



# Learning to Co-Produce

## An online course

Review of piloting the L2CP training  
January 2021



## 1. Introduction

Learning to Co-produce (L2CP) is an on-line course designed for post-graduate meteorological students (or those engaged in studies related to meteorology, such as hydro-met and agri-met) to strengthen their engagement with decision-makers and users. The project was funded by the UK Research and Innovation (UKRI)/ Foreign, Commonwealth and Development Office (FCDO) Science for Humanitarian Emergencies and Resilience (SHEAR) programme, within the programme's Impact and Integration component. It was originally planned that the course would be developed and piloted through a series of face-to-face workshops. With the onset of the pandemic in March 2020, the team instead developed and piloted an on-line course.

L2CP partners include: University of Nairobi, Agence Nationale de l'Aviation Civile et de la Météorologie (ANACIM), Université Cheikh Anta Diop (UCAD), Kenya Meteorological Department (KMD)'s Institute of Meteorological Training and Research (IMTR), the Uganda National Meteorological Agency (UNMA), the IGAD Climate Predictions and Application Centre (ICPAC), Kenya Red Cross Society (KRCS), the Walker Academy at the University of Reading, the Universities of Bristol, Oxford and Sussex, the UK Met Office, the UK Centre for Ecology and Hydrology and King's College London, which is leading the initiative. Through African Science for Weather Information and Forecasting Techniques (SWIFT) project, L2CP also partnered with ACMAD and the Federal University of Technology, Akure (FUTA), Nigeria. UNMA also engaged the participation of Makerere University and Uganda's National Meteorological Training School, and ANACIM engaged the Université Gaston Berger (UGB), in piloting the course.

Drawn from a wide range of experiences in developing weather and climate services for different countries and contexts across West and East Africa, the course comprises 10 modules providing:

- A background on the process and principles of co-production
- Approaches for conveying key climate concepts to non-technical users,
- Understanding the decision-making context and supporting users in appropriately using weather and climate information; and
- Monitoring and evaluation to demonstrate the impact of weather and climate services.

The modules bring together theory and practice, with each module containing a series of practical exercises illustrated with case studies, films and animations, together with links to resources for in-depth follow-up. All of the course can be undertaken remotely. Each module is designed to last around 1 hour with follow up assignments to be undertaken individually or in small groups. In the piloting, each block of modules was followed by a live follow-up where the L2CP team and course convenors provided feedback on assignments.

With the aim of supporting its integration within the core curriculum of meteorological training, the training was piloted between October-December 2020 with 105 students and staff enrolled from across 11 institutions, including: IMTR/KMD, University of Nairobi, KRCS, Uganda's National Meteorological Training School, UNMA, Makerere University, ANACIM, UCAD, UGB, FUTA and Imperial College. 46 students completed the course, with principal challenges to completion including: the course only being available in English, insufficient on-line access, and insufficient time for engagement alongside existing work commitments. The project aims to support the development of a French language version of some of the modules in early 2021 and, if funding permits, enable auto-enrolment via the Walker Academy platform where the course is housed.

This report summarises learning from the course review and evaluation, demonstrating:

- a. The feedback from students and institutional leads who took part in piloting the course;
- b. Demand for the course; and
- c. Areas for further development.

## 1.1 Overview of modules

The course is hosted on the Walker Academy platform <http://www.walker.ac.uk/academy/learning-to-co-produce/>

		Content
Block 1	Module 1.1	Principles, process and actors involved in the co-production of climate services
	Module 1.2	Practical approaches and skills to support the co-production process
	Module 1.3	Bringing together local and traditional with scientific sources of knowledge about the weather and climate
Block 2	Module 2.1	Key concepts about weather and climate and conveying these to non-technical decision-makers
	Module 2.2	Climate systems and their predictability, and communicating these to non-technical decision-makers
	Module 2.3	The probabilistic nature of weather and climate information: quantifying, interpreting and communicating forecast uncertainty
	Module 2.4	Measuring forecast skill
Block 3	Module 3.1	Understanding the decision-making context in which climate information is to be used
	Module 3.2	Building decision-makers' confidence in using climate information
Block 4	Module 4.0	Monitoring, evaluation and learning of climate services

## 1.2 Sources of data for the review and evaluation

The following review is based on evaluation forms completed by students and institutional focal points, polls and 'chat' gathered during the course's four live reviews, general correspondence as well as two review discussions undertaken after the completion of the course with the L2CP team and partnering institutions. Anonymised direct quotes from the completed evaluation forms are included in italics in this report.

