Annual Review

Title: Sustainable Cooling and Cold Chain Solutions Programme		
Programme Value £ (full life): £21million		**Review date:** July 2024
Programme Code:	**Start date:** March 2022	**End date:** July 2025

Summary of Programme Performance

Year	**1 (2023)**	**2 (2024)**				
Overall Output Score	**A**	**A**				
Risk Rating	**Medium**	**Medium**				

DevTracker Link to Business Case:	https://devflow.northeurope.cloudapp.azure.com/files/documents/Sustainable-Cooling-and-Cold-Chain-Solutions_Business-Case_IC-20230922020926_Redacted-20240313100340.pdf
DevTracker Link to results framework:	https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fdevflow.northeurope.cloudapp.azure.com%2Ffiles%2Fdocuments%2FSCCCS-LogFrame-2024_-20250123110156.xlsx&wdOrigin=BROWSELINK

A. SUMMARY AND OVERVIEW

A1. Description of programme

Cooling and refrigeration are critical for a safe and functioning society; however, many of these technologies use hydrofluorocarbons (HFC's) that are extremely potent Greenhouse Gases (GHG) and currently account for about 20% electricity use and 7% GHG emissions globally[1]. Demand for cooling and cold-chain equipment continues to soar in response to increasing global temperature rises, and without rapid action, predictions suggest rates could double for power consumption by 2050 and GHG emissions by 2030.[2] Furthermore, lack of effective refrigeration directly results in losses of 526 million tonnes of food production or 12% of the global total[3], representing a significant missed opportunity to improve global food security.

The Sustainable Cooling and Cold Chain Solutions (SCCCS) programme aims to deliver affordable, resilient and equitable cooling and cold chain to emerging markets, to improve economic outcomes and wellbeing, and reduce food and vaccine loss whilst mitigating the environmental impacts of cooling and cold chain through more energy efficient and climate friendly technologies. Outcomes are delivered through a whole systems approach developing the technical assistance, toolkits and policies to equip rural communities, policy makers and governments to deliver on development goals and accelerate the climate benefits of the Kigali Amendment to the Montreal Protocol through early integrated actions on energy efficiency and HFC phasedown. The United Nations Environment Programme (UNEP) are the lead delivery partner receiving Defra funding, working in partnership with University of Birmingham (UoB) as the lead academic partner, and further downstream partners. In-country partners including the

[1] Fox, T et al. 2024. The Hot Reality: Living in a +50°C World. Available at: CCN-The-Hot-Reality-Full-Report.pdf. K-CEP. 2018. Optimization, Monitoring, and Maintenance of Cooling Technology. Kigali Cooling Efficiency Program. Available at: Optimization, monitoring, and maintenance of cooling technology - Clean Cooling Collaborative.
[2] Fox, T et al. 2024. The Hot Reality: Living in a +50°C World. Available at: CCN-The-Hot-Reality-Full-Report.pdf.
[3] UNEP. 2022. Amid food and climate crises, investing in sustainable food cold chains crucial. Available at: https://www.unep.org/news-and-stories/press-release/amid-food-and-climate-crises-investing-sustainable-food-cold-chains

Government of Rwanda who allocated the dedicated campus for the flagship Africa Centre of Excellence for Sustainable Cooling and Cold Chain (ACES).

The SCCCS programme was established in March 2022, consolidated through the 2021 Spending Review (SR21) from individual projects starting in 2019 and is split into three main workstreams. The **Cold Chain Centres of Excellence (CoE)** workstream representing 80% of funding, aims to reduce food and vaccine loss through technical and knowledge support for capacity building and training for smallholder farmers, healthcare experts and technicians, through a hub and regional establishment reference model which can be replicated in other markets. This workstream is developing sophisticated modelling to establish cold chain need and identify optimal delivery pathways, and other models including the HFC Outlook Model, former workstream four. Workstream two, **Model Regulations,** develops guidelines and complementary tools such as public procurement guidelines and country savings assessments which serve as the basis for minimum energy performance standards (MEPS), labels and financing programmes for refrigeration and cooling improvements to accelerate implementation of the Kigali amendment. This is complimented by workstream three which pursues **Policy Harmonisation** at regional levels and **National Implementation** which delivers technical assistance to Governments for adopting and enforcing policies consistent with regionally harmonised model regulations. The programme is pan-African is scope, currently workstream one is operating in Rwanda and Kenya focusing delivery at the ACES centre and two rural communities in Kenya, with cooperation underway to expand further in Senegal and Lesotho. Replication of the CoE model is underway with two centres in India, Haryana and Telangana state. Workstream two and three are providing technical assistance to the East African Community and Southern African Development Community, which comprises 22 African nations (including Rwanda, Kenya and Lesotho).

A2. Summary supporting narrative for the overall score in this review

The annual review process for the SCCCS programme has identified good progress in the reporting period (August 2023 to July 2024). There has been important learning uncovered by in-country challenges this year, particularly in handling novel procurement processes and the time taken to develop skills in-country which have led to delays in getting specialist equipment to the Africa Centre of Excellence for Sustainable Cooling and Cold-Chain (ACES) in Rwanda and the first Specialist Outreach and Knowledge Establishment (SPOKE) in Kenya. Despite challenges, the programme team has adapted well to early implementation learning and is developing new understandings which will be reflected in more agile delivery going forwards.

Building on the past three years developing the first-of-kind system approach to cooling and cold-chain, comprising the toolkits, models, design and training, the programme is transitioning to implementation phase and due to the iterative nature of the programme, there remains some misalignment between activity and how this is measured in the logical framework (LogFrame). This review was undertaken by Defra through a desk-based assessment using the following sources: UNEP quarterly reports, ACES annual review[4], independent UNEP evaluation (2018-2022), LogFrame reporting and questionnaire responses provided by delivery partners.

A GESI audit conducted in 2023 scored the programme as 'GESI unaware' and the programme has developed an action plan to respond to these findings. The Defra programme team are reviewing and updating GESI ambition, currently set at GESI sensitive. A summary of programme responses to audit recommendations are highlighted in section C and E. Overall, the programme has achieved expectations this year and scores an A. This score acknowledges that despite some individual outputs not meeting milestones, due to longer delivery timeframes and setting of targets which had not duly accounted for the lag time to develop and test novel approaches, there is strong evidence outlined in the achievements below which demonstrate that the programme has set up a strong foundation and continues to build momentum.

Key achievements during the reporting period:

Centres of Excellence

- Phase-one launch of ACES in March signals growing stakeholder support for the CoE work, attended by over 100 stakeholders including the Rwandan Environment Minister, UNEP Chief of the Energy and Climate Branch, Defra Environment Director General and senior

[4] Available at: ACES-Review-2024.pdf

representatives from the Montreal Protocol Multilateral Fund, Ozone Secretariat and international development organisations.

