



Conservation Agriculture in Malawi: Networks, Knowledge Gaps and Research Planning

Report on the National Conservation Agriculture Research Planning Workshop
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Summary

Much has been made recently of the inefficiencies of agricultural research, innovation and extension in sub-Saharan Africa, particularly in relation to the promotion of conservation agriculture (CA). The 1st African Congress on Conservation Agriculture held in Zambia in March 2014 highlighted common problems of uncoordinated effort on the part of the action-research community and persistent knowledge gaps with regards to field level performance and barriers to uptake. In this paper we present the findings of a systematic and practitioner-led approach to mapping the community of practice around CA in Malawi and identifying priorities for future research in order to inform better practice. The findings are intended as a reference point for future research planning both in terms of the questions and knowledge networks identified but also in the practitioner-led planning process described which could be broadly applied across disciplines and subjects. The paper highlights the cross-scalar and inter-disciplinary nature of CA knowledge gaps and describes the actors and networks best placed to address them, with the intention that this will form the basis of future collaborative research proposals and programmes.

Background to Conservation Agriculture in Malawi

Conservation agriculture (CA) is broadly defined as a system of farming based on the principles of minimum soil disturbance, permanent organic coverage of soil, and the avoidance of monocropping. It has been promoted through a variety of national agricultural strategies, government policies, research programmes and non-governmental projects across sub-Saharan Africa as a key strategy for improving the sustainability, resilience and productivity of smallholder agriculture (Giller et al., 2009, Garrity et al., 2010, Rosenstock et al., 2013). In particular, CA is understood as having a number of benefits over conventional, till-based agriculture, in semi-arid and dry sub-humid environments with respect to the better retention of soil moisture and the prevention of top-soil erosion and plough pans (Arslan et al., 2014, Andersson and D'Souza, 2014, Andersson and Giller, 2012, Haggblade and Tembo, 2003, Baudron et al., 2013).

Whilst conservation agriculture is based on principles that have long been practiced within African agricultural systems, a new interest on the part of agricultural research community and non-governmental organisations on CA as a package, and an agricultural technology, emerged in the 1980s. This was initially in the context of large scale commercial farming in southern Africa (Zimbabwe and South Africa in particular) (Haggblade and Tembo, 2003, Marongwe et al., 2011, Fowler and Rockstrom, 2001). Attempts were made by the national agricultural research institutes of neighbouring countries such as Zambia and Malawi to adapt these techniques to smallholder farming. This push has been driven in particular by the efforts of a few key organisations, such as the Conservation Farming Unit (CFU) of the Zambian National Farmers Union, donor support to major programmes such as the USAID funded Malawi Agroforestry Extension Project (Bunderson et al., 2002) and by focused projects led by a range of non-governmental organisations (Andersson and D'Souza, 2014).

In Malawi in 2014 there is a broad variety of international research-led and non-governmental organisations for whom the advancement of conservation agriculture is an integral part of their operations and outreach, as shown by the number of NGOs represented at the CA workshop on which this report is based (Appendix A). Within the varied CA projects which these organisations have instigated across Malawi, diverse interpretations of what CA is and how it should be best practiced have emerged. These include different ideas about the use of synthetic fertilisers, crop rotations, cover crops, planting basins and more, as well as alternative ideas about how such practices should be promoted and incentivised (Andersson and D'Souza, 2014, Andersson and Giller, 2012).

Recent concern about low rates of adoption have called some to question the compatibility of CA with the livelihood strategies of smallholder farmers and the sustainability of incentive-based outreach (Giller et al., 2009). There have been simultaneous calls for more locally appropriate adaptations of agricultural best practice messages, in order to better meet the needs, and fit within the constraints of, smallholder farming systems. Some also suggest that more consistent definitions of what CA is and what represents adoption are required to improve the monitoring and evaluation of strategies outreach at a national level (Andersson and D'Souza, 2014).

Underpinning these concerns are a number of persistent gaps in the knowledge of the CA community of practice about the benefits and trade-offs of CA; its performance under different agro-ecological conditions; socio-economic, political, and cultural constraints to adoption (and to

realising optimal benefits); the relative merits of alternative models of CA promotion at national and local levels; and the broader societal value of CA in terms of providing positive environmental externalities. In spite of the varied nature of CA benefits and challenges, there have been very few attempts at analysing CA endeavours from an interdisciplinary and multi-scale perspective. As a result, some of these complex and multi-faceted knowledge gaps have remained unaddressed by regional overview studies (e.g. Rusinamhodzi et al., 2011).

One of the key messages to emerge from the recent 1st Africa Congress on Conservation Agriculture (held in Lusaka in March 2014), was the need for a more collaborative effort between the varied Conservation Agriculture actors in order to identify and effectively address knowledge gaps¹. In response to this call, a National Conservation Agriculture Research Planning Workshop was planned and held in Malawi on May 6th 2014. This workshop was co-hosted by the Lilongwe University of Agriculture and Natural Resources (LUANAR) and the University of Leeds. The aim was to involve members from across the CA community of practice in Malawi in order to identify knowledge gaps and to collectively determine the best ways to address them through participatory research planning exercises.

The objectives of the workshop were to:

- Build a comprehensive picture of the CA community of practice in Malawi and strengthen networks and create an opportunity for knowledge exchange across it.
- Involve a wide range of representatives from across the CA community of practice in Malawi in the collective discussion of key challenges faced within CA practice and policy.
- Link these challenges to underlying knowledge gaps and begin to plan collaborative approaches to best addressing these gaps (in the form of concept notes that might be the basis of future research proposals)

This report presents details of, and results from, the research planning workshop, including a description of its planning, format and participants as well as preliminary graphic and written outputs from the institutional mapping, knowledge gap brainstorming, and concept note writing exercises. The report concludes with a synthesis of these findings and suggestions for ways forward.

Description of the Workshop and Participants

Prior to the workshop, significant effort was put into stakeholder identification. A broad review of organisational documents was undertaken with organisation representatives and a continual snowball sampling strategy was implemented. Key resources such as the National Conservation Agriculture Task Force database and the participant list from the Africa Congress on Conservation Agriculture provided an initial starting point, but other organisations, for whom CA is an implicit part of their operations, were identified through a three month period of desk-based document trawling and in-field discussions. The lead facilitator conducted site visits and interviews with organisation representatives prior to the workshop, providing a useful background on current and ongoing in-

¹ Declaration of the First Africa Congress on Conservation Agriculture available at <http://www.africacacongress.org/>

country project work. The independence from these projects that facilitators from the University of Leeds retained was, however, beneficial for the unbiased and unframed facilitation of the workshop.

The workshop itself was attended by 28 participants representing 19 organisations. These ranged from academic institutions to large and small-scale non-governmental practitioner organisations, CGIAR institutions, the FAO, and representatives of national government ministries (see Appendix A).

The first workshop session involved creating institutional maps that positioned the various organisations represented at the workshop, as well as others that were not, in relation to the remit of their CA activities. These remits were considered in terms of their orientation towards research, action or a combination of the two; and the scale at which they operate (fields, farms, communities, markets and institutions, national policy, international policy, or across two or more of these scales). Participants worked in small groups of 5-8 to alter, correct and modify an initial map produced during the workshop scoping period focusing particularly on marking out the nature of their organisational remit, adding any of their project partners that were missing from the map, and drawing lines between organisations to represent existing partnerships.

A second workshop exercise focused on brainstorming participant defined challenges and barriers to fulfilling their remit, which allowed for answers from across the research-action spectrum and at all variety of scales. The intention was that the most pertinent and transcendent of these challenges could be converted into avenues for future research. Translating experienced challenges into underlying knowledge gaps and researchable questions was achieved through a facilitator-led causal chain exercise, in which groups were asked to trace back from initial challenges by answering a series of 'why', 'where', 'when', 'what', 'how much' and 'for whom' questions until this chain of questioning reached points at which the answers were unknown, disputed, context-specific, or not supported by sufficient evidence. It was these points that represent underlying knowledge gaps and potential areas for future research.