Student evaluation forms: 46 students submitted evaluation forms. The following analysis is based on the 44 forms completed by students on-line. Two further evaluation forms sent by email due to difficulties uploading on the platform were received after the cut-off date for inclusion in analysis of quantitative evaluation data.

Institutional focal point evaluation forms: 3 focal points at piloting institutions completed evaluation forms, with others providing feedback in the joint review and/or by email.

The L2CP team held an internal review to share findings from analysis of the evaluation forms and review sessions, and feedback their reflections on the modules and wider course. Focal points at Ugandan Meteorological Training Institutions, KMD/IMTR and ANACIM took part in a later discussion particularly focused on potential use and uptake of course content.

## 2. Overview of key findings from evaluation

99% of students found the training either extremely or mainly useful in strengthening their understanding of what is entailed in the process of co-producing weather and climate services.

94% of students assessed that the training as either extremely or mainly useful in strengthening their capacities and confidence to engage in co-producing weather and climate services.

97% or 43 out of 44 students would recommend the course to others.

*'A great course that should be upscaled.'*

*'Thanks a lot to l2cp for eye opener.'*

*'I would like to thank the organizers of this course. It has been helpful, engaging, practical, interactive and fun. I enjoyed it so much.'*

*'The course was truly a wonderful experience. It has helped me appreciate not just the role of co-production, but also boosted my own confidence as a meteorologist. It has endowed what I do with meaning, by showing me that there is a way to make the work we do more worthwhile to the development endeavors... Being a meteorologist is now endowed with greater meaning, direction and purpose.'*

The 3 focal points at piloting institutions that completed the course evaluation assessed L2CP as extremely useful in strengthening students' understanding of what is entailed in the process of co-producing weather and climate services, and mainly or extremely useful, in strengthening students' capacities and confidence to engage in co-producing weather and climate services.

*'The course is good and I wish it's done by all weather and climate forecasters, it will add a lot of value in what they do.'*

*'(T)he training has been an eye opener to our students (and, in a significant way, to myself as well). Going forward, I consider the training material to be very rich, quite resourceful, and widely applicable.'*

## How would you describe the L2CP on-line training?



Figure 1: Word cloud from Module 4 Live Review where students and focal points provided feedback on the course

### 2.1 Course Organisation and Access to the course

44 students (97%) were satisfied or very satisfied with the organisation of the online course. The 3 focal points that completed the evaluation assessed that the course was well organised and well structured, including in the balance between theory and practice.

Evaluation feedback frequently raised the need for improved functionality of the platform through which the training was provided. For example, some students experienced difficulties with saving inputs on the discussion boards and submitting the on-line evaluation forms. Students and focal points also raised the need to support accessibility of the course through ensuring airtime/internet connection to support on-line access: 'Helping learners with bundles through funds credited to their accounts for smooth learning.' '(I)t affects the whole group when others aren't able to submit assignments on time or to attend feedback sessions due to lack of internet - we miss out on a wealth of ideas and insights from them.'

A number of students felt that the time working on assignments was too short and constrained, particularly where they were undertaking the course alongside existing duties. The small number of students that completed the course in Senegal highlighted the vital need for translation of modules and supporting resources into French to ease access for Francophone students.

The course sought to support interaction through using discussion boards and assignments in the modules and, in the live reviews, provided feedback on submitted assignments, alongside inviting comments and questions, and undertaking quizzes, polls and exercises. Students were provided with an email contact for raising technical concerns, but the project did not encompass sufficient resource to enable the L2CP team to respond to individual students' questions on the course content. Students and focal points requested more interaction, both with the course tutors and with each other: 'I think there needs to be a way of contacting the organizers other than the live feedback sessions'. 'It will be wonderful to have greater interaction among participants to learn from each other.' Focal points raised the need for assignments involving teamwork, engaging the students in an ongoing project or providing paid internships to build skills and gain practical experience. One student also wanted a final end of course assessment: 'We needed some real tests at the end of the course rather than just assignments'.

In responding to evaluation questionnaire questions on whether students or focal points felt there were topics that were missing or not covered in sufficient detail, there were several requests for more information on topics that were not the focus of the training, including: climate change, climate data analysis, climate modelling, advanced forecasting and enabling meteorologists to better undertake research. One focal point raised that 'Other skills used in forecast verification can be included'.

## **2.2 Piloting institutions' proposed use of the course in future training**

All 3 focal points that completed the evaluation questionnaire propose using L2CP in their future training.

IMTR/KMD appreciates the value of the course to support an increased focus on climate services alongside greater moves to on-line training. The County Directors of Meteorological Services who participated in the piloting found the course useful for their work. IMTR is reviewing its curricula to fit with new governmental training frameworks and regulations. The focal point particularly noted the importance of recognising different levels of trainees, with the current L2CP course appropriate for meteorologists with degree training, while there remained a need to develop counterpart training for technicians who have not been to university.

