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Research Programmes
PROPOSAL

Document Status: With Council
ESRC Reference: ES/L012391/1

DFID-ESRC Growth Research Programme Call 2 (2013)

Organisation where the Grant would be held

Organisation	The University of Manchester	Research Organisation Reference:	SEED Pfact 21228
Division or Department	Environment and Development		

Project Title [up to 150 chars]

Assessing the growth potential of farmer-led irrigation development in sub-Saharan Africa

Start Date and Duration

a. Proposed start date	01 October 2014	b. Duration of the grant (months)	36

Applicants

Role	Name	Organisation	Division or Department	How many hours a week will the investigator work on the project?
Principal Investigator	Professor Philip Woodhouse	The University of Manchester	Environment and Development	7.5
Co-Investigator	Dr Gert Jan Veldwisch	Wageningen University	Environmental Sciences	8.25
Co-Investigator	Professor Daniel Brockington	The University of Manchester	Environment and Development	3.75
Co-Investigator	Dr jean Philippe Venot	Wageningen University	Irrigation and Water Enginering Group	3
Co-Investigator	Dr Hans Charles Komakech	Nelson Mandela African Institute NMAIST	WESE	8.52
Co-Investigator	Ms Angela Manjichi	Polytechnic Institute of Manica	divisão de agricultura	7.27

Classification

International in nature? Yes

Please give details

The research is a collaboration between social science researchers at the University of Manchester (UK) with irrigation engineers at the University of Wageningen (Netherlands) and co-researchers at the Instituto Superior Politecnico de Manica (Mozambique) and the Nelson Mandela African Institute of Science and Technology (Tanzania). The research undertakes a study of irrigation and its social and economic impacts in a number of different sites in Mozambique and Tanzania. The findings of this research are also to be compared to similar work already being undertaken by one of the co-researchers in Burkina Faso.

Objectives

List the main objectives of the proposed research [up to 4000 chars]

The main objective of this research, in a context of intensifying interest and growing international investment to develop irrigation in Africa, is to provide an understanding of African farmers' own initiatives to develop irrigation, and their potential to generate broad-based growth in agricultural production. As yet such initiatives, while widely identified, lack systematic analysis of what drives them and what consequences they set in train at both local level and in the wider economy.

A second objective is therefore to identify farmers' motives in developing irrigation, and changes that such 'farmer-led' irrigation brings about in the pattern and productivity of land use, the growth and distribution of agricultural income, changing land and water rights and the impacts on social groups, particularly those differentiated with respect to wealth, gender and ethnicity, and/or length of residence in the area (long-settled vs recent immigrants). Within this objective we seek to understand not only why some farmers develop irrigation, but also why others do not, so as to establish more clearly the socio-economic impact of small-scale irrigation.

A third objective is to analyse the extent to which technical, financial and organisational support for irrigation development is available from government, NGO or private sectors, and the accessibility of such support to different social groups seeking to develop irrigation. In pursuing this objective we are aware that many African governments have promoted foreign investment in large-scale farming and that this may substantially narrow the options for smaller-scale intensification based on irrigation.

A fourth objective is to undertake a comparison between different case studies of 'farmer-led' irrigation in order to assess whether small-scale 'farmer-led' irrigation (that is, irrigation that is actively sought, adopted and adapted by smaller-scale agricultural producers) provides a significant policy option as a route to a more 'broad-based' agricultural growth.

A fifth objective is to engage African researchers in developing and using methods of data collection and analysis that allow rigorous cross-disciplinary evaluation of small-scale irrigation, in terms of its agricultural functioning, its economic and social effects, and its requirements for investment in terms of technical and financial support.

Finally, the project will engage policy-makers on irrigation and agricultural development at national and international level to evaluate the potential for contemporary farmer-led irrigation development to contribute to more inclusive economic growth in sub-Saharan Africa.

Summary

Describe the proposed research in simple terms in a way that could be publicised to a general audience [up to 4000 chars]

This research will contribute to answering the question "what institutions and policies lead to investment in irrigation by individual farmers, groups of farmers and large-scale enterprises?" under the first DEGRP theme "Agriculture and Growth". The project will assess whether current investment by farmers in small-scale irrigation might offer a model for broad-based economic growth in rural areas of Africa.

The research is timely because, after nearly two decades of stalled irrigation investment due to poor performance of irrigation projects in Africa in the 1970s, international commitment to funding African irrigation is growing rapidly as a response to rising food prices and the continuing stagnation of African agricultural productivity. However, funding commitments are yet to be informed by systematic analysis of how irrigation actually works in today's farming contexts in Africa, leading to uncertainty about choices of technology and forms of social organisation needed, and concerns that implementation of large-scale irrigation will repeat past problems and not achieve broad-based economic growth.

This study will respond to this gap by bringing together social science researchers from the UK and irrigation scientists from the Netherlands to work with African researchers in Mozambique and Tanzania on case studies of contemporary irrigation in Africa. The studies will focus on cases where there is evidence that small-scale farmers are investing in irrigation,

including the construction of furrows to divert streams, the management of wetter lowlands to grow rice, and the adoption of new low-cost pump technologies and drip irrigation.

Each study will develop an analysis of these irrigation developments from a local and a national perspective. At a local level, a combination of interviews and questionnaire surveys will be used to identify why farmers do, or do not, invest in irrigation, the kinds of technical and financial support they can obtain, the changes in agricultural productivity they achieve, and the wider social and economic consequences, particularly for people (e.g. women, younger men, and those recently-settled in the area) whose rights to use land and water are typically subordinate to others in hierarchical systems of local governance.

Case study findings will be presented for discussion by communities participating in the study. At a national level, interviews and workshops with policy-makers in both international development agencies and government, and with non-government organisations and commercial suppliers of irrigation equipment, will be used to provide an analysis of these agencies' perceptions of 'farmer-led' irrigation development and the extent to which such development is supported by policy. The countries selected provide strongly contrasting policy environments, Tanzania having recognised and supported farmer-initiated irrigation in the past whereas Mozambique has not.

Project findings will be disseminated internationally through open access publication in peer-reviewed academic journals, and through engagement with an international advisory group including academic and 'end user' representatives. At a national level, the project will undertake workshops with officials and policy-makers on irrigation in both Tanzania and Mozambique both during inception and after completion of the local-level fieldwork on irrigation case studies. Research findings will also contribute to curriculum development by the African research partners.

Academic Beneficiaries

Describe who will benefit from the research [up to 4000 chars].

The research is designed to provide empirical analysis that is so far lacking in two linked areas of debate on African agriculture and its contribution to economic growth: the potential productivity of small-scale production; and alternative investment models for raising African agricultural output.

On the first of these, the research will directly benefit African scholars at ISPM (Mozambique) and NM-AIST (Tanzania) by enabling them to gain insight and expertise on contemporary dynamics of agricultural change.

On the second, the research will contribute a significant empirical study to the 'land grab' debates on large-scale foreign agricultural investment in Africa. These have been characterised by concern about potential negative effects on rural livelihoods, but have lacked detailed studies of alternative patterns of investment that could offer a model for more inclusive agricultural intensification. This research will thus contribute to this area of scholarship, notably through networks such as the LDPI (Land Deals Politics Inititiative) and the Future Agricultures Consortium.

The work is of direct relevance to PLAAS (Programme on Land and Agrarian Studies) in South Africa, where Professor Ben Cousins has been undertaking research on small-scale irrigated vegetable production at Tugela Ferry, and with whom the project PI (Woodhouse) has an established collaboration through an earlier DFID-ESRC grant to study small-scale irrigated sugar production. The research will also contribute to the social and economic analysis of agriculture by IESE (Instituto de Estudos Sociais e Económicos) in Mozambique, with whom Woodhouse has collaborated on a study of large-scale irrigation investment in the Limpopo valley (Ganho, 2013).

The study will extend the ground-breaking work on farmer-initiated irrigation in Africa undertaken by Wageningen University's Water Resources Management Group which has hitherto focused primarily on water management issues. This project will enable a more thorough and systematic social and economic analysis of such irrigation initiatives and hence an engagement with a broader audience of scholars working on African agriculture and rural development. This will be of importance within Wageningen and Manchester Universities, which both have a number of departments and centres engaged in research on agriculture and/or economic growth. In the case of Manchester, these include the Brooks World Poverty Institute and the DFID-funded ESID (effective States for Inclusive Development) programme.

Staff Duties

Summarise the roles and responsibilities of each post for which funding is sought [up to 2000 characters]

The proposed research has three main components:
1. Detailed case studies of irrigation in Mozambique and Tanzania. These will be undertaken by field researchers (one in each country), supervised by a team of co-investigators. These teams will be Woodhouse, Veldwisch and Manjichi in Mozambique, and Brockington, Veldwisch and Komakech in Tanzania. The field researchers will be responsible for primary recording of interviews, questionnaire responses, and preliminary data compilation. The supervisory teams will be responsible for the design and writing up of the case studies, as well as supervising the field research.
2. Review of national policy on irrigation, its underlying priorities and assumptions about the role of 'farmer-led' irrigation, and public and private programmes that are being implemented to support different types of irrigation. This work will be undertaken by the team of co-Investigators, as identified above for each of the two countries. This work will also be undertaken by Venot for Burkina Faso.
3. Comparative analysis of the case studies within and between countries. This work is to be co-ordinated by Woodhouse, with components supplied by other co-Investigators (Brockington, Veldwisch, Venot, Manjichi, Komakech).
All co-investigators will be involved in writing up the research for publication.

Overall project management will be by the PI (Woodhouse), who will direct the work of the project manager in coordination of research activity, and support to dissemination activity (arranging meetings, maintenance of webpages, email circulation lists).

Impact Summary

Impact Summary (please refer to the help for guidance on what to consider when completing this section) [up to 4000 chars]

We will engage key stakeholders at four levels: national policy-makers, local users, African academics, and international academic/users.

National policy-makers. In each of the countries in which the research is to be undertaken we will convene a series of "strategic workshops" at inception, mid-term and 6 months before the end of the project. At each workshop the research team (Manchester/WUR and African research partners) as well as key policy makers and technical advisors on irrigation will be able to assess and discuss the project activities and findings. Workshop outcomes will inform research design and data collection activities (at inception, and mid-term) and data interpretation and research findings (in the final workshop).

Local users: At a local level, we will seek opportunities to engage with farmers' organisations in discussing the research findings, particularly in terms of comparing different irrigation approaches and their relevance for different groups (e.g. women and youth). These meetings will also involve staff from the local irrigation and agricultural administration so that to raise their awareness -and readiness to engage with- farmer-led irrigation innovation and development.

African academics. In each of the case study countries, the research will involve the Manchester and Wageningen researchers working with African co-investigators from higher education and research institutions: - ISPM in Mozambique, NM-AIST in Tanzania
This will offer opportunities for capacity building: through collaborative research design and data collection, and the possible use of data collected by junior researchers for a PhD in a local university (the PhD will be co-supervised by staff from Manchester/WUR). The research will also provide the basis for seminars and curriculum development in ISPM (Mozambique) and NM-AIST (Tanzania), particularly in reframing how irrigation is perceived by students (notably, in their awareness of local 'artisanal' adaptations of more formal irrigation technology) and in interdisciplinary methodologies for irrigation appraisal, particularly with respect to understanding broader social and economic effects.

International academics/users. early publication of research results in high quality journal papers will challenge current thinking by re-framing debates about the potential options of investment in irrigation (the last 6 months of the project are specifically devoted to this activity). These papers will emphasise cross-disciplinary analysis and accessibility to non-

specialist readers by targeting Open Access publication in key high-impact journals (World Development, Journal of Peasant Studies, Journal of Agrarian Change, Water Alternatives). Findings will be disseminated also by conference presentations and via shorter briefing notes to mailing lists and via web pages. The project will also use a high-level "advisory group" to guide the implementation of the project and offer opportunities for the project to inform international policy agendas.