- Finances and land for the Cold Chain CoE in Haryana, India, have been approved by the State Government, demonstrating the CoE reference and replication approach.
- The first foundation training courses have taken place in Rwanda, Kenya and India and received overwhelmingly positive feedback from participants.
- Over £19million of co-funding and in-kind support has been leveraged across programme workstreams, reinforcing the growing interest and buy-in to the programme.
- Research and expert team developed the community cooling hub (CCH) business model and design which is now moving to procurement of an integrated CCH offering multiple services underpinned by a single cooling energy system.
- Completed design and early internal testing on the first-of-kind complex virtual model using country-level data to design integrated cold-chain in developing markets.
- The HFC Outlook Global Model has been used to inform the targets set under the Global Cooling Pledge now signed by 71 countries and used as evidence to underpin multiple reports under the Montreal Protocol.
- Launch of the Clean Cooling Network (CCN) and Online Knowledge Platform in July this year which will underpin the global vision and become the key point of reference for knowledge sharing, information, training and networking capabilities.
- Delivery partners have made important progress in improving knowledge gaps of Gender Equality and Social Inclusion (GESI) in the cooling and cold chain sector and feeding this research through to evidence gathering and internal ACES Monitoring and Evaluation framework, training modules, all of which provide novel findings and tools to inform how to deliver the programme and future interventions, in a more equitable way.

Model Regulations and Country Savings Assessments developed through the **Model Regulations** workstream delivered to over 150 governments as part of the Montreal Protocol funded Twinning Training Workshops for National Ozone Officers, Energy Focal Points and Financial Mechanism.

Under the **Policy Harmonisation and National Implementation** workstream, the Southern African Development Community (SADC) approved harmonised MEPS and requirements for low global warming potential refrigerants for air conditioners and refrigerating appliances.

Breakdown of outputs below.

Output	Score
Enhanced capacities to implement policies, programmes, and investment plans	A
Improved skills and technical capacity within country to implement sustainable cooling and cold-chain solutions through capacity building	A
Increased access to, energy efficient and climate friendly cooling and cold-chain solutions for food and vaccines.	B

A3. Major lessons and recommendations for the year ahead

Key lessons learned:

- **Lesson 1. ACES Institute start-up challenges.** The bespoke procurement process for the institute has experienced both process-based and external delays in launching ACES, including hiring a procurement officer due to the nature of the programme and the skills required. The programme team has pivoted well to avoid further delays by supporting the development of a bespoke procurement process for the institute, which will provide the baseline approach for future reference model.
- **Lesson 2. Developing in-country standards.** Historic in-country refrigeration training has been delivered to varying standards, so the programme team has invested more time to building capacity in-country to meet international standards. This is being integrated into the reference approach to upscaling and replicating the CoE workstream which will adjust to in-country capability, needs and objectives.
- **Lesson 3. Managing external delays to delivery timescales.** Linked to last year's annual review, the CoE workstream has experienced slower delivery timescales due to in-country learning and delays due to novel contracting in Rwanda. As the programme evolves, so does

programme learning which will mitigate against similar issues in future by managing process-related risks earlier in the planning phase, including agreeing contracting details upfront to avoid changes which delay progress later.

- **Lesson 4. Streamlining Defra Reporting Process.** Internal Defra team changes and updated ODA requirements have led to additional reporting asks to delivery partners this year which have taken more resource and longer to action than anticipated. Defra should reflect on the communication and roll-out of these requirements and asks, and seek improvements to maximise efficiency and accuracy of information received.

Recommendations for the next year:

- **Recommendation [1] Delivery partners** should work with Defra to review the programmes LogFrame to ensure this measures the programme activities which represent the most impactful pathways to achieve desired outcomes and impacts. Changes should adopt the individual LogFrame recommendations outlined in Section C below, particularly reviewing milestones and reflect any enhancements made to the theory of change. This should be complete by the end of 2024.
- **Recommendation [2] Defra** should review meeting cycles and set out a clear timeline of reporting procedures for Delivery Partners to streamline asks and ensure alignment with ODA requirements. This should be done in the next two months.
- **Recommendation [3] Delivery partners** should account for lessons learned on delivery timescales in their workplans to ensure future delivery plans reflect the realistic timescale required to conduct activities, including flexibility for contingencies. This should be done as soon as possible. [Lessons 1-3]
- **Recommendation [4] Defra** should seek a time extension for the programme to allocate additional time required for administration of Defra funds as part of UNEP due diligence and to enhance monitoring, evaluation and learning of first phase programming to implement further lessons learned through to the upscale and replication model. This should be done in the next six months.
- **Recommendation [5] Defra** should develop a clear evaluation plan for the programme to ensure the right measures are in place to evaluate programme performance and feedback any lessons into programme governance, monitoring and delivery. This should include an in-country visit to meet with implementing partners and beneficiaries to assess processes and early impact delivery. This should be conducted ahead of the next annual review.
- **Recommendation [6] Defra and delivery partners** should establish a consistent approach to risk management at regular intervals which aligns with internal Defra reporting processes (Linked to Recommendation 2). This should be complete by the end of 2024.
- **Recommendation [7] Delivery partners** should continue to track feedback on training and GESI workstreams to integrate lessons learned into their analysis and activities in the next year. This should be monitored and continually updated throughout the year. **Note:** this responds to the GESI audit recommendation to clarify how GESI analysis is being integrated into project design.

B: THEORY OF CHANGE AND PROGRESS TOWARDS OUTCOMES

B1. Summarise the programme's theory of change, including any changes to outcome and impact indicators from the original business case.

The Programme's theory of change (ToC) is at Figure 1 below. The outcome and impact indicators have remained consistent since inception, however, minor and proportionate updates to the theory of change have been made to ensure this best demonstrates the integrated systems-level scale of intervention required to achieve lasting systemic change. Adjustments made are highlighted below:

- Expansion on the issue being addressed which must ensure growth is equitable and resilient against future climate shocks whilst optimising opportunities to mitigate negative climatic impacts, particularly targeting improvements to women and youth access to cooling and cold chain.
- At activity level, the programme is at the forefront of novel research activities including the return on investment from sustainable cold chain, policy and finance mechanisms which underpin uptake, testing and demonstration as a major activity of the Centres of Excellence.
- Exchange of information and research via the recently launched Clean Cooling Network and online knowledge platform will enable further opportunities for integrated activity across the workstreams and engage more stakeholders on the associated programme tools.

- For the programme to realise global reach and maximise benefits, this depends on expansion through the reference and replication approach as a key output, and linked to this at an outcome level, global cooperation and partnerships are crucial to gain both policy, social and financial support to expand the reach of the programme. Both steps are needed to achieve lasting, systemic change.
- The programme is expected to have far-reaching and long-lasting impacts particularly through reducing food and vaccine loss to increase productivity, decrease poverty and improve health and safety. At impact level this has been expanded out to greater resilience not just for communities but also to climate change and future shocks and disruptions to cold chain which is a crucial component of climate adaptation.

Key programme assumptions have been added to the Theory of Change for reference. It is anticipated that the combination of outputs listed in the ToC will collectively deliver the outcomes and impacts, however as a result of this annual review, the ToC and LogFrame will be reviewed to improve consistency across MEL and to address current misalignment between reporting and programme activities so this better reflects the pathways taken to achieve long-term outcomes and impacts. Current programme evidence indicates the underlying programme assumptions hold true. As a research and pathfinder programme we will conduct further review of underlying programme assumptions, and any new findings or changes will be reflected in the next annual review.

