

TRANSFORMATIONAL CHANGE

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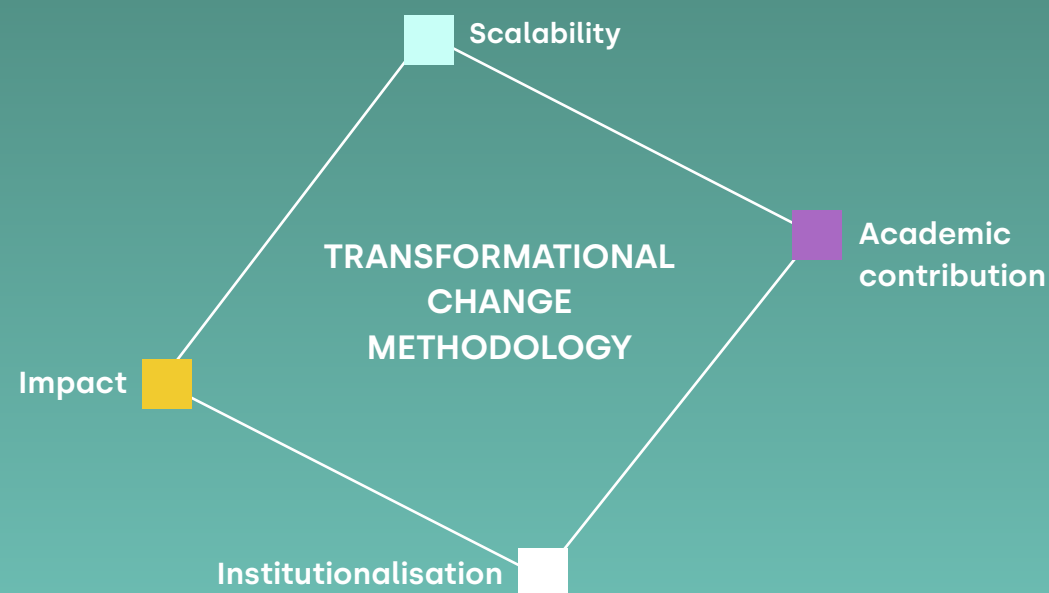




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1. Understanding Transformational Change

The IGC works with policymakers in low- and middle-income countries to promote inclusive and sustainable growth through pathbreaking research. Our research and policy engagement are supported by an international network of researchers and resident country offices across Africa, South Asia, and the Middle East. The collaborative approach made possible by this model – with embedded country teams that bring senior policymakers together with leading researchers – has created an effective mechanism for collaborative idea generation.

To understand, enhance, and communicate IGC's impact, we created a 'Transformational Change' methodology in 2024. The methodology aims to identify the conditions in which research can achieve significant and positive policy and academic impact by focusing on four key dimensions: innovative contribution, institutionalisation, scalability, and impact. Our Monitoring, Evaluation, and Learning (MEL) Team is now applying this methodology to a series of case studies. The knowledge from these studies will deepen our understanding of the IGC's pivotal contributions and help us to draw actionable insights that inform future strategies and reinforce IGC's role in driving evidence-informed policy research.

From May to July 2024, we applied our Transformational Change methodology to the Ghana Commodity Exchange (GCX) research and policy engagement cluster, drawing on internal documents, official reports, publications and thirteen interviews conducted between May and July 2024.¹

¹ The interviewees consulted for this case study were: Principal Investigator and Professor of Economics, NYU, **Yaw Nyarko**. Policy stakeholders: Former Minister of Trade and Industry of Ghana, **Alan John Kyerematen**; Former Minister of Agriculture of Ghana, **Owusu Afriyie Akoto**; COO, Ghana Commodity Exchange, **Robert Owoo**; Former CEO, Ghana Commodity Exchange, **Kadri Alfah**; Former CEO, Ethiopia Commodity Exchange, **Ermias Eshetu**. Representative from an international organisation: Regional Director, WFP West Africa, **Chris Nikoi**. IGC Staff: IGC Ghana Country Director, **Nii Sowa**; IGC Senior Country Economists, **Henry Telli** and **James Dzansi**; IGC Head of Research Programme, **Shahid Vaziralli**; IGC Research and Impact Officer, **Anum Anis**; and IGC Head of Firms Initiative, **Rania Nasir**.