Ethical Information

Has consideration been given to any ethical matters raised by this proposal ? Yes

Please explain what, if any, ethical issues you believe are relevant to the proposed research project, and which ethical approvals have been obtained, or will be sought if the project is funded? If you believe that an ethics review is not necessary, please explain your view (available: 4000 characters)

This research will include work with disadvantaged people whose vulnerability (financially and socially) may be exacerbated as a consequence of their provision of information to the project. Steps will therefore be taken to ensure the anonymity of those who act as informants to the project, and that the project's purpose is made clear to those contributing information to it. The University of Manchester has an approval process that is applicable to all research undertaken by staff and students (see: http://www.campus.manchester.ac.uk/researchoffice/governance/ethics/uniapproval/). Should this proposal be funded, all fieldwork plans will be subject to this approval procedure

Summary of Resources Required for Project

Financial resources

Summary fund heading	Fund heading	Full economic Cost	ESRC contribution	% ESRC contribution
Directly Incurred	Staff			80
	Travel & Subsistence	51950.00	41560.00	80
	Other Costs	0.00	0.00	80
	Sub-total			
Directly Allocated	Investigators			80
	Estates Costs	7099.00	5679.20	80
	Other Directly Allocated	0.00	0.00	80
	Sub-total			
Indirect Costs	Indirect Costs	30320.00	24256.00	80
Exceptions	Staff	0.00	0.00	100
	Other Costs	258198.00	258198.00	100
	Sub-total	**258198.00**	**258198.00**	
	Total			

Summary of staff effort requested

	Months
Investigator	37.00
Researcher	0
Technician	0
Other	18
Visiting Researcher	0
Student	0
Total	55

Other Support

Details of support sought or received from any other source for this or other research in the same field.
Other support is not relevant to this application.

Related Proposals

Proposal is related to a previous proposal to ESRC

Reference Number	How related?
ES/L004887/1	Follow up to outline proposal

Previous Proposals

Enter the ESRC reference numbers of any support sought or received from ESRC in the past five years.

RES-167-25-0746

Staff

Directly Incurred Posts

			EFFORT ON PROJECT							
Role	**Name /Post Identifier**	**Start Date**	**Period on Project (months)**	**% of Full Time**	**Scale**	**Increment Date**	**Basic Starting Salary**	**London Allowance (£)**	**Super-annuation and NI (£)**	**Total cost on grant (£)**
Other Staff	Project Manager	01/10/2014	36	50	6.29	01/08/2015		0		
									Total	

Applicants

Role	Name	Post will outlast project (Y/N)	Contracted working week as a % of full time work	Total number of hours to be **charged** to the grant over the duration of the grant	Average number of hours per week **charged** to the grant	Rate of Salary pool/banding	Cost estimate
Principal Investigator	Professor Philip Woodhouse	Y	100	990	7.5		
Co-Investigator	Dr Gert Jan Veldwisch	Y	100	1089	8.2	0	0
Co-Investigator	Professor Daniel Brockington	Y	100	495	3.8		
Co-Investigator	Dr jean Philippe Venot	Y	100	396	3	0	0
Co-Investigator	Dr Hans Charles Komakech	Y	100	1125	8.5	0	0
Co-Investigator	Ms Angela Manjichi	Y	100	960	7.3	0	0
						Total	

Travel and Subsistence

Destination and purpose		Total £
Outside UK	PW and DB: Inception visit to Mozambique (1 flight @ £2000, 5 days subsistence @ £70 each)	4700
Outside UK	PW and DB: Inception visit to Tanzania (1 flight @ £2000, 5 days subsistence @ £70 each)	4700
Outside UK	PW: Inception visit to Burkina Faso (1 flight @ £1000, 5 days subsistence @ £70)	1350
Outside UK	PW: Supervision visit to Mozambique (1 flight @ £2000, 10 days subsistence @ £70)	2700
Outside UK	DB: Supervision visit to Tanzania (1 flight @ £2000, 10 days subsistence @ £70)	2700
Within UK	PW and DB: Mid term review visit to Mozambique and Tanzania (1 flight @ £2000, 10 days subsistence @ £70 each)	5400
Within UK	PW and DB: End of fieldwork review in Mozambique and Tanzania (1 flight @ £2000, 10 days subsistence @ £70)	5400
Outside UK	Advisory Panel travel and subsistence costs for 4 members of the panel to meet project researchers (Manchester/Wageningen) on 3 occasions	10000
Outside UK	One day workshop during inception, mid term and final review visits @ £2500 per workshop for each country (6 workshops)	15000
	Total £	51950

Other Directly Incurred Costs

Description	Total £
Overseas Costs: CoI Gert Jan Veldwisch 22% time commitment	43660
Overseas Costs: JP Venot 8% time commitment	14538
Overseas Costs: Research Associates (2 x 3 years @ £6000 per year)	36000
Overseas Costs: research officers (2 x 18 months @ £75 per day)	59400
Overseas Costs: Overheads @ 20% of relevant staff costs	11640
Overseas Costs: Overheads at 50% of relevant staff costs	47700
Overseas Costs: International flights (x 12 @£2000 per flight)	24000
Overseas Costs: JPV and GJ Subsistence 98 days @ £70 per day	6860
Overseas Costs: Fieldwork expenses for Research Officers (18 x 10 days @ £40) x 2	14400
Total £	258198

Timetable estimates of the number of months after the start of the project to reach the following stages:

Stage	Number of Months
Completion of all preparation and design work	9
Commencement of fieldwork or material/information/data collection phase of study	9
Completion of fieldwork or collection phase of study	24
Commencement of analysis phase of study (substantive phase where research facilities are involved)	24
Completion of analysis phase of study	29
Commencement of writing-up of the research	29
Completion of preparation of any new datasets for archiving	36
Completion of writing-up	36

Data Collection

If the research involves data collection or acquisition, please indicate how existing datasets have been reviewed and state why currently available datasets are inadequate for this proposed	The applicants have reviewed work on African irrigation, including datasets held by international development agencies, and can confirm that no datasets yet provide social and economic data from areas where irrigation is being initiated by farmers (as distinct from datasets generated from large-scale irrigation schemes with tenancy

research. If you do not state to the contrary, it will be assumed that you (as principal applicant) are willing for your contact details to be shared with the affiliated data support service (UK Data Service) working with the Research Councils.	arrangements for small-scale farmers).
Will the research proposed in this application produce new datasets?	Yes
Will this data be:	✔ Quantitative Qualitative
Please give a brief description of the datasets.	We expect to generate data from questionnaire surveys of users and non-users of irrigation in up to six different irrigation contexts.
It is a requirement to offer data for archiving. Please include a statement on data sharing. If you believe that further data sharing is not possible, please present your argument here justifying your case.	We do not envisage any difficulties in making data available for archiving.
Who are likely to be the users (academic or non-academic) of the dataset(s)?	academic
Please outline costs of preparing and documenting the data for archiving to the standards required by the affiliated data support service (UK Data Service) working with the Research Councils.	The data preparation will be the responsibility of the project staff. No additional cost is anticipated.

OTHER INFORMATION

Academic Reviewers

1	Name	Organisation	Division or Department	Email Address
Professor William Adams		University of Cambridge	Geography	wa12@cam.ac.uk

Academic Reviewers

2	Name	Organisation	Division or Department	Email Address
Dr Saturnino Borras		Erasmus University Rotterdam	International Institute ofSocial Studies	borras@iss.nl

User Reviewers

1	Name	Address	Town	Email Address
Dr Nicole Lefore		Private Bag X813	Pretoria	n.lefore@cgiar.org

User Reviewers

2	Name	Address	Town	Email Address
Dr Pieter Waalewijn		Irrigation & Water Resources Specialist	World Bank Malawi Country Office	pwaalewijn@worldbank.org

Classification of Proposal

(a) User Involvement

The nature of any user engagement should be indicated

Design	x
Execution	
Dissemination	x
Training	x
Not applicable	

Proposal Classifications

Research Area:

Research Areas are the subject areas in which the programme of study may fall and you should select at least one of these. Once you have selected the relevant Research Area(s), please ensure that you set one as primary. To add or remove Research Areas use the relevant link below. To set a primary area, click in the corresponding checkbox and then the Set Primary Area button that will appear.

Please select one or more Research Areas

Subject	Topic	Keyword
Development studies	Natural Resources, Environment and Rural Development [Primary]	Agriculture, agricultural policy
Development studies	Natural Resources, Environment and Rural Development [Primary]	Food security, food supply
Development studies	Natural Resources, Environment and Rural Development [Primary]	Land ownership and tenure
Development studies	Natural Resources, Environment and Rural Development [Primary]	Rural Livelihoods
Development studies	Natural Resources, Environment and Rural Development [Primary]	Water resources in LICs
Development studies	Natural Resources, Environment and Rural Development [Primary]	

Qualifier:

Qualifiers are terms that further describe the area of study and cover aspects such as approach and geographical focus. Please ensure you complete this section if relevant.

To add or remove Qualifiers use the links below.

Type	Name
Approach	Qualitative
Approach	Quantitative
Collaboration location region	Africa
Collaboration location region	Western Europe
Geographic Area	Africa
Project Engagement by Sector	Academic Users
Project Engagement by Sector	Business Sector
Project Engagement by Sector	Third Sector

Free-text Keywords:

Free-text keywords may be used to describe the programme of study in more detail. To add a keyword, you first need to search existing Research Areas by entering the keyword in the Search box and selecting the Filter button.

If the keyword is adequately reflected by one of the terms displayed below, click in the corresponding checkbox then select Save. If no potential matches are displayed, or none of those displayed are suitable, select the Add New button followed by

the Save button to add it as a descriptor. To add or remove those previously added use the links below.
Free-text Keywords
economic impact
investment models
irrigation

Pathway to impact

The research will generate new evidence on irrigation dynamics in Sub-Saharan Africa, hence contribute to a re-framing of education and policy on irrigation in Africa, through a combination of planned and opportunistic activities aimed at influencing thinking and action. We will engage key stakeholders at four levels: national policy-makers, local users, African academics, and international academics/users.

National policy-makers. In each of the countries in which the research is to be undertaken we will convene a series of "strategic workshops" at inception, mid-term and 6 months before the end of the project. These strategic workshops will bring together the research team (Manchester, WUR, NM-AIST and ISPM) as well as key stakeholders who will be interested in, and in a position to, assess and discuss, the project findings. These workshops are key elements of our iterative research design. The outcomes of the discussions will be used to inform research design and data collection activities (at inception, and mid-term) and data interpretation and research findings (in the final workshop).

The workshops will include national research and higher education institutes, international and national agencies concerned with policy on agriculture and natural resource use, non-government development organisations and private sector suppliers of irrigation equipment, and representatives of farmers' organisations. Researchers' existing networks will be exploited to promote these workshops and disseminate the outcomes of the discussions. In addition to the networks of African research partners, Venot's prior work with the International Water Management Institute (IWMI), Veldwisch's current role as Capacity Development Consultant for the World Bank-funded PROIRRI (2013-2016) irrigation capacity development project in the Ministry of Agriculture, Mozambique, Woodhouse's collaboration (2011-2014) with the Instituto de Estudos Sociais e Económicos (IESE) in Mozambique, and Brockington's extensive networks in Tanzania offer the scope for widespread engagement of relevant partners.

The research project has already been discussed with iDE UK and iDE-Mozambique. iDE (formerly International Development Enterprise), is a social enterprise whose objective is to alleviate poverty through better agricultural water management practices. It has pioneered a market-approach to irrigation development by individual farmers, and is interested in contributing to the research to identify opportunities to expand its programs – notably in Mozambique and Burkina Faso. iDE has agreed to provide a member of the project advisory panel (see below)

Local users: At a local level, we will seek opportunities to engage with farmers' organisations in discussing the research findings, particularly in terms of comparing different irrigation approaches and their relevance for different groups (e.g. women and youth). These meetings will also involve staff from the irrigation and agricultural administration so that to raise their awareness –and readiness to engage with- farmer-led irrigation innovation and development

African academics. A key element to enhance the impact of research is that of capacity building so that in-country organizations and actors are trained to, and familiar with, new ways of envisioning irrigation development. In each of the case study countries, the research will be undertaken in collaboration with African researchers from higher education and research institutions:

- ISPM in Mozambique, NM-AIST in Tanzania

We adopt a multi-track approach to capacity building. First, regular meetings will be organized between the research team (Manchester, WUR, NM-AIST and ISPM) . Research

design and data collection techniques will be collaboratively designed during these meetings. In each country, the long term involvement of a single master-level junior researcher (18 months over a period of 3 years), whose main role will be to implement data collection activities, will ensure "learning-by doing". If circumstances allow, junior researchers will make use of this data to inform the completion of a PhD in a local university (the PhD will be co-supervised by staff from Manchester/WUR). Second, data collected and preliminary findings will support the organization of a seminar series in each in-country partner organization (it is expected three seminars will be organized each year in each country). Third, research findings will inform the development of curricula of academic programmes on agriculture and irrigation at ISPM (Mozambique) and NM-AIST (Tanzania). Important areas in which we identify opportunities to build capacity are: in reframing how irrigation is perceived by students (notably, in their awareness of local 'artisanal' adaptations of more formal irrigation technology); and also in interdisciplinary methodologies for irrigation appraisal, particularly with respect to understanding broader social and economic effects.

