce is either under-trained or unqualified for their positions. HOTCATT, the Hotel, Catering and Tourism Training Institute, is the primary public instrument for addressing this, but its reach into rural areas and sector-specific contexts remains limited.

The third is destination marketing depth. Ghana has demonstrated strong capacity for campaign-driven peaks — the Year of Return in 2019, the Beyond the Return campaign and the December in Ghana programme have each generated measurable spikes in arrivals and spend. What has proven more difficult



is promoting the rest of the country as a tourist destination, primarily due to a lack of global awareness. The GTA's digital infrastructure and national campaign platforms are well developed for Accra-facing promotion; they have not yet been deployed effectively for rural and thematic routes, including cocoa country, forest reserves and cultural heritage sites outside Greater Accra.

### ***Private sector partners with development potential***

Several Ghanaian private sector actors are well positioned to help close these gaps and represent concrete partnership targets for the Dutch Embassy and sector platforms operating in Ghana.

Fairafric (Suhum, Eastern Region) is the most developed agri-sector tourism enterprise in the country, operating a farm-to-factory-to-chocolatier experience that bundles agricultural visit, processing plant and chocolate workshop into a single four-and-a-half-hour product. It is the benchmark and natural mentoring partner for new farm operators.

Jolinaiko Eco Tours (Accra, Dutch-Ghanaian owned) is GTA-licensed, community-oriented and Dutch-speaking, with an existing European client base and operational experience building rural village lodges. It is the most direct private sector bridge between Dutch demand and Ghanaian rural destinations.

Adansi Travels and Kaya Tours are established Accra-based inbound tour operators with international distribution networks. Kaya Tours already operates in the cruise tourism segment at Takoradi and Tema ports, demonstrating existing capacity to handle international visitor logistics outside Accra. Both operators are the gateway through which new rural products must pass to reach packaged international demand.

The Know Your Cocoa Foundation (KYCF) and the Ohene Cocoa Eco-Tourism Farm are developing internationally marketed cocoa tourism experiences in partnership, positioning themselves as child-labour-free and sustainability-certified destinations. They are the supply-side proof of concept for cocoa agritourism and the appropriate hosts for any Embassy-facilitated Dutch sector visit programme.

Sunseekers Tours and Blast Tours operate primarily in the cruise and heritage segment but have distribution reach that extends to European travel agencies, making them potential co-marketing partners for rural routes once the product quality meets their standards.

The common thread across all of these actors is that they are currently operating largely in isolation from each other and from the public sector institutions responsible for destination marketing and infrastructure. A convening mechanism — whether an industry working group under the GTA or an Embassy-facilitated platform — that brings these private actors into regular contact with each other and with MoTAC and MoFA would likely do more for rural tourism development than any single infrastructure investment.