GCX research team and IGC staff at a nano commodities exchange warehouse in Wono, Ashanti region.

2. The Ghana Commodity Exchange (GCX)

In Ghana, the agricultural sector makes up around 20% of GDP and employs almost 40% of the workforce, with 70% of these being smallholder farmers (The World Bank, 2024; The World Bank, 2023; Aljudu et al., 2022). However, market inefficiencies and information gaps between farmers and traders have led to suboptimal pricing, mismatched supply and demand, and reduced market participation (Neza et al., 2021). A potential avenue to address these inefficiencies are agricultural commodity exchanges. These are platforms for farmers and traders to access real-time market information on commodities, aimed at improving transparency of prices, increasing the quality of produce and offering solutions to storage. Commodity exchanges offer a "transformational experience for countries", not just in terms of the effects they have on markets, but also because they promote positive behavioural changes amongst farmers and traders (E. Eshetu, personal communication, 22 May 2024).

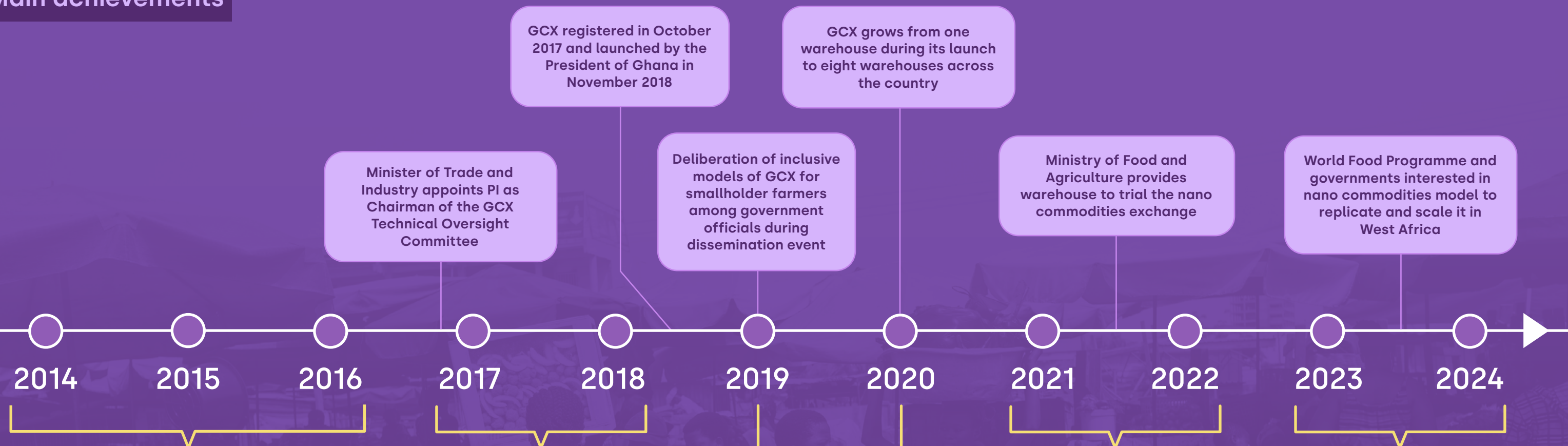
Since 2014, the IGC has funded a cluster of seven research projects and one event to explore solutions to these market frictions, with an investment of nearly GBP 0.5 million.² The key outcome of this work is the research support and policy engagement that contributed to the design, implementation, and evaluation of the Ghana Commodity Exchange (GCX). While recognising that the creation of the GCX was a collective effort driven by several stakeholders from government and academia as well as private and international organisations who were committed to its set-up and were persistent in providing essential support and guidance throughout the process, this exploratory case study focuses on IGC's contribution to this process.