International academics/users. An emphasis on early publication of research results in high quality journal papers will seek to fill the evidence gap that this research addresses and challenge current thinking by re-framing debates about the potential options of investment in irrigation (the last 6 months of the project are specifically devoted to this activity). These papers will emphasise cross-disciplinary analysis and accessibility to non-specialist readers by targeting key high-impact journals (*World Development, Journal of Peasant studies, Journal of Agrarian Change, Water Alternatives*). Open access publication in these journals is secured, where necessary, through the University of Manchester's 'Gold OA' provision (http://www.openaccess.manchester.ac.uk/). Key findings will be disseminated also by conference presentations and via shorter briefing notes to mailing lists and via web pages.

The project will also engage with an "advisory group" made up of three or four academic and non-academic experts to maximise the project's relevance for, and impact on, international agendas of irrigation development. Advisory group meetings will both guide the implementation of the project and offer opportunities for the project to inform the design of development projects and curricula of higher education institutes. We have positive indications of willingness to join an advisory panel from: Prof. Charlotte de Fraiture (UNESCO Institute for Water Education), Dr Rudolph Cleveringa (International Fund for Agricultural Development technical advisor – water), and Lewis Temple/David Jackson (iDE-UK).

Assessing the growth potential of farmer-led irrigation development in sub-Saharan Africa.

Research goals and links to DEGRP Call themes

The proposed research starts from the important insight that 'formal' irrigation investments in Africa are widely perceived to have performed poorly, with little public funding of irrigation from 1985 to 2005 (AfDB, 2008), but that there has been widespread investment by African farmers themselves in diverse 'informal' irrigation methods. These include diversion of streams into furrows to water crops, small pump systems, wetland reclamation, and other methods of improved water control and productivity (Southgate and Hulme, 2000; Lankford, 2009, Bolding et al, 2010, Veldwisch et al, 2013, De Fraiture and Giordano, 2013). However, there are no systematic studies of this phenomenon and its contribution to growth in agricultural production or the wider economy. This research seeks to understand the factors that are influencing farmers' decisions to invest, or not, in irrigation and the consequences for economic growth and income distribution. It addresses the DEGRP call theme "Agriculture and Growth" through the sub-theme "why so little irrigation in Africa", with particular relevance to the question "What institutions and policies lead to investment in irrigation by individual farmers, groups of farmers and large-scale enterprises?"

Background

Reasons identified for past failures of formal systems have included: flawed technical design; poor market access; inadequate supporting infrastructure (roads, input supply chains, etc.); and the frequent – but mistaken - assumption that irrigated agriculture could count on 'free' household labour (Moris and Thom, 1985; Diemer and Vincent, 1991; Veldwisch et al., 2009), which had particularly negative effects on women's control of land and labour (Carney, 1988). As a consequence, the financial viability of irrigation schemes was often overestimated and project failure rate was as high as 60% (Inocencio et al., 2007).

Continuing low agricultural productivity in sub-Saharan Africa and sharp increases in food prices, have prompted renewed interest in irrigation. Water resources are perceived to be under-used, and, under conditions of rainfall uncertainty, irrigation is necessary to reduce risk to encourage other investments like fertiliser (Svendsen et al, 2009). This latter constraint is predicted to intensify, as climate change will make the timing of rainfall more irregular.

For a number of reasons, therefore, there is now renewed interest in irrigation in Africa. In 2007, five international organizations (World Bank, AfDB, FAO, IFAD and IWMI) jointly prepared a collaborative agricultural water strategy, and the following year established the Agricultural Water for Africa (AgWA) partnership with the objective of promoting: "Increased investment in agricultural water management that is socially equitable, profitable at the farm level, economically viable, environmentally sound and sustainable" (AgWA, 2010). More recently, the World Bank (2010) has argued for large-scale investment leading to an "aggressive expansion of Africa's irrigated agricultural area". At smaller scales important experience is being generated by non-government agencies such as iDE (http://www.ideorg.org/) and Kickstart (http://www.kickstart.org/) seeking to develop commercial supply chains for small-scale irrigation equipment in Africa.

However, despite this growing potential for investment, it remains unclear what type of irrigation is appropriate for different African contexts (Lankford, 2009). A World Bank (2007) typology being widely used by potential funders identifies five different 'business lines' or 'building blocks' for irrigation development practiced at different scales and with different modes of private sector involvement:

1. Individual smallholder irrigation for high value markets
2. Small-scale community-managed irrigation for local markets

3. Improved water control and watershed management in a rain-fed environment
4. Market-oriented irrigation on a Public-Private Partnership (PPP) basis
5. Reform and modernization of existing large scale irrigation schemes

The latter two forms of irrigation development imply large-scale irrigation driven by state and/or private sector (mostly foreign) investment in agricultural land in Africa (World Bank, 2010). The prospect of a new wave of 'formal' large-scale irrigation has given rise to concern that this will close off more broad-based opportunities for agricultural growth (White et al., 2012). There are grounds to question whether an emphasis on large-scale irrigation will be the most cost-effective pattern of investment (Fujie et al., 2011), and recent estimates of irrigation potential suggest that the scope for financially viable (IRR>12%) small-scale irrigation is more than double (3.75 million ha) that of large-scale irrigation (1.35 million ha) in sub-Saharan Africa (You et al, 2010:22-23).

These estimates, however, are highly sensitive to assumptions about irrigation cost, and choice of technology. They depend on regional-scale modelling exercises, rather than empirical analysis of existing farmer-led improved water control and full irrigation found in contemporary processes of agricultural intensification. There is some evidence that these processes involve factors as yet under-researched in African contexts, such as the role of in-migration in markets for land and labour, and the role of local (often customary) institutions where farmers' irrigation initiatives affect shared resources (Woodhouse, 2003; 2012; Veldwisch et al, 2013). Similarly, little has been published about the impacts of new markets for agricultural output, or of new commercial sources of irrigation technology, such as low-cost drip irrigation (WUR, 2013). Thus, while models of 'farmer-led' irrigation may promise more inclusive agriculture-based economic growth, little is known about the socio-economic impacts of such developments that are already taking place.

Objectives and research questions

We need, therefore, to learn more about the broader growth impacts of the first three modes of irrigation listed above. That is the purpose of this research. We ask:

1. What characterises small-scale farmers' own initiatives in developing improvements in water management for agriculture, and what social and economic changes are associated with them? And how are these socially differentiated (gender, age, ethnicity, etc.)?
    a. What are the drivers of irrigation development (e.g. new economic opportunities, or perceptions of changing climatic/rainfall conditions, technologies becoming available, demographic changes)?
    b. How has irrigation changed local agriculture (e.g. crops grown, productivity rates, in-migration, land tenure, gendered access to land and water)?
    c. Where and, in what form, have farmers obtained advice and support for irrigation development (e.g. investment, technical support, equipment supply, input-output linkages), and how effective has that been?
    d. How does small-scale farmers' irrigation development affect trends in the creation and distribution of local prosperity?
2. What views do agricultural development agencies (government, donors, NGOs, commercial investors) have about irrigation developed by small-scale farmers?
    a. What models of irrigation do national policies promote and what socioeconomic groups and goals are targeted. For instance, how is the priority to raise national agricultural output (with a presumption in favour of large-scale schemes) balanced by an objective of improving rural livelihoods through small-scale agriculture?

b. What public and private programmes are being implemented to support different types of irrigation (investment, technical support, equipment supply, input-output linkages)?
c. What information do public agencies hold in relation to farmer-led irrigation and how is that used in planning decisions (including regulation of small scale use, water rights and authorisation of large-scale private investments)?

Methodology

To answer these questions the proposed research will undertake case studies of a variety of different types of farmer-led irrigation falling under three broad categories:

Individual smallholder irrigation using small pumps, typically involving farmers upgrading from manual watering (bucket, watering can) to pumped irrigation (typically, motorised or treadle pumps) to produce fruit or vegetables for sale.
Hill-furrow irrigation of cash crops (e.g. vegetables, fruit, coffee) involving stream diversion into furrows that are often shared by a number of individual producers.
Water control in wet lowlands typically as a means of upgrading rainfed rice production for household consumption plus sale of surpluses.

Case studies will be undertaken in two countries, Tanzania and Mozambique, with contrasting policy environments for small-scale irrigation, and comparisons will be also drawn from a third country, Burkina Faso, in which field studies are already being undertaken by one of the co-investigators.

Tanzania has recognised the importance of farmer-led irrigation development since at least the 1980s, actively supporting traditional furrow irrigation such as in Kilimanjaro region, although often with a strong focus on modernisation and formalisation of these schemes. It is one of the few African countries that includes such forms of irrigation in its inventories and policies on irrigation (MoWI, 2009). Tanzania emphasises irrigation in its agricultural policy and is among the leading countries implementating the CAADP requirements for investment in irrigation (Cooksey, 2013).

In *Mozambique*, by contrast, irrigation has historically been considered almost exclusively in terms of large-scale production and infrastructure. Small-scale agriculture has recently become more central to national development plans, as evidenced by (1) the Green Revolution strategy of 2008, (2) the Strategic Agrarian Development Plan, setting out the policy priorities for the Ministry of Agriculture for the period 2010-2019, and (3) the recent National Irrigation Strategy. Despite this, it is yet unclear how irrigation policy will address rapidly proliferating farmer initiatives in irrigation development (Veldwisch et al, 2013).

In *Burkina Faso*, where a semi-arid climate makes much of the cultivated area marginal for rain-fed agriculture, irrigation development has long been on the national agenda – starting from large scale public investments in the 1970s, and more recently reiterated in 2006 with the National Policy for the Sustainable Development of Irrigated Agriculture (MAHRH, 2006). The Ministry of Agriculture has set up dedicated units, in charge of the promotion of irrigation technologies (mostly for individual investors), and overseeing existing (larger-scale) surface irrigation. In 2008, Burkina Faso was one of the few African countries that met, and even exceeded, CAADP targets for agricultural investment (>10% of the national budget) and growth (>6% per year) (www.nepad.org).

These countries supply a variety of cases of farmer-led irrigation corresponding to the typology identified above. Firstly, there are numerous examples of booming development of *individual smallholder irrigation*, to supply fruit and vegetables to nearby cities and some export markets. Small-scale farmers in Mozambique increasingly use motorized and treadle pumps, as do Burkina Faso farmers, directly pumping water upstream of small reservoirs.

While some public investments promote these developments by establishing equipment supplies and market information networks, social enterprises, such as iDE and Kickstart, also play a leading role. These use a business model for poverty alleviation by promoting equipment sales to individual farmers, but face challenges in scaling up this approach. They operate in Mozambique, Tanzania and Burkina Faso, amongst other countries. The largely uncoordinated nature of water use under such initiatives also means that formal government agricultural development organizations can regard small-scale irrigators as "pirates" as much as "pioneers" (de Fraiture et al., 2013).

Secondly, s*mall-scale community-managed irrigation* provides an important pathway for increasing irrigated area and production. Often initiated through state- or NGO-run integrated rural development projects, such as those that constructed small reservoirs for soil and water conservation in Burkina Faso, they have been rehabilitated for irrigation purposes. However, farmers tend to avoid the "official" downstream irrigation schemes in favour of installing pumps to irrigate upstream of the dams (Venot et al., 2012). In contrast, the hill/furrow irrigation systems in the mountainous areas along the Rift Valley have been initiated and sustained by farmers themselves, in some areas since before colonial times (Adams, 1992). In other places, such as in Mozambique, these furrow systems have only expanded recently, but now cover areas estimated at tens of thousands of hectares, and thus are probably larger than formal irrigation in the country (Veldwisch et al., 2013).

Thirdly, the potential for *improved water control in rain-fed agriculture* is huge in both Mozambique and Tanzania where there are large areas of rain-fed rice production developed by farmers in wet lowland areas. Some of these 'informal' areas are much more productive than the nearby formal irrigation systems, such as for instance around Moshi and the Lower Moshi Irrigation System in Tanzania (Beez, 2004). These systems also have parallels in the valleys (or *bas-fond*) in Burkina Faso where they are a crucial resource for food production.

From these contexts, case studies have provisionally been identified for detailed field studies. In Mozambique and Tanzania, the studies will be clustered geographically:

In central Mozambique:

- Hill-furrow irrigation systems developed by farmers in Manica province: rapidly expanding in the past three decades as a result of farmer investment.
- Lowland rice irrigation in Sofala province: long-standing 'informal' irrigation that has recently been the site of development of more market-oriented production.
- NGO or social enterprise efforts to support smallholder-based irrigation via the dissemination of individual low-cost irrigation technologies (pumps and drip-irrigation) to individual farmers.