In thinking about how these questions might be addressed, participants were then asked to refer back to the institutional maps, identify the appropriate scale at which research, and consequential action, might take place in relation to the knowledge gap, and therefore identify the actors that are best placed to address them and the necessary lines of communication for the research findings. This information was collated into research concept notes, which were produced in the final session of the workshop.

The following sections present the findings from the workshop, including images of the direct outputs and digitized versions of them, each is summarised and a synthesis of the findings and their implications is presented in the subsequent discussion section of the report.

Institutional Mapping

Across the conservation agriculture community in Malawi are a varied range of actors and remits, from academic institutions that are predominantly research focused to national-level policy-makers and NGOs that have community-scale, action-oriented remits. These remits are focused at a variety of scales, with research that takes place at the scale of the field and concentrating on crop responses and soil compositions being part of the same broad community of practice as community-level agricultural extension programmes, and national and international level agricultural policy making. In an idealised and simplified model of how this community functions, operations at the action end of the spectrum should be informed by the findings of rigorous and robust research, and activities at an international and national scale should be informed by evidence and experiences at a variety of sub-scales. It is essential for efficient and effective research and action, therefore, that clear communication and co-ordination takes place across a network that spans this breadth and depth of remits and institutions. Notably, there are organisations (such as TLC, Concern Worldwide, and others) whose remits involve a combination of research and action and that cut across multiple scales. Such actors undoubtedly play an important role in coordination and brokering knowledge across the network.

Being aware of actors and understanding the dynamics of existing networks (and existing bodies of knowledge within it), as well as strengthening the connections of the network is an important first step in effective research and action. At the 1st ACCA it was claimed that, whilst there is a diverse community of practitioners working on CA across Africa, even at national and sub-national levels there is a lack of co-ordination and communication between disparate actors with duplications and contradictions in effort a common and problematic consequence.

The institutional mapping exercise was aimed at developing a useable and iterative reference point, particularly for the planning of research projects and communication of research findings. Figure 1 shows the initial outputs of the mapping exercise which were produced by the four groups. Boxes drawn around each organisation name show the extent of their remit coverage, with the vertical axis represents distinct categorisations of scale and the horizontal axis showing categories of research (left), action (right) and research and action (middle).

These alterations have been collated to produce the maps presented below, which could eventually become published as an accessible and interactive web resource. It was felt that an addition to the map was required in order to accommodate funding bodies within a separate compartment.

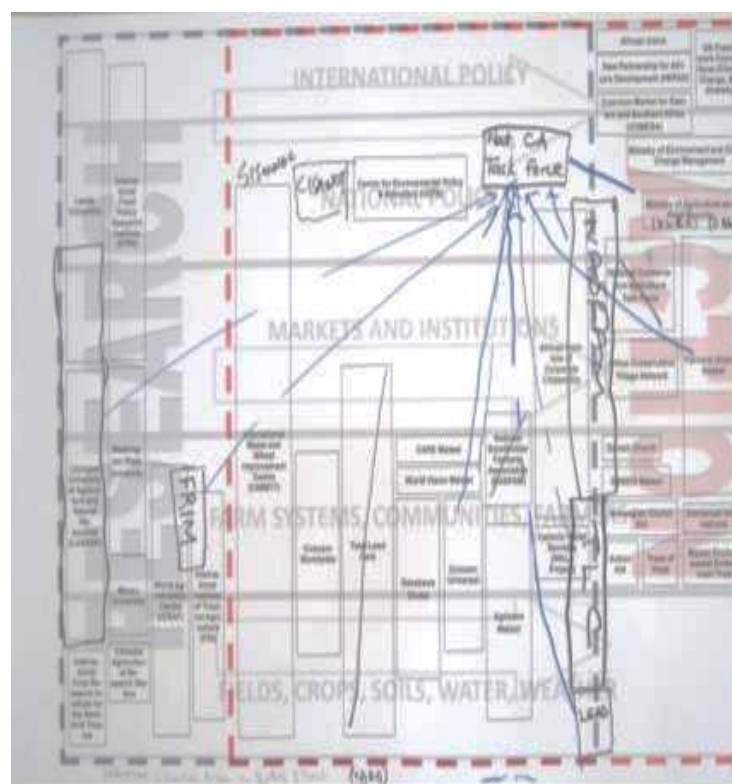
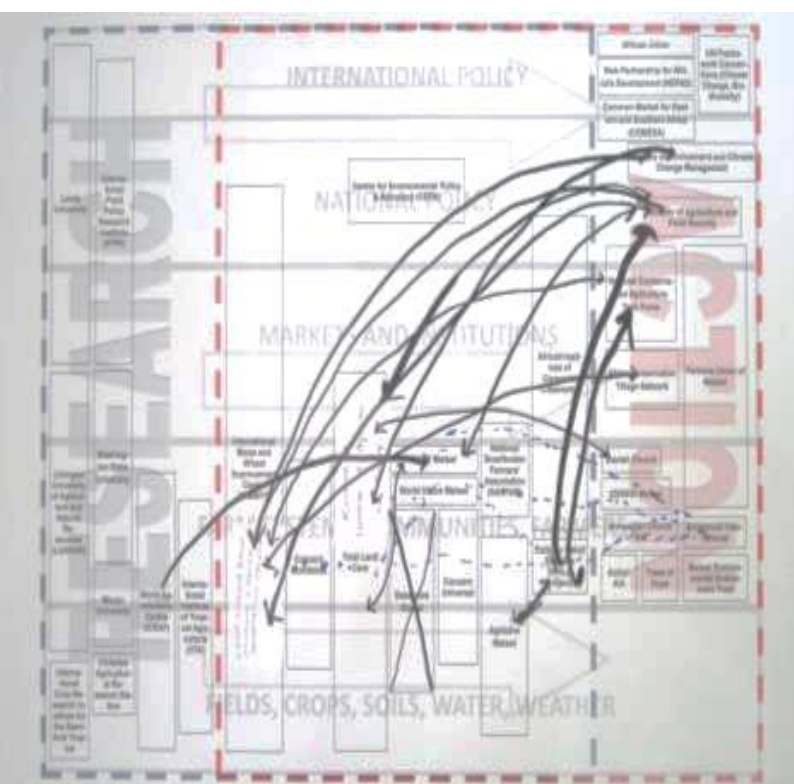
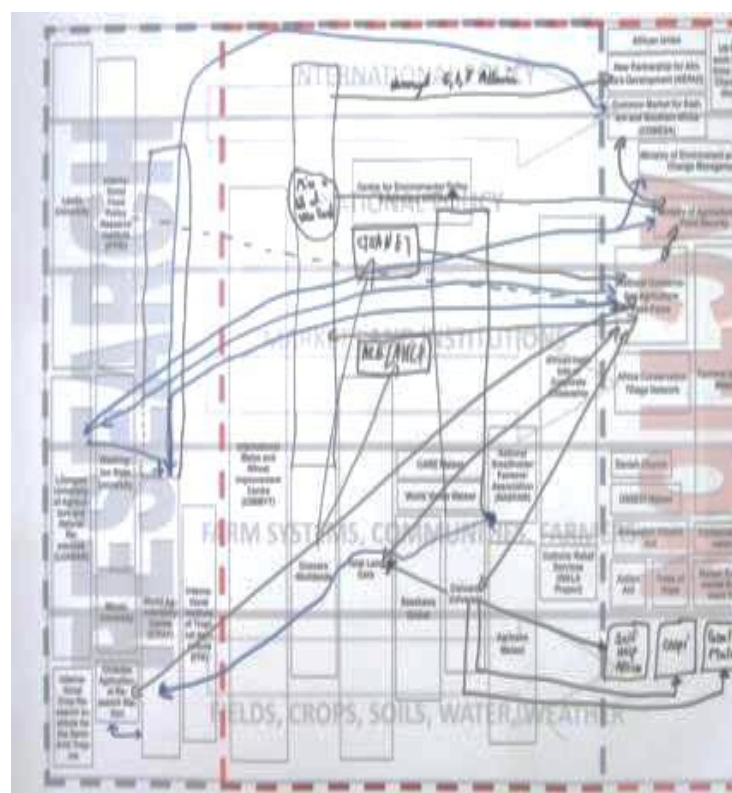
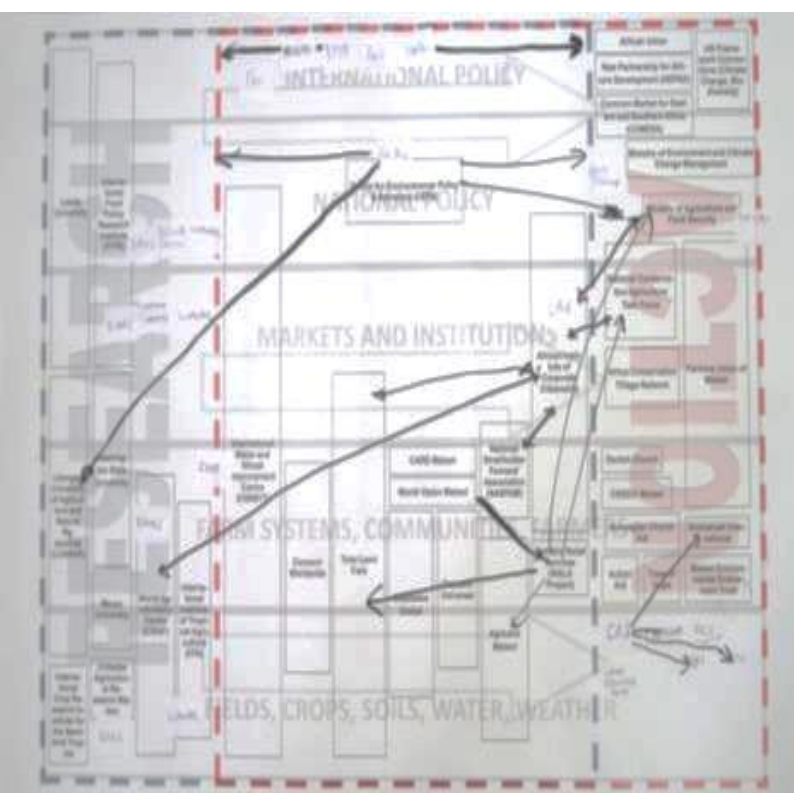