² This includes GBP 434,507 through Commissioning Board projects, GBP 60,000 through quick response smaller grants (SPFs) and GBP 5,000 spent on events.

Transformational Change timeline

Ghana Commodity Exchange (GCX)

Main achievements



PROJECT 1
Pilot study looking at the data sources needed to measure a baseline for setting up and evaluating the commodities exchange. Innovations included a mobile phone app and an IT platform for the exchange.

PROJECT 2
Pilot expansion to continue studying models to predict the impact of commodity exchanges and its evaluation. Emphasis on products to be traded inside and outside the GCX, including prices and quantities.

PROJECT 3
Findings from the earlier projects disseminated to the Government alongside capacity-building activities that supported the GCX project team.

PROJECT 4
Exploratory survey of farmers and buyers to understand their buying and selling decisions, and to test the differences between GCX-registered and non-GCX-registered communities.

PROJECT 5
Study expanded the research subjects to include smallholder farmers, randomising access to GCX among smallholder farmers to evaluate the impact of GCX use.

PROJECT 6
Project pilots 'nano commodities' markets with a small numbers of traders and farmers brought together in their own villages to engage in structured intermediated trade.

PROJECT 7
Expansion of previous project. Nano commodities markets are now being studied with forwards and futures contracts with the availability of warehousing facilities for smallholder farmers.

Research and policy engagement

This timeline illustrates the evolution of the Transformational Change story over time, highlighting key achievements related to IGC-funded research and policy engagement. It acknowledges the accumulation of research findings, policy efforts, and contributions from multiple actors, emphasising contribution rather than direct attribution to the observed outcomes.

The IGC's contribution to change:

- Promoting innovative and rigorous **academic research** that builds on the stock of knowledge and expands the literature of commodity exchanges, with a publication in the *Journal of Development Economics*, discussing theories of commodity markets through a search model;
- Supporting the **implementation and institutionalisation** of the GCX through dissemination and policy engagement, and continuing to inform strategies to **amplify its reach** through ongoing research;
- Fostering ten years of strong policymaker-researcher collaboration that enabled iterations of the research that could feed into evidence-informed policy changes **impacting the economy and the wellbeing of smallholder farmers** in Ghana.

"In the past, for most farmers the source of market was farmgate, now they trade in profitable supply chains, now they have broader options to trade, farmers are just not harvesting and selling, they now have a central point to negotiate prices, this has helped them improve livelihoods and reduce poverty"
(K. Alfah, personal communication, 27 May 2024).

3. The path to Transformational Change

a. Contributing to the design of a commodity exchange in Ghana through rigorous evidence

There has been interest in setting up a commodity exchange in Ghana since the 1990s, in recognition of the importance of agriculture to the country's growth trajectory. The goal was to provide farmers with improved market access, reducing post-harvest losses, and improving livelihoods. From 2005 onwards, as the idea of commodity exchanges gained political momentum in Ghana, international organisations, including the World Bank and USAID, supported feasibility studies to advise the government and concluded that Ghana was ready for its own exchange, which would require adjustments to its legal framework (USAID, 2015).

Motivated by the establishment of the Ethiopia Commodity Exchange (ECX) in 2008, a regional movement led by the African Union Commission sought to create commodity exchanges for strategic African products (Africa Union Commission, 2015). This movement aimed **"to transform the way of life of the farmers, to also support the national and the continental food security strategy and the trade opportunities, the economic interests of Africa, and also political stability"** (E. Eshetu, personal communication, May 22, 2024).



Professor Yaw Nyarko explains how bilateral trade negotiations take place at a marketplace in the Ashanti region.

In 2014, the government committed to establishing the Ghana Commodity Exchange (GCX) during the President's State of the Nation Address in 2014 (Mahama, J.D., 2014). The expectation was that the GCX would "establish state-of-the-art, transparent, and professional market institutions to create an orderly, transparent, and ready market for goods that are produced by farmers in the country" (Ministry of Finance, 2017).