In northern Tanzania:

- Hill-furrow irrigation systems in the Same-Moshi-Arusha area: traditional irrigation of coffee and bananas that is subject to new market dynamics and new competition for water;
- Small-scale rice producers developing 500ha of informal irrigation upstream of the formal Lower Moshi Irrigation System (LMIS).
- NGO or social enterprise efforts to support smallholder-based irrigation via the dissemination of individual low-cost irrigation technologies (pumps and drip-irrigation) to individual farmers.

In Burkina Faso, the research design is different, yet complementary. The research we propose will build on current (already funded) activities conducted by staff and one PhD from Wageningen University in the DRiP project (WUR, 2013). This focuses on understanding the ethos and practices of social enterprises and small-scale private actors involved in the promotion of smallholder-based irrigation. It also seeks to understand the reasons for an

apparent disconnect between technical choices made by social enterprises, NGOs and governmental agencies and farmers' needs.

The proposed research will enable direct collaboration between four academic institutes (two African and two European) and facilitate exchange with the on-going DRiP project in Burkina Faso. Researchers from ISPM in Mozambique (Manjichi) and NM-AIST in Tanzania (Komakech) will collaborate with social science researchers (Woodhouse and Brockington) from Manchester with expertise in the socio-economic dimensions of agricultural intensification and with water engineering/natural science researchers (Veldwisch and Venot) from Wageningen University with expertise in irrigation development. In Mozambique and Tanzania research teams combining African and European partners and more experienced and junior researchers will develop an interdisciplinary analysis of farmer-led irrigation corresponding to the two sets of research questions identified earlier:

(1) the case study/irrigation system level, and (2) the national policy context.

Irrigation case studies

Each case study will include surveys and more qualitative interviews to understand water management aspects (including quantity and efficiency of water use), socio-economic characteristics, and the processes through which irrigation technology is acquired. Each case study will initially focus on establishing the economic rationale for farmers' use of irrigation, the technical and institutional services on which they draw and the social and economic consequences of irrigation development. These aspects will be investigated by semi-structured interviews conducted with key informants among both farmers and suppliers of equipment and technical services. The information obtained will be used to establish a typology of different types of users and non-users of irrigation in relevant local settlements. This typology will include the elaboration of control cases of non-adopters of irrigation both within communities in which irrigation investment is taking place and in neighbouring communities where there is no irrigation. Particular attention will be paid to identifying differences in irrigation use associated with wealth, gender, ethnicity and age. This typology will then be used to design a short questionnaire survey to assess the extent of particular patterns of irrigation use and non-use within local communities, and their consequences for growth and distribution of prosperity. Survey sample size will be adjusted to the size of communities surveyed, and the number of categories in the typology of users/non-users of irrigation. Preliminary findings from this phase will be presented and discussed with local farmers' and community groups.

National policy context

This part of the research sets out to answer the second set of research questions, addressing "What views do agricultural development agencies (government, donors, NGOs, commercial investors) have about irrigation developed by small-scale farmers?" In a preliminary phase (see below) the research will review how irrigated areas are inventoried and government policies are geared towards different types of irrigation. This will involve interviews of key policy-makers and technical personnel in irrigation agencies, and in a variety of NGOs, private sector and/or government actors supplying technical support and equipment. Further information will be generated through a one-day inception workshop in both Tanzania and Mozambique. Insights from current research being undertaken by Wageningen (Venot) in Burkina Faso will also inform this preliminary analysis. This aspect of the research will be revisited in a further set of interviews and workshop with policy makers and irrigation specialists once irrigation case studies have been completed. This will enable case study findings to be used to interrogate the current policy context in terms of the potential contribution of farmer-initiated irrigation to broader agricultural development.

Comparative Framework
The research questions set out above are informed by a broad political economy framework for analysis of irrigation initiatives at the level of individual farmers' decision-making, at the level of local community (in terms of impacts on land use and distribution of income from increased production) and in the broader economy (in terms of both economic growth potential, but also the demand for technical and market support). The data generated by the irrigation case studies and by the analysis of the national policy context will be further used to generate a comparative analysis across all case studies to establish key parameters of different types of farmer-led irrigation. These will include (but not be restricted to): sustainability of the irrigation system (productivity and durability of water supply); inclusivity (in terms of local trends towards socio-economic differentiation); and scaleability (in terms of a supportive economic, technological and institutional environment). To our knowledge, no research on the socio-economic dimensions of contemporary small-scale irrigation development in Africa has yet been undertaken to supply the data contemplated by this study.

In each country, the research will involve the following phases:

Preliminary phase (9 months): Manchester and Wageningen researchers will work with their co-investigators in Mozambique and Tanzania to undertake the initial analysis of the respective national policy context, including an inception workshop. Comparative analysis of the irrigation policy context will be undertaken for Burkina Faso. During this phase the teams of co-investigators will also undertake a preliminary analysis of each of the selected examples of different types of irrigation to confirm its overall extent, number of users, historical development and hydrological characteristics. Field researchers to undertake the irrigation case studies will also be recruited in this phase.

Detailed field studies (18 months) The field researchers, under supervision of the co-investigator teams, will undertake the fieldwork for the irrigation case studies, including data recording and storage and initial data analysis (transcription of interviews, checking and initial statistical treatment of survey data, identification of preliminary findings). Preliminary findings will be presented to farmers' and community representatives for comment and discussion.

Review of policy implications (9 months) drawing on the findings of the detailed field studies, the co-investigators will undertake further interviews and a workshop with policy makers and technical advisors in Mozambique and Tanzania. In the last six months comparative analysis of the irrigation case studies will be undertaken and publication of findings initiated.

Networking with other academic and non-academic stakeholders
In addition to the one-day workshops to engage policy makers in Tanzania, Mozambique and Burkina Faso in the preliminary and review phases of the research (at 6 and 30 months), provision has also been made for meetings of a project advisory group at key milestones (6, 18 and 30 months). The advisory group includes potential users of the research findings (see 'pathways to impact') who are also influential in shaping international irrigation agendas.

Research Outputs
The research findings will be published in as open access papers in high-impact refereed journals, with at least one paper targeted to each of the following: *Journal of Agrarian Change, Journal of Peasant Studies, Development and Change*, *Water Alternatives* and *World Development.* More immediate publication of research findings is envisaged via conference presentations and working papers posted to project web-pages (see initial information at: http://smallscaleirrigationinafrica.wordpress.com/) maintained by the project manager, and disseminated in shorter policy papers both via network mailing lists and at policy workshops in Mozambique and Tanzania.

Justification of resources

Staff activity

The project will undertake research in two countries, identified as Mozambique and Tanzania. Work in each country will involve at least one researcher from both Manchester and the Netherlands and one researcher from an African research organisation.

Mozambique: Veldwisch, Woodhouse and Manjichi
Tanzania: Brockington, Komakech and Veldwisch.

In addition, Manchester and Wageningen researchers will collaborate in an assessment of lessons to be learned from research already being undertaken by Wageningen University (WUR (2013). in Burkina Faso (Brockington, Venot Veldwisch and Woodhouse).

The resources identified as necessary for this work are as follows:

Directly Incurred Staff

A Project Manager (0.5 grade 6 (sp29) post for three years) has been included in the budget. This post will provide support for management of the research activity and also for dissemination (webpage maintenance, working paper production, network contacts).

Directly Incurred Other

Travel and subsistence costs of £26,950 are included for University of Manchester staff. This includes international flights for Woodhouse and Brockington, along with subsistence costs, as follows:

Inception visit to Mozambique (x2 Woodhouse and Brockington)
Inception visit to Tanzania (x2 Woodhouse and Brockington)
Inception visit to Burkina Faso (x1 Woodhouse)
Supervision visit to Mozambique (x1 Woodhouse)
Supervision visit to Tanzania (x1 Brockington)
Mid-term review visit to Mozambique and Tanzania (x2 Woodhouse and Brockington)
End of fieldwork review in Mozambique and Tanzania (x2 Woodhouse and Brockington)

The travel and subsistence budget will enable Woodhouse and Brockington to undertake the research and supervisory activities and participation in stakeholder workshops as set out in the Case for Support. Airfare costs take account of the need for regional/local connecting flights to reach northern Tanzania and central Mozambique."

During inception, mid-term and final review visits a one-day workshop with development funders and policy makers is planned, with a budget of £2,500 for each workshop in each country (£15,000 total)

We have additionally requested £10,000 to fund travel and subsistence costs of 4 members of the advisory panel to meet the project researchers (in either Manchester or Wageningen) on three occasions during the course of the project.

Justification for Resources

Directly Allocated Costs

For the UK investigators, we are requesting 20% of PI time (Woodhouse) and 10% for the Co I (Brockington).

Exceptions – requested at 100%

For the international co-investigators we are requesting 22% of time for Veldwisch and 8% of time for Venot, plus the overhead of 20% associated with these salaries, totalling XXX

We have budgeted for 40 days per year of staff time for each of the two African co-Investigators (@ £150/day, £36,000 total over three years). The **African co-Investigators** will each recruit a more junior (MSc-level) **field researcher** to undertake the detailed field studies under their supervision and that of the Manchester/Wageningen researchers. We have allowed a total of £59,400 to cover the cost of two field researchers for 18 months. Salary costs for the African co-Is and field researchers have been budgeted with an additional 50% overhead, giving £143,100 overall.

Travel costs for the Wageningen researchers include 8 flights for Veldwisch and 4 flights for Venot, and an allowance for subsistence 35 days for Venot and for 63 days for Veldwisch, giving a total of £30,860.

African field researchers' travel and subsistence costs have been budgeted as £40 per day, assuming they will spend 50% of working days in the field (total allocation £14,400)

Justification for Resources

Daniel Brockington. Research CV

Education

Geography BA (Hons) Oxon, First Class (1992); PhD, Anthropology, UCL, (1998)

Employment

Department of Geography, University of Cambridge 1998-2002; Department of Geography, University of Oxford 2002-2005; IDPM, University of Manchester 2005+: University Lecturer 2005; Senior Lecturer 2007; Reader 2010; Professor of Conservation and Development 2012.

University Visits and Visiting Fellowships

University of Dodoma, Tanzania (March 2013); University of Roskilde, Denmark (May 2012); ATREE, Bangalore, India (Jan '08-April '08); University of Canterbury, Christchurch, New Zealand. (January '07 – May '07); Australian National University, Canberra, Australia (October '06 – January '07); Rhodes University, Grahamstown, South Africa. (January – April '05);

Selected Publications

Books

Brockington, D. 2014. *Celebrity Advocacy and International Development.* Routledge, London.

Brockington, D and Duffy, R. (eds) 2011. *Conservation and Capitalism.* Wiley-Blackwell, Oxford.

Brockington, D. 2009. *Celebrity and the Environment. Fame, Wealth and Power in Conservation.* ZED books, London.

Brockington, D., Duffy, R. and Igoe, J. 2008. *Nature Unbound. Conservation, Capitalism and the Future of Protected Areas.* Earthscan, London.

Brockington, D. 2002. *Fortress Conservation. The preservation of the Mkomazi Game Reserve.* James Currey, African Issues series, Oxford.

Papers

Holmes, G., Scholfield, K. and Brockington, D. 2012. 'A Comparison of Global Conservation Prioritization Models with Spatial Spending Patterns of Conservation Nongovernmental Organizations' *Conservation Biology* 26 (4): 602-609.

Buscher, B., Brockington, D., Igoe, J., Neves, K. and Sullivan, S. 2012. Towards a consolidated critique of Neoliberal Biodiversity Conservation. *Capitalism, Nature, Socialism* 23 (2): 4-30.

Brockington, D. 2012. 'A Radically Conservative Vision? The Challenge of UNEP's *Towards a Green Economy*.' *Development and Change* 43 (1): 409-422.

Oldekop, J.A., Bebbington, A.J., Brockington, D., and Preziosi, R.F. 2010. 'Understanding the Lessons and Limitations of Conservation and Development.' *Cons Biology* 24 (2): 461-9.

Dressler, W., Büscher, B., Schoon, M., Brockington, D., Hayes, T., Kull, C., McCarthy, J., and Streshta, K. 2010. From Hope to Crisis and Back Again? A Critical History of the Global CBNRM Narrative. *Environmental Conservation* 37 (1): 5-15.