# Endnotes

- <sup>1</sup> J. Taylor, M. J. Beillard, and J. D. Galloway, "Ghana – Cocoa Sector Overview – 2025," GAIN Report No. GH2025-0008 (Accra: U.S. Embassy – Foreign Agricultural Service, Office of Agricultural Affairs, USDA Foreign Agricultural Service, March 31, 2025), [https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Ghana+-+Cocoa+Sector+Overview+-+2025\\_Accra\\_Ghana\\_GH2025-0008.pdf](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Ghana+-+Cocoa+Sector+Overview+-+2025_Accra_Ghana_GH2025-0008.pdf).
- <sup>2</sup> Statistics Netherlands (CBS), "Nederland passeert Duitsland als grootste exporteur cacao-producten" [Netherlands Surpasses Germany as Largest Exporter of Cocoa Products], April 3, 2026, accessed April 19, 2026, <https://www.cbs.nl/nl-nl/nieuws/2026/14/nederland-passeert-duitsland-als-grootste-exporteur-cacao-producten>.
- <sup>3</sup> IDH (Initiatief Duurzame Handel), "Handel en leveringszekerheid van de Nederlandse cacao-sector" [Trade and Supply Security of the Dutch Cocoa Sector], June 2025, accessed April 19, 2026, <https://idh-prp.files.prepr.io/78ahfxqi4hyd/handel-en-leveringszekerheid-van-de-nederlandse-cacao-sector.pdf>.
- <sup>4</sup> Statistics Netherlands (CBS), "Nederland passeert Duitsland als grootste exporteur cacao-producten," April 3, 2026, accessed April 19, 2026, <https://www.cbs.nl/nl-nl/nieuws/2026/14/nederland-passeert-duitsland-als-grootste-exporteur-cacao-producten>.
- <sup>5</sup> United Nations Development Programme, "Ghana: Sustainable Cocoa," accessed April 19, 2026, <https://www.undp.org/foodsystems/ghana-sustainable-cocoa>.
- <sup>6</sup> G. A. Ameyaw, O. Domfeh, and E. Gyamera, "Epidemiology and Diagnostics of Cacao Swollen Shoot Disease in Ghana: Past Research Achievements and Knowledge Gaps to Guide Future Research," *Viruses* 16, no. 1 (2023), <https://doi.org/10.3390/v16010043>.
- <sup>7</sup> Youth Sounding Board, interview by author, video call, March 31, 2026.
- <sup>8</sup> Solidaridad, interview by author, video call, January 14, 2026.
- <sup>9</sup> Farmers' Voice Radio, interview by author, video call, April 9, 2026.
- <sup>10</sup> Farmers' Voice Radio, interview by author, video call, April 9, 2026.
- <sup>11</sup> CBI, interview by author, video call, April 24, 2026.
- <sup>12</sup> Vice Versa Global, interview by author, video call, December 17, 2025.
- <sup>13</sup> Solidaridad, interview by author, video call, January 14, 2026.
- <sup>14</sup> CBI, interview by author, video call, April 24, 2026.
- <sup>15</sup> Farmers' Voice Radio, interview by author, video call, April 9, 2026.
- <sup>16</sup> Farmers' Voice Radio, accessed March 29, 2026, <https://www.farmersvoiceradio.org/>.
- <sup>17</sup> Vice Versa Global, "Introducing Vice Versa Media Ghana," accessed April 26, 2026, <https://www.viceversaglobal.com/introducing-vice-versa-media-ghana/>.
- <sup>18</sup> F. Tomatis, A. Carità, and C. de Broissia, *Creating Successful Agritourism Experiences: A Practical Guide* (FAO–EBRD, 2024), [https://agivate.org/wp-content/uploads/2024/05/Creating-Successful-Agritourism-Experiences\\_08.pdf](https://agivate.org/wp-content/uploads/2024/05/Creating-Successful-Agritourism-Experiences_08.pdf).