That same year, IGC began collaborating with Professor Yaw Nyarko (Principal Investigator) on this topic. Nyarko applied for IGC funding to develop a case study in Kumawu, in the Ashanti region of Ghana. The research aimed to explore the potential of commodity exchanges to reduce market frictions and address development challenges. It also sought to establish a baseline before the GCX was set up, which would later facilitate its evaluation.

Having previously worked on an evaluation of the ECX, Nyarko recognised the importance of implementing learnings from this in the Ghanaian context; "[u]nfortunately, little preparatory work was done before the establishment of the ECX, which made impact evaluation difficult. The goal of this research is to provide tools, scientific methods, and measurements to enable impact evaluation of the Ghana Commodity Exchange (GCX)" (Nyarko Y., 2019). This IGC-funded research therefore focused on what would be needed to measure a baseline, through existing data sources and new technology.

Following the recommendation of the IGC Ghana team and the Firms Research Programme Directors, the IGC funded this project through its second Commissioning Board in 2014.³ The design and methodology of the research was deemed to be highly original, given its innovative use of technology, initially through price alert phone messages, then mobile phone-based trading platforms and, finally, the commodity exchange platforms: "the commodity exchange is really nothing other than technology plus rules of trading, plus government-backed standards and warehouses" (Neza et al., 2021). This technology enabled real-time data collection from farmers and traders and facilitated analysis to a high level of detail and accuracy. The mobile apps used as part of this study later evolved to become a key aspect of the GCX roll-out.

The research provided new perspectives on the real-world effects of commodity exchange markets on smallholder farmers' behaviours and economic outcomes. It highlighted that better data collection is essential to successfully measure the impact of agricultural policy innovations, such as commodity exchanges. The research also concluded that the establishment of a commodity exchange could address development challenges faced by farmers, allowing for price discovery and transparency, effectively matching them with traders, increasing quantity and quality of produce, and offering solutions for the storage and credit access limitation (Neza et al., 2021).

The research team realised that further funding would be necessary to expand the baseline study nationally, and in 2017 the IGC supported the expansion of Nyarko's initial research through its sixth Commissioning Board. This research continued to study models to predict the impact of the commodity exchange through mobile apps, focusing on market structure, market participants, production data, quality data, price data and transport sector information, to eventually evaluate the GCX's impact comprehensively (Nyarko Y., 2016). The proposal also sought to deepen the understanding of the potential positive and negative impacts of commodity exchanges by studying the prices and quantities of "products traded 'inside' and 'outside' the GCX" (Nyarko Y., 2016).

The project showed that commodity exchanges do not benefit all farmers equally; "we found that this market institution eliminates many of the economic disadvantages of the bilateral trading environment. We find, however, that not all farmers benefit from the commodity exchange" (Nyarko Y. and Pellegrina H. S., 2022). The suggestion was, therefore, that commodity exchange markets may need to coexist with existing decentralised exchange markets to maximise benefits to market participants. Based on this, the research supported a "partial mandate" design, as defined by Nyarko, where both types of markets coexist across all commodities. This research was eventually published in the *Journal of Development Economics* in 2022, authored by Yaw Nyarko and Heitor S. Pellegrina.

³ It should be noted that Nyarko's research has also been the recipient of grants by other donors, such as NYU-CTED and anonymous donors.

b. Supporting the institutionalisation of the GCX through dissemination, collaboration and capacity-building

Alongside IGC's ongoing research, the GCX had been gaining traction with politicians in other ways too. In June 2015, President John Mahama launched the 'GCX Project', appointing a technical team to work on its design, who worked to ensure that the regulatory framework was ready and studied the viability of different commodities.⁴ Nyarko shared his findings from the 2016 project with the GCX project team, providing them with validation of their progress (R. Owoo, personal communication, 28 May 2024). He also worked closely with the team, providing technical support on the design of the GCX.