Brockington, D. and Scholfield, K. 2010. 'Conservation NGOs and the Conservationist Mode of Production in sub-Saharan Africa.' *Antipode* 42 (3): 551-575.

Igoe, J., Neves-Graca, K. and Brockington, D. 2010. 'A Spectacular Eco-Tour Around the Historic Bloc: Theorizing the Convergence of Biodiversity Conservation and Capitalist Expansion. *Antipode* 42 (3): 486-512.

Brockington, D. and Scholfield, K. 2010. 'The work of conservation organisations in sub-Saharan Africa.' *Journal of Modern African Studies* 48 (1): 1-33.

Brockington, D., Sachedina, H., and Scholfield, K. 2009. Conservation as a Driving Force in Land Use Change in Tanzania. *International Journal of African Historical Studies* 41 (3): 1-24.

Brockington, D. 2008. 'Corruption, Taxation, Democracy and Natural Resource Management in Tanzania.' *Journal of Development Studies* 44 (1): 103-126.

Brockington D. 2008. 'Powerful Environmentalisms. Conservation, Celebrity and Capitalism.' *Media, Culture and Society* 30 (4): 551-568.

Igoe, J. and Brockington, D. 2007. 'Neoliberal conservation. A brief introduction.' *Conservation and Society* 5 (4): 432-449

Schmidt-Soltau, K., and Brockington, D. 2007 'Protected Areas and Resettlement: what scope for voluntary relocation?' *World Development* 35 (12): 2182-2202.

Brockington, D. 2007. 'Devolution, Community Conservation and Forests. On local government performance and Village Forest Reserves in Tanzania.' *Soc and Natural Resources* 20: 835-48.

Brockington, D. 2006. 'The politics and ethnography of environmentalisms in Tanzania.' *African Affairs* 105 (418): 97-116.

Brockington, D. and Igoe, J. 2006. 'Eviction for Conservation. A Global Overview.' *Conservation and Society* 4 (3): 424-70.

West, P., Igoe, J. and Brockington, D. 2006. 'Parks and Peoples: The Social Impact of Protected Areas.' *Annual Review of Anthropology* 35: 251-77

Adams, W.M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Hutton, J., Roe, R., Vira, B., and Wolmer, W. 2004. 'Conservation and Poverty: A Framework for Analysis' *Science* 306: 1146-9.

Selected Research Grants

2010-12	A 24 month ESRC mid-career fellowship called 'Celebrity and Development.' Value £250k.
2010-11	An AHRC network to look at the work of celebrity, the media and environmentalisms. I was a co-investigator. Value £30k.
2005-8	ESRC Research Fellowship for work on the Social Impacts of Protected Areas Oct 2005 – Sept 2008. Value £160,000. This grant was rated Outstanding, (Very) Good and Good by its evaluators.
2005-7	AHRC funded research project 'Land degradation in Central Tanzania'. I was a co-I. Value £30k

Editorships

I am editor of the journals *Conservation and Society* (since 2007) and *Environment and Society, Advances in Research* (since 2010) and associate editor of *Environmental Conservation* (since 2009).

PhD Supervision

I am supervising 9 students; 8 have completed; 1 student was awarded the Harold K. Schneider Student Prize in Economic Anthropology and the Audrey Richards' Prize for best Africanist thesis in the UK 2008-9.

International Conferences and Talks

June 12	Convenor of an international Symposium at Manchester on Capitalism, Democracy and Celebrity Advocacy. 25 speakers and discussants.
June 11	Co-convenor of Nature Inc! in the ISS at the Hague, attended by nearly 200 people.
Sept 08	Co-convenor of an international Symposium at Manchester on Conservation and Capitalism. 25 speakers attended.
June 04	Co-convenor of an interdisciplinary conference called 'Trees, Rain and Politics in Africa' examining issues of environmental change and environmental politics attended by more than 100 people.

I have received invitations to present my work and research, with travel costs paid, on 6 continents to academic and policy making audiences.

Teaching I have taught courses on environment, society, development and the media to masters and undergraduate students at the Universities of Manchester, Oxford, Cambridge, London and Rhodes University since 2000..

Websites http://celebrityanddevelopment.wordpress.com;
http://environmentalismandconservation.wordpress.com
http://studyinggreen.wordpress.com & www.justconservation.org

CURRICULUM VITAE (CV)

Name:	Hans Charles Komakech
Profession:	Lecturer/Water Resources Management
Nationality:	Uganda
Postal Address:	NM-AIST, Box 447, Arusha, Tanzania
Tel:	+255 786 821 863 or +255 764 821 863
E-mail:	hans.komakech@nm-aist.ac.tz

I am currently a lecturer of integrated watershed and river basin management at the department of Water, Environmental Science and Engineering, Nelson Mandela African Institution of Science and Technology, Tanzania. I have researched the emergence and evolution of endogenous water institutions in Tanzania. Specifically, I looked at the endurance and dynamics of local water governance and state intervention through formalisation of water user groups in furrow irrigation in the Pangani basin, Tanzania.

Education:

- PhD: Water Resources Management, TU-Delft and UNESCO-IHE, the Netherlands, 2013
- MSc Water and Waste Engineering, Water Engineering Development Centre (WEDC), Loughborough University, UK, 2008.
- MSc Water Resources Management, UNESCO-IHE, Delft the Netherlands, 2005.
- BSc Civil Engineering, Makerere University, Kampala, Uganda, 1999.

External grants and awards

2013-2018 VLIR -IUC programme on "Sustainable management of soil and water for the improvement of the livelihoods in the upper Pangani basin, Tanzania". Local Subject Leader - *Water and People: understanding eco-hydrological process to develop participatory water allocation tools in the Pangani basin.* (Total VLIR-IUC programme budget 1.5 million euro spread over six years).

Selected publication in peer reviewed journals

Komakech, H. C. and Van der Zaag, P. 2013. Polycentrism and pitfalls - the formation of water users' forums in Kikuletwa catchment, Tanzania. *Water International*, 38(3), 231-249

Komakech, H.C., Van der Zaag, P. and Van Koppen, B. 2012a. The last will be first: conflict over water transfers from subsistence irrigation to cities in the Pangani river basin, Tanzania. *Water Alternatives 5(3).*

Komakech, H.C.; Van der Zaag, P. and Van Koppen, B. 2012b. The dynamics between water asymmetry, inequality and heterogeneity sustaining canal institutions in Makanya catchment, Tanzania. *Water Policy 14(5): 800-820*. doi: 10.2166/wp.2012.196

Komakech, H.C., Condon, M. and Van der Zaag, P. 2012. The role of statutory and local rules in allocating water between large- and small-scale irrigators in an African river catchment. *Water SA* 38(1): 115-125.

Komakech, H. C. and Van der Zaag, P. 2011. Understanding the emergence and functioning of river committees in a catchment of the Pangani basin, Tanzania. Water Alternatives, 4(2): 197-222.

Komakech, H. C.; Van Koppen, B.; Mahoo, H. F. and Van der Zaag, P. 2011a. Pangani river basin over time and space: on the interface of local and basin level responses. *Agricultural Water Management* 98(11) 1740-1751.

Employment Record:

Employer Nelson Mandela African Institute of Science and Technology (NM-AIST), Feb 2012 to-date
Position **Lecturer/Researcher**, Water governance, Integrated Watershed and river basin management, Environmental governance courses

Employer **Norplan Uganda Limited** June 2006 to Jan 2007
Project Consultancy services of water resources development and Management and other civil engineering design and supervision. Responsible for administrative work, acquisition, planning of activities, supervision of technical work, planning, design, pre-contract services and construction supervision of water resources and sanitation projects.

Employer **Africare Uganda,** July 2001- October 2003
Project Uganda Food Security Initiative Project **(USAID funded). Project Manager/Engineer**
Duties Major duties included monitoring and evaluation of ongoing activities and direct supervision of community watershed management activities and priority road construction.

Employer Stirling International Civil Engineering Limited, Uganda December 2000 – July 2001
Project **Owen Falls dam rehabilitation project. Project Manager** Responsible for management of the rehabilitation works of Owen Falls Dam hydropower station in Jinja, Uganda. Duties included site superintendence, detail measurement of completed works and preparation of joint venture payment certificate for approval and payment.

Employer **World Food Programme and Assist UK,** June 1999 – December 2000

Project **South Sudan Relief Supply Road Rehabilitation project. Project Manager/Engineer** in charge of the rehabilitation works of relief supply routes/roads in South Sudan. Duties included administrative and logistic supply management, planning, design and supervision of construction works.

Research Interests

- Irrigation development and management
- Water institutions and governance
- Integrated Water Resources Management and governance
- Networks and Social network analysis
- Agent-based modelling and participatory simulation
- GIS and remote sensing, land use change and land use studies
- Climate change adaptation and mitigations research

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

Full name: Hans Charles Komakech

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Curriculum Vitae

Angela Manuel Manjichi

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Education

- **July 2009:** Master Degree in Environmental Management. University of Notre Dame. Australia
- **1999 - 2004**: Licentiate's degree in Agronomy Engineering. Eduardo Mondlane University (UEM). Mozambique
- **1997-1998** – Secondary School. Josina Machel secondary school – Maputo, Mozambique

Working Experience

October 2005 – to the date: Higher Polytechnic Institute of Manica (ISPM)–Manica.

1. Director of Business Incubator Centre:
2. As a lecturer in Rural Extension and Development:
3. Member of internal quality assurance committee – development of quality assurance norms and procedures, periodical evaluation of quality standards
4. Coordinator of Institution's Unit for Gender and HIV/AIDS

June – November 2008 – Research Assistant Notre Dame University - Australia

Projects and Consultancy

June 2013 up to date – National Coordinator of the project on *Piloting a mobile phone system for the delivery of information to farmers and agribusinesses to support the sustainable intensification of maize and legume farming systems in east and southern Africa, with potential applications in regional Australia.* Funded by ACIAR and implementing with QAAFI

- **June 2011 up to date –** Mozambique focal point in the international Program "Sustainable Intensification of Maize-Legumes Cropping Systems for Eastern and Southern Africa (SIMLESA)" being responsible for:

  - Establishment of Innovation Platforms on the target districts for scalling out of technology
  - Gender Mainstreaming in the program activities in Mozambique

- Monitoring and Evaluation of the program in Mozambique

- **June 2011 to December 2012 –** coordinator of the project **"***Towards Integration of TVET in Manica Province. Building Synergies between Secondary and Higher Level"*, with the goal of align the curriculum of TVETS at secondary and higher level financed by NUFFIC

- **January 2012 to the date –** coordinator of "Supply Chain Entrepreneurship Development Program" financed by Nepad Business Foundation with three main components: curriculum development in supply chain in agriculture, business incubation and internship of students

AWARDS

- 2011 – October 2013 - Africa Women in Agriculture Research and Development (AWARD) fellowship, sponsored by Consultative Group on International Agriculture Research, held in several countries for two years
- November 2010 - Netherlands Fellowship Program, sponsored by the Netherlands government
- 2008 –August 2009 - Australian Development Scholarship, held in Australia for 18 months

Areas of Interest

- Agriculture and Extension Education – development innovative ways of promoting change at household level through education, and technology up scaling
- Gender
- Adult Education – promoting change, effective teaching methodologies,
- Rural Entrepreneurship and Market Access – value chain analysis,
- Climate Change and Rural Livelihoods -

Curriculum Vitae Dr. G.J.A. (Gert Jan) Veldwisch

Contact details

Wageningen University, Water Resources Management Group, Droevendaalsesteeg 3a, 6708 PB Wageningen, +31 317 482668, gertjan.veldwisch@wur.nl

Education

2008	**PhD in Development Studies** at the Centre for Development Research (ZEF), University of Bonn. The PhD was awarded the qualification *magna cum laude*.
2003	**MSc Tropical Land Use, specialisation in Irrigation and Water Management**, Wageningen University. Graduated in September 2003.

Employment record

2009 – present	**Assistant Professor Irrigation and Development** at the Water Resources Management Group of Wageningen University.
2008 – 2009	**Post-Doctoral Fellow** at the International Center for Tropical Agriculture (CIAT), based in Chimoio, Mozambique.
2004 – 2008	**Junior Researcher** at the Centre for Development Research (ZEF), University of Bonn, Germany
2003 – 2004	**Independent researcher** based at the African Regional Office of the International Water Management Institute (IWMI), South Africa.