*'IMTR has over the years adopted adaptive learning strategies with a view to achieve better learning outcomes. In this approach, the IMTR, within her mandate to build capacity for use of climate information in Kenya, will certainly take up the L2CP approach and methods in the future.'*

Having supported the development and piloting of L2CP to support its alignment with existing meteorological training, the University of Nairobi (UoN) Department of Meteorology is considering options for take up of L2CP. Consideration is being given as to the feasibility of integrating elements of the course within existing BSc and MSc complementary modules, or whether to offer the L2CP course independent of the syllabus, as was the case in supporting piloting of the course.

The Ugandan National Meteorological Training School provides diplomas in meteorology and agrometeorology. They are in the process of curriculum review and are considering the potential for including elements of L2CP Block 2 on key climate concepts, with regard to forecast probability and verification.

In Senegal, ANACIM is discussing with UCAD and other institutions providing climate training, including UGB and the Institut supérieur de formation agricole et rurale (ISFAR), the potential for integrating the course within relevant existing courses.

One focal point noted that: '*Guidance on how to integrate coproduction in the curriculum of Meteorological training needs to come out clearly.*'

## **2.3 Students use of learning in ongoing and future work and research**

In their evaluation feedback, students noted that they propose using learning acquired through the training within ongoing and future projects, research and community engagement, as well as in training other meteorologists.

*'Before I did not know that the public are also important in climate issues, in my research I'll be engaging the public to get more about climate and how it affects them.'*

*'With the current changes in weather and climate, co-production is definitely the only way to go. Weather and climate impacts all sectors of the economy and therefore, to reduce the impacts, we need to start taking in this weather and climate information. However we can only take it in if it is useful to us (tailored to our needs) which*

*necessitates us to engage in the production of this weather and climate information for easy understanding and interpretation of the forecasts.'*

*'(The course) has already helped in my research. I got to understand some of the concepts that were otherwise hard for me to understand. For example, that video that was used to explain the ENSO and IOD was by far the best video to better explain those concepts. And these are some of the concepts of my research and interest.'*

*'I endeavour to communicate probabilities better in the future, I endeavour to give information about forecast uncertainties, to do MEL and do forecast skill scores.'*

*'I hope to integrate the ideas like including skill scores in forecasts in my own work as a meteorologist to improve forecasting processes in my country. I am planning to advance with my studies, and this course has laid a great foundation for me. I hope to integrate the co-production approach in my own research and projects, to work collectively with different stakeholders for a common purpose.'*

*'It will assist during my research and how to convey information on climate and weather to farmers in my immediate community.'*

*'I will effectively communicate, develop area specific advisories and understand challenges stakeholders are facing in using Climate Forecast products.'*

### 3. Review of module content

This section of the report considers for each block of modules:

- quantitative and qualitative feedback from students' individually completed evaluations;
- polls undertaken during live reviews;
- issues raised within the evaluation forms completed by focal points at partnering institutions; and
- notes from course leads drawn from the live review of their module.

#### Block 1: Principles and concepts underpinning co-production

Perceptions of % of students	Extremely useful	Mainly useful	Only some parts useful	Not at all useful
How useful have you found Module 1.1?	63	34	2	
How useful have you found Module 1.2?	61	38		
How useful have you found Module 1.3?	68	31		

In terms of students' perceptions of usefulness, Module 1.3 had the highest rating at 68% followed by module 4.0 at 66%.

Students suggestions for improving modules in Block 1:

Evaluation highlighted the need for:

- More practical examples to illustrate key concepts and principles; and
- Greater time and review to ensuring students' full grasp these key concepts and principles underpinning the whole course.

#### Module 1.1:

What are your suggestions for improving Module 1.1	Add more practical examples, and more videos and with voice-overs, more time is needed to do the exercises
	It would be great to have a live session, to go over the ideas as they are fundamental to the rest of the course.
	Improve information on background about climate services and information before each module
	The terminology used be further broken down to be more explicit
Yours suggestions for improving Module 1.2:	Course materials should be made accessible (offline ) and downloadable. It reduces the time spent in completing the module.
	Increase more time allocation
	Improve on explanations by use of videos
	In addition to quizzes, uploading videos while doing some practical assignments would be useful in this module
	It should also be made downloadable. Also, the additional resources/ journals should be made less cumbersome
Your suggestions for improving Module 1.3	Add Recaps

	More Video Materials needed
	Course materials should be made accessible (offline ) and downloadable. It reduces the time spent in completing the module
	Addition of an audio practical demonstration of a traditional local experts, showcasing how they use traditional knowledge to forecast the weather
	It will be easier to understand if broken down to a more explanatory and interesting module

**Focal points highlighted the need for Module 1.3** to: ‘Emphasize identification of key stakeholders in development and dissemination of weather and climate information’ and ‘Give more examples to blend traditional forecasting with scientific forecasting’.