Figure 1: Institutional map alterations made by workshop groups

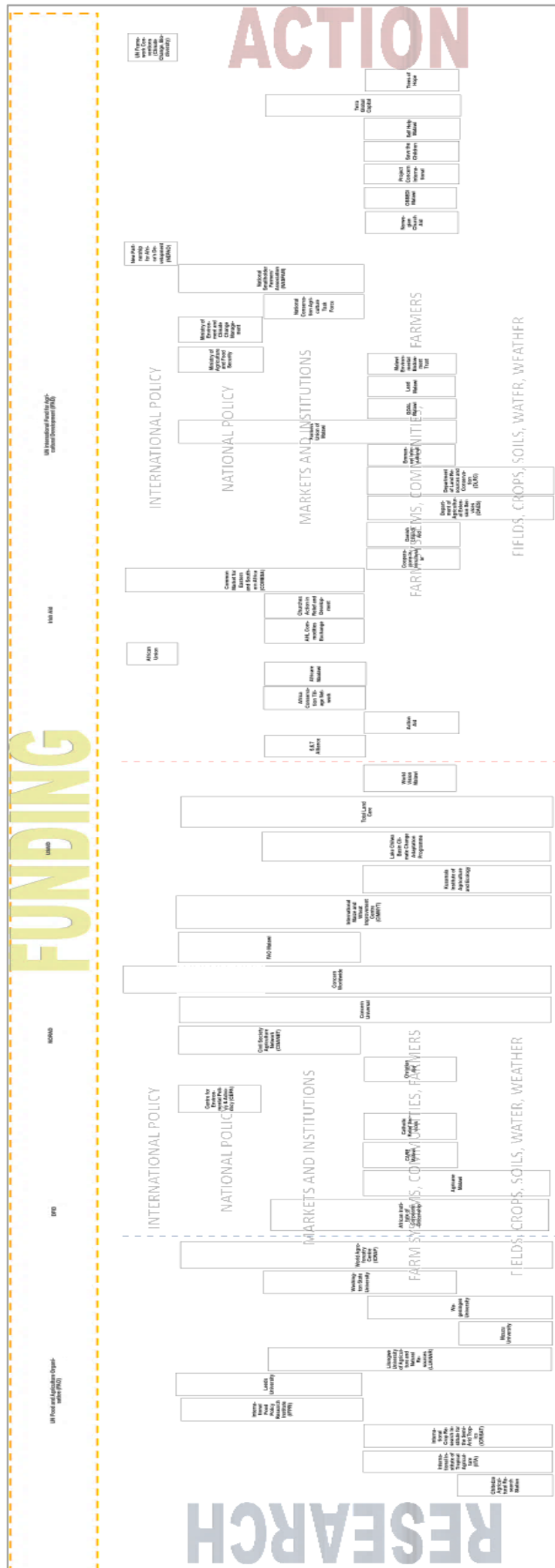


Figure 2a: The digitized compilation of inputs to the institutional map (show in close ups below).

Figure 2b (top): Close up of the research end of the institutional spectrum – showing those organisations with a predominantly research-focused remit

Figure 2c (middle): Close up of the research-action space at the centre of the map – showing those organisations with a remit that combines action and research

Figure 2d (bottom): Close up of the action end of the institutional spectrum – showing those organisations with a predominantly action-focused remit

Based on links drawn on the maps by workshop participants, two sets of networks are presented in figures 3a and 3b. Figure 3a shows the coordination role played by the National Conservation Agriculture Task Force (NCATF) within this community of practice. The NCATF was originally established in 2002 and relaunched in 2007 after a number of unproductive years. The impetus for the relaunch was a meeting of the Conservation Agriculture Regional Working Group in Zimbabwe (which called for the development of national CA coordinating bodies across southern Africa) and support from the UN Food and Agriculture Organization (FAO). The task force is chaired by the Farmers Union of Malawi and its secretariat is within the Ministry of Agriculture and Food Security's (MoAFS) Department for Land Resources Conservation (DLRC). The central mandate of the NCATF is to play a supporting and coordinating role for CA organisations and activity within Malawi. It both works to align national policy with the priorities and strategies of these organisations and agricultural development district (ADD) and ensure that there is a national conservation agriculture investment framework to ensure consistency in its definition, practice and promotion. This framework is currently being developed on the basis of an existing document produced by Total Land Care (Gertrude Kambauwa, DLRC). Through funding from Irish Aid and through the FAO, NCATF activity has included a national baseline survey of CA adoption and practice and the establishment of CA demonstration plots in six ADDs. Through external funding there are plans for the NCATF to become established as a trust that is independent of the MoAFS and which can thus facilitate greater networking and action planning across all stakeholder groups.

NCATF Strategic Pillars:

1. Capacity building;
2. Outreach;
3. Resource Mobilization;
4. Research, Monitoring and Evaluation; and,
5. Coordination and Regulatory framework.

The co-ordinating role played by the NCATF is an important one, but it is restricted by capacity limitations and often poor communications across the network. For example, even representatives from those organisations listed as members of the NCATF at the workshop were unaware of the baseline surveys and the national framework planning taking place within the DLRC.