Two years later in 2017, the government announced the establishment of the GCX, as part of their national budget – a step towards the institutionalisation of the exchange. Nyarko was formally appointed Chairman of the GCX Technical Oversight Committee in August of that year, by the then Minister of Trade and Industry, Alan Kyerematen; **"I sought the assistance of Professor Nyarko. I knew he had that capacity to help us, so I created a technical oversight committee, and I put him in charge. It's recognising that you need that technical support – that is very important"** (A. Kyerematen, personal communication, 28 May 2024).

⁴ The main regulatory developments of this stage include: Commodity Exchange Regulations, 2014 (Memorandum); Securities Industry Act, 2016 (Act 929); GCX's formal registration as a private company limited by shares under a PPP model, 2017; and, issuance of its securities exchange license, enabling it to start its operations in 2018.



Trader, Eunice Osei, describes her experience at the nano commodities trade fair.

Minister Kyerematen's commitment to the project was clear from the outset. In 2017, he facilitated a meeting with the government's Economic Management Team (EMT), an advisory body to the Cabinet, where the GCX project team and Nyarko proposed a model for the GCX and advocated support for its implementation. Minister Kyerematen's position as an EMT member enabled him to bring the project to the forefront of the national agenda, and led the project through Cabinet approval:

"...it was [Minister] Alan who championed this in the cabinet with the EMT, [Minister] Alan led him [Nyarko] and it was he [Minister] who pitched the idea to the President, which led to a meeting with the President and later on other Ministers bought into it and then the project moved to the Ministry of Finance" (J. Dzansi, personal communication, 31 May 2024).

The GCX was registered in October 2017, with the government formalising its intention to operationalise the GCX in its 2018 Budget Statement: "...work on setting up the Ghana Commodity Exchange (GCX) and Warehouse Receipt System has been on-going for a decade. The Exchange is expected to enable easy access to markets, fair pricing for smallholder farmers, and formalise informal agriculture trading activities. Government's priority is to operationalise the Commodity Exchange in 2018" (Ministry of Finance, 2017).

Following this commitment, IGC continued to support the work through an additional grant, prioritising capacity-building efforts among key stakeholders, including government officials and the GCX team, to learn from global best practices. This grant supported activities including a series of high-level meetings in the UAE in October 2017, with various commodities and mercantile exchanges from around the world. Among the participants were the then

Vice President of Ghana, various officials, and the GCX project team. The meetings enabled the participants to see a commodity exchange in action and to interact with international players in this space. Additionally, a meeting with leaders from the ECX and the GCX was held in November 2017 to share best practices, and the funding supported several other meetings, workshops, and knowledge sharing events on warehouse management, technological solutions, and financial management systems unique to commodity exchanges.

In early 2018, a new management team for the GCX was instated and given until the end of the year to set the exchange up. Nyarko, being the Chair of the GCX Technical Oversight Committee at the time, played a role in appointing Dr Kadri Alfah as CEO. Alfah has recognised Nyarko's contribution and support, stating that their regular meetings facilitated shared perspectives and learnings, and provided a space to plan jointly for next steps, which was critical to the project's success (K. Alfah, personal

communication, 27 May 2024). The research insights, visits and lectures provided essential knowledge and context to the GCX team (R. Owoo, personal communication, 28 May 2024).

On 6 November 2018, the GCX went live, with inauguration by President Afuko-Addo. It was described as a "game changer for the Agricultural Sector in Ghana" (Ministry of Finance, 2018).⁵ During the launch, the then Finance Minister, Ken Ofori-Atta publicly thanked the IGC for its support and role in the launch of the GCX (Nyarko Y., 2021).