### Block 1: Live Review Poll

Responses of individual students in live review	More than 2 hours	1-2 hours	Under one hour
How long did you need to be online to complete a module?	16	10	3
How long did it take you to do an assignment	8	14	7

One focal point highlighted the need for Module 1.1 ‘to be allocated enough time as it has a lot of key resource documents to read’.

From across the course, there is recognised need to further clarify each of the principles, particularly: Conscious facilitation, Transparency of forecast accuracy and certainty, and Value add for All. Within Block 1, there is a need to go through each of the principles with a practical illustration of each.

In reviewing evaluation feedback, the L2CP team raised the need to:

- Highlight that the existing L2CP is intended as a foundational course for introducing key concepts and consider developing more, in-depth follow-up courses; and
- Accumulate a library of resources and practical examples from discussions and illustrations in ‘the field’, identifying these both from existing resources and requesting partners to film where approaches are employed within future work.

### Block 2: Key Climate Concepts

<b>Better Understanding of Key Climate Concepts</b>	<b>A lot</b>	<b>Moderately</b>	<b>A bit</b>
Degree to which Modules 2.1/2.2 increased my own understanding of key weather and climate concepts	68	29	2
Degree to which Modules 2.3 increased my own understanding of key weather and climate concepts	61	36	2
Degree to which Modules 2.4 increased my own understanding of key weather and climate concepts	77	20	2
<b>Better prepared to communicate to decision-makers</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>

Module 2.1/2.2 I now feel better prepared to communicate key weather and climate concepts in everyday language accessible to non-technical decision-makers/ users.	47	52	
Module 2.3 I now feel better prepared to communicate key weather and climate concepts in everyday language accessible to non-technical decision-makers/ users.	43	56	
Module 2.4 I now feel better prepared to communicate key weather and climate concepts in everyday language accessible to non-technical decision-makers/ users.	54	40	4

Students suggestions for improving Block 2 modules:

Your suggestions for improving Section 2.1 and 2.2	Increase time to learners to submit the assignments and go through the modules
	More explanations on a few meteorological terms to communicate these to non-technical users
	Inclusions of analysis on how the various climate drivers determine the climate of an areas using real observation datasets
	More references material to be shared
	Module 2.2 was a bit more technical. I understood better on second reading. More practice questions would help to better master the module too
Your suggestions for improving Module 2.3	Include recaps
	Providing wide range and number of assignments
	Add more time
	Make slide notes downloadable for future reference – and include more worked examples
Your suggestions for improving Module 2.4:	More practical sessions if possible in the Measuring forecast skill
	Other External learning resources should be provided and made readily available
	This was a little technical. I felt that more calculation examples would be great, like those provided in the feedback session
	Add more time – more examples, simpler, more lively

One focal point raised that 2.3 could potentially be strengthened through reviewing 'basic probability for learners'. Another that more time should be allocated to Modules 2.2-2.4, as most of the material was new to students.

**Live Review Poll**

Responses of individual students in live review	More than 2 hours	1-2 hours	Under one hour
How long did you need to be online to complete a module?	5	6	-
How long did it take you to do an assignment	2	4	5

**Block 3: Understanding the decision-making context in which climate information is to be used and building decision-makers' confidence in using climate information**

Perceptions of % of students	Extremely useful	Mainly useful	Only some parts useful	Not at all useful
How useful have you found Module 3.1?	59	31	9	
How useful did you find Module 3.2?	56	40	2	

Module 3.1: As echoed in practical experience of using this methodology, the Problem tree exercise was not well understood and completion of the related assignment was poor. There is a need to include more explanation on the series of steps in the problem tree exercise. Comprehension could be supported through including a worked example for the assignment and/or carrying out the assignment in small groups and enabling direct contact with the facilitator to contextualise the methodology.

Module 3.2: The assignment requires further clarification and inclusion of a worked example to illustrate and ensure students fully appreciate the task.