A clearer definition and narrowing of the NCATF remit, such that it acts primarily as the knowledge broker and co-ordinator across the CA community, will be a valuable step towards better co-ordinated and research-informed action. Organisations from across the research and action spectrum can make a contribution to this by being active in their engagement with the NCATF, such that participation and contributions are not limited to a small subset of the community.

Figure 3b shows the networks of five cross-district projects that advocate and involve outreach of CA in Malawi:

- Concern Worldwide Conservation Agriculture Programme – Concern Worldwide, Civil Society Agriculture Network, AHL Commodities Exchange (funded by Irish Aid and Accenture)
- Developing Innovative Solutions with Communities to Overcome Vulnerability through Enhanced Resilience (DISCOVER Project) – Concern Universal, Self Help Africa, GOAL Malawi, Cooperazione Internazionale
- Evergreen Agriculture for Sustainable Food Production – World Agroforestry Centre, Total Land Care, National Smallholder Farmers' Association, Ministry of Agriculture and Food

Security (funded by Irish Aid)

- Kulera Biodiversity Project -- Total Land Care, Washington State University, CARE Malawi, , Terra Global Capital (funded by USAID)
- Wellness and Agriculture for Life Advancement – Catholic Relief Services, World Vision Malawi, Africare, Emmanuel International, Save the Children, Project Concern International Malawi (funded by USAID)

Project partners include actors from across the research-action community. Institutions such as ICRAF (in the case of Evergreen Agriculture Project) and Washington State University (in the case of Kulera) provide important input from, and links to the large scale academic research initiatives (including drawing on lessons from outside of Malawi). The involvement of the National Smallholder Farmers' Association of Malawi and Ministry of Agriculture and Food Security (Evergreen Agriculture), and AHL Commodities Exchange (Concern Worldwide) provide important links to policies and markets that might create enabling conditions for successful project implementation. Figure 3c (map) shows that there is good national coverage achieved by these projects though there are some district overlaps even just across these five projects (two or more are operating in Salima, Lilongwe, Nsanje, Kasungu, Chiradzulu, Karonga).

However, there are limits to the cross scalar nature of these projects, with most activity taking place at the community or farm system level, often with few inputs from field-level research and with little impact on action at the level of markets, institutions and national policy. Some projects also lack partnership with organisations at the research end of the spectrum, and rely predominantly on small-scale internal project evaluations and assessments as an evidence base for action.

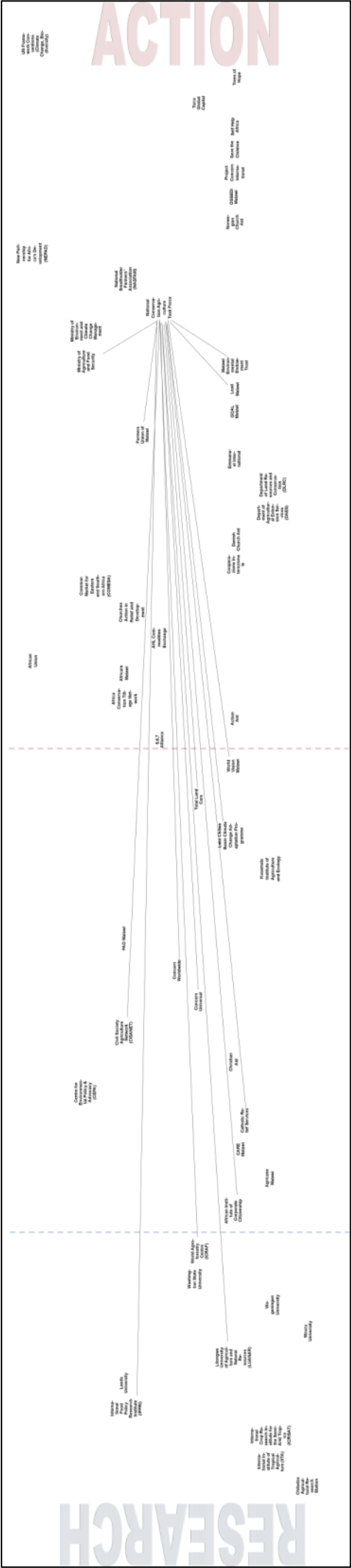
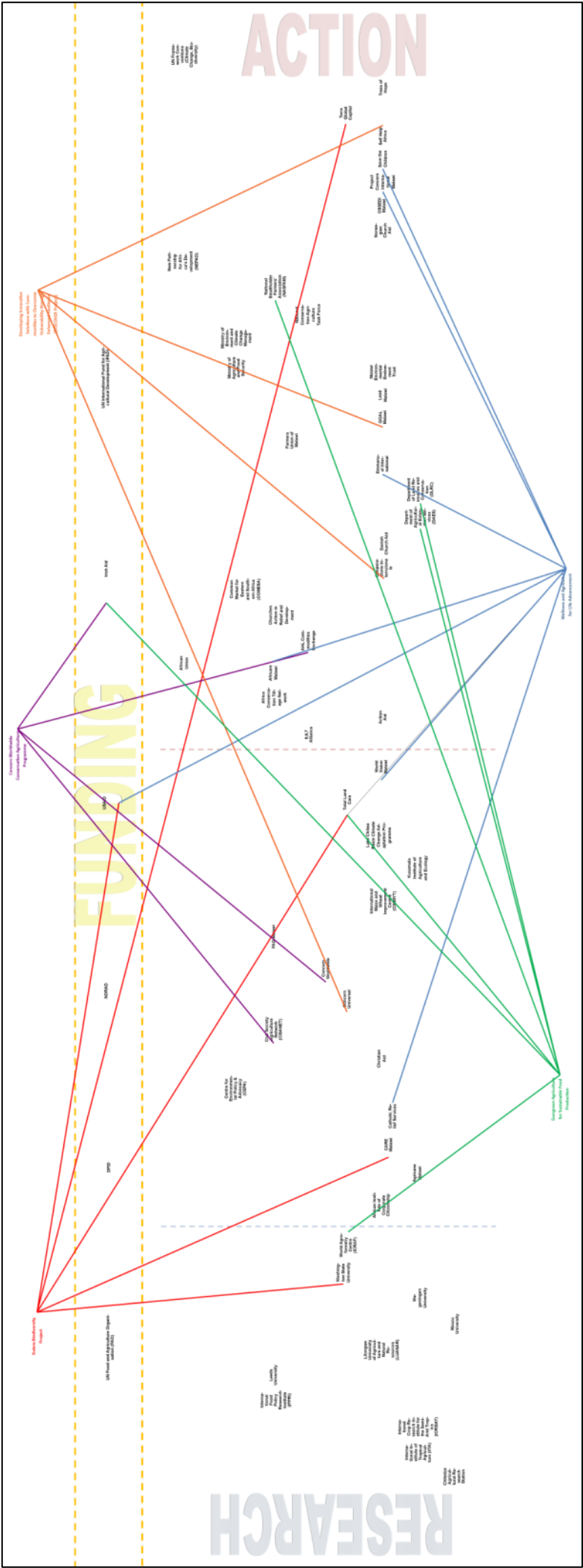
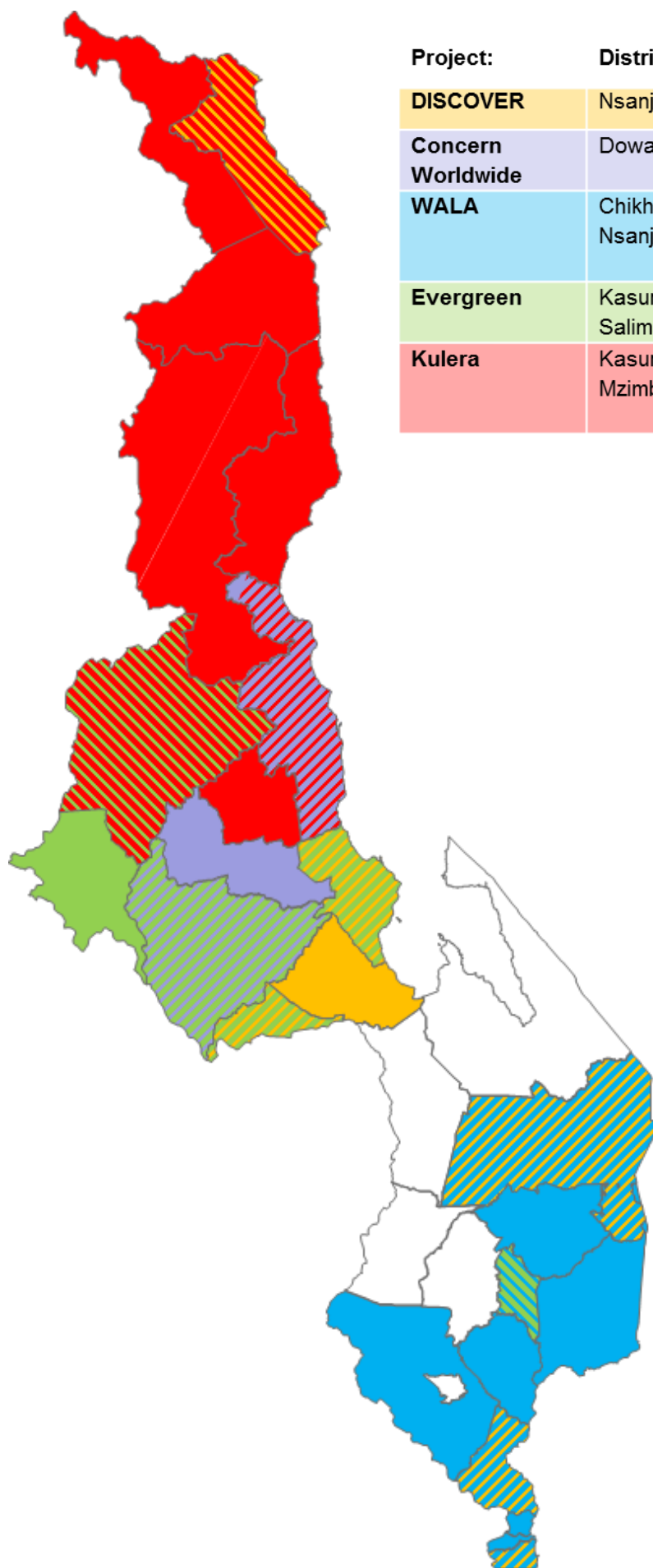