c. Evaluating the impact of the GCX

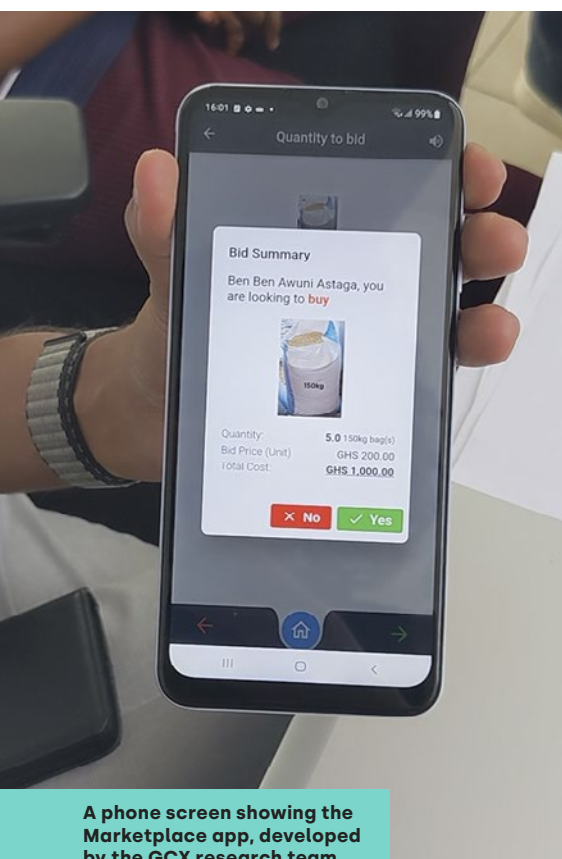
The GCX has expanded since its launch: more farmers and traders have used the platform each year; it has grown from two warehouses in 2018 to eight across the country by 2024; and since 2022 has expanded to include soybeans, sorghum, sesame, milled rice, and cashew, in addition to yellow and white maize.⁶ The total volume of trade also rose from around 100 MT by the end of 2018 to over 5,500 MT by the end of 2022, and the total value of trade had risen to over GHS 31.3 million by 2022. Furthermore, the Exchange has directly and indirectly employed over 1,700 individuals, integrating over 350,000 farmers into its network through training, and membership programmes (GCX, 2023).

Beyond the direct and indirect impact and reach of the GCX, multiple policymakers have referred to the positive effect it has had on farmers and their livelihoods, and how it has improved market access for agricultural produce and aided in job creation. Minister Kyerematen says **"the value comes from the fact that now they [farmers and traders] have a well-structured, organised system and infrastructure that allows them to feed their commodities into a system that will give them fair pricing.... [W]ithout an exchange basically you are left to the mechanisms of the market, where middlemen can take advantage of you; you can't use the financial system [and] there are no proper contracts and contracting arrangements for you as a farmer"** (A. Kyerematen, personal communication, 28 May 2024).

In 2019, Nyarko was interested in further supporting the government of Ghana and GCX by evaluating the impact of the Exchange, GCX by collecting data to study its impact during the harvest season. IGC further collaborated with Nyarko by providing a quick-response exploratory grant aimed at surveying farmers and buyers ahead of the harvesting season to understand their buying and selling decisions, and to test differences between GCX-registered and non-GCX-registered communities. To disseminate the findings of these initial survey results, IGC also funded a workshop in Kumawu in partnership with the GCX, where senior policymakers, including the Deputy Minister of Trade and Industry, engaged with the research team on the role of the GCX in the local economy.

⁵ The main regulatory developments of this stage, ensuring a stronger institutionalisation of the GCX include: Commodity Exchange Guidelines, 2019 (SEC); Warehouse Receipt Guidelines, 2019 (SEC); SEC and GCX Regulations issued in 2019, 2020, 2021 and 2022.

⁶ Furthering research on this cluster of work, in 2020, IGC supported a project by a different set of researchers (Felix Asante and Martha Awo) to conduct research on the value chains and the viability of including cashew nut and shea within the GCX.



A phone screen showing the Marketplace app, developed by the GCX research team.



Traders (research participants) register for the trade fair at the CTED Research Centre in Kumawu.