As a result of last year's review, Defra realigned the outcome on improved knowledge with the output on training to better reflect the theory of change that training is first required to realise any changes in knowledge. Through delivering training this year, implementers have identified that current standard of refrigeration technician training does not meet expected international standard. This has meant additional time is required to develop in-country capacity and demonstrates how delivery is being adapted to maximise quality outcomes and not just delivery of outputs. Prioritising quality of training across the programme is important and provides a stronger foundation for adopting programme solutions which can deliver socio-economic benefits for beneficiaries, and to economically empower smallholder farmers and their communities. This reinforces that the programme is taking the right approach to identify and deliver targeted assistance to meet the needs of local farmers, healthcare professionals and technicians. In addition, outcome indicator 2.2 has been adjusted to monitor the specific sub-set of farmers who implement training after course completion which then report improved income as a result, to better attribute the activities of this programme to reported improvements in participants income.



Figure 1 - Updated Theory of Change.

B2. Describe where the programme is on/off track to contribute to the expected outcomes and impact. What action is planned in the year ahead?

Model regulations guidelines and national implementation and policy harmonisation workstream activities are progressing as expected, and on target to meet programme objectives to equip countries with the capacity to shift in a sustained way to energy-efficient and climate-friendly cooling appliances. This is evidenced by the widespread use of model regulation guidelines and supporting materials, regional adoption of harmonised policy recommendations, and commitments for national implementation in many markets that previously had little to no progress on MEPS or labels for cooling products. The CoE workstream is on track to achieve the expected outcomes and impacts over the long-term scale; however, there is a reporting lag against programme outcome and impact indicators which monitor the amount and value of food loss avoided, economic benefits for smallholder farmers, and the impact of avoiding GHG emissions. Results at this level will not be realised until the necessary time has elapsed for equipment roll out, training and use.

There are no pre-existing tools which can assess the potential economic and nutritional benefits and environmental impacts of the cold-chain at the programme scale, therefore academic partners are undertaking novel research and testing to develop programme-bespoke cold-chain models which will help to improve monitoring, evaluation and learning at the outcome/impact level. Delivery partners should continue to test underlying programme assumptions and particularly where long-term impacts indicators are not yet reporting, adjust these as the programme evolves.

Furthermore, a time extension beyond current programme end date is recommended to complete all funded activities in line with procurement timeframes, UNEP's risk management and reporting processes and to enable more time to test and validate the ACES hub and SPOKE model to maximise impact of the reference and replication approach. Initial evaluation work for the programme has been undertaken by independent evaluators of UNEP's cooling portfolio and an initial evaluation plan set out as part of the original full business case. This plan is under review in light of annual review findings to ensure evaluation processes match programme evidence stages which should be set out in a more detailed Defra evaluation plan.

B3. Justify whether the programme should continue, based on its own merits and in the context of the wider portfolio

Based on the programme's progress since inception, future potential, and contributions to the wider portfolio, the programme should proceed into implementation and roll-out with the recommendations outlined above.

The work to develop and train countries on model regulations guidelines, support regional governments with national implementation technical assistance and harmonised adoption of MEPS is continuing to meet expectations. As this work is focused on voluntary government and regional-level policy change, the end-to-end process of agreeing, adopting, and regulating MEPS can take years to complete. However, the expected savings for 22 countries under SADC and EAC adopting MEPS is substantial (outlined in section C) and provides a strong basis for continuation of these activities.

Despite the lag time for reporting on outcomes and impacts, the programme contributes to multiple International Climate Finance (ICF) objectives, and evidence across the LogFrame this year suggests transformational change is likely (ICF 15). This is assessed by the following criteria: evidence of effectiveness is shared, and capacity and capability can be increased (drivers), leverage/ create incentives for others to act and replicability (mechanisms) and sustainability (enabler). The programme has significant training and outreach activity planned in the coming year which signposts the growing interest amongst beneficiaries, industry, governments and within the Montreal Protocol. Over £19 million of co-funding and finance has been leveraged since March 2023, including in-kind contributions of expert review and land. Continued financial and in-kind support is expected to continue and will bolster programme activities.

The Centre of Excellence work has required significant time and resource over the past three years to develop the design, toolkit and training resources, reflecting the first kind of system approach to cold chain which aims to correct previously flawed and siloed investment activities. The reference hub and SPOKE model have been developed through ACES and the Kenya SPOKE which can be expanded across Africa and replicated to new geographies using technical expertise developed by the programme. This model can be used to leverage in-country partners to finance and resource the build and operations, demonstrating good value for money, as demonstrated by expansion in Haryana, India. To maximise value for money of funding to date, the programme should continue to roll out the foundational activities developed through the current phase to continue important learning which can support expansion through the reference and replication model across Africa and into other markets. Further funding will realise greater benefits achieved through upscale and replication of activities to date.

C. DETAILED OUTPUT SCORING

Output Title	Enhanced capacities to implement policies, programmes, and investment plans		
Output number:	1	Output Score:	A
Impact weighting (%):	40	Weighting revised since last AR?	Yes, up from 30%

Indicator(s)	**Milestone(s) for this review**	**Progress**
Output Indicator 1.1 - Number of macro level tools developed for gaps and needs analyses and impact assessment	6	**5** (B) (1) The Community Cooling and Cold-Chain Needs Assessment Guide and Toolkit 2) A framework for analysis: the ACES cooling and cold-chain market 3) Virtual Model 4) Model regulation guidelines for off-grid refrigeration 5) Green public procurement guidelines for heat pumps
Output Indicator 1.2 - Number of SPOKEs / outreach programmes established	4	**6** (A) (Rwanda, Lesotho, Senegal, Kenya, India (2)) *(3 new, 3 cumulative)*
Output Indicator 1.3 - Number of organisations and countries using the HFC Outlook Model	15 (cumulative)	**18** (A+) (MLF, TEAP, Cool Coalition, University of Bristol, World Bank (IFC), Global Food Cold Chain Council, Bahrain, Bosnia, Dominican Republic, Gabon, Guatemala, Honduras, Kuwait, Mali, Senegal, Sri Lanka, Kenya, Rwanda)
Output Indicator 1.4 - Number of regional harmonisation activities for cooling products	2 (cumulative)	**2** (A) (SADC, EAC)
Output Indicator 1.5 - Number of governments receiving targeted support for implementation of MEPS or Energy Efficiency interventions (voluntary or mandatory) for cooling products	4	**4** (A) (1. Eswatini 2. Botswana 3. South Africa 4. Zimbabwe)

C1. Briefly describe the output's activities, and provide supporting narrative for the score.

This output focuses on developing the tools and delivering technical assistance to improve in-country capacities to implement programme solutions. This is an important first step to socialising the importance of sustainable cooling and cold chain and supporting governments, policy makers and local communities to adopt changes. The results across this output have met expectations this year and the programme is making good progress towards enhancing in-country capabilities, underpinned by the development of bespoke tools which will guide analysis and impact assessment of activities.