Figure 3a (above): Diagram showing organisations that are a part of the National Conservation Agriculture Task Force in Malawi.

Figure 3b (below): Diagram showing the organisations involved in 5 cross-district humanitarian programmes in Malawi





Project:	Districts:
DISCOVER	Nsanje, Dedza, Salima, Karonga, Machinga
Concern Worldwide	Dowa, Lilongwe, Nkhonkhota
WALA	Chikhwawa, Chiradzulu, Machinga, Mulanje, Nsanje, Thyolo, Zomba
Evergreen	Kasungu, Mchinji, Chiradzulu, Lilongwe, Salima
Kulera	Kasungu, Ntchisi, Nkhonkhota, Rumphu, Mzimba, Karonga, Chitipa, Nkhata Bay

3c: Map showing district coverage of the 5 projects described in Figure 3b

Key Challenges and Knowledge Gaps

In the second workshop exercise, participants brainstormed the key challenges that they face in fulfilling the remit of their organisations. The following list summarises the challenges that emerged from this session - many are interconnected or represent sub-sets of other challenges listed. Here they have been grouped according to the nature of the challenge, with a particular focus on relevant scale:

Overarching Results-Based Challenge:

- **Low rates of CA adoption and uptake and high rates of disadoption**

Policy Constraints:

- Lack of political will to support CA through policies and infrastructure (including contradictory policies and agricultural extension advice)
- Lack of clear and consistent definition of what CA is
- Lack of coordination between CA organisations leading to contradictory approaches (and agricultural extension advice) and duplications of effort

Farm Level Constraints:

- Competing uses for residues (in mixed livestock systems)

Market Level Constraints:

- Lack of clear and consistent definition CA
- Limited availability and affordability of agricultural inputs such as fertiliser and herbicides
- Lack of support from the private sector

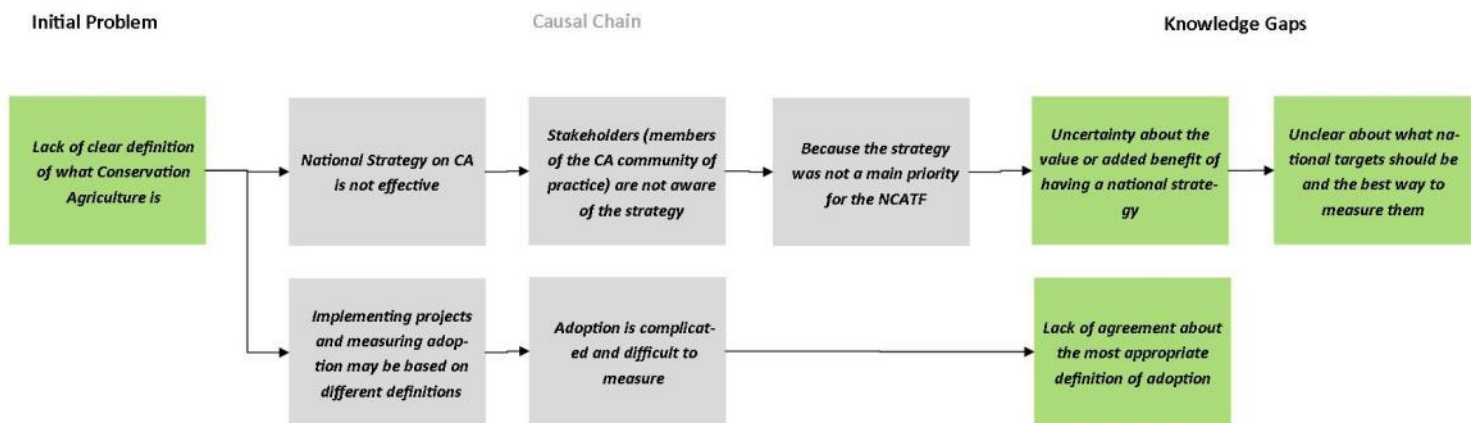
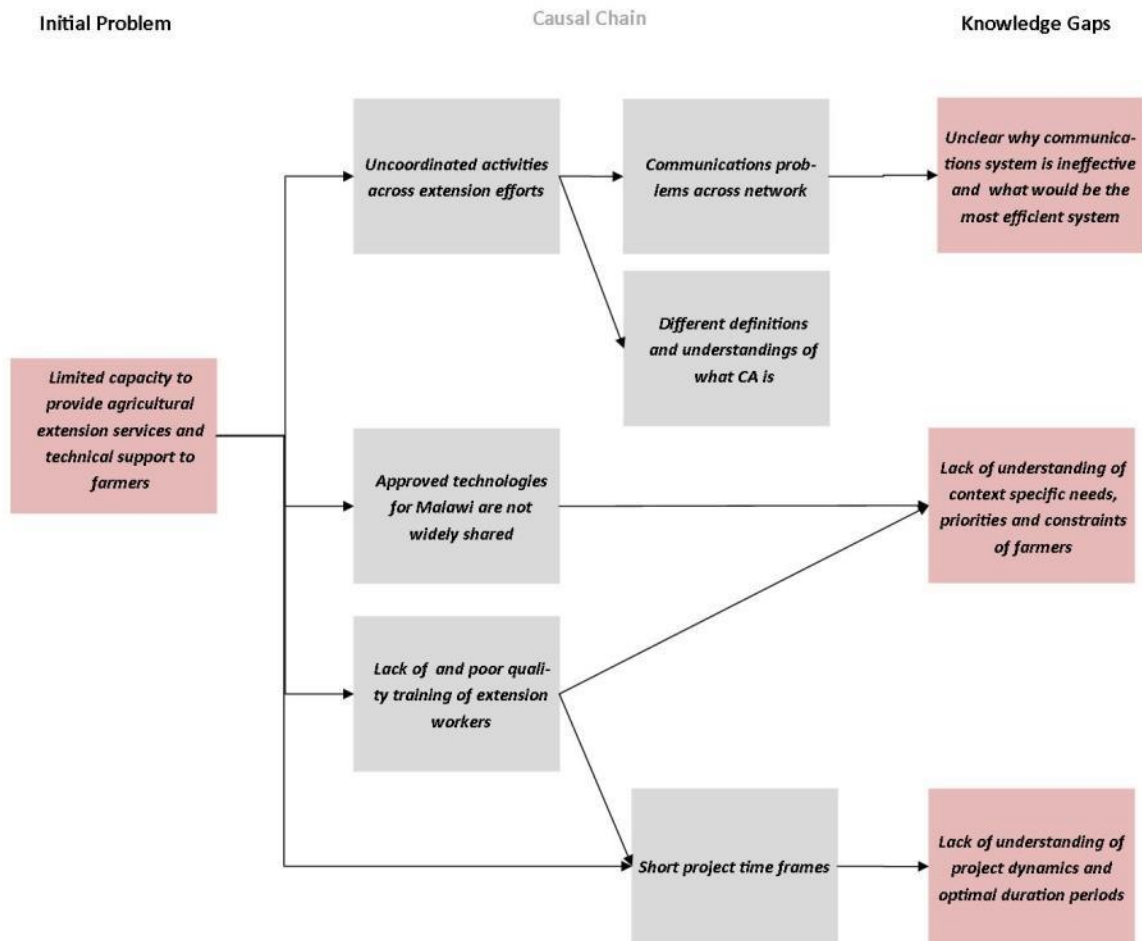
Organisational and Funding Level Constraints