Selected Grants and Contracts

2013-2019	**Principle investigator** for the research component of the "Irrigation Service Provider for rice in the lowlands of Sofala and Zambezia for PROIRRI"; design and implementation process of 3,000 ha rice irrigation in Mozambique (GoM-WorldBank - 5.8 million USD).
2013-2017	**Curriculum developer** for the "Capacity Development Consultant for PROIRRI"; institutional and capacity development project for the irrigation sector in Mozambique (GoM-WorldBank - 1.75 million euro).
2012-2014	**Principle investigator** of the "Messica Irrigation Pilot Project" (MIPP); action-research on supporting farmer-led irrigation development in Mozambique (Partners for Water - 600,000 euro).
2011	**Principle investigator** of "The (missing) link between land and water rights" (Netherlands Ministry of Foreign Affairs - 11,000 euro).
2010	**Co-investigator** of "Mapping and identification of smallholder irrigation potential in Manica and Sofala provinces, Mozambique" (GoM-WorldBank – 50,00 USD).
2010-2012	**Co-investigator** of "Gender Differentiated Impact of Low-cost Irrigation Technologies in Zambia"; collaborative research project with IDE Zambia and UNZA (IDRC – 30,000 CAD).
2009-2010	**Co-investigator** of "Value Chains for Pro-poor Development" ; action-research on a case of farmer rice cooperatives Zambezia province, Mozambique (Netherlands Ministry of Foreign Affairs)
2008-2009	**Principle investigator** of "Efficient water and nutrient use in cereal grains systems in market-based Conservation Agriculture systems" (Sub-Saharan Africa Challenge Program (SSA-CP) – 500,000 USD/year).

2008-2009	**Principle investigator** of "Increasing total farm productivity in vulnerable production systems in Mozambique through improved germplasm, water and nutrient use efficiencies" (Government of Austria – about 500,000 euro)
2006-2008	**PhD Researcher** of the ZEF/UNESCO project "Economic and Ecological restructuring of land and water use in Khorezm, Uzbekistan" with the topic of the doctoral research 'Water allocation and distribution processes in the Khorezm irrigation and drainage system, Uzbekistan'
2008	**Co-investigator** of "Principles, Approaches and Guidelines for Participatory Revitalisation of Smallholder Irrigation Schemes" (Water Research Commission, South Africa).

Selected Publications

Veldwisch, G.J.; W. Beekman and A. Bolding (2013). Smallholder irrigators, water rights and investments in agriculture: Three cases from rural Mozambique. Water Alternatives 6(1): 125-141.

Beekman, P.W. and G.J.A. Veldwisch (2012). The evolution of the land struggle for smallholder irrigated rice production in Nante, Mozambique. Physics and Chemistry of the Earth (50–52): 179–184.

Mehta, L., G.J.A. Veldwisch and J. Franco (2012). Introduction to the Special Issue: Water grabbing? Focus on the (re)appropriation of finite water resources. Water Alternatives 5(2): 193-207.

Veldwisch, G.J.A., P.P. Mollinga, D. Zavgorodnyaya and R. Yalcin (2012). 'Politics of Agricultural Water Management in Khorezm, Uzbekistan'. In: C. Martius; I. Rudenko; J.P.A. Lamers and P.L.G. Vlek. Cotton, water, salts and soums - economic and ecological restructuring in Khorezm, Uzbekistan. Springer: Dordrecht, Heidelberg, London, New York. pp.127–140.

Nkala, P., N. Mango, M. Corbeels, G.J.A. Veldwisch and J. Huising (2011). The conundrum of conservation agriculture and livelihoods in Southern Africa. African Journal of Agricultural Research 6(24): 5520–5528.

Veldwisch, G.J.A. and B. Bock (2011). 'Dehkans, Diversification and Dependencies: Rural Transformation in Post-Soviet Uzbekistan'. Journal of Agrarian Change 11: 581–597.

Veldwisch, G.J.A. (2010). 'Adapting to Demands: Allocation, Scheduling and Delivery of Irrigation Water in Khorezm, Uzbekistan', in: M. Spoor and M. Arsel (Eds). Water, Environmental Security and Sustainable Development. London and New York: Routledge, pp 99–122.

Veldwisch, G.J.A.; A. Bolding and Ph. Wester (2009). 'Sand in the Engine: The Travails of an Irrigated Rice Scheme in Bwanje Valley, Malawi'. Journal of Development Studies 45(2): 197–226.

Veldwisch, G.J.A. and M. Spoor (2008). 'Contesting rural resources: Emerging 'forms' of agrarian production in Uzbekistan'. Journal of Peasant Studies 35(3): 424–451.

Veldwisch, G.J.A. (2008). 'Authoritarianism, validity, and security: Researching water distribution in Khorezm, Uzbekistan', in: C.R.L. Wall and P.P. Mollinga (Eds), Field Work in Difficult Environments: Methodology as Boundary Work in Development Research. Berlin: Lit Verlag. pp.161–181.

Veldwisch, G.J.A. (2007). 'Changing patterns of water distribution under the influence of land reforms and simultaneous WUA establishment: Two cases from Khorezm, Uzbekistan', Irrigation and Drainage Systems 21(3-4): 265–276.

Veldwisch, G.J.A. (2006). 'Local Governance Issues after Irrigation Management Transfer: A Case Study from Limpopo Province, South Africa', in: S. Perret, S. Farolfi and R. Hassan (eds). Water Governance for Sustainable Development: Approaches and Lessons from Developing and Transitional Countries. London: Earthscan, pp. 75–91.

JEAN-PHILIPPE VENOT, Curriculum Vitae

Contact details:

Water Resources Management (WRM) group, Environmental Science Department, University of Wageningen, P.O. Box 47, 6700 AA Wageningen, The Netherlands.
Tel: 0031 317 483 446; Email: jean-philippe.venot@wur.nl

Education:

Institut National Agronomique de Paris-Grignon (INA P-G), France : Engineer Degree- Agronomy (2004)
INA P-G , MNHN, and University of Paris 7: Master Environment and Development (2004)
University of Paris X-Nanterre, France: PhD, Human Geography (2008)

Career:

2012(October)-	Researcher, Water Resources Management, University of Wageningen
2011-2012	Researcher –Development Studies, International Water Management Institute (IWMI, Burkina Faso)
2009- 2011	Post-Doctoral Fellow- Political Ecology, International Water Management Institute (IWMI, Ghana)

Selected Research Grants and Contracts:

2010-2012	**Principal Investigator and Team Leader,** CPWF-Volta Project *Sub-basin management and governance of rainwater and small reservoirs* (US$875,000 over three years)
2009-2011	**Principal Investigator,** Small reservoir component of the Agricultural Water Solutions Project funded by the BMG Foundation ($400,000 over three years)

Selected Publications

Venot, J.P.; Clement, F. (2013). Justice in Development? An Analysis of Water Projects and Reforms in the Rural South. *Natural Resources Forum* 37:19-30.

Cherlet, J.; Venot, JP. (2013). Structure and agency: Understanding water policy change in West Africa. *Water Policy* Doi:10.2166/wp.2013.086

Venot, J.P.; Hirvonen, M. (2013). The stabilization of controversy: small reservoirs of sub-Saharan Africa as anchoring devices. *Society and Natural Resources* Doi:10.1080/08941920.2012.723306

Venot, J.P.; de Fraiture, C.; Nti-Acheampong, E. (2012). Revisiting Dominant Notions: A Review of Costs, Performance and Institutions of Small Reservoirs in sub-Saharan Africa. IWMI Research Report. Colombo 144: Sri Lanka: IWMI

Venot, J.P.; Bharati, L.; Giordano, M.; Molle, F. (2011) Beyond water, beyond boundaries: Spaces of water management in the Krishna river basin, South India. *The Geographical Journal* 177 (2):160–170.

Venot, J.P.; Andreini, N.; Pinkstaff, C.B. (2011). Planning and corrupting water resources development: The case of small reservoirs in Ghana. *Water Alternatives* 4(3): 399-423.

Venot, J.P.; Cecchi, P. (2011). Valeur ou performances? Evaluation des risques et opportunités des agricultures irriguées : Le cas des petits barrages d'Afrique de l'Ouest. *Cahiers Agriculture* 20 : 112-7.

Narayanan, N.C.; Venot, J.P. (2009). Drivers of change in fragile environments: challenges to governance in Indian wetlands. *Natural Resources Forum*. 33:320-333.

Venot, J.P.; Molle, F. (2008). Groundwater depletion in the Jordan highlands: can pricing policies regulate irrigation water use? *Water Resource Management* 22(12): 1925 – 1941.

Molle, F.; Venot, J.P.; Hassan, Y. (2008). Irrigation in the Jordan valley: are water pricing policies overoptimistic? *Agricultural Water Management* 95 (4): 427-438.

PHILIP WOODHOUSE, Curriculum Vitae

Contact details:
Institute for Development Policy and Management (IDPM), School of Environment and Development, University of Manchester, Oxford Road, M13 9PL; Tel: 0161 275 2801; Email: phil.woodhouse@manchester.ac.uk

Education:
Oxford University, UK : BA (Class I Hons) in Agricultural and Forest Science.
Reading University, UK: PhD, Soil Science

Career:

2012 -	Professor of Environment and Development, University of Manchester.
1998 - 2012	Senior Lecturer in Environment and Rural Development. Institute for Development Policy and Management, University of Manchester
2003 -2006	Head, Institute for Development Policy and Management, University of Manchester
1993	Visiting Researcher, Dept. of Sociology, University of the Witwatersrand, South Africa
1990-1998	Lecturer in Environment and Rural Development, Institute for Development Policy and Management, University of Manchester, UK
1986 -1990	Research Fellow, Faculty of Technology, The Open University, Milton Keynes, UK
1983 – 1986	Agricultural Research Specialist (northern Mozambique field research programme), Food and Agriculture Organisation of the United Nations, Rome
1977 – 1983	Soil Scientist, National Institute of Agronomy Research, Mozambique

Selected Research Grants and Contracts

2012- 2016	**Co-Investigator** Leverhulme Centre for the Study of Value at the University of Manchester (£510,000): lead investigator on study of land and water markets in sub-Saharan Africa.
2011- 2014	**Principal Investigator**, Farm scale and viability: an assessment of black economic empowerment in sugar production in Mpumalanga Province, South Africa. (ESRC-DFID: £259,000)
2010- 2011	**Co-Investigator**, Ecosystem Services for Poverty Alleviation (ESPA) Project Preparation Grant. NERC-DFID-ESRC (£15,500)
2009 – 2011	**Co-Investigator**, Community Based Systems to support HIV treatment in rural areas of Eastern and Southern Africa (CoBaSys). University of Manchester component (£78,000) of EU –Africa collaboration (partners in Italy, Finland, and five African countries)
2004 –2005	**Co-Investigator**, *Market-based land transfers in 'communal areas', Zimbabwe.* Global Poverty Research Group (ESRC-funded) (£5000)
2003-2004	**Principal Investigator**. *Regulatory reform of water sector in South Africa* Centre for Regulation and Competition (DFID-funded): (£15,000)
2001	Conservation of Biodiversity and Sustainable Use of Forest Resources in the Caatinga Ecoregion Desk study for DFID and UNDP, Brasilia.
1999	**Principal Investigator**: Pilot study of implementation of the 1998 National Water Act, Inkomati Basin (with R Hassan) DFID, UK, and Department of Water Affairs and Forestry, South Africa.
1998-2001	**Principal Investigator**: *Effects of policy and institutional environment on natural resource management and investment by farmers and rural households in East and Southern Africa.* DFID Natural Resources Policy Research Programme (with University of Bradford, UK, University of Fort Hare, South Africa, Makerere University, Uganda) (£308K)
1994-1997	**Principal Investigator**: *Land Degradation in Africa: Land, Water and Local Governance, in Mali, Botswana, Kenya, and South Africa* . ESRC (£133K)
1988	**Principal Investigator**: *Irrigation Restructuring in Senegal River Valley* . Social Science Research Council, New York,. (£10K)

Invited Service since 2000
Research Assessment Exercise 2008, member of sub-Panel 43 'Development Studies', Higher Education Funding Council for England. Research proposal reviews for ESRC, ESRC-DFID (2009), Norwegian Research Council (2007-8). ESRC/NERC Interdisciplinary Studentship Assessment Panel. (2005-2009).

Selected Publications

Woodhouse, P. (2012) Agricultura, Pobreza, e a Receita do PARP. In: L. de Brito, C. Castel-Branco, S Chichava, A Francisco (eds) *Desafios para Moçambique 2012.* Maputo: Instituto de Estudos Sociais e Económicos.