Output Indicator 1.1 - A key tool developed and to be released later this year is the virtual model to design integrated cold chains in developing markets, developed by Heriot Watt university. This will underpin future work to understand and develop optimised end-to-end integrated cold-chain solutions to meet social and economic targets; mitigate associated GHG emissions to meet environmental targets

and build resilience against future shocks and disturbances. Other programme bespoke models[5], are at various levels of development and field testing prior to launch and transition to commercial software. Models will remain in a continuous state of development and receive ongoing updates and improvements based on user feedback. Under the model regulations workstream, guidelines have been developed for off-grid refrigeration and green public procurement for heat pumps which is awaiting internal review in UNEP prior to publishing. These products provide the template for MEPS and reference criteria for sustainable public procurement (SPP) for governments considering new appliances and through regional harmonisation and national implementation, enable a fast-tracked development process and trust in using materials which are widely recognised internationally.

Output Indicator 1.2 - The first SPOKE delivered by ACTS in Konza, Kenya will be fully operational by the end of the year with activities underway developing the broader reference approach, comprising the key systems and processes to support further replication activities for additional SPOKES. There have been delays to site readiness for the installation of the try-before-you-buy (TBYB) equipment at the two selected sites caused by security issues and flooding. However, the first TBYB equipment is being installed at the Kinale site, with all training on installation, operations and maintenance conducted by equipment provider Ecozen. Statements of Cooperation to replicate the model in Senegal and Lesotho have been signed and scoping is underway for the Rwanda SPOKE community. Additional country partners have expressed interest in future SPOKES which indicates growing interest and uptake to realise the Pan-African reach of ACES.

Output Indicator 1.3 - The HFC Outlook model can better support government and policy makers to fully understand the climatic impact of RACHP equipment and assess pathways to reduce GHG emissions from products and equipment that use HFCs at a national, regional, and global level. This is currently being utilised by over 10 A5 Countries to provide HFC reduction and energy efficiency pathways to support Kigali phasedown targets. The model has evidenced the Global Cooling Stocktake Report led by the Cool Coalition, a sustainable cooling assessment by the Multilateral Fund of the Montreal Protocol (MLF) and energy and refrigeration impacts modelling by the Technical and Economic Assessment Panel (TEAP) of Montreal Protocol. This work has been integrated into the CoE workstream and will provide a strategic output for the modelling and data analysis pillar including developing Country Outlook Models for Rwanda and Kenya and will play an important role in developing the future cold-chain security index.

Output Indicator 1.4 and 1.5 - Regional harmonisation in the Southern African Development Community (SADC) was approved in February 2024 and consultations are underway in the East African Community which are expected to achieve similar results. The approved harmonised MEPS for air conditioners and refrigerating appliances for SADC estimates electricity savings of nearly 8TWh by 2040 which is equivalent to a reduction of CO2 emissions by 6.5 million tonnes and fosters additional cost-savings for consumers who are projected to save approximately US$840 million on annual electricity bills. UNEP are working with Eswatini, Botswana, Zimbabwe, South Africa, and The Gambia (funded by GCF) on implementation of the regional MEPS. Projected electricity savings for these partners are substantial and as high as 1.8 TWh in South Africa, which is equivalent to 1.9 million tonnes of CO2 (indirect emissions) and 3.6 million tonnes of direct emissions.

C2. Describe any changes to this output during the past year, and any planned changes as a result of this review.

The weighting of this output has increased from 30% to 40% since the last annual review. This is due to adjustments made to the LogFrame which resulted in one less output than previously reported, and weighting has been redistributed across the three outputs. As the HFC Outlook Model is now integrated into CoE, Defra and Delivery partners should consider how to best assess this in current phase implementation, to ensure that the right outputs from this modelling are reflected as a key pathway to outcomes on improved capacity to facilitate uptake of sustainable cooling and cold-chain solutions. Output 1.1 was adjusted since the last reporting period to specify tools developed, formerly tracking where this was applied. Once the CoE workstream modelling tools are in use, the LogFrame should measure outcomes on the number and type of users and usage, to track engagement with these first-of-kind tools and how this is supporting researchers, policy makers and governments to better understand and guide integrated action on cold-chain to deliver environmental and socio-economic goals.

[5] Models are categories into five groups: 1) Virtual Model, 2) Policy, Finance and Business models, 3) Horizon Scanning, 4) Digital Twins and Telemetric, 5) Return on Investment and Business models.

C3. Progress on recommendations from the previous AR (if completed), lessons learned this year and recommendations for the year ahead

A key lesson discovered through implementing the regional harmonisation process in SADC was understanding the numerous steps at government level including regional reviews, national consultations, and commenting and voting rounds to develop these. Technical assistance for national implementation of MEPS to front runner countries in each region has proven effective so that they can serve as models and increase the likelihood that other countries go beyond regional commitments. National implementation support in these countries will also provide lessons to feed into future implementation support activities.

Long procurement timeframes (up to 9 months for the Environmental Test Chamber) are a consistent reality for this programme due to long lead in times globally for bespoke and specialist equipment. The lack of availability and accessibility for alternative technologies in developing markets means all equipment is imported and subject to external trade and export pressures. Over the last year, the programme has learnt more about the procurement processes for equipment and in-country capacity. To avoid further delays, delivery partners provided more hands-on support through UNEP's head of procurement, which supported by the international expert team, developed a bespoke procurement manual for the programme which will be used to mitigate similar challenges with future replication.

Recommendations for the year ahead:

- Due to the long delivery period for some of these outputs, **delivery partners** should disaggregate results in the programme LogFrame between cumulative and in-year figures. Milestones should be reviewed for next year's reporting period.
- **Delivery partners** should adapt workplans to account for realistic procurement timeframes which remain flexible to external challenges, ensuring early lessons-learned are adopted to mitigate against internal delays for future roll-out and replication. This should be done as soon as possible.

Output Title	Improved skills and technical capacity within country to implement sustainable cooling and cold-chain solutions through capacity building		
Output number:	2	Output Score:	A
Impact weighting (%):	40	Weighting revised since last AR?	Yes, up from 30%

Indicator(s)	**Milestone(s) for this review**	**Progress**
Output Indicator 2.1 - Number of farmers attending training courses to address sustainable cooling and cold-chain development and access	1500	**171** (C) (79 Female, 88 Male, 4 Unknown)
Output Indicator 2.2 - Number of sectoral stakeholders (non-farmer) who have engaged with ACES	250	**1,144** (A++) (322 Female, 558 Male, 264 Unknown)
Output Indicator 2.3 - Percentage of farmers engaged (through to completion) through ACES and SPOKEs training and capacity building, reporting implementation of PHM and cold-chain initiatives	66	No data available
Output Indicator 2.4 - Number of governments/organisations that have participated in training (webinar or in-person) on the Model Regulation Guidelines	60	**99** (A++) 94 Countries and 5 organisations (LBNL, CLASP, GIZ, IGSD, IEA) at Twinning Workshops.
Output Indicator 2.5 - Number of procurement experts trained on the SPP toolkit	30	**7** (A) (SPP training in November 2023 for Egypt's Housing and Building National Research Center (1 Female, 6 Male))

C1. Briefly describe the output's activities, and provide supporting narrative for the score.