- **Lack of clear and consistent definition of what CA is**
- Lack of understanding and discussion of appropriate and context-specific conservation agriculture (e.g. low input CA)
- Short time horizons and limited budgets for CA projects and limited donor support
- **Limited capacity to provide agricultural extension services and technical support to farmers**

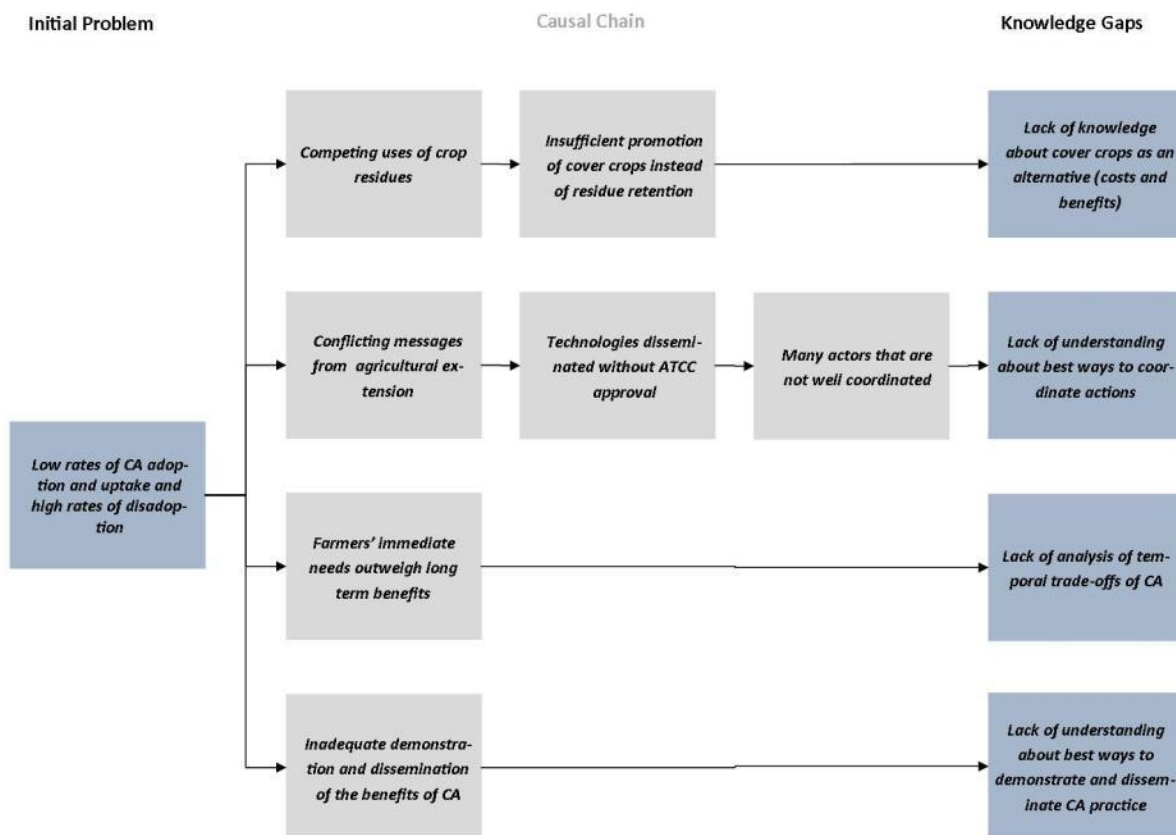
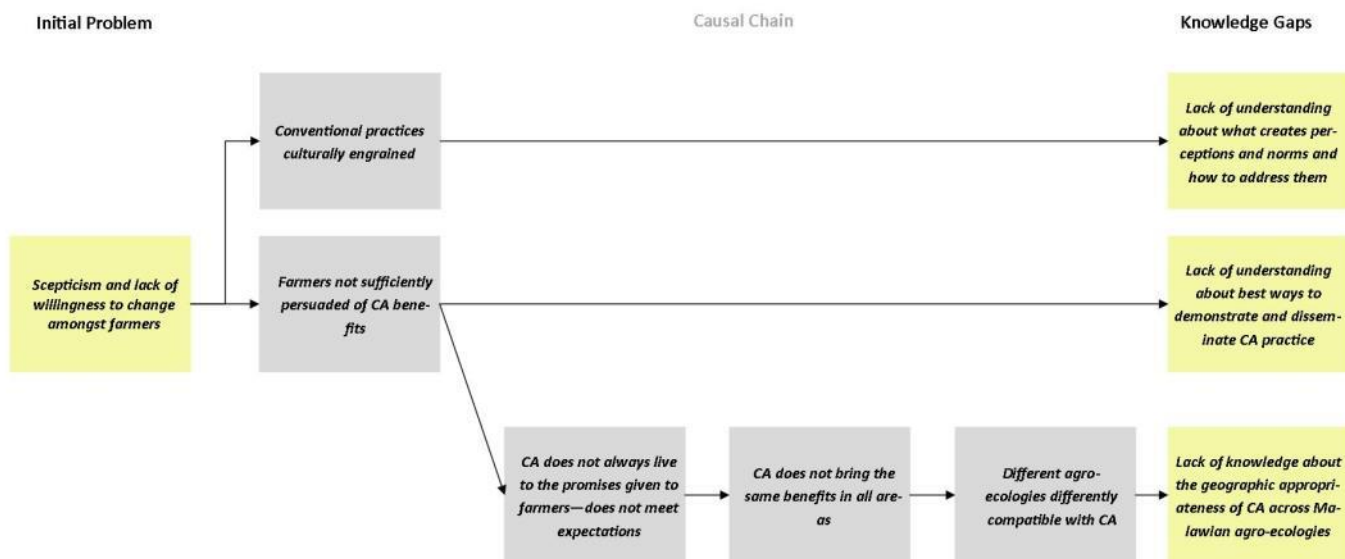
Knowledge/Information Constraints

- Limited capacity within research institutions to conduct long-term, large-scale research projects
- Lack of communication of knowledge across the CA community of practice

Through a causal chain exercise, which is documented in the following the diagrams, participants attempted to link four of these challenges (highlighted in bold type) to underlying knowledge gaps that might be addressed through research programmes.



