Chapter 10: Constructing a generic model

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10.1 INTRODUCTION

One of the stated outcomes of this study is a generic model that can be applied in nutritional interventions in rural communities (referred to as the *model* in this text). A model was seen as a framework of the process to follow within community-based nutritional interventions. The context within which the *model* was developed was a geographic, rural area on a commercial farm. It was a small-scale pilot study, with female adults as participants. The content revolved around the addressing of a particular identified need, which included the promotion of good hygiene and sanitation practices to members of this community. The *model* is considered a comprehensive framework and a visual representation of the process that was followed, namely situation analysis, design, implementation and evaluation. The users of this *model* were anticipated to be interested academic scholars and researchers. The *model* does not intend to be a recipe for action, but a guide to stimulate further intellectual cognitive activity. It is also not meant to constitute a final mould of steps, activities and methods, but it rather offers an overview of an intervention in process.

The *model* is based on the research study and is fashioned by interactions with the participants of the study as well as various literature sources. The reasoning for this was found in Coffey and Atkinson (1996:156) who stated that data is there to think with and to think about. Ideas about data should therefore go beyond the data. This reasoning was introduced by Charles Sanders Peirce (Coffey & Atkinson, 1996:156), which he called 'abductive logic'. Mouton (1996:74) also refers to it as 'diagnostic induction' or 'retroduction'. The aim is to present plausible explanations of patterns and regularities found in the data. It is an unconventional way of thinking that allows for a more dynamic interaction between data and theory. Analysis and interpretation go further than the mere technical categorisation and description of the data; it is rather found in those intellectual accounts that expand the data. It starts from a particular identified phenomenon, which is taken further by relating it to broader concepts. There is repeated interaction among existing ideas, former findings and observations, new observations and new ideas. The generation of ideas for the construction of this *model* did not be depend on data alone.

This *model* was theoretically validated with current findings on the local situation and was adapted along the research process. Validation is an ongoing, emerging process based on applied evaluative research to conform for implementation in other communities on commercial farms. Modifications were in accordance with feedback from the participants, outcomes of

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impact evaluation, expertise and recommendations of external evaluators and other stakeholders. Feedback from process evaluation further guides intervention modification, closing the feedback loop.

All models or frameworks need not consist of causal explanations. Many theories generated from qualitative research take the form of ideal types, that is, patterns or typifications constructed out of all the actual cases observed. They are intended to capture the key features of a given phenomenon without necessarily displaying all the particulars of individual cases. This was also the case in this *model* where the given phenomenon was the nutritional intervention. The *model* further internalised the process of Participatory Action Research (PAR) within rural communities, contributing to the body of knowledge on the relevance and success of interventions in rural communities within the realms of health and nutrition.

A great deal of flexibility is implied in the *model,* allowing modifications to be made where needed and as a result, the *model* became more focused. The activities included in each phase are not all-inclusive and additional ones could be added, as demanded by the application of the *model* within a particular context. Some of these ideas might be discarded in future and others modified, while others might be developed and documented more fully. The process is therefore never considered to be complete.

The process that was followed when devising the *model* is summarised in Figure 10.1. A literature search has been conducted and I decided to use a particular four-phase framework (Figure 3.1) as first building block. This framework was extrapolated to the methodological framework for the research design (Figure 3.2) on which the intervention on Oranje-farm was based. The intervention was evaluated in terms of process and outcomes and the relevant results were used to develop the first draft of the *model*. The development process was transformed into a slide show, which was electronically sent to external evaluators. The received comments were analysed and used to draft a second version. Abductive logic was again applied to add value to the *model*. The adapted *model* was presented to a group of attendees at a micronutrient-deficiency course as well as electronically mailed to a second group of external evaluators. Comments received were once more used to expand, adapt and verify the constructed *model*. This particular version will be sent for peer review before it is published.