**Live Review Poll**

	More than 2 hours	1-2 hours	Under one hour
How long did you need to be online to complete a module?	4	6	-
How long did it take you to do an assignment	4	3	

Your suggestions for improving Module 3.1:	Some voice notes were incomplete (not fully explaining the concepts) making it a bit complicated
	Add more time
	The terminologies used here should have been more simple.
Your suggestions for improving Module 3.2	Additional examples should be included.
	Add more time
	Further improvement and clarification is needed in Approach 3: Forecast Preparedness option Matrix

Block 3 could be strengthened through inclusion of a glossary of key terms. This could also support the course more widely.

**Module 4: Monitoring, evaluation and learning for climate services**

Perceptions of % of students	Extremely useful	Mainly useful	Only some parts useful	Not at all useful
How useful have you found Module 4.0?	66	28	4	

Completion of the assignment demonstrated mixed levels of understanding of the intended task and a number of the ten principles of co-production introduced in Modules 1.1-1.3. The assignment could be strengthened through including an illustrative example, employing one or more of the assignments developed by students taking part in the piloting.

### Live Review Poll

Responses of individual students in live review	More than 2 hours	1-2 hours	Under one hour
How long did you need to be online to complete a module?	9	11	
How long did it take you to do an assignment	4	13	3

### General feedback on the format of the Live Reviews

Live reviews were undertaken after each block of modules with date and times of these provided to the students at the outset of the course. The live reviews were recorded and uploaded on the platform to enable those students unable to attend to benefit from the discussions.

In their evaluation forms, students and focal points provided general feedback on how useful they found these sessions:

Perceptions of students (%)	Extremely useful	Mainly useful	Only some parts useful	Not at all useful
How useful were the live feedback sessions	63	25	9	2

The 3 focal points that completed the course evaluation perceived the live feedback sessions as extremely useful.

Participation in the live reviews varied greatly, with many more people taking part in the live reviews for Blocks 1 and 4:

- 53 students were on the first live review
- 10-15 students were on the second live review
- 6 students were on the third live review
- 59 were on the fourth live review

Completion of modules and submission of assignments decreased over the course, but was more consistent than participation in the live events:

Module and assignment	Number of students who completed assignments before live review
1.1-1.3	Approximately 58 (not recorded)
2.3	43
3.1	42
3.2	33
4.0	37

Students' proposals for how to improve the live reviews:

What are your suggestions on how the live feedback sessions could be improved?	Facilitator could look into the internet costs
	More facilitators need to be available for live input.
	The live feedback need to come up immediately after each module

#### 4. Next steps

Formal confirmation of the project funding was only provided in November. As of late January, KCL is developing a partnership agreement and wording for the 'terms and conditions' for access to and use of the on-line training.

ANACIM deployment of resources is being finalised, aiming to support translation of a number of the modules.

The team awaits clarification whether there may be a small amount of additional resource available to L2CP. In late 2020, KCL requested additional resources for: review, revision and uploading of revised modules, development of the platform to enable self-enrolment and self-assessment; and translation of modules into French. The ability of the Walker Academy to maintain hosting of the course on their platform will be greatly facilitated through enabling self-login with automatic registration of user and requiring acceptance of agreed terms and conditions/licensing. Team members also raised the usefulness of the platform being able to support short-life access to specific modules, without having to complete the whole course, to support related workshops and trainings. If additional resource becomes available, the team can review prioritisation of its use.

Students have requested continued access to the course and resources. The Walker Academy has confirmed that it can host the training on its platform until June 2021. Longer-term hosting of the course is dependent on additional funding to support auto-enrolment, minimising the need for Walker Academy staff to enrol and support students' access, as well as potential and confirmed demand for the resource. Meantime all the team have been provided with a link to download the course modules.

Ongoing discussion to consider potential use and uptake of the course are ongoing with: ANACIM, UCAD and institutions providing climate training in Senegal; African SWIFT with regard to the potential for inclusion of elements of the course in their 2021 Summer School; ACMAD support to enable discussion with WMO Global Campus. Team members also raised that it would be useful to raise awareness of the course with ICPAC, to support the institution's work to promote co-production of climate services within its regional initiatives. L2CP has been invited to present the initiative at an internal ICPAC learning even planned for late March 2021.

Reviews with the team and institutional focal points also identified practical measures that could support further development and uptake of the course including:

- Developing a manual of course content that would enable the course to be contextualised for regions and institutions;
- Guidance on integrating the course, or elements of it, within existing curricula. This could be in a written format and/or form a half-day seminar.
- Developing a library of resources, including videos to practically illustrate the methodologies included in the training. This could pool partners' existing footage and partners be requested to record future proposed activities including, for example, the approaches employed in the May 2021 African SWIFT coproduction workshop.
- Developing a short, introductory film on the course content to promote awareness of the resource.