Woodhouse, P. (2012) Water in African Agronomy. In: J Sumberg and J Thompson (eds) *Contested Agronomy. Agricultural Research in a Changing World.* Abingdon: Routledge

Woodhouse, P. (2012) Reforming Land and Water Rights in South Africa *Development and Change* 43 (4):847-868

Woodhouse, P. (2012) New Investments, Old Challenges: Land Deals and the Water Constraint in African Agriculture *Journal of Peasant Studies* 39 (3): 777-794

Woodhouse, P. (2012) Foreign Agricultural Land Acquisition and the visibility of water resource impacts in sub-Saharan Africa. *Water Alternatives* 5 (2): 208-222

Agnew, C. and Woodhouse, P. (2011) Climate Change Resilience and Adaptation: Perspectives from a Century of Water Resources Development. *Environment and Society: Advances in Research* 1: 156-183

Kaarhus, R. and Woodhouse, P. (2011) Development of National producer Organizations and Specialized Business Units in Mozambique. Noragric Report 63 http://www.umb.no/noragric/

Agnew, C. and Woodhouse, P. (2011) *Water Resources and Development* Abingdon: Routledge

Woodhouse, P. (2010) Beyond industrial agriculture? Some questions about farm size, productivity and sustainability. *Journal of Agrarian Change* 10 (3): 437-453

Colin, J-P. and Woodhouse, P. (2010) Introduction: Interpreting Land Markets in Africa. *Africa* 80 (1): 1-13 (special issue on land markets in Africa).

Chimhowu, A. and Woodhouse P (2010) Forbidden but Not Suppressed: a 'Vernacular' Land Market in Svosve Communal Lands, Zimbabwe. *Africa* 80 (1): 14-35

Woodhouse, P. (2010) Productivity Constraints in African Agriculture. In: L. de Brito, C. Castel-Branco, S. Chichava and A Francisco (eds) *Industrialização e Acumulação Económica em Moçambiqu*e. Maputo: Instituto de Estudos Sociais e Economicos.

Woodhouse, P. (2009) Technology, environment and the productivity problem in African agriculture: comment on the World Development Report 2008. *Journal of Agrarian Change* 9 (2)

Woodhouse, P. (2008) Natural Resource Management and Poverty in Sub-Saharan Africa. In: M. Rutten, A. Leliveld & D. Foeken (eds) *Inside poverty and development in Africa. Critical reflections on pro-poor policies.* Brill Academic Publishers, Leiden pp. 25-56

Fernandes, L. and Woodhouse, P. (2008) Family Farm Sustainability in Southern Brazil: an application of agri-environmental indicators. *Ecological Economics* 66 (2): 243-257

Chimhowu A. and Woodhouse, P. (2008) Communal Tenure and Rural Poverty: reflections on land transactions in Svosve Communal Area, Zimbabwe, *Development and Change.*39 (2) 285-308.

Bernstein, H. and Woodhouse, P. (2006) Africa: ecopopulist utopias and (micro-) capitalist realities. In: C. Leys and L. Panitch (eds) *Coming to Terms with Nature.* Monmouth: Merlin Press

Brown, J. and Woodhouse, P. (2006) 'Pioneering redistributive regulatory reform. A study of implementation of a Catchment Management Agency for the Inkomati Water Management Area, South Africa'. In: Martin Minogue and Ledivina Carino (eds*). Regulatory Governance in Developing Countries*. Edward Elgar, Cheltenham.

Chimhowu, A. and Woodhouse, P. (2006) "Customary vs Private Property Rights? Dynamics and Trajectories of Vernacular Land Markets in Sub-Saharan Africa" *Journal of Agrarian Change* 6 (3) 346-371

Bahiigwa, G., Rigby, D. and Woodhouse, P. (2005) "Right Target, Wrong Mechanism? Agricultural Modernization and Poverty Reduction in Uganda." *World Development.* 33 (3) 481-496

Woodhouse, P. (2003) "African Enclosures: a default mode of development." *World Development.* 31 (10) 1705-1720

Rigby, D. , Woodhouse, P., Burton, M. and Young, T. (2001) "Constructing a farm level indicator of sustainable agricultural practice" *Ecological Economics,* 39(3) 463-478

Woodhouse P, Bernstein H, and Hulme D (2000) *African Enclosures? The Social Dynamics of Wetlands in Drylands*. . Oxford, James Currey.

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AfDB (2008) *Investment in agricultural water for poverty reduction and economic growth in Sub-Saharan Africa: Synthesis report.* African Development Bank, Food, and Agriculture Organization, International Fund for Agricultural Development, and International Water Management Institute. Abidjan, Ivory Coast: AfDB; Rome, Italy: FAO; Rome, Italy: IFAD; Colombo, Sri Lanka: IWMI; Washington, DC: World Bank.

AgWA (2010). AgWA governance, institutional and operational architecture. Agricultural Water for Africa. http://www.ukia.org/agwa/AgWA%20Architecture%20Inception%20Report.pdf

Beez, J. (2004). The Appropriation of Rice at Mt. Kilimanjaro: A Japanese Development Project and its Consequences. In: Probst, P. & Spittler, G. (eds). *Between Resistance and Expansion. Dimensions of Local Vitality in Africa.* Münster, New York: Lit, 193-209.

Bolding, A.; Post Uiterweer, N.C. and Schippers, J. 2010. The fluid nature of hydraulic property: A case study of Mukudu, Maira and Penha Longa irrigation furrows in the upper Revue River, Manica District, Mozambique. In van der Zaag, P. (Ed), *What role of law in promoting and protecting the productive uses of water by smallholder farmers in Mozambique?*, pp. 105-136. Challenge Program Project No. 66. Delft: UNESCO-IHE Institute for Water Education.

Carney, Judith A. 1988. 'Struggles over crop rights and labour within contract farming households in a Gambian irrigated rice project', *Journal of Peasant Studies* 15(3): 334–349.

De Fraiture, C., & Giordano, M. (2013). Small private irrigation: A thriving but overlooked sector. *Agricultural Water Management*. In press.

Diemer, G and Vincent, L. 1992 Irrigation in Africa: The Failure of Collective Memory and Collective Understanding. *Development Policy Review* 10: 131-154.

Fujiie, H., Maruyama, A., Fujiie, M., Takagaki, M., Merrey, D. J., & Kikuchi, M. (2011). Why invest in minor projects in sub-Saharan Africa? An exploration of the scale economy and diseconomy of irrigation projects. *Irrigation and Drainage Systems*, 25(1), 39-60.

Ganho, A-S (2013) Friendship' Rice, Business, or 'Land-grabbing'? Land Deal Politics Initiative Working Paper 32. http://www.iss.nl/fileadmin/ASSETS/iss/Research_and_projects/Research_networks/LDPI/LDPI_WP_32.

Inocencio, A., Kikuchi, M., Tonosaki, M., and Maruyama, A. 2007. *Costs and Performance of Irrigation Projects: A Comparison of Sub-Saharan Africa and Other Developing Regions* research Report 109. Colombo: International Water Management Institute.

Lankford, B. 2009. Viewpoint – The right irrigation? Policy directions for agricultural water management in sub-Saharan Africa. *Water Alternatives* 2(3): 476-480.

MAHRH. (2006). Politique nationale de développement durable de l'agriculture irriguée. Stratégie, plan d'action, plan d'investissement à l'horizon 2015 – Rapport principal, MAHRH, Ouagadougou, Burkina Faso: MAHRH. www.agriculture.gov.bf/SiteAgriculture/documents/default.html

Moris, J. and Thom, D. 1985. *African irrigation overview. Water management synthesis-II Project report 37*. Logan, Utah, US: Utah State University.

NEPAD (New Partnership for Africa's development). (2003). *Comprehensive Africa Agriculture Development Program*. Johannesburg: NEPAD.

Southgate C and D.Hulme 2000. Uncommon Property: the scramble for wetland in southern Kenya, in: Woodhouse P, Bernstein, H. and Hulme, D. *African Enclosures? Social Dynamics of Wetlands in Drylands*, Oxford: James Currey.

Svendsen, S., Ewing, M., Msangi, S., 2009. *Measuring irrigation performance in Africa*. IFPRI Discussion Paper 894. International Food Policy Research Institute, Washington, D.C.

Veldwisch, G.J.A.; A. Bolding and Ph. Wester 2009. 'Sand in the Engine: The Travails of an Irrigated Rice Scheme in Bwanje Valley, Malawi'. *Journal of Development Studies* 45(2): 197–226.

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White, B., Borras, S., Hall, R, Scoones, I. and Woolford, W. 2012. The new enclosures: critical perspectives on corporate land deals. *Journal of Peasant Studies* 39 (3-4):619-647

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Woodhouse, P 2012 Foreign Agricultural Land Acquisition and the Visibility of Water Resource Impacts in Sub-Saharan Africa *Water Alternatives* 5 (2):

World Bank. (2006). Reengaging in agricultural water management: Challenges and Options. Washington D.C: The World Bank.

World Bank. (2007). *World development report 2008.* Washington, DC: The World Bank

World Bank, 2010. *Africa's infrastructure : a time for transformation*. Washington: The World Bank.

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You, L., Ringler, C., Nelson, G., Wood-Sichra, U., Robertson, R., Wood, S., Guo, Z., Zhu, T. and Sun, Y. (2010) *What Is the Irrigation Potential for Africa? A Combined Biophysical and Socioeconomic Approach.* IFPRI Discussion Paper 00993 Washington DC: International Food Policy Research Institute

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17 October 2013

ESRC:Outline Grant
Assessing the growth potential of farmer-led irrigation development in sub-Saharan Africa.
ES/L004887/1

Following approval of the above outline application, I am writing to draw attention to a number of changes that have been introduced in the development of the full proposal which is submitted to Council today.

Country Focus
The research has been more narrowly focused on two countries (Mozambique and Tanzania) with a comparative study of a third (Burkina Faso) in which one of the project partners has already begun research on small-scale irrigation. These changes were partly due to changes in availability of co-investigators, but also to a recognition that a greater degree of comparative analysis could be generated from the contrasting policy contexts in Mozambique and Tanzania. The revised design also allows us to capitalise more effectively on the work already underway in Burkina Faso.

Control Cases
As specified by the Panel Feedback, the Case for Support for the full proposal makes clearer that the case studies of 'farmer-led' irrigation will establish control cases of non-users of irrigation. These will be generated for each of the six irrigation case studies by including cases of non-use of irrigation both within communities where irrigation investment is taking place and also in neighbouring communities where irrigation development is not happening. The generation of data for these control cases will cover both qualitative and quantitative (survey) elements of each case study.

Capacity Building
As recommended in comments by reviewers of the outline proposal, we have identified specific co-investigators in each of the African partner research organisations, and we have been able them in developing the full proposal. The full proposal also provides specific information about how the teams of co-investigators from the UK, Netherlands, Tanzania and Mozambique will work together. In the outline proposal we had indicated that the fieldwork for the case studies would be undertaken as PhD projects by African research students. However, although this remains our aim, a clear funding package for these students is not yet in place, but we are confident that at least one will be funded through our research partner in the Netherlands. Should this full proposal be approved we will seek further funding for an African PhD student at Manchester from additional sources. As a consequence the field research for the case studies is budgeted in terms of two 18-month contracts for postgraduate researchers to be recruited by our African research partners.

Dissemination

We have strengthened project management with a view to improving our capacity to ensure timely dissemination not only to a wide audience but also to those who have influence in setting the agenda for irrigation development at an international level. Thus, in addition to the workshops with national-level policy-makers in the case study countries, we have identified an advisory group with whom the research team will meet during the course of the project, and we have made provision for a 0.5 post project manager. This latter has been the primary reason for the increase in overall budget requested, compared to the outline proposal.

Yours sincerely.