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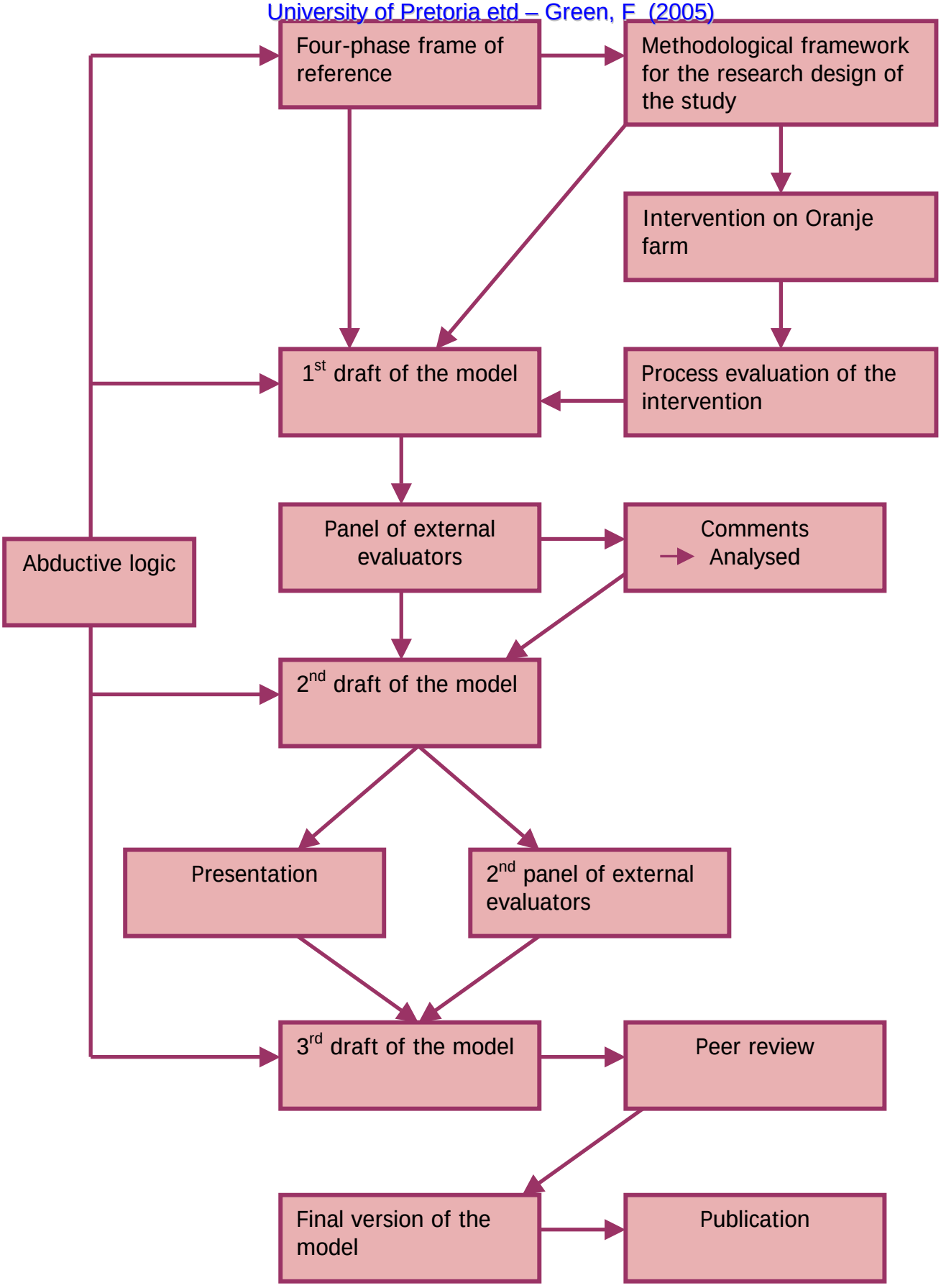

FIGURE 10.1: PROCESS FOLLOWED DURING CONSTRUCTION OF THE MODEL

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10.2 FRAME OF REFERENCE

The first drafts of the *model* reflect a methodological frame of reference, which was also used as parameter for the research design of this study. The four-phase framework (as indicated in Figure 3.1) was extrapolated, in order to be applied as an interactive reference for the design phase of the intervention. This framework was selected from the vast array available to fit in with the values, preferences, and belief systems of the research team, as well as with the approaches integrated into the research design of the study. More criteria set for the choice of the framework were that it is action-orientated, address a number of components simultaneously, is flexible enough to be rearranged to suit the demands of a particular community, emphasise design (structured planning), reflects evaluative research and that it is not iterative. The frame of reference used in this study was chosen because I believe it to meet the above-mentioned criteria and therefore valid to meet the needs of the participative community. The framework also fits into a commonly accepted approach to rural community development, namely programme planning (as stated by Burkey, 2000: 42).

