

Topic	Guiding protocol	Application
<b>Administrative information</b>		
<i>Title</i>	1,2,4	An evidence synthesis of the AR4D literature: Protocol
<i>Date</i>		19 August 2020
<i>Key words</i>		AR4D, agricultural research for development
<i>Update/version</i>	1, 4	This is the first version (v1) of the protocol that was approved by JH and NV on 19 August 2020.
<i>Registration</i>	1, 4	The protocol will be submitted to the Open Science Foundation (OSF) for preregistration. The original version of the protocol (v1) was published on 20 August 2020, prior to undertaking the evidence synthesis, on <a href="https://jeroenvanderheijden.net/?p=421">https://jeroenvanderheijden.net/?p=421</a>
<i>Corresponding author(s)</i>	1, 4	Corresponding author: Jeroen van der Heijden, Victoria University of Wellington Mobile +64 (0)22 563 5082 Room 821a, Rutherford House, Pipitea Campus PO Box 600, Wellington 6140, New Zealand <a href="mailto:jeroenvanderheijden@vuw.ac.nz">jeroenvanderheijden@vuw.ac.nz</a>
<i>Contributors, contributions</i>	1, 4	JH is author of this protocol. The protocol takes inspiration from a series of handbooks on meta-analysis, systematic reviews, and evidence synthesis (Card, 2015; Cooper, 2017; Cooper, Hedges, & Valentine, 2019; Eklund Karlson & Takahashi, 2017; Gough, Oliver, & Thomas, 2012; Heyvaert, Hannes, & Onghena, 2017; Howell Major & Savin-Baden, 2010; Ringquist, 2013; Saini & Shlonsky, 2012). The second reviewer (NV) read, provided feedback and approved this protocol.
<i>Amendments</i>	1, 4	If this protocol needs amendments, these will be explained in an updated version of the protocol. Each amendment, description of changes made, and the rational for making changes will be described.
<i>Support</i>	1, 4	This evidence synthesis is funded by ACIAR, the Australian Centre for International Agricultural Research. JH is the Chair in Regulatory Practice at VUW. This role is partially funded by the New Zealand Government Regulatory Practice (G-REG) initiative. The evidence review will be used for the project "A qualitative comparative analysis of the impact of ACIAR's agricultural research for development work". It mainly serves to distil (1) the causal conditions that in the broader academic literature are identified as necessary and/or sufficient to achieve desirable outcomes of AR4D, and (2) how these outcomes are operationalised in this literature. NV was contracted by the Chair for support with the review.
<i>Sponsor</i>	1, 4	None.
<i>Role of sponsor</i>	1, 4	N/A.
<b>Introduction</b>		
<i>Rationale</i>	1, 2, 3, 4	For 40 years, the Australian Centre for International Agriculture Research (ACIAR) has been encouraging and supporting research projects. To draw key-lessons from this 40-year period of research support, an impact evaluation will be carried out. It asks: What elements of the ACIAR model in practice are associated with the most successful project outputs and enduring outcomes in different contexts? To answer this question, the existing database of ACIAR research projects (n=40-100) will be evaluated using qualitative comparative analysis (QCA) logic and tools. This allows for uncovering the various (context-specific) modes of operating that have allowed ACIAR to make contributions to innovation system development.  A first step in a QCA analysis is to identify, define, and calibrate the causal conditions ("independent variables") and outcomes of interest ("dependent variable"). This evidence synthesis of the academic AR4D literature aims to