This output focuses on delivering training to improve in-country capacity to support implementation of programme solutions. This addresses skills gaps as a key barrier to uptake, identified through initial needs assessment. Training through will range from introductory fundamental level, master's courses, operational staff training and training new engineers for installation and maintenance of equipment, delivered and upscaled through train the cold-chain technician trainer courses for example, which is critical to implementation of solutions in country. Training can be deployed in physical centres and on the CCN knowledge platform for dual training capability. Overall, this output has met expectations this year and there is good progress made to capacity building despite underachieving some milestones.

Output Indicator 2.1 - Fewer farmers than expected have been trained this year due to equipment delays and as initial estimates failed to account for development and testing of training courses which took place for much of this reporting period. This is not expected to be a persistent issue as equipment is under preparation on site, future roll-out is expected to factor in lessons learned on equipment procurement into delivery plans, and trainings have been developed through ACES and Kenya SPOKE which can be adapted and rolled out at pace in future sites. Overall, 171 farmers have been directly trained through the programme this year, including through the first foundation training programmes in Rwanda, Kenya and India, and train the trainer courses on post-harvest management and cold chain in Rwanda and Kenya. This includes 36 individual farmers utilising the smart farm in Rwanda which delivers integrated research on wider climate adaptation challenges and will inform scale-up approaches to broader farming communities and food systems. Although it is too soon to measure improved knowledge as a result of training, there is positive early indication from the Kenya foundation training for example, where participants overwhelmingly rated the standard of facilitators, the relevance of training and how this improved learning, highly. Results from training will be assessed by follow-up surveys with trained beneficiaries and to monitor if this is having the desired outcome of improving equitable outcomes. The number of farmers reached through engagement at forums, workshops, events, and conferences is much greater, with over 780 farmers engaged through ACES this year. This includes a total of 196 farmers who attended the Farmers Forum in Kenya of which 90% showed interest to join the new horticulture cooperative. There has been a positive uptake and response to farmer training this year and participant interest in the training regularly outweighs places on the courses, which is a clear indication of demand for training.

Output Indicator 2.2 - The number of sectoral stakeholders who have engaged with ACES has exceeded expectations through extensive delivery partner engagement at global, regional, and local events, conferences, and forums to socialise the programme with farmers and financiers, leveraging engagement with and support for the programme. Despite delays to full operations at ACES, the centre has hosted multiple events, including a successful phase one launch in March 2024. Once equipment is installed at the Kenya SPOKE and ACES is fully operational by Spring 2025, this will facilitate greater numbers of farmers trained although the greatest impacts will be realised through engagement at higher levels to ensure buy-in to the reference and replication model. Participation by women has been slightly lower than desired this year for training as we aim for this to be gender balanced. Recommendations are being integrated into the next training courses to improve women's engagement such as through an emphasis on gender considerations in selection criteria. In addition, a bespoke training module for GESI integration in cooling and cold-chain interventions has been developed and already delivered in Kenya.

Output Indicator 2.4 and 2.5 - A wide range of governments and organisations have benefited from model regulation guidelines training this year as well as organisations such as United Nations Development Programme and World Bank using guidelines and related tools as a basis to set policies. Development of model regulations for heat pumps has shifted to wait for technical standards which are still being pursued by a technical cohort beyond the scope of UNEP and there has been a delay to the training webinar for off-grid refrigerators (now anticipated in Autumn 2024). Despite this, outreach by UNEP has reached further than expected due to twinning training in partnership with OzonAction, funded through an $890,000 MLF grant. This targets national ozone officers and senior energy officials and promotes the deployment of existing Defra-funded Model Regulations Guidelines and Country Savings Assessments, highlighting the savings opportunities. The Sustainable Public Procurement (SPP) sub-project was a part of the individual projects funded prior to SR21 and many of the original project deliverables were achieved and concluded in reporting period 2022/23. The milestone for this period did not account for the natural tail end of training and in-year results do not reflect that original project aims have been met. Therefore, it was agreed that this has met expectations despite the target

not being reached. Continued promotion of the model regulations guidelines and related tools through technical workshops and international events by UNEP will continue to be an effective means to maintain awareness and secure buy-in toward further utilisation. SPP activities will also continue in other markets going into the future building up on the original workstream.

C2. Describe any changes to this output during the past year, and any planned changes as a result of this review.

The weighting of this output has been increased 10% as per reasoning highlighted in the previous section.

Output Indicator 2.3 was developed following last year's annual review to capture the capacity building chain from training through to implementation and when sufficient time has elapsed, surveying self-reported improved income as a result of the training programme(s). There is no data for this output noting the delivery and subsequent reporting lag between design, equipment installation and training leading to purchase impact and changes in farmer and consumer practices. This should be adjusted to an outcome, based on the programme assumption that increased knowledge will lead to increase uptake and adoption of practices.

Targets for Output 2.1 and 2.2 should be reviewed and noting operational capacity at ACES and Kenya SPOKE, set with ambitious but realistic milestones. Results where possible, should also distinguish the difference in sources/output of training where beneficiaries of the train-the-trainer programme will act as community mobilisers to exchange this knowledge within their cooperatives - leading to more people trained as cumulative impacts of initial training.

Results from this year show that engaging farmers beyond initial training participants is a key step to raising awareness of the programme and encouraging future participation. In recognising this, Defra recommend that output 2 should be expanded to report the number of farmers who have engaged with ACES but that this should remain disaggregated from the training output, recognising the difference in outcomes between engagement and training. It would be insightful to track the percentage of farmers engaged with ACES that then become trained through the programme to track the effectiveness of outreach through visit, events, and workshops – this should be explored. In track with the step change designed through the programme, at a later stage this should monitor what trainees do with their training and the rate and type of implementation.

C3. Progress on recommendations from the previous AR (if completed), lessons learned this year and recommendations for the year ahead

Delivery partners have made significant progress on mainstreaming gender equality and social inclusion within programme design. This work is underpinned by a six-pillar GESI workstream which is developing the design and framework, analysis, monitoring and evaluation tools, policies, and safeguarding measures to integrate GESI into every stage of the CoE workstream. Actions are responding to the GESI audit and include the development of a GESI cooling and cold chain sector transformations scoping report on the gaps, opportunities and challenges faced in achieving equitable access to cold chain. This responds to the recommendation to strengthen GESI analysis for workstream one and is being fed through to the development of a GESI framework for evidence gathering and project design and GESI MEL framework, as well as the preparation and delivery of training materials on GESI capacity and awareness for implementing partners and beneficiaries.