A phase-process to nutritional interventions is not new. Several researchers have constructed or used similar approaches calling it either steps or stages (Ahmad, 1995:254; Babu & Rhoe, 2002:365; Gillespie & Yarbrough, 1984:175; UNICEF, 1990). Similarities were also depicted with interventions that promoted agricultural extension (Düvel, 1991:70), hygiene (UNICEF, 1999a: 15) and adult education (Caffarella, 1994:18). Even within mechanical-, engineering- and construction-projects, certain phases are distinguished, often called the life cycle of a project (Adams & Barndt, 1983). In all these models and interventions it is clear that each of the phases (with its consecutive steps) were transformed into the next, and remained in operation throughout the life cycle of the intervention. Each phase thus contributed to the development of the successive phase until the decision is made to withdraw from the community or hand the intervention over to chosen representatives.

10.3 EXTERNAL EVALUATION

10.3.1 Data gathering

After construction, the *model* was sent out to 45 external evaluators considered experts in the field of nutrition intervention, programme planning or community development. The list of panel members comprised national and international experts, mainly those who were either known by my study leaders and me or cited in the thesis. This method is also known as the Delphi-group

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technique (Stuter, 2003), which was originally conceived as a way to obtain the opinion of experts without necessarily bringing them together face-to-face. The technique is iterative and aims to obtain a broad range of opinions from an expert panel. The *model* was presented as slide show using MS Power Point software. The various response levels are indicated in Table 10.1 and the responses summarised in Box 10.1.

10.3.2 Results

The various comments received were collated and summarised. Comments received were not shared with the rest of the panel members. The aim was to progressively clarify and expand on issues, identify areas of agreement or disagreement and commencing to refine the *model*.

TABLE 10.1: RESPONSES OF EXTERNAL EVALUATORS FOR FIRST ROUND
(N=45)

Category		**Comments received**	**Unable to respond**	**No response**	**Unknown address**
Local academic institution	9	2	2	5	0
Other national academic institutions	11	2	1	8	0
National health/research institutions	4	2	1	1	0
International academic institutions	9	1	1	5	2
International health/research institutions	8	0	1	7	0
Private capacity experts	4	1	0	2	1
Total	**45**	**8**	**6**	**28**	**3**
%		**18**	**13**	**62**	**7**

The level of response was 18%. This low response rate can probably be attained to the fact that because no explanatory notes were attached. People indicated various reasons for being unable to respond: no time available, other work priorities, not within field of expertise, and do not understand the purpose of the request. Limited experience in any of the relevant fields could have also contributed to the low response. The comments that were received, however, were extremely valuable and useful.

The *model* was streamlined and sent out for a second time. The co-supervisor of the study sent it to add some more credibility to the request. It was electronically mailed to 27 people, of which five responded. Six people of the second panel were also included in the first panel, mainly because we considered them as experienced and capable to give significant feedback on

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the *model*. A presentation on the *model* was also given at the Centre of Nutrition to attendees of a micronutrient-deficiency course, with another request for comments. Three more comments were received.

10.3.3 Data analysis and interpretation

The results were systematically organised (selected and condensed), displayed (see Box 10.1) and then incorporated into the *model* to add value, support or modify aspects of it. Wolcott (1994:36) describes this process as the threshold in thinking and writing *"at which the researcher transcends factual data and cautious analysis and begins to probe into what is to be made of them"*. The insights that were revealed during the evaluation process reinforced the choice of the various steps included and validated the contention that nutrition intervention is a long-term, carefully planned process with a consecutive interactive series of steps that builds upon each other. A further valuable output from the evaluations was the information generated with regard to future operationalisation of the *model*, which will require the correct mix of approaches, methods, steps and actions.