Philip Woodhouse
Professor of Environment and Development

ESRC/DFID Joint Scheme
Project Progress Report

Background Information:

Award Number:	RES-167-25- 0746 ; ES/1034242/1
Award Title:	Farm scale and viability: an assessment of black economic empowerment in sugar production in Mpumalanga Province, South Africa.
PI Name:	Professor Philip Woodhouse
PI Institution:	University of Manchester, UK
Award Dates:	1/08/2011 – 31/07/2014
Progress Report date:	2/10/2013
Brief summary of research project:	Land reform remains a key element in efforts to redress South Africa's legacy of historic injustice, but is an arena of intense debate about the impact of farming scale on agricultural productivity and rural incomes. This research seeks to inform the debate on land reform by drawing on a range of 'paradigms of viability' identified by Cousins and Scoones (2010) to pose the following research questions: 1. What is the productivity of land, water, labour and capital at different farm scales (i.e. within the farm production unit)? 2. What is the impact of income from different scales of farming on livelihoods and wellbeing among rural communities. More broadly, how does income from, and investment in, farming at different scales feature in livelihood strategies. 3. How are the benefits and costs of farming distributed among different social groups or classes in the South African economy? 4. How does scale of farming affect political and institutional relations within rural communities, particularly with respect to conflict and cohesion over natural resource use? 5. What lessons does this research provide for policy on foreign financial investment in farmland in sub-Saharan Africa. The proposed research will proceed as two linked projects. A 'production analysis' project will focus primarily on questions 1, 3, 4 and 5. This will assess the productivity of land, labour capital and water on farms of different scales, and the relative impacts of these different scales of production on the local economy. In addition it will undertake an institutional analysis (i.e. of the processes of management and control, including access to land and water, and market linkages) . A second 'livelihood impact' project – to be undertaken through a linked doctoral studentship - will focus on the significance of income from sugar farms in the livelihoods of different social groups in the area. This second project will therefore address research questions 2 and 3, and also provide further analysis relevant to research question 4 and 5. Both of the linked projects will involve a combination of quantitative and qualitative analysis.
Web pages linked to the	http://www.sed.manchester.ac.uk/idpm/research/farmscale/ http://www.manchester.ac.uk/research/Phil.woodhouse/research

project	
	Is the project multidisciplinary? Yes Does the project employ mixed methods? Yes Does the project incorporate gender analysis? Yes

Reporting Progress:

1	**Progress of the Research Programme**	The first phase of the research was undertaken as planned, through visits by the PI to South Africa during August 2011 and March 2012. Inception activities included meetings with the sugar company (TSB) and the national Canegrowers representative body, Canegrowers SA, based in Durban. Following endorsement of the project by the head of research at Canegrowers SA, Dr Stuart Ferrer, in March 2012, further discussions were held with the secretary of the Provincial branch of Canegrowers in Mpumalanga, who also agreed to assist the project identify small-scale canegrowers in the project area. Officials at TSB indicated they will assist the project in contacting medium-scale and large-scale (Joint venture) canegrowing enterprises. Meetings were also held with the secretaries of the Mill Cane Committees for canegrowers at both Malelane (Mr Mashaba) and Komati (Mr Repinga) sugar mills. Links with the research group led by Professor Ben Cousins at the University of the Western Cape have been consolidated through participation by both PI and the doctoral student (see 5, below) in research workshops at UWC in October 2011 and March 2012. Despite delays to the second phase (Farm Survey) due to the PI being on sick leave in June-July 2012, a survey of 115 small-scale growers was been completed in May-July 2013 and data analysis is currently underway. The data from questionnaires will be complemented by historical records on past production and credit for each survey participant, to be provided by sugar company officials and with the written consent of the growers concerned. Data on large-scale production is being provided by the TSB management in relation to 'joint-venture' sugar production on community trust land (land owned by black communities after land reform). Very substantial progress has also been made on obtaining documentation and oral accounts of the changing process of land governance in the study area, particularly in relation to the process of land reform and its aftermath.
2	**Impact during lifetime of project**	Due to delays in 2012, the project remains in a relatively early stage as far as research findings and outputs are concerned. However, the networking achieved with the research group based at UWC has meant that the project is well-known in relevant research circles in southern Africa, and there are already identified channels through which to disseminate outputs. Equally, the contacts already established with different parties in the South African sugar industry means that the project's research findings are awaited by non-academic users within this industry, not least among small-scale growers who participated in the questionnaire survey. Arrangements are in hand for a presentation of preliminary findings to small-scale growers and TSB management in June 2014.
3	**Planning for future impact**	Work is underway on two background papers: on the development of the sugar industry in South Africa; and on the evolution of land use and land occupation in the sugar-growing areas of the Mpumalanga lowveld. These will be posted on the

		project website as basic reference resources and to establish context for the more detailed fieldwork studies. They will also be useful in establishing baseline points of comparison with other studies being undertaken on sugar in southern Africa (notably by Prof Ian Scoones and others in southern Zimbabwe). The possibility of comparative analysis has been raised already and it may be anticipated that this will open further channels for dissemination and policy engagement. It needs to be noted that the South African sugar industry has in recent years invested in significant production and processing capacity in other countries in southern Africa (notably Zambia and Mozambique), using both small-scale (outgrower) and large-scale production models. This expands the immediate relevance of the project beyond South Africa.
4	**Capacity Building**	The linkage established with Prof Ben Cousins' programme at UWC means that the project is already integrated in a research training programme for South African researchers. In addition, the research design and analysis in this project will furnish examples that will be used for teaching research methods to postgraduate students at the Institute for Development Policy and Management at the University of Manchester. In particular, a four-hour workshop will be designed to develop understanding of quantitative method on the course unit IDPM70992 'Development research' in the 2014-5 academic year.
5	**Project Linked PhD Studentships**	The linked PhD studentship is being carried out by Paul James, who recently commenced his third year of PhD registration at the University of Manchester. His project is titled: *Black Economic Empowerment and rural livelihood in South African agriculture: sugar farming in Mpumalanga*. It seeks to answer the research questions: • What is the impact of income from different scales of farming on livelihoods and wellbeing among rural communities? More broadly, how does income from, and investment in, farming at different scales feature in livelihood strategies? • How are the benefits and costs of farming distributed among different social groups or classes in the South African economy? Paul James has been undertaking fieldwork in South Africa since February 2013, and is due to return to Manchester at the end of November 2013. He has established a detailed knowledge of the study area and has generated data from around 40 key informant interviews and from extensive documentary records.
6	**Project Management**	Fieldwork planned for 2012 was delayed until 2013. However, progress since February 2013 has largely achieved the data collection planned. While data analysis has already been started, it is anticipated that an extension of six months will be required to the project completion date.
7	**Financial Management**	There have not yet been any departures from planned expenditure, except that expenditure on field work was delayed by about nine months.
8	**Any other issues to report**	No
9	**Outputs to date**	A description of the project has been posted on the website: http://www.sed.manchester.ac.uk/idpm/research/farmscale/ There are no further published project outputs at present.

Assessing the growth potential of farmer-led irrigation development in sub-Saharan Africa.

Data Management Plan

Context

The proposed research will combine both qualitative and quantitative approaches. While the specific research sites have been provisionally identified on the basis of the co-investigators' collective past experience, further work will be needed to develop a field design for data collection that can be adapted to the different circumstances of specific case studies. For example the balance between data collected about individual and shared aspects of water and land use will vary according to the type of irrigation. Furthermore, an explicit part of our research design is that a qualitative analysis should precede and inform the design of quantitative (sample survey) data collection.

Existing Data, New Data and Quality Control

All the proposed research will generate new data, although substantial use will be made of secondary sources where these exist. It is known, however, that the availability of secondary sources will vary greatly between case studies. We will be collecting qualitative data, primarily recordings, images and notes from interviews, participant observation, document analysis, and workshop discussions. These will be analyzed primarily using qualitative data software (Nvivo). We will also be undertaking sample surveys, to be analysed using quantitative data packages (SPSS).

The research will be undertaken by a specific team of researchers in each country: Woodhouse, Veldwisch and Manjichi in Mozambique; Brockington, Veldwisch and Komakech in Tanzania. However, a shared methodology will be identified during the preliminary phase of the research, to enable comparative data to be generated by the different case studies. These discussions will share experience, advice and guidelines in the planning of practical activities. Plans will also be reviewed by the research ethics committee of the University of Manchester, or by collaborators' Universities where they receive internationally accepted standards of scrutiny (see Ethics statement for details).The methodology will be further monitored and modified as needed through joint field visits by the co-researchers to the different case study sites before and during the field study phase of the research. Basic approaches to data collection will seek to employ the following strategies:

- Standardised data capture: the development and use of an interview and participatory observation guide; interview recording and subsequent transcription where feasible, but also using notes taken during interview where recording is not accepted by informants;
- Data validation: triangulation of research results, by comparing notes from interviews and ethnographic observation with grey literature, internet sources, other interviews and scholarly literatures;
- Repeat sampling and calibration across projects e.g., communicating results of the research back to respondents and communities where research was conducted. This will be undertaken at the level both of case studies (presentation and discussion of preliminary case study findings) and also at the level of national policy analysis (workshops with policy-makers and technical advisors).
- Validation of results: in addition to workshops in Tanzania and Mozambique, validation and dissemination of results will be pursued through meetings with the advisory group, who will include academic and non-academic 'end users' of the research
- Quality of research outputs: Finally we will also control and monitor quality through the writing up of working papers, conference papers and articles.

Storing, Sharing and Archiving Data

To enable long term accessibility and validation, data will be stored in formats that are open, non-proprietary, and compatible with ESRC data archiving standards. We will ensure that appropriate metadata are also retained. Metadata will comprise: contextual information about data structure, data collection and control mechanisms; and documented analyses and results. Metadata will refer to published information relating to the research project.

All electronic data will be stored and backed up daily on secure University servers. The project will make use of the University of Manchester Research Data Management Service (RDMS). The RDMS will allow researchers to store, manage and curate their data, as well as preserve data after project completion. All data will be stored on the University of Manchester RDMS, which is replicated.

Paper copies and manuals generated from the research programme will be stored in stand-alone locked cabinets held in a secure location with card access only. This will hold any paper data as well as allow storage of laptops and external hard drives.

Where data are to be anonymised, this will be as early in the study process as possible. Identifiers of individual case studies or respondents will be kept separately in a secure place from the anonymised data. The anonymisation key will be kept separately from the anonymised records. To ameliorate potential security risks (e.g. theft), minimal data will be retained on encrypted laptops used on the project and at the end of each data capture, data will be securely transferred onto the RDMS.

The PI will ensure that time and resources are available to archive and make available the data the project produces. This will be particularly important to enable comparative analysis between different case studies. Finally, our project website will also include access to data we generate as part of our outreach and engagement activities. As findings are tested and checked they will be made publicly available through the project website, in addition to the ESRC Data Store.

The PI will oversee the archiving/preservation of the research data in accordance with ESRC guidelines. This will include appropriate metadata to enable other researchers to understand how the research was undertaken, how the data was created or acquired, and how the data might be re-used. We will make data available to other researchers in a timely manner; however, we do reserve the right to not publish data until we have published outcomes from this programme of work and reported on impact milestones to the ESRC. Data will be made available through the UK Data Service, the programme website, the University of Manchester RDMS and eScholar repository, together with appropriate metadata in line with ESRC policy around data archiving. This is normally undertaken within three months of the end of award.

Data storage and sharing will also be subject to scrutiny by the relevant University ethics committees. This will determine how data are stored, who can see / use it (both within and post-project) and for how long it is kept. Before giving consent, all participants will be informed that data will be kept securely on systems, which only the project researchers can access, and will be coded in such a way that individual participants cannot be identified.

Some anonymised data will eventually be made open access and this will also be made clear to participants before they consent. However *please note* that there will be occasions when anonymity can only be safely preserved by not depositing data. Here, as on previous occasions, we will be working closely with staff at the ESRC Data Store as well as our ethics committee to ensure that best practice is followed both to safeguard our informants and to maximize the use of data. This will be rare, but it is likely to occur in some instances.

Copyright/Intellectual Property Right
Intellectual property and copyright are held across the partner institutions of Manchester and our collaborators. All relevant data created by each institution, and the intellectual property rights therein, are subject to the intellectual property policy of that institution. The data created by each institution will generally be the property of the respective institution (and/or, where relevant, a subsidiary company), unless agreed otherwise. Should we be successful in securing funds from the ESRC for this research, contractual agreement between partners in the project will be established to clarify ownership and IP along with considerations of restrictions on data sharing and permissions for re-use. The Data Management Plan will be used throughout the duration of the project as a tool to manage the ownership of research data.

Responsibilities
The PI (Woodhouse) will have overall responsibility for data management, which includes the research data management plan throughout the lifecycle of the project. The PI will ensure that the ownership of, and intellectual property rights in, all data are agreed formally in advance, paying due regard to the intellectual property policies of the project partners, and any relevant third-party agreements of data providers.

Metadata production around the creation of the data, processing and analysis, quality assurance, and delivery of data for archiving, will be a shared approach within the project (led by the PI) with appropriate procedures and measurements in line with good research practice. The Co-investigators will advise and assist as required. Furthermore, the University of Manchester RDMS team will work with Professor Woodhouse in advising and supporting the researchers on all aspects of data management.