Figures 5a,b,c,d: Digitised representations of the causal chain diagrams produced, with the initial problems and underlying knowledge gaps represented by coloured boxes

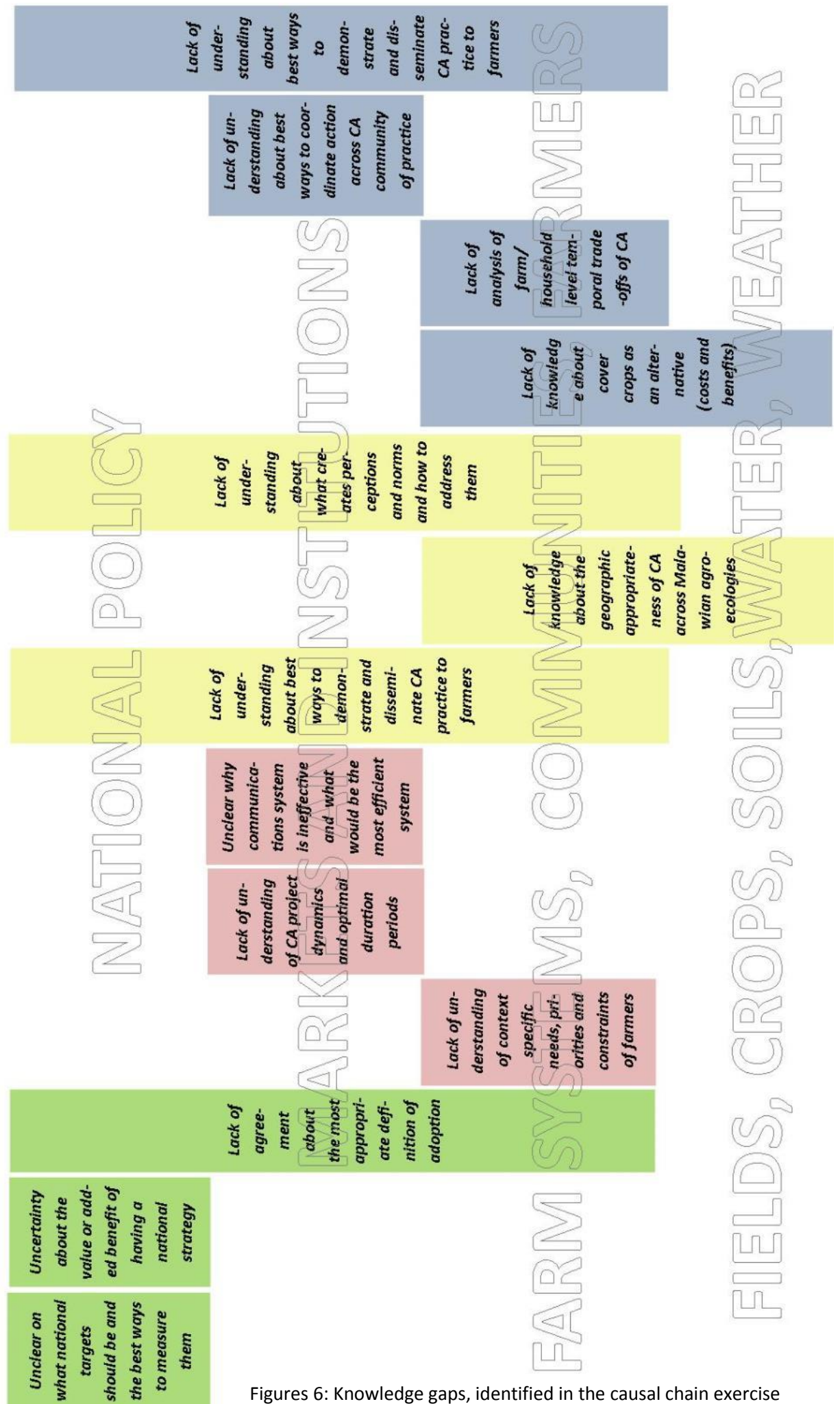


The knowledge gaps identified through this exercise were diverse and in some cases discussions around each of the initial challenges took unpredictable routes. As such, mapping out the causal chain is a useful way for making these connections and understanding how addressing different knowledge gaps may play a beneficial role in overcoming a broader set of experienced challenges.

The knowledge gaps that emerged from the exercise relate to different scales of operation and below (Figure 6) they are mapped on to the scale categories (fields, farms, markets and institutions, national policy and international policy) used in the institutional mapping exercise. These are not simply spatial categories, but, particularly in terms of research, also represent different disciplinary spheres. Field level knowledge gaps, for example, correspond largely to agronomy, hydrology or plant and soil science, whereas those at the scale of communities, markets and institutions may be socio-economic and at a national and international level they are political. What is clear from the diagrams below is that whilst an initial challenge may appear to be agronomic, socio-economic, or political in nature, the underlying knowledge gaps behind them cross scales and disciplines and so require a multi-level, integrated interdisciplinary research approach.

Cross-referencing between the maps of knowledge gaps and institutions provides a useful way of thinking about who might hold existing relevant knowledge and/or who might be best placed to address the knowledge gap.

INTERNATIONAL POLICY



Figures 6: Knowledge gaps, identified in the causal chain exercise ,plotted on to their relevant scale

Research Planning

Taking a selection of the knowledge gaps identified, workshop participant began to develop concept notes for potential future research projects programmes, with the intention that these might form the basis of future research proposals. In each case, the concept notes addressed the following questions:

- What are the research objectives?
- What are the important data? Who may already hold relevant knowledge?
- What are the best ways of collecting it? Who/which organisations are best placed to collect it? (referring back to the research end of the institutional maps)
- How should it be analysed?
- What are the outcomes/impacts of the research? (thinking particularly about the initial challenges)
- How does it need to be communicated/who to? (referring back to the action end of the institutional maps)

Three concept notes, which represent the collated outputs of the final workshop exercise (which produced four concept notes – three of which have been combined in to two to remove overlaps) are presented over the following pages

Research Concept Note 1:

Question: What are the optimal cover crop applications for preventing soil loss?

Objectives: To determine best planting practices for the use of groundnuts as a cover crop within a maize farming system. Optimal is defined in this instance as providing maximum total soil coverage in the post-harvest period without compromising the total maize yield achievable in the field (including pest and disease impacts). The research applies to a low-altitude moist-transitional environment with one 3-4 month maize growing season per year

Data to be collected: 4 replicate randomized blocks (10*10m) of 4 treatments (16 blocks total) over five years.

Treatment variables: groundnut spacing – (1) zero cover crop; (2) 15cm between plants and 75cm between rows; (3) 15cm between plants and 50cm between rows; (4) 15 cm between plants and 25cm between rows -- with all other conditions (e.g. maize variety, planting dates) constant.