BOX 10.1: SUMMARY OF COMMENTS AND OPINIONS ON THE MODEL FROM EXTERNAL EVALUATORS (n=8)

Impressive. Entry through leaders of the community. Do not restrict to adults only. Conceptualisation of causes. Essential success factors should be considered. Feedback to the media.

Interesting. Very complex. Delete non-essential components.

Accentuate the cyclical nature of the model. Focus more on the active search for reasons of problems (analysis) instead of addressing problems. Stronger figuration of community participation, empowerment and ownership.

Logic. Difficult to deduct the type of intervention that will be addressed. How does it differ from other models?

Only a model of procedure. Not much is revealed about the content. Only needs have been identified as behaviour determinants. Will the programme therefore be effective?

'Instructional plan' and 'transfer of learning' do not reflect PAR. Report to stakeholders as well.

Thorough and well-reasoned. Some problematic issues. Reduce the information. Use simpler format. PAR is not fully reflected. Some terms are very directive. Include the application of ethical principles. Feedback should be received sooner from participants. Add important key persons (farmer). Include interdisciplinary peer review throughout the process.

Some explanatory notes should accompany it. Does not allow for nutritional measurements. Be more specific with the title. Avoid the term 'personal'. What is the difference between literature study and theoretical base? Use 'identify target' rather than choose. Model has value but needs to be refined.

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10.4 ADDED VALUE

A literature search was conducted with the aim of finding publications on other nutrition intervention models that could add value to the constructed *model* of this study. The emphasis was on the process and not on explanation of outcomes like the influence on nutritional knowledge, attitudes, skills, behaviour or other health impacts. The following criteria were formulated in order to consider a particular model useful, namely that it had to:

- Show visual presentation
- Use a phase-approach
- Be related to health and/or nutrition
- Mention context and content
- Be previously applied and tested
- Be comprehensively described.

Within this framework, a search for applicable models commenced. An electronic search was conducted using various search engines with the key words 'nutrition intervention model' to be included anywhere in the text of the publication. The facilities of the Academic Information Service of the University of Pretoria as well as those available on www.ojose.com were used. Apart from the electronic search, various text books in the field of community nutrition, health promotion and adult education were consulted.

A considerable body of literature was found. Those who were consulted are indicated in Box 10.2. These were screened in order to corroborate the interpretations and to check that interpretations, made when the *model* was constructed, are grounded in prior research and anchored in the literature. This approach was followed in a disciplined manner. The connotation of 'disciplined' implied rigor and care. Due care was exercised to ensure consistency and comprehensiveness in the screening procedures pursued.

The literature sources were also used as building blocks in the following way:

- Put various steps in order
- Provided meaning to empirical findings
- Provided an explanation for observed events and relationships
- Showed which variables are related and how they are related
- Provided new insight
- Stated a general uniformity beyond this particular *model*
- Enabled extrapolation from the known to the unknown

- Verified the proposed *model*
- Stimulated and guided further thinking
- Provided a basis for refining the *model*
- Explored different ways to look at the *model*
- Revealed the various facets.

The following models found in the literature were regarded as applicable and valuable and were used to enrich and verify the *model*:

- A model for the promotion of complex innovations through programmed extension (Düvel, 1991: 70)
- A community nutrition paradigm (Endres, 1999: 71)
- Seven-step process for programme planning, implementation and evaluation (Frankle and Owen, 1993: 217)
- Community project development model (Gajanayake & Gajanayake, 1993: 7)
- A problem-based nutrition care process (summarised by Lacey & Cross, 2002: 582)
- ACADA model for communication programmes (UNICEF, 1999b: 13).