- <sup>19</sup> Straits Research, *Agritourism Market Size, Share & Trends Analysis Report: By Activity (On-Farm Sales, Outdoor Recreation, Agritainment, Educational Tourism, Accommodations, Entertainment, Others), By Sales Channel (Travel Agents, Direct) and Region (North America, Europe, APAC, Middle East and Africa, LATAM) Forecasts, 2022–2030* (Straits Research, 2021), <https://straitsresearch.com/report/agritourism-market>.
- <sup>20</sup> F. Tomatis, A. Carità, and C. de Broissia, *Creating Successful Agritourism Experiences: A Practical Guide* (FAO–EBRD, 2024), [https://activate.org/wp-content/uploads/2024/05/Creating-Successful-Agritourism-Experiences\\_08.pdf](https://activate.org/wp-content/uploads/2024/05/Creating-Successful-Agritourism-Experiences_08.pdf).
- <sup>21</sup> F. Orgaz Agüera and C. M. Domínguez-Valerio, "Cocoa-Based Tourism: Exploring Tourists' Image, Satisfaction and Loyalty Regarding a Cultural Heritage Destination," *Journal of Quality Assurance in Hospitality & Tourism* (2024): 1–24, <https://doi.org/10.1080/1528008X.2024.2400659>.
- <sup>22</sup> R. Bannor, H. Oppong-Kyeremeh, B. Amfo, and A. Allotey, "Diversification into Agritourism by Cocoa Farmers in Ghana as an Alternative Source of Income," *Agricultural Finance Review* (2022), <https://doi.org/10.1108/AFR-10-2021-0136>.
- <sup>23</sup> G. Eshun and K. Mensah, "Agrotourism Niche-Market in Ghana: A Multi-Stakeholder Approach," *African Journal of Hospitality, Tourism and Leisure* (2020): 319–334, <https://doi.org/10.46222/ajhtl.19770720-21>.
- <sup>24</sup> G. Eshun and T. M. Tichaawa, "Developing Agro-Tourism Tours on the Cocoa Sector in Africa: Emerging Issues from Ghana," *EuroEconomica* 39, no. 1 (2020), <https://dj.univ-danubius.ro/index.php/EE/article/view/243>.
- <sup>25</sup> D. S. B. Azumah, G. Dagunga, A. Zakaria, N. A. Boateng, and K. B. Mensah, "Migration and Youth Participation in Cocoa Production in Ghana," *Acad. Lett. Article* 3267 (2021).
- <sup>26</sup> M. Addaney, J. A. Akudugu, M. O. Asibey, M. A. Akaateba, and E. D. Kuusaana, "Changing Land Tenure Regimes and Women's Access to Secure Land for Cocoa Cultivation in Rural Ghana," *Land Use Policy* 120 (2022): 106292.
- <sup>27</sup> T. Bessa, M. Dooley, and K. Phillipovich, *Women's Land Rights and Economic Empowerment in Cocoa Communities in Ghana: Final Report, USAID Integrated Land and Resource Governance Task Order under the Strengthening Tenure and Resource Rights II (STARR II) IDIQ* (Washington, DC: Tetra Tech, August 2023), [https://tenuresecurity.org/wp-content/uploads/2023/10/ILRG-Ghana-WEE-Final-Report-Aug-2023\\_rev\\_508.pdf](https://tenuresecurity.org/wp-content/uploads/2023/10/ILRG-Ghana-WEE-Final-Report-Aug-2023_rev_508.pdf).
- <sup>28</sup> S. Dash, S. Sharma, P. J. Powrel, and Likhila B., "Agritourism as a Livelihood Diversification Strategy: Economic, Social, and Policy Impacts on Small and Marginal Farmers in India," *International Journal of Progressive Research in Engineering Management and Science* 5, no. 8 (August 2025): 811–819.
- <sup>29</sup> G. Eshun and C. Tettey, "Agrotourism Development in Ghana: A Study of Its Prospects and Challenges at Adjeikrom Cocoa Tour Facility." *Bulletin of Geography: Socio-Economic Series* 25 (2014): 81–99.
- <sup>30</sup> African Centre for Economic Transformation (ACET). *Diagnostic Study of Tourism in Ghana*. Accra: ACET, 2015.
- <sup>31</sup> G. Eshun and K. Mensah. "Agrotourism Niche-Market in Ghana: A Multi-Stakeholder Approach." *African Journal of Hospitality, Tourism and Leisure* (2020): 319–334. <https://doi.org/10.46222/ajhtl.19770720-21>.
- <sup>32</sup> J. Garwi, "Unlocking Sustainable Agritourism Development in Angola: Critical Success Factors and Stakeholder Perspectives: A Case Study of Huambo Province," in *Agritourism for Sustainable Development: Reflections from Emerging African Economies* (GB: CABI, 2024), 142–159, <https://doi.org/10.1079/9781800623705.0011>.
- <sup>33</sup> G. Eshun and C. Tettey, "Agrotourism Development in Ghana: A Study of Its Prospects and Challenges at Adjeikrom Cocoa Tour Facility," *Bulletin of Geography. Socio-economic Series* 25, no. 25 (2014): 81–99, [https://www.researchgate.net/publication/285277162\\_Agrotourism\\_development\\_in\\_Ghana\\_A\\_study\\_of\\_its\\_prospects\\_and\\_challenges\\_at\\_Adjeikrom\\_Cocoa\\_Tour\\_Facility](https://www.researchgate.net/publication/285277162_Agrotourism_development_in_Ghana_A_study_of_its_prospects_and_challenges_at_Adjeikrom_Cocoa_Tour_Facility).