		<p>distil the most common conditions and outcomes from the literature to build a theoretical model that can be applied, deductively, in the ACIAR impact evaluation. Within the impact evaluation, additional conditions and outcomes may be traced in an inductive manner (Schneider &amp; Wagemann, 2013; Van der Heijden, 2017).</p> <p>Thus, this evidence synthesis asks:</p> <ul style="list-style-type: none"> <li>- What are the dominant desirable outcomes of AR4D research support currently identified in the academic AR4D literature?</li> <li>- What are the dominant causal conditions currently identified in the academic AR4D literature as necessary and/or sufficient to achieve desirable outcomes of AR4D research support?</li> </ul>
<i>Objectives</i>	1, 2, 3, 4	<p>The aim of this evidence synthesis is to synthesize the evidence base of the academic AR4D literature that maps, explores, and interrogates the outcomes of AR4D research support. To this end, this evidence synthesis will answer the following questions:</p> <ol style="list-style-type: none"> <li>1. What desirable outcomes may be expected from AR4D research support?</li> <li>2. Under what circumstance, when, and how AR4D research support likely to result in these desirable outcomes?</li> <li>3. For questions 2, if heterogeneity is found in studies on AR4D research support: What is the role of context on the outcomes of AR4D research support?</li> </ol>
<b>Methods</b>		
<i>Eligibility criteria</i>	1, 2, 3, 4	<p>Studies will be selected according to the PICO criteria (participants, interventions, comparators, outcomes) outlined below:</p> <p><i>Study designs</i> We will include any type of medium-n or large-n (five cases or more) empirical study that assesses the outcomes and causal conditions of AR4D research support; and, we will include any type of meta-research study (including narrative reviews, evidence synthesis, and meta-analysis) of research on AR4D research support.</p> <p><i>Participants</i> There will be no restrictions by background, type or number of participants (including, but not limited to, people, firms, regulators, and jurisdictions) of studies.</p> <p><i>Interventions</i> Of interest are studies that empirically observe the outcomes and causal conditions of AR4D across at least five real-world examples, and meta-research studies (including narrative reviews, evidence synthesis, and meta-analysis) of research on AR4D research support.</p> <p><i>Comparators</i> Given the broad perspective of AR4D (research support) studies that compare AR4D (research support) with desirable outcomes, compare AR4D (research support) with less desirable (or even undesirable) outcomes, and that compare AR4D (research support) with desirable and less desirable outcomes will be relevant to include to allow for cross-study comparisons:</p> <ul style="list-style-type: none"> <li>- Desirable outcomes, less desirable outcomes, undesirable outcomes.</li> <li>- Causal conditions that help achieving these outcomes, causal conditions that hamper achieving these outcomes.</li> </ul>

		<p><i>Outcomes</i> Endpoints of AR4D <i>research support</i> are of primary interest. Endpoints of AR4D itself of secondary interest (needless to say, there is overlap between the two).</p> <p><i>Timing</i> There will be no restrictions by time, length, or repetitions (including no repetitions) of studies.</p> <p><i>Setting</i> There will be no restrictions by the setting(s) of studies.</p> <p><i>Language</i> We will include articles reported in English.</p> <p><i>Academic literature</i> We will include published peer-reviewed articles, books, and book chapters, including ‘online first’ and ‘early access’ publications. We will also include non-published academic work.</p> <p><i>Non-academic literature</i> We will open the evidence synthesis to include non-academic literature. We will, however, source publications from databases with an “academic orientation”—WorldCat, Scopus and Web of Science. We will acknowledge the limitations of this orientation reporting findings from the evidence synthesis (Mahood, Van Eerd, &amp; Irvin, 2014).</p>
<i>Information sources</i>	1, 4	Both qualitative and quantitative studies will be sought. Documents will be sourced from the following databases: WorldCat, Scopus and Web of Science.
<i>Search strategy</i>	1, 2, 3, 4	Search strategies for each database: <ul style="list-style-type: none"> <li>- WorldCat search: <ul style="list-style-type: none"> <li>o all publications with the words “agricultural research for development” or “AR4D” in any searchable field, published in English, since 1980.</li> </ul> </li> <li>- Scopus search: <ul style="list-style-type: none"> <li>o all publications with the words “agricultural research for development” or “AR4D” in their titles, abstracts, or keywords, published in English, since 1980.</li> </ul> </li> <li>- Web of Science search: <ul style="list-style-type: none"> <li>o all publications with the words “agricultural research for development” or “AR4D” in any searchable field, published in English, since 1980s.</li> </ul> </li> </ul>
<i>Study records and data management</i>	1, 4	We will use MS Excel to for data management (document selection and document coding) and a shared Dropbox folder to share files.
<i>Selection process</i>	1, 2, 4	Two reviewers (JH and NV) will independently screen articles against the following inclusion criteria. This will be done in three rounds: <ul style="list-style-type: none"> <li>- Round 1 <ul style="list-style-type: none"> <li>o Publication titles, abstracts/summaries, and keywords will be screened to exclude publications that are unlikely to report on any type of medium-n or large-n (five cases or more) empirical study that assesses the outcomes and causal conditions of AR4D research support; or any type of meta-research study (including narrative reviews, evidence synthesis, and meta-analysis) of research on AR4D research support. The reviewers will use the following scores: yes (include), no (exclude), unsure (include). Intercoder</li> </ul> </li> </ul>