BOX 10.2: SELECTION OF PUBLICATIONS USED FOR VALUE ADDING

- ACHTERBERG, C & MILLER, C. 2004. Is one theory better than another in nutrition education? A viewpoint: more is better. *Journal of Nutrition Education and Behavior* 36(1): 40-42.
- ACHTERBERG, CL, NOVAK, JD & GILLESPIE, AH. 1985. Theory-driven research as a means to improve nutrition education. *Journal of Nutrition Education* 17(5): 179-184.
- AHMAD, M. 1995. Nutrition education and training programme model for evaluation and planning. *Evaluation and Program Planning* 18(3): 253-258.
- ANDRIEN, M. 1994. *Social communication in nutrition: A methodology for intervention.* Rome. FAO.
- BABU, SC & RHOE, V. 2002. Designing nutrition interventions with food systems: planning, communication, monitoring and evaluation. *Journal of Crop Production* 6(1): 365-373.
- BOTELHO, RJ & SKINNER, H. 1995. Motivating change in health behaviour. Implications for health promotion and disease prevention. *Primary Care* 22(4): 565-589.
- BUCHANAN, D. 2004. Two models for defining the relationship between theory and practice in nutrition education: is the scientific model meeting our needs? *Journal of Nutrition Education and Behavior* 36 (3): 146-156.
- CONTENTO, IR, RANDELL, JS & BASCH, CE. 2002. Review and analysis of evaluation measures used in nutrition education intervention research. *Journal of Nutrition Education and Behavior* 34(10: 2-25.

(continued)

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BOX 10.2: SELECTION OF PUBLICATIONS USED FOR VALUE ADDING
(continued)

- ELDER, JP, AYALA, GX & HARRIS, S. 1999. Theories and intervention approaches to health–behavior change in primary care. *American Journal of Preventive Medicine* 17(4): 275-284.
- EWLES, L & SIMNETT, I. 1999. *Promoting health. A practical guide.* 4th ed. New York. Baillière Tindall.
- FRANKLE, RT & OWEN, AL. 1993. *Nutrition in the community. The art of delivering services*. 3rd ed. London. Mosby.
- GLANZ, K & ERIKSEN, MP. 1993. Individual and community models for dietary behavior change. *Journal of Nutrition Education* 25(2): 80-85.
- GLANZ, K & MULLIS, RM. 1988. Environmental interventions to promote healthy eating: A review of models, programs and evidence. *Health Education Quarterly*15: 395-415.
- HOELSCHER, DM, EVANS, A, PARCEL, G & KELDER, S. 2002. Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association* 102(3): S52-S63.
- HUBLEY, J. 1988. Understanding behaviour: the key to successful health education. *Tropical Doctor* 18: 134-138.
- ISMAIL, S, IMMINK, M & NANTEL, G. 2002. Improving nutrition programmes. An assessment tool for action. Rome. FAO.
- LACEY, K & CROSS, N. 2002. A problem-based nutrition care model that is diagnostic driven and allows for monitoring and managing outcomes. *Journal of the American Dietetic Association* 102 (4): 578-589.
- SAHYOUN, NR, PRATT, CA & ANDERSON, A. 2004. Evaluation of nutrition education interventions for older adults: a proposed framework. *Journal of the American Dietetic Association* 104(1): 58-69.
- SMITH, B & SMITASIRI, S. 1997. *Nutrition education for the public. Discussion papers for the FAO expert consultation.* FAO Food and Nutrition paper 62. Chapter 2: A framework for nutrition education programmes. Rome. FAO.
- THOMAS, J. 2002. Nutrition intervention in ethnic minority groups. *Proceedings of the Nutrition Society* 61(4): 559-567.
- UNICEF. 1999b. *Towards better programming. A manual on communication for water supply and environmental sanitation programmes*. Water, Environment and Sanitation Technical Guidelines Series - No. 7. New York. UNICEF.
- VAN DILLEN, SM, HIDDINK, GJ, KOELEN, MA, DE GRAAF, C & VAN WOERKUM, CM. 2003. Understanding nutrition communication between health professionals and consumers: development of a model for nutrition awareness based on qualitative consumer research. *American Journal of Clinical Nutrition* 77(4): 1065S-1071S.

(These references are not all reflected in the reference list)

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The findings were used to contribute to a number of features that an effective model for nutritional intervention should exhibit. It should hence:

- Establish successful partnerships
- Pilot test all measuring instruments
- Determine the factors which underlie a person's decision to perform or not perform a behaviour
- Concentrate on changing only those factors which are important for influencing changeable behaviour
- Promote actions which are realistic and feasible within the constraints faced by the community
- Build on ideas, concepts and practices that people already have
- Repeat and reinforce the messages over time using different methods
- Be adaptable and uses existing channels of communication
- Be entertaining and attract the community's attention
- Use clear simple language with local expressions and emphasises short term benefits of actions
- Provide opportunities for dialogue and discussion to allow learner participation and feedback on understanding and implementation
- Use demonstrations to show the benefits of adopting practices.