An ACES Equality and Diversity policy and Safeguarding and Sexual Exploitation, Abuse and Harassment (SEAH) policy has been developed which will be used to guide all implementing partners. In response to recommendations to ensure indicators are gender sensitive, the LogFrame was reviewed and disaggregated to distinguish results by gender. As a result of this review, the LogFrame should be developed further to clarify who the programme will reach and how they will benefit. Following the work preparing the tools, policies, and training for integrating GESI into ACES design, **delivery partners** should take early opportunities to test what impact this is having on intended beneficiaries and continue to apply lessons from implementation back to research and policy development. This will respond to audit recommendations to clarify how analysis is being integrated into project design

Defra realigned improved knowledge as an outcome in the LogFrame last year, however further alignment is recommended to better demonstrate the complete capacity-building pathways and lag time between stages to deliver the expected outcomes and impacts. A key lesson to take forwards into future roll out is recognising that existing refrigeration training standards in-country may be at a basic-level

and require more time to deliver capacity to international standards. As a result, ACES will have a highly competent team and operating procedures to train the trainers in other markets, which demonstrates good value for money. Start-up challenges for the institute have slowed complete transition to the ACES board, whilst processes are developed and tested through the first time developing this approach in-country. Delivery partners are proactively exploring with Kenyan partner Africa Centre of Technology Studies (ACTS) on how to future-proof this process to avoid similar start-up challenges in future.

Recommendations:

- In the next year, **delivery partners** should focus on follow-up engagement with trainees to track whether training is having the desired impact on improved knowledge, and on improving equality in access and experience for women, youth and rural communities and as per iterative nature continue to refine delivery to maximise equality of impact and identify any unintended impacts.
- **Defra and delivery partners** should review the milestones for this output, particularly where currently overly exceeding and under exceeding targets. This review should consider whether output 2 is tracking the right activities at this stage to facilitate the expected outcome for improving uptake of sustainable cooling and cold-chain solutions. **Defra** should move output 2.3 to outcome level and consider retiring or adjusting output indicator 2.5 now that the original deliverables are complete.
- **Delivery partners** should include an analysis of existing refrigeration training standards as part of community needs assessment and integrate this as standard in the reference approach for future replication.

Output Title	Increased access to, energy efficient and climate friendly cooling and cold-chain solutions for food and vaccines.		
Output number:	3	Output Score:	B
Impact weighting (%):	20	Weighting revised since last AR?	No

Indicator(s)	**Milestone(s) for this review**	**Progress**
Output Indicator 3.1 - Number of Community Assessments conducted to support equipment deployment	8	**2** (B) (Cooling Needs Assessment in Rwanda and Communities needs assessment in Kenya)
Output Indicator 3.2 - Number of demonstration activities completed with support from ACES	12	**5** (B) (Vaccine Cold Chain Symposium 9-11/10/2023 ACES workshop and inaugural conference 17-19/10/2023 ACES phase one launch 4/3/2024 Visit by Kingdom of Lesotho Officials in August 2023 Visit by Rwanda Officials, including Minister of Environment, Education and from University of Rwanda, pre-launch March 2024)
Output Indicator 3.3 - Number of public health interventions contributing towards sustainable delivery of vaccines for future needs, and vaccine/cold-chain demand mitigation	10	**10** (A) (5 research studies, 2 vaccine programmes, 2 key events and 1 additional education activity)

C1. Briefly describe the output's activities, and provide supporting narrative for the score.

This output focuses on deploying activities which increase access to programme solutions through outreach, demonstration, and knowledge dissemination. LogFrame milestones have not been reached for conducting community assessments and demonstration activities, however, there has still been

good progress considering lessons learned on the time required to first deliver the foundational pathway activities needed to achieve long-term outcomes and impacts.

Output Indicator 3.1 - Fewer individual assessments were conducted this year; however, the Kenya communities needs assessment was much more comprehensive, involving: data collection, interviews with key informants, focus groups, consultations and farm visits reaching over 1000 people and will support the deployment of training and capacity building in communities participating in the reference SPOKE in Kenya and outreach activities, including identifying the pilot communities for TBYB. This represents a key activity needed to deliver targeted assistance to increase access to locally driven solutions and will help guide future community assessments in Senegal and Lesotho to understand the gaps, challenges, and opportunities to delivering SPOKES in new locations.

Output Indicator 3.2 - The number of equipment demonstrations has not met expectations this year due to delays in getting equipment on site. This is due to various factors: weather conditions making site preparations slower than anticipated in Kenya, customs delays, the availability of specialist parts for bespoke equipment and the practicalities of delivering overseas equipment to locations that are not readily equipped for this activity. Over 10 pieces of sophisticated equipment are at varying stages along the procurement, delivery and installation chain for ACES and the Kenya TBYB locations, with some pieces already installed on site and ready for training to be conducted by manufacturers. Other equipment is in customs and some awaiting shipping. Once equipment is on site there is additional lag time prior to training to account for installation, testing and then to train local technicians on the operation and maintenance on site. Despite this, equipment such as koolbox solar-powered freezers and Danfoss Cold Room has been used for demonstration purposes at official events and other awareness purposes during visits from Government officials which can impact technology considerations when setting supporting policies, investments and deploying training, for example. The number of demonstration activities is expected to grow exponentially once ACES is fully operational in Spring 2025 and through demonstrations in mobile training such as TBYB and training community mobilisers through further train the trainer programmes.

Output Indicator 3.3 - The focus of the vaccine cold chain work is in developing an industry leading system that delivers equitable access to new vaccine technologies, reduces waste and inefficiencies, is resilient to future climate shocks and can be applied to all vaccines and future vaccine-preventable diseases. There has been over £2.5million of finance leveraged for the vaccine workstream through in-kind support and external grant awards, including two clinical PhD salaries and non-clinical PhD students from Rwanda. There has been widespread dissemination of programme findings to the community of healthcare professionals and policy makers including at the UK Clinical Vaccine Network *C*onference which presented ACES to over 150 UK leaders in clinical vaccine research, and the joint ACES/Rwanda Biomedical Centre Vaccine Symposium in Kigali which brought key partners from the UK together with 100+ partners in Rwanda for a week of presentations and study site tours. Overall activities are on track and expected to increase in the next year as research projects get underway and feedback novel findings as a first step of research out of Rwanda into SPOKEs.

C2. Describe any changes to this output during the past year, and any planned changes as a result of this review.

No changes to this output have taken place this year. This review identified a reporting overlap between methodologies for this output and related outcome indicators. **Defra and delivery partners** should review the methodologies for this output to check that the right activities are being tracked and to avoid double counting results across indicators.

C3. Progress on recommendations from the previous AR (if completed), lessons learned this year and recommendations for the year ahead

Based on third party reviews of existing work in the cold chain sector, previously conducted needs assessments have lacked the granularity needed to understand the key drivers and levers for effective change and have not given due consideration to resilience planning. Delivery partners are developing guides to set standards and ensure consistency in design and output for study teams undertaking assessments, including a community cooling and cold chain needs assessment guide and toolkit developed by ACES, UoB and ACTS.

The research team are developing methodologies for testing equipment in Africa for the African market which is an important step to enable comparison of equipment and metrics to check it is fit for purpose

and top performing. This includes developing commissioning and testing programmes for site equipment, to ensure consistency with standards and quality control of manufacturers.