- <sup>34</sup> C. Sabao, K. W. Chikwape, and E. Mugoni, "Re-Branding the African Continent through Agritourism," in *Agritourism for Sustainable Development: Reflections from Emerging African Economies* (GB: CABI, 2024), 29–46, <https://doi.org/10.1079/9781800623705.0003>.
- <sup>35</sup> Ministry of Environment, Science, Technology & Innovation and Sustainable Energy for All, *Ghana Energy Transition and Investment Plan* (Government of Ghana, 2023), 44, <https://www.seforall.org/system/files/2025-05/Ghana-ETIP.pdf>.
- <sup>36</sup> T. K. Avordeh et al., "Demand Response as a Catalyst: Ghana's Strategic Pathway to 10% Renewable Energy by 2030," *Energy Reports* 14 (December 2025): 3033–47, <https://doi.org/10.1016/j.egy.2025.09.049>.
- <sup>37</sup> International Energy Agency (IEA), "Ghana," *Countries & Regions*, 2023, <https://www.iea.org/countries/ghana>.
- <sup>38</sup> R. Kipkoech et al., "Opportunities and Challenges in Ghana's Renewable Energy Sector," *Discover Applied Sciences* 6, no. 10 (2024): 530, <https://doi.org/10.1007/s42452-024-06148-x>.
- <sup>39</sup> J. T. Mensah and G. Adu, "An Empirical Analysis of Household Energy Choice in Ghana," *Renewable and Sustainable Energy Reviews* 51, no. C (2015): 1402–11, <https://ideas.repec.org/a/eee/reus/v51y2015icp1402-1411.html>.
- <sup>40</sup> G. K. Aboagye, "Electric Cooking and Promoting Clean Cooking Solutions in Ghana," statement to Parliament of Ghana, February 18, 2025, <https://www.parliament.gh/floor?dis=43>.
- <sup>41</sup> B. Amponsah-Doku et al., 'Improving Soil Health and Closing the Yield Gap of Cocoa Production in Ghana – A Review', *Scientific African* 15 (March 2022): e01075, <https://doi.org/10.1016/j.sciaf.2021.e01075>.
- <sup>42</sup> "Mesu Akompi Technical Institute - School Details & Programmes Offered," SHS Select, accessed May 13, 2026, <https://shsselect.com/schools/mesu-akompi-technical-institute>.
- <sup>43</sup> "Climate Fund Managers (CFM) and Société Des Energies Nouvelles (SODEN) Sign Agreement to Develop World's First Cocoa Waste-to-Energy Plant in Côte d'Ivoire," Climate Fund Managers, June 3, 2025, accessed April 10, 2026, <https://climatefundmanagers.com/2025/06/03/climate-fund-managers-cfm-and-societe-des-energies-nouvelles-soden-sign-agreement-to-develop-worlds-first-cocoa-waste-to-energy-plant-in-cote-divoire/>.
- <sup>44</sup> N. Murungi, "Côte d'Ivoire: Climate Fund Managers in Cocoa Waste-to-Energy Deal," *Africa Private Equity News*, March 26, 2024, <https://www.africaprivatteequitynews.com/p/cote-divoire-climate-fund-managers>.
- <sup>45</sup> Solidaridad, interview by author, video call, January 14, 2026.
- <sup>46</sup> GADM, "Global Administrative Areas — Ghana," accessed May 6, 2026, [https://gadm.org/download\\_country.html](https://gadm.org/download_country.html).
- <sup>47</sup> European Commission, Africa Knowledge Platform, "Cocoa Map: Côte d'Ivoire and Ghana," dataset, accessed May 6, 2026, <https://africa-knowledge-platform.ec.europa.eu/dataset/cocoa-map-cote-divoire-and-ghana>.
- <sup>48</sup> OpenStreetMap contributors, "Ghana," Geofabrik Download Server, accessed May 6, 2026, <https://download.geofabrik.de/africa/ghana.html>.
- <sup>49</sup> European Commission, Joint Research Centre, "African Electricity Grid," Africa Knowledge Platform Geospatial Server, accessed May 6, 2026, [https://geospatial.jrc.ec.europa.eu/geoserver/africa\\_platform/wms?service=WMS&version=1.1.0&request=GetMap&layers=africa\\_platform%3Aelectric\\_grid&bbox=-17.459300252494586%2C-34.786724125278226%2C49.38885116577151%2C37.26156167217266&width=712&height=768&srs=EPSG%3A4326&format=image/geotiff](https://geospatial.jrc.ec.europa.eu/geoserver/africa_platform/wms?service=WMS&version=1.1.0&request=GetMap&layers=africa_platform%3Aelectric_grid&bbox=-17.459300252494586%2C-34.786724125278226%2C49.38885116577151%2C37.26156167217266&width=712&height=768&srs=EPSG%3A4326&format=image/geotiff).