The comments from the external evaluators and the outcomes of the literature study were used to construct the final, comprehensive version of the *model*. The various phases and steps within the *model* are displayed in Figures 10.2-10.8. Each phase and step will first be discussed.

10.5 THE PROCESS FOLLOWED

The first building block was the frame of reference, which I called the ADIE-framework of the process that was followed namely analysis, design, implementation and evaluation. This framework was applied to the particular context of the study. Each consecutive phase of the process is separately illustrated in the *model* as illustrated in Figures 10.2-10.8. For clarity reasons, to enhance readability and to ease understanding, the pursued discussion is based on the process that was followed during the course of this study. Each phase and step is presented in terms of what has been done in this study (stated in past tense), proceeded by recommendations from external evaluators and insight gained from the literature (stated in future tense).

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Phase 1 (illustrated in Figure 10.3 and 10.4) focus on analysis, including (1) preparation and (2) contact-making followed by steps related to (3) data gathering on the situation and (4) transforming the gathered data. The focus in Figure 10.5 is on Phase 2 (design) with the consecutive steps of (1) formulating goals and objectives (2) designing a facilitation plan and (3) designing an evaluation plan. Implementation is the third phase (Figure 10.6) including steps of (1) preparing (2) conducting, coordinating, integrating (3) revising, which included monitoring and giving feedback (4) repeating and reinforcing. The designed evaluation plan (from phase 2) and information from monitoring activities is drawn upon to conduct Phase 4 (evaluation) (Figure 10.7), which consist of (1) data gathering – on the process as well as the outcomes of the intervention (2) reviewing the data and (3) reflecting on the data. Reflecting on data included dissemination to all the stakeholders involved, the participants, academics and the media.

10.5.1 Starting point

All interventions, studies, programmes or initiatives must have a starting or entry point, which can be multiple - a personal interest, a current stated problem in an area, and/or an existing need expressed by a particular community. A starting point shows the researcher in the direction of the group and context within which the intervention will be conducted. You can go out searching for a relevant community or a group (or even an individual) can approach you as the scientist/researcher/specialist in order to solve a particular problem or to assist them to fulfil a need. This group can be people living within the boundaries of a certain geographical area with the same interests, members from the same institution (church, school) with similar problems, or patients attending a community clinic reporting to have similar needs. If the starting point is priority within the specific country, a mandate, or a response to public outcry, and it is relevant to the involved institution's mission, it is an excellent rationale for proceeding with the intervention (CDC, 2001).

This particular intervention (and study) started with an interest in community nutrition and recently available results from a national survey indicating that malnutrition (specifically stunting) in young children living on commercial farms was significant (Labadarios, 2002). This starting point led us in the direction of a particular commercial farm, influenced by factors such as logistics and personal relations.

Attached to the 'starting point' were preconditions that related to the context within which this community-based intervention was devised, namely PAR and community-based participatory research (CBPR). Almost by definition, most nutritional interventions are 'community-based'

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(Ismail, Immink & Nantel, 2002:3). PAR, however, is not necessarily implicit in this definition. These are also seen as prerequisites to self-sustaining interventions.

10.5.2 Phase 1

Phase 1 (illustrated in Figure 10.3 and 10.4) focus on situation analysis, including (1) preparation and (2) contact-making followed by (3) data gathering and (4) transformation of the gathered data.

10.5.2.1 Preparing

Preparations consisted of creating a theoretical base of knowledge, skills and expertise, setting up a research team (and task teams), writing a proposal and obtain funding.

Theoretical knowledge and practical experience was needed regarding the methodology as well as the content of the study. The literature was used as a tool for critical thinking and planning. Literature was consulted on a continuous basis as the intervention progressed. Literature studies and readings were therefore never considered a once-off activity.