This work was supplemented by another IGC Commissioning Board grant in 2020, which supported collaboration with the GCX to conduct training and facilitation activities in a random sample of 50 villages. This research aimed to study the interest and take-up of the GCX amongst farmers, pilot the use of an app to study market frictions, and inform how the established national exchange could transform agricultural value chains, trade, investment, and productivity. The research showed that there were several constraints to overcome before the national commodity market could reach its full potential. These constraints included solving for transportation costs and distance to markets, the lack of warehousing facilities available locally and the nature of credit options available for smallholder farmers. It highlighted that although the uptake of the commodity exchange was good, it was not as high as expected and had further potential. These results later led to the trial of the nano commodities model, with IGC's support in 2021.

d. Creating new evidence-informed avenues for GCX scale-up

Data from the initial years of GCX operations demonstrated that while the Exchange had been steadily expanding, it was not as inclusive to smallholder farmers as expected. This was corroborated by the results of the IGC's research on evaluating the impact of the exchange in 2019, which revealed that the GCX could benefit from certain design changes to become more inclusive, including by improving warehousing facilities and credit facilities. Robert Owoo, COO of the GCX stated that the Exchange has yet to reach its full potential in the agricultural commodities field, as it can still grow both in terms of volume of trade and in the number of farmers and traders it can reach (R. Owoo, personal communication, 28 May 2024).

To inform the design changes through evidence-informed insights, the IGC funded a project in 2021 to pilot a model of the 'nano commodities exchange'; local agricultural markets "with small numbers of traders and farmers brought together in a central location in their own villages to engage in structured intermediated trade" (Nyarko Y., 2021). The research introduced a theoretical model of nano commodities exchanges and market formation and created a 'nano commodities exchange' marketplace in the central Ashanti region to study the outcomes of such a model (Nyarko, Y., 2022). The empirical research aimed to inform and facilitate the transition from nano exchanges to the GCX for both smallholder farmers and traders: "The nano exchange, as well as the national exchange, has the ability to lessen the information disadvantage suffered by marginalised groups, as well as for women. [...] There could be learning by doing on the nano commodity exchanges leading farmers to later enter the main national exchange" (Nyarko Y., 2022).

Ghana's Ministry of Agriculture at the time, Minister Owusu Afriyie Akoto, supported the research. He stated that some of the earlier projects and their research findings and recommendations helped substantiate the work that the project team was already doing, and he was willing to continue supporting the work (O. Akoto, personal communication, 27 May 2024). Subsequently, the Ministry provided a warehouse to the research team to carry out this experiment. Building on the findings of the pilot, the IGC provided an additional grant in 2022 through its eighth Commissioning Board to expand the research to a larger sample and include forward contracts within the project. This study is still ongoing.

For IGC Ghana's Country Director, Dr Nii Sowa, the nano commodities market and its future potential is what is most impactful about this work:

"For economic policy to really have a much stronger impact, the basic level or the unit level is actually more interesting than changes at the policy level (...) When you have the average person in Ghana benefitting from a particular project, is one of the greatest benefits that can be offered."
(N. Sowa, personal communication, 31 May 2024).

The research on nano commodities has received interest from the World Food Programme (WFP) due to its potential to tackle issues of food security. Chris Nikoi, Regional Director, WFP West Africa, explains *"...the people who face food insecurity when there's some shock, a large proportion of them can be farmers themselves, so the question is, if smallholder farmers tend to be a part of the most vulnerable community when there is a shock, what are the reasons for it and what can be done to ensure that [they] are not facing food insecurity? (...) Creating an exchange all the way as close as possible to the market (...) will then provide the linkages from the micro aggregators to the second level aggregators who then are able to utilise the GCX itself"* (C. Nikoi, personal communication, 27 May 2024).