		<p>reliability scores will be reported (agreement percentage and Cohen's kappa). In this round, we take a liberal approach to inclusion and will only exclude the combinations of 'no' and 'no' (i.e., if at least one of the coders uses the score 'yes' or 'unsure', the publication is included for screening in the next step).</p> <ul style="list-style-type: none"> <li>- Round 2 <ul style="list-style-type: none"> <li>o Publications will be screened in full to exclude publications that are unlikely to report on any type of medium-n or large-n (five cases or more) empirical study that assesses the outcomes and causal conditions of AR4D research support; or any type of meta-research study (including narrative reviews, evidence synthesis, and meta-analysis) of research on AR4D research support. The reviewers will use the following scores: yes (include), no (exclude), unsure (include). Intercoder reliability scores will be reported (agreement percentage and Cohen's kappa). In this round, we resolve all intercoder disagreements.</li> </ul> </li> </ul>
<b>Data items (variables and outcomes)</b>		
<i>Data abstraction</i>	1, 2, 3, 4	Data will be abstracted from the articles following the PICO criteria discussed above. Data abstracted will be recorded in text (to be coded later). A standardized Excel form will be used to ensure that both reviewers (JH and NV) abstract similar data from the articles. To ensure consistency across the reviewers, we will conduct calibration exercises. We will resolve disagreements by discussion.
<i>General information</i>	1, 2, 3, 4	<p>JH and NV will abstract:</p> <ul style="list-style-type: none"> <li>- Geographical location research team/lead author</li> <li>- Geographical location(s) of AR4D studied</li> <li>- Calendar year(s) of AR4D studied</li> <li>- Calendar year(s) of AR4D carried out (to assess time-lapse between AR4D project and observation)</li> <li>- Stage of AR4D studies (design, implementation, completion)</li> <li>- Sub-sector of AR4D studied (crops, livestock, fisheries and aquaculture, forestry)</li> <li>- Type of observation (direct, counterfactual, indirect)</li> </ul>
<i>Primary conditions</i>	1, 2, 3	<p>JH will abstract:</p> <ul style="list-style-type: none"> <li>- Causal conditions mentioned</li> <li>- Causal narrative of AR4D outcomes (to distil conditions of interest)</li> <li>- Other relevant observations about the 'input', 'throughput' or 'output' of AR4D studied</li> </ul>
<i>Primary outcomes</i>	1, 2, 3, 4	<p>JH will abstract (if applicable/reported):</p> <ul style="list-style-type: none"> <li>- Desirable outcomes of AR4D (research support)</li> <li>- Less desirable outcomes of AR4D (research support)</li> <li>- Undesirable outcomes of AR4D (research support)</li> </ul>
<i>Secondary outcomes</i>	1, 2, 3	<p>JH to abstract.:</p> <ul style="list-style-type: none"> <li>- Decreased/improved relationships between AR4D research support organisations and their stakeholders</li> <li>- Spill-over effects from AR4D research support across supported projects</li> </ul>
<i>Note</i>		The exact set of data items to be abstracted will be affected by the selection process. Engagement with the literature in this process will give a better understanding of the variables and outcomes that can be abstracted from the selected publications.