- <sup>50</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks" (master's thesis, KTH Royal Institute of Technology, 2016), 29, <https://kth.diva-portal.org/smash/get/diva2:946287/FULLTEXT01.pdf>.
- <sup>51</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 25, 32–33.
- <sup>52</sup> P. Cognigni, C. Leonelli, and M. Berrettoni, "A Bibliographic Study of Biochar and Hydrochar: Differences and Similarities," *Journal of Analytical and Applied Pyrolysis* 187 (2025): 106985.
- <sup>53</sup> S. Masoumi, V. B. Borugadda, S. Nanda, and A. K. Dalai, "HydroChar: A Review on Its Production Technologies and Applications," *Catalysts* 11, no. 8 (2021): 939, <https://doi.org/10.3390/catal11080939>.
- <sup>54</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 34.
- <sup>55</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 32-33.
- <sup>56</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 34.
- <sup>57</sup> D. Donkor et al., "Cocoa Byproduct Utilization in the Bioeconomy: A Review of Waste-to-Resource Strategies," *Biofuels* (2025): 12, <https://doi.org/10.1080/17597269.2025.2550911>.
- <sup>58</sup> Y. Ge et al., "Integration of Anaerobic Digestion and Hydrothermal Carbonization towards Low Carbon Disposal and Utilization: A Simulation Study," *Sustainable Energy Technologies and Assessments* 83 (November 2025): 2, <https://doi.org/10.1016/j.seta.2025.104611>.
- <sup>59</sup> "Senegal: Creating Fuel for Cooking and Improving Food Production with Biomass Waste," UN-IHE Institute for Water Education, January 20, 2023, <https://www.un-ihe.org/senegal-creating-fuel-cooking-and-improving-food-production-biomass-waste>.
- <sup>60</sup> E. Antwi et al., "Anaerobic Digestion and the Effect of Hydrothermal Pretreatment on the Biogas Yield of Cocoa Pods Residues," *Waste Management* 88 (April 2019): 138, <https://doi.org/10.1016/j.wasman.2019.03.034>.
- <sup>61</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 30.
- <sup>62</sup> K. R. Parmar and A. B. Ross, "Integration of Hydrothermal Carbonisation with Anaerobic Digestion; Opportunities for Valorisation of Digestate," *Energies* 12, no. 9 (2019): 13, <https://doi.org/10.3390/en12091586>.
- <sup>63</sup> "Ghana - Bio4Africa," Bio4Africa, accessed April 12, 2026, <https://www.bio4africa.eu/pilot-projects/ghana/>
- <sup>64</sup> "Senegal: Creating Fuel for Cooking and Improving Food Production with Biomass Waste," UN-IHE Institute for Water Education, January 20, 2023, <https://www.un-ihe.org/senegal-creating-fuel-cooking-and-improving-food-production-biomass-waste>.
- <sup>65</sup> K. J. H. Angbé et al., "Harnessing Cocoa Waste for Biochar Production and Emission Reduction to Promote Sustainability in West Africa," *Waste Management Bulletin* 4 (January 2026): 1, <https://doi.org/10.1016/j.wmb.2026.100282>.
- <sup>66</sup> S. B. Anoraga et al., "Cocoa By-Products: A Comprehensive Review on Potential Uses, Waste Management, and Emerging