Officials from the WFP West Africa and the WFP Ghana have visited Kumawu to study the model (Nyarko, Y., 2022); **"the problems across Ghana, Togo, Cote d'Ivoire, etc. are not different at all at the level of smallholder farmers so it's completely replicable (...) that's why we facilitated the learning mission"** (C. Nikoi, personal communication, 27 May 2024). WFP West Africa has also facilitated the visit of the Togolese Agricultural Ministry to observe the trade fairs in action, who now plan to replicate this model in Togo in future.

Many other countries have also visited the GCX to learn more about its model: former CEO of GCX, Dr Alfah recollects the visits of stakeholders from Kenya, Tanzania, Nigeria, Togo, amongst others, to learn from the GCX experience and success so far (K. Alfah, personal communication, 27 May 2024). In addition, the GCX has received interest and delegations from the EU, UNIDO, and USAID and has played a leading role in the creation of the African Commodities Exchanges Association (ACX) in 2023, a coalition of sixteen commodities exchanges across Africa under the leadership of the Africa Continental Free Trade Area (AfCFTA) (GCX, 2023; B&FT Online, 2023). The ACX is expected to support in harmonising trade regulations, expediting cross-border transactions and contributing to the realisation of a common African market.

4. What makes this case transformational?

Key achievements by dimension

- **Academic contribution:** The research funded by IGC led to a publication in the *Journal of Development Economics* and has advanced our understanding of how commodity exchanges can improve market functioning and enhance the welfare of farmers in low- and middle-income countries. Given the innovative, coherent, and rigorous academic approach, coupled with its high potential policy impact, IGC has consistently supported this work to explore new hypotheses that emerged from the research findings.
- **Impact:** A decade of IGC support for research and policy engagement was critical to the establishment of the GCX which now plays a significant role in Ghana's development and economic advancement.
- **Institutionalisation:** IGC-supported research contributed to policy decisions related to the design and establishment of the GCX, helped to position the Exchange at the forefront of the agenda of relevant policy stakeholders and supported capacity enhancement activities within the government.
- **Scalability:** GCX played a leading role in the setting up the ACX, and has grown as a regional leader in supporting other African nations in developing their own commodity exchanges, who aim to replicate the GCX model. Recent research on nano commodities exchange will help to inform strategies to scale the reach and impact of the GCX, with potential for this research to be applied in other IGC countries as well.

5. Drivers of change

Through our Transformational Change analysis, we have identified the following key factors that enabled IGC's engagement to contribute to change:

Ownership and support from policy champions. Effective communication with all relevant policy stakeholders – across the political spectrum and administrations – was crucial in enabling policy change. The IGC's position, as a neutral and respected partner, was important to maintaining a working relationship with government, even during times of political change. Additionally, having champions within the policy sphere for the GCX, who believed in and could advocate for its potential impact, was instrumental in driving the project forward and securing political support at the highest level.

Ongoing collaboration and researcher's commitment to policy impact.

The continuous collaboration between researchers and policymakers, from inception to implementation, was fundamental in informing the policy process through well-targeted research. Disseminating context-specific, relevant learnings and sharing feedback were key to this effort. Additionally, the Principal Investigator's commitment to achieving tangible policy impact played a crucial role in building strong relationships with policymakers and promoting capacity-building activities.

Supporting agile research and policy engagement processes through the strategic use of various funding streams. Offering a variety of funding streams (including rigorous competitive grants, fast response grants, seed funding for exploratory research, and funding for dissemination activities), enabled the IGC to identify important learning opportunities and support research and its dissemination, stimulating interest and maximising reach among policymakers, while expanding the literature on this topic.

Fostering long-term research collaborations. The presence of an IGC in-country team, with embedded country economists and country leadership for over a decade in Ghana, has fostered close, collaborative relationships with policymakers and researchers. This structure facilitated the co-generation of research, enabled timely exchanges between policymakers and researchers, and allowed frontier research to inform pivotal policy decisions.

Responsiveness to local demand for research and contextual relevance.

Having the commitment to support research and engagement in response to local priorities and needs was vital for ensuring impactful research projects. The IGC's country team's understanding of the local context and of domestic policy priorities was central to identifying these opportunities.

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