There have been delays with in-country procurement for specialist equipment due to the time taken to develop in-country refrigeration training to expected international standards. This learning has led to the development of the ACES procurement manual and will be supported through coordination across partners to unpick issues prior to installation. External factors which contribute to long procurement timeframes will be factored into workplans. Additional factors, such as risk of theft or damage to equipment should be handled by UNEP and monitored through an asset inventory (this is set out in further detail in risk management section below).

Recommendations:

- **Defra** should review this output with **delivery partners** to avoid duplication of results across the LogFrame.
- **Delivery partners** should review milestones in the LogFrame in line with planned activities in the next year to set realistic targets.

D: RISK

Overview of risk management

The risk level of the programme is medium, updated from Low/Medium as outlined in the original full business case. The risk management process was refined in Spring 2024, and key risks to delivery have been signalled to Defra in monthly monitoring meetings between Defra and UNEP. Delivery partners also maintain their own risk registers, which feed into the updated quarterly reporting structure. Following structural changes within Defra, there is a need to establish a new process to escalate programme risks to an appropriate board and better integrate risk management across all categories with delivery partners, which should be done before the end of the year. Overall programme risk increased at stages throughout the year due to factors set out below. Programme risk remains within appetite which adopts the ODA portfolio risk appetite (outlined next to each risk category below). As an action from this review, Defra will update the programme's risk appetite, taking into account areas where there may be a higher level of risk appetite (for example, on innovative elements). Key risks from the reporting period are summarised below:

Project and Programme (Open)

- As set out in the previous annual review, governance of the ACES centre and procurement challenges remain as programme risks, which have led to overall delays. In response to the recommendations last year, initial Government to Government calls were established to enable workplans to be monitored and avoid further in-country delays. With the transition of ACES to the Institute, workplans and processes are now managed by the ACES oversight board, and daily management and implementation led by the operational team. However, full operational capacity has been slow to establish due to key staffing vacancies (Executive Director) and limited in-country capacity to develop bespoke processes. The ACES Board have stepped in to support the day-to-day operations with oversight from Rwanda Environment Management Authority while putting in place the formal governance structures, managed through weekly calls.
- As risk mitigation, UNEP have held release of initial funds to the institute until key processes are in place including an agreeable work plan and procurement plan, cash flow document, manuals and key positions filled. The campus will officially move over to management by the ACES board once a comprehensive risk assessment is complete. Senior Rwandan officials have scaled-up direct support and commitment to ensure follow through, and experts from the International CoE team have been added to the Institute Team to address initial gaps.
- Regional harmonisation and national implementation work may be subject to delays due to the reliance on different stakeholders to progress work, and compliance with comprehensive Government processes is dependent on government capacity and priorities. UNEP have mitigated these risks by working directly with front-runner countries in the region first, and better understanding countries' policies and positions on regional MEPS before putting it to a vote. The potential delayed delivery risk will always remain; however, these external factors were always known about the project and remains within appetite.

Financial and Fiduciary (Cautious)

- There is a risk as the programme grows and outsources activities to additional downstream partners that there is less control over a complex delivery chain and management of funds and resources. For example, there was an instance of theft this year of some TBYB unit components (approximate value £750) whilst in storage. Delivery partners have implemented mitigation procedures such as reviewing the sequencing of equipment arrival and additional security measures; however, this was not escalated through the risk management process. Delivery partners should raise all instances of theft/ fraud to Defra as soon as they become aware. An asset inventory should be established to record all equipment as standard procedure for monitoring programme assets.

Safeguarding (Cautious)

- Safeguarding practices have been a major focus this year, as well as GESI considerations. The completion of a GESI scoping report, as well as robust SEAH and safeguarding policies that can be rolled out to all future centres, will ensure policies are consistent for all staff and students of the Centres and Spokes. Specific safeguarding policies will need to be developed ahead of the creche facility opening at the ACES campus in Rwanda and delivery partners should assess how effective this is at removing gendered barriers to participation. Defra and delivery partners should encourage open discussion of safeguarding risks through the delivery chain to ensure that all partners and beneficiaries are aware of routes to escalation at every level. There is ongoing work to review and update the Defra programme team's approach and plan on SEAH safeguarding which should be included in the next Annual Review.

Delivery and Operational (Cautious)

- The risk to Defra internal capacity heightened in the latter half of this reporting period due to internal movement and key vacancies that could not be filled during recruitment restrictions. This made it difficult to digest the amount and level of detail of some reporting, as well as manage workloads and updated ODA guidance. With a fully resourced team structure now in place, Defra will focus on re-establishing clear processes to support smooth programme management which fulfil ODA compliance measures.

Strategic Alignment

The programme is closely aligned with the Paris Agreement. The programme's underpinning objective is to enhance the climate benefits of the Kigali Amendment to the Montreal Protocol through early integrated action on energy efficiency and HFC phasedown in developing countries. Through system design the programme is considering climate and environmental risks are identified and reduced at every stage, carefully considered through design of the tools, model, training and design for the cold chain centres of excellence.

Strategic and Contextual risks *(Open)*, and Reputational risks *(Cautious)* remained minor over the reporting period. We continue to monitor these risks by working closely with Posts, and UK Government stakeholders.

E: PROGRAMME MANAGEMENT: DELIVERY, COMMERCIAL & FINANCIAL PERFORMANCE

Summarise the performance of partners and Defra, notably on commercial and financial issues.

Delivery against planned timeframe

There have been delays in delivery timescales for the CoE workstream due to a combination of novel procurement processes, long lead times for equipment and in-country challenges which have provided important learning to support more agile delivery in future upscaling and replication. As a first-of-kind programme these challenges are being translated into lessons and recommendations have been set out for Defra and delivery partners to ensure these risks are monitored internally, expectations for risk management made clear with delivery partners, and for delivery partners to account for realistic timeframes and possible contingencies in their workplans, providing flexibility tolerance noting the iterative nature of learning.

Financial Management
Regular finance calls between Defra and UNEP were established following recommendations last year to better navigate the contracting and procurement channels and plan, to ensure timely processing. Since the transition of ACES to an independent autonomous institute, the ACES Board have been working closely with UNEP procurement to mitigate the previous issues of contracting/procurement channels. Earlier this year, UNEP's head of procurement prepared a procurement manual to support future processes and committed to act as procurement officer on behalf of the ACES institute to fast-track support to reduce procurement delays.

Due to exchange rate variance, previous year actual spends overshot in-year forecasts which cumulatively meant there was less funding available to spend this year than planned. As a result, programme partners have readjusted activities for the forthcoming reporting period to account for a slight shortfall in budget for the year. Monitoring of finances is handled by UNEP. Defra should consider introducing a financial reporting system and frequency with UNEP as appropriate.

Partner Performance
UNEP's Terminal Evaluation of Cooling Projects from 2017-2022[6] was rated highly successful and independent evaluators recognised the systems approach to promote sustainable cold chains in countries where previous isolated efforts have failed, as a key strength. The project research team are committed and provide technical expertise across the complex workplans to deliver the cold chain CoE programme, meeting monthly to monitor progress across work areas to identify risks, challenges and solutions to ensure efficacy of activity and to unblock issues. UNEP have the right in-house capabilities to deliver this programme and coordinate across the academic and downstream partners.