Green Technologies for Cocoa Pod Husk Utilization," *Heliyon* 10, no. 16 (2024): 3, <https://doi.org/10.1016/j.heliyon.2024.e35537>.

<sup>67</sup> Anoraga et al., "Cocoa By-Products," 3.

<sup>68</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 35

<sup>69</sup> D. K. Adomako and ICCO Secretariat, *Project on Pilot Plants to Process Cocoa By-Products: Summary Report on a Pilot Project in Ghana*, EX/131/7/Add.1 (International Cocoa Organisation, 2006), 12.

<sup>70</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 36–38.

<sup>71</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks," 63.

<sup>72</sup> A. M. Deve et al., "Innovative Biochar Applications for Sustainable Water Purification," *International Journal on Emerging Research Areas* 3, no. 1 (2023): 120, <https://ijera.in/index.php/IJERA/article/view/59>.

<sup>73</sup> International Renewable Energy Agency (IRENA), *Renewable Power Generation Costs in 2023* (Abu Dhabi: IRENA, 2024), <https://www.irena.org/Publications/2024/Sep/Renewable-Power-Generation-Costs-in-2023>.

<sup>74</sup> International Renewable Energy Agency (IRENA), *Renewable Power Generation Costs in 2023* (Abu Dhabi: IRENA, 2024), 172–188.

<sup>75</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks."

<sup>76</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks."

<sup>77</sup> International Energy Agency, *Outlook for Biogas and Biomethane: Prospects for Organic Growth* (OECD, 2020), <https://doi.org/10.1787/040c8cd2-en>.

<sup>78</sup> "Ghana: Distributed Biochar Production in Smallholder Farms," *Atmosfair*, accessed April 10, 2026, <https://www.atmosfair.de/en/climate-protection-projects/negative-emissions/ghana-distributed-biochar/>.


<sup>79</sup> International Energy Agency, *Outlook for Biogas and Biomethane: Prospects for Organic Growth* (OECD, 2020), <https://doi.org/10.1787/040c8cd2-en>.

<sup>80</sup> "Ghana: Distributed Biochar Production in Smallholder Farms," *Atmosfair*, accessed April 10, 2026, <https://www.atmosfair.de/en/climate-protection-projects/negative-emissions/ghana-distributed-biochar/>.

<sup>81</sup> "Energy," FMO (Dutch Development Bank), accessed May 13, 2026, <https://www.fmo.nl/partner-with-us/energy>.

<sup>82</sup> R. Arthur et al., "Integrated Assessment of Bio-Methane Potential from Cocoa Pod Husk in Ghana Using Physicochemical Characterisation and Geospatial Techniques," *Scientific African* 29 (September 2025): e02795, <https://doi.org/10.1016/j.sciaf.2025.e02795>.

<sup>83</sup> D. Maleka, "Assessment of the Implementation of Alternative Process Technologies for Rural Heat and Power Production from Cocoa Pod Husks."



<sup>84</sup> Ghana Statistical Service, Consumer Price Index: Annual Inflation Report – March 2023 (Accra: Ghana Statistical Service, 2023).

<sup>85</sup> "Impact That Matters," SNV, accessed May 13, 2026, <https://www.snv.org/>.

<sup>86</sup> "DGGF," Invest International, accessed May 13, 2026, <https://investinternational.nl/what-we-do/financing/dggf/>.



THE  
WEST  
WING