<b>Risk of bias individual studies</b>		
<i>Risk assessment</i>	1, 4	We expect to find a relatively small number of medium-n or large-n (five cases or more) empirical studies that assess the outcomes and causal conditions of AR4D research support; and, we expect to find a relatively small number of meta-research studies (including narrative reviews, evidence synthesis, and meta-analysis) of research on AR4D research support. We do not expect to find more than 10 studies in total. This limits the extent to which we can use accepted protocols for assessing potential bias of these studies. To the extent possible, the reviewers (JH and NV) will assess selection bias, performance bias, detection bias, attrition bias and reporting bias (Mayo-Wilson & Grant, 2019). This will be done after completing round 2 of the selection process (discussed above). The reviewers will use the following scores: low risk of bias, unclear risk of bias, high risk of bias.
<b>Data synthesis</b>		
<i>Quantitative synthesis, methods</i>	1, 2, 4	We do not expect to find a large enough number of studies that report an effect-size to allow for a quantitative synthesis (e.g., fixed effects or random effects models).
<i>Additional quantitative analyses</i>	1, 2, 4	If possible, we will provide descriptive statistics when presenting the findings from the evidence synthesis – while keeping in mind the risks of such ‘vote counting’ (Borenstein, Hedges, Higgins, & Rothstein, 2009).
<i>Qualitative synthesis, methods</i>	3	If the abstracted data allow, we will follow a realist synthesis approach, “a theory-driven synthesis aimed at unpacking mechanisms of how complex programs or interventions work (or why they fail) in particular contexts and settings” (Heyvaert et al., 2017, 237).
<i>Additional qualitative analyses</i>	3	If the abstracted data do not allow for a realist synthesis approach, we will fall back on a more traditional (but systematic) synthesis approach and present findings in a transparent, consistent and comprehensive manner. We will aggregate and integrate data where possible and aim to generate a new inductive understanding of how a generally agreed upon set of causal conditions affect the outcomes of AR4D research support (i.e., an interpretive approach) (Howell Major & Savin-Baden, 2010; Saini & Shlonsky, 2012).
<b>Meta-bias(es)</b>		
<i>Assessment</i>	1, 3, 4	The main publication bias that our evidence synthesis is subject to will mainly build on (peer-reviewed) academic publications. There is a risk that we will find a relatively high number of positive experiences with AR4D (research support) that may not be representative of all the experiences (i.e., a selective reporting bias). We will be explicit about this possible bias when presenting the findings of the evidence synthesis. Unfortunately, we will not be able to run tests for sample biases (Hardwicke et al., 2020) as we expect to find a too small number of studies to include in the evidence syntheses (see above under ‘additional qualitative analyses’).
<b>Confidence or quality assessment</b>		
<i>Method</i>	1, 2, 3, 4	We expect to find a small number of studies to include in the final evidence synthesis (see above), and we expect that most of these will be discussing the effects of AR4D research support in qualitative terms. To the extent possible, the reviewers (JH and NV) will assess the quality dimension of the studies using the CASP Checklist for qualitative research (CASP, 2018). This will be done after round 2 of the selection process (discussed above). The coders will use the following scores: risk of low quality, unclear risk of low quality, little risk of low quality. An average risk estimation will be calculated from the coders’ scores. Please note, this quality dimension assessment is not meant to judge

		the quality of the individual studies, but to assess how much weight we can reasonably assign to findings presented in the evidence synthesis (Heyvaert et al., 2017).
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Guides used: (1) AMSTAR 2 = MeaSurement Tool to Assess Systematic Reviews version 2 (Shea et al., 2017); (2) MARS = American Psychological Association (APA) Meta-Analysis Reporting Standards (essentially the MARS protocol is modified from, Cooper, 2017); (3) MMRS = Mixes Methods Research Synthesis protocol (Heyvaert et al., 2017); (4) PRISMA-P = Preferred Reporting Items for Systematic Meta-Analyses (Shamseer et al., 2015).

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