Data on maize performance: Total shelled weight of grain per acre, % of crops with pest damage – measured at harvest. % ground cover of weeds and weed compositions, using random quadrats at early growth, flowering, and grain filling stages

Data on soil cover: 1 week, 2 weeks, 3 weeks, 4 weeks after planting and after maize harvest % bare soil using random quadrats

Daily rainfall and average daily temperature throughout growing and postharvest season

Data collectors: CIMMYT; ICRISAT at the Chitedze Agricultural Research Station

Data analysis: Statistical regressions

Research impacts: Information will be used to improve understanding about appropriate alternatives to residue retention in order to maintain soil coverage within maize farming systems. This should inform conservation agriculture outreach and extension in moist-transitional environments with the result that CA systems are designed in a locally appropriate and achievable manner, particularly in cases where crop residue retention represents a barrier to adoption.

This research could form a part of a broader interdisciplinary programme addressing barriers to CA adoption

Communication and outreach: The results should be made widely available across the CA community of practice, using the NCATF networks in order to achieve this outreach, and it should also feed into consultations around the national CA framework, via the NCATF and the Ministry of Agriculture and Food Security's Department for Land Resources Conservation.

Research Concept Note 2:

Question: What is the most appropriate way of defining CA adoption?

Objectives: To determine a nationally applicable and consistent definition of CA adoption that is agreeable across the CA community of practice in Malawi and can be used within all surveys of CA adoption in order to produce more accurate and reliable metric of its uptake at national and district levels

Data to be collected: Information on all definitions of adoption currently in use, including details about who is using them and the rationale behind them.

Opinions about the appropriateness and applicability on alternative definitions from representatives across the CA community of practice

Collected through analysis of project documents of all organisations with the NCATF database followed up with a focus group/workshop meeting involving representatives of each organisation aimed at facilitating group discussion around alternative definitions

Data collectors: NCATF in collaboration with independent research organisation (such as academic institution) in order to facilitate discussion

Data analysis: Analysis is achieved in a participatory manner through workshop deliberations, inclusive of attempt to co-write a workshop definition of adoption. This would be written up as a report by the independent facilitators and circulated for comment across participants

Research impacts: A standard definition of CA would form the basis of reliable national and district-level monitoring of CA outreach and impact, providing a evidence base on which to develop national agricultural policy that is conducive to, and supportive of , conservation practices

Communication and outreach: The NCATF and the Department of Land Resources Conservation would be well placed to promote the definition of CA adoption and ensure that all statistics utilised within policy processes adhere to this standard definition. Monitoring and evaluation is often an enforced condition of funding support, the donor community should be aware of best practice in conducting monitoring, so it will be important that this research is fed-back to the donor community either directly or via the NCATF.

Research Concept Note 3:

Question: How effective is CA under different agro-ecological conditions

Objectives: To compare field trial information, combined with the experiences of CA adopters (and dis-adopters), in the Lower Shire valley and the Highlands in order to compare the effectiveness of CA in contrasting agro-ecological zones.

Data to be collected: Household survey from a stratified sample within 4 villages in each agro-ecological zone (identified through random sampling) totalling 400 survey responses. Questions address agricultural practices, constraints, and self-evaluation of CA systems. Follow up survey with household interviews in one village from each zone (selected on the basis of representativeness from surveys)

Secondary data from ongoing field trials of CA at Makhanga (Lower Shire Valley) and Makoka (Highlands) Agricultural Research Stations of maize under CA conditions (including daily weather data) over the past 8 years.

Data collectors: LUANAR in collaboration with Leeds University and Total Land Care

Data analysis: A combination of qualitative and quantitative data analysis, including statistical analysis of survey responses, multivariate analyses of crop trial data and coding of interview transcripts.

Research impacts: Better understanding of the local appropriateness and impacts of CA would help to tailor agricultural extension to local environments and based on more realistic and relevant expectations about the impact of the technology – this may in turn help to improve positive impacts and adoption rates as well as reducing rates of dis-adoption.

Communication and outreach: The findings should reach those implementing CA projects in the relevant locations through targeted reports and face-to-face meetings with organisational representatives. Information about regional variation may also have relevance in national strategic planning and policy making, so accessible write-ups of the research should reach the NCATF and the Ministry of Agriculture and Food Security, in addition to being published in the conventional academic literature routes for communication to a broader interested audience.

Synthesis and Conclusions

The research planning workshop involved representatives from across the CA community of practice in Malawi, and the diversity of experience, expertise, and organisational remits was evident in the variety of challenges and underlying knowledge gaps that emerged. The knowledge gaps identified do not represent a comprehensive catalogue, but rather are suggestive of the variety and range of avenues for future valuable and impact-led research on CA in Malawi (and southern Africa more broadly).

A strong theme to emerge from the workshop discussions was the cross-scalar and interdisciplinary nature of the knowledge gaps that underpin practical and experienced challenges within the CA community. It appears that there is a real need for interdisciplinary research projects that cross-scales (from field level to international policy). The institutional mapping exercise suggests that actors and knowledge exists at the various scales within the existing community of practice, but that there is a pressing need for these varied practitioners, policy makers and researchers to collaborate in designing, implementing and disseminating the outputs of research. The three research concept notes presented here represent a first step towards developing such stakeholder-led research proposals.

Facilitating collaborative research and communication across the CA community, such that actions are informed by rigorous and robust research, will further require improved coordination of the network, a role which the National Agricultural Task Force is well placed to fulfil, as well a commitment on the part of all members to knowledge sharing.

Workshops such as the one described in this report bring together representatives from across the community to identify knowledge gaps that have relevance to practitioners, identify existing bodies of knowledge, and build networks and collaborations best placed to address research questions, disseminate knowledge and act on it. It therefore represents a model for future action and research planning, and its outputs provide a useful reference tool for moving forward with these activities. The institutional maps, lists of key challenges, underlying knowledge gaps, and concept notes detailed within this report are valuable reference points for the planning and proposal of future research activities. The University of Leeds and LUANAR intends to follow up on the avenues and connections developed through this process in continuing dialogue around research needs and developing collaborative programmes in order to address them. We encourage workshops participants and other readers of this report to feedback to the authors and contribute to this process by continuing to communicate knowledge and seek research partnerships across the CA community.

The practitioner-led planning process described has applications beyond conservation agriculture and it is noted that this type of research planning model could be used across disciplines and projects in order to ensure that research-action efforts are targeted at the experienced needs of practitioners and build on existing knowledge networks.

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Appendix A

Workshop Participant List

Name	Organisation	Job Title/Position
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George Phiri	FAO	Tech. Coordinator-CSA
Stewart Gee	Concern Worldwide	FIM Coordinator
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Jackson Kachidede	Care-Malawi	Project Coordinator
Betty Chinyamunyamu	NASFAM	Development Director
Mcloud Kayira	AICC	Project Coordinator
Wycliffe Kumwenda	NASFAM	Farm services Manager
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David Nthakomwa	CRS-WALA	Senior Programs Officer
Mwiriha Kapondaganga	Concern Universal	TQAM
Getrude Kambauwa	DLRC	CLRCO-LMT
John Paul	Total Land Care	Project Manager
Wezi Mhango	LUANAR	Senior Lecturer
John Mlava	LUANAR	Lecturer-Land Res. Mgt
Ivy Ligowe	DARS	Research Scientist
M.T. Nthara	LADD/LRCD	Chief Land Resources
Mbonera Msimuko	Luso TV	Reporter
Patricia Ngwale	LUANAR	Media Specialist
Bester Kauwa	Luso TV	Camera man
Wisdom Mwale	ZBS	Reporter
David Mkwambisi	LUANAR	Programmes Coordinator & Workshop Host
Daniel Sikawa	LUANAR	Lecturer
Edna Chinseu	DARS	Lecturer/Researcher
Sibongile Zimba	LUANAR	Lecturer
Lessah Mandoloma	LUANAR	Lecturer-NRM
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