There have been some moderate delays to UNEP's quarterly reporting during this review period, however this more widely reflects the reporting process across downstream partners and several hands-on deliverables ahead of the ACES launch. UNEP have hired additional staff to support programme management including a strategic coordination and partnerships lead. Improvements have also been made to governance and oversight, through development of the CNN and online platform which will improve coordination and support as the programme scales up. Further improvements will be supported through recommendation 2.

Risks Dialogue
This year, Defra developed a comprehensive delivery chain map with support from delivery partners to capture the number of academic institutions, governments and industry involved through the programme down to the delivery of training activities. This should be monitored and updated on a rolling basis as the programme brings on new partnerships. Risk management is reviewed in the above section.

Monitoring and Evaluation
Since the last review, Defra undertook visits to monitor and support delivery of ACES site readiness ahead of the first phase launch, including attending the launch event itself. Due to personnel changes in Defra and the transition of the CoE workstream from design and build to implementation and delivery, the focus of Defra programme management is shifting. This next year, Defra should arrange a field visit to ACES and/or Kenya SPOKE to engage with operations on the ground and with programme partners and beneficiaries to understand how early implementation activities are working for those engaged with the programme and it's training. Plans on evaluation should be expanded from the original full business case and set out in an evaluation plan ahead of the next Annual Review.

UNEP have raised an issue of misalignment between Defra's and downstream partners reporting processes, making consolidation and reporting to Defra a challenge. Whilst updates to governance schedules and monitoring meetings between Defra and UNEP were refined this year, Defra recognises that processes could be more streamlined and will consider any further revisions to improve efficiency of programme management.

E2. Assess the VfM of this output compared to the proposition in the Business Case, based on performance over the past year

[6] Terminal Evaluation of UNEP Cooling Project - United for Efficiency

Economy
Spending for the programme across workstreams has been consistent with that set out it in the business case. There have not been any changes in the cost of major inputs and cost drivers, however slower delivery timescales particularly for procurement means there is a risk of overspending on staffing budgets. As mitigation, delivery partners have remained agile in resourcing across the programme and where required have shifted work forwards to maintain delivery, and moved staff across workstreams to reallocate resource rather than increase staff costs. The UNEP terminal evaluation concluded that procurement is conducted in the correct way, and that procurement for the ACES project avoided additional costs by conducting procurement in-house instead of a third-party[7].

Efficiency
Value for money of Defra's anchor funding has been enhanced through delivery partners securing co-funding and leveraging finance to date. The programme has received over 100% match funding to date which includes over £19m secured between April 2023 - July 2024, equivalent to 90% Defra programme value[8] . Furthermore, across all workstreams, various events are also hosted at the cost of event sponsors and travel expenses often covered by other parties. It is expected that ongoing co-financing and partner support will continue to be secured to deliver the self-sustaining approach.

As outlined in last year's review, training delivered through community mobilisers is an efficient way of funding training to a few individuals which then share skills and knowledge within their community for maximum impact. This year, teams from Rwanda and Kenya attended a two-week course with Cool Concerns in the UK and an on-going programme is under development which will ensure that training outreach is conducted to international standards.

Regional harmonisation programmes are cost efficient as they engage multiple countries at the same time while only one set of core policies need to be developed and agreed upon. Model Regulation Guidelines benefit from significant donations of time as well as data which underpins the development of both the guidelines and preparation of supporting information documents. Based on estimated value of in-kind support, over 40% of co-funding and finance leveraged between April 2023-July 2024 for workstreams 2 and 3 came from donations of time and resource.

The emerging build, own, operate approach to replication of the Cold Chain Centres of Excellence (CoE) workstream provides good value for money, as Defra funding, which has developed the CoE reference model provides the technical assistance, and costs for development and operations are leveraged in-country. Although, a needs-based approach will continue to be taken depending on geography, for example expansion across Africa is expected to require continued support on equipment purchase. The effectiveness of this approach is being tested through Haryana CoE where the State Government has committed funding to build and begin initial operations of the centre. This is the approach which can best leverage support from the UN Montreal Protocol MLF and the development of plans to support optimised delivery of the Kigali Amendment.

Effectiveness
It is not possible to measure all outcomes and impacts at current early implementation phase, however the pathways taken are highly regarded as the necessary steps to achieve transformational change. Year 1 and 2 LogFrame results indicate that transformational change is likely (ICF 15). Longer term impacts on food saved and economic returns for farmers will not be realised until the necessary time has elapsed for implementation and equipment use, however there is still good progress at outcome level. For example, since programme inception 11 reports have disseminated programme knowledge including findings from the 3 Degrees of Change report[9] which have influenced supermarket chain Morrisons to trial raising temperatures of their freezers to save energy and money.[10] 39 individual commitments to support ACES have been signed including major multi-national technology partners and funding from International Finance Corporation to showcase early-stage technologies at ACES.

Equity

[7] Page 89, UNEP Terminal Evaluation .
[8] This figure is calculated using Defra funding only and not co-funding from host country partners. Accounting for co-funding from Government of Rwanda and State Government of Haryana, this would be equivalent to 60% overall programme value.
[9] The-Three-Degrees-of-Change_Summary-Report_November-2023.pdf (sustainablecooling.org)
[10] Morrisons trials raising temperature of its freezers to save energy and money | Morrisons | The Guardian

Ensuring that uptake of and access to cooling and cold chain is equitable is a key consideration for the programme. The focus on delivering equity to date has been in addressing key knowledge gaps through research and developing novel frameworks and tools to capture impacts on equity. The GESI mainstreaming approach is being developed in partnership with ACTS to develop a consistent strategy for the Kenya SPOKE, ensuring alignment with the ACES GESI framework and underpinning the model for future upscaling and replication. Initial training results show that there is a slight gender imbalance in participation. Of the number of farmers trained this year, ~47% are women and ~28% of other stakeholders engaged through ACES are women (~23% unknown). Insight from the World Food Logistics Organisation (WFLO) led post-harvest training course in Kenya noted that participation by women is impacted due to the projects engaged having low representation of women in leadership positions.

The focus of GESI workstream activity has been developing the research base to understand the challenges and opportunities of the cold-chain, to improve equality of outcomes for targeted beneficiaries (small-holder farmers, women, and youth). This was an important first step as the existing literature on the role of gender in the cold-chain sector, is insufficient. Delivery partners have also developed policies and assessment tools for standardisation on SEAH and safeguarding and developed a monitoring and evaluation framework to assess programme outcomes from the GESI lens to feed improvements back through to design and delivery. Through increased roll out of activities, the next annual review should report on how programme findings are being fed back into improving equitable outcomes in design and delivery and how this delivers value for money. As part of this, delivery partners should integrate learnings from early trainings and activities back into design to maximise access and participation of marginalised target groups in the programme at all levels.

Cost Effectiveness

There are early indicators of cost effectiveness recognised through this review, such as efficiency in delivery and inputs, however it remains too soon to comment on overall cost-effectiveness. It is recommended that the Defra programme team develop quantified metrics of the 5 ‘E’s’ for the next annual review.

Date of last narrative financial report		Date of last audited annual statement	