The research team of this study consisted of three main members. I considered myself knowledgeable regarding the methodology and content and was experienced in terms of community nutrition, derived from previous work as a community dietician. The second team member was also knowledgeable about nutrition, and was included in the team because she was from the same culture and could speak the local language. She was also an enrolled post-graduate student at the Department Consumer Science. The third team member was an experienced senior researcher and very knowledgeable about the underlying philosophy and various approaches and theories included in this study. All involved team members were knowledgeable on the principles of the underlying philosophy that has driven the intervention. In this case, it was PAR combined with critical theory, adult education principles and evaluative research. Team members were also familiar with the process of programme design, implementation and evaluation. Other involved partners were knowledgeable about nutrition and agricultural aspects.

Stakeholders and partners should be recruited, selected and chosen to strengthen the efforts of the research team and to provide diverse perspectives and expertise (CDC, 2001). The size, resources and nature of the intervention should guide the specific components of the team as recommended by Ismail *et al* (2002:5). All involved team members were knowledgeable on the principles of the underlying philosophy that has driven the intervention. In this case, it was PAR combined with critical theory, adult education principles and evaluative research. Team

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members were also familiar with the process of programme design, implementation and evaluation.

The next part of this step was to construct a work plan and to outline the schedule, time frame and responsibilities. A research plan (intervention proposal) was written as the first step in ensuring the ultimate success of the intervention. The proposal was approved by the post-graduate committee of the Department Consumer Science of the University of Pretoria as well as the ethical committee of the Faculty. Included in this proposal was a work breakdown structure, as indicated in Figure 3.3. A research plan is a concise document that provides a clear idea of what the intervention is all about and should indicate the following aspects:

- What specific strategies are being considered for implementation
- Who will benefit from the intervention
- How the intervention will operate
- What the requirements are for effective implementation (Dennill *et al,* 2000:90).

A well-written, concise proposal is of paramount importance, since this document will be used to obtain funding and sponsorships.

10.5.2.2 Contact making

Important key persons in the community, such as the farmer, shop owners, school principal and teachers were identified and contacted. The aim was to get acquainted with the people and to display empathy with and interest in the situation. Contact making had three main goals, namely:

- For the people to know and accept the research team for what they are and able to do
- To earn acceptance from the people
- To know and understand the people and their situation (problem, need, interests).

Contact making refers to either meeting the group or individual or entrancing the area. This could be a first appointment for negotiating access to a group, meeting the leaders or spokespeople who can be a tribal head, a town mayor, a community health nurse, the head of a school or any other person considered to be of importance in that community. For individual cases it can be a family member or friend of the actual person in need. In this study it was the farm owner.

Contact making can never be rushed. The involved parties had to accept the research team's bona fides before the intervention could commence. This was done through informal talks, friendliness, and a keen interest in the people and their circumstances and by just being

available and present. Specific methods used were individual informal interviews, observations and group discussions.

Access can be a lengthy process, especially if there is power, money or politics at stake. It can involve in-depth discussions, motivations and negotiations. A draft, preliminary plan of action is necessary to use as starting point for discussions. Practical application of ethical issues is also very relevant and important during this step (as it is through the rest of the intervention). We, as the research team, did try to build trust and a partnership with the community. We showed empathy and respect and acknowledged their feedback and comments. Group discussions were hold to clearly indicate to the community who we are and what we can do. The intervention idea was sold to the participants and they were convinced of the feasibility of the intervention as well as the benefits for them. A 'group leader' who acted as spokesperson and key informant was elected and decisions on the specific methodologies and approaches to be applied were also communicated.

10.5.2.3 Data gathering

The next step was to gather information in order to establish a basis for the intervention, identify ideas and to sort and prioritise these ideas. This was done in a structured way including various sources of data and data collection methods. Three types of data were gathered, namely contextual, nutritional and interventional. Contextual data was descriptive in nature and was needed to put the identified problem/need/interest and proposed intervention in a specific context. The next level of information focused on the specific nutritional issues at stake, which were anthropometrical, biochemical, clinical, and dietary information. Other related information that was gathered included food access (various resources, food production, preservation), food adequacy (safety, quality, quantity, diversity), stability and sustainability (coping strategies and safety nets).

What was called 'intervention information' was collected next. This involved knowledge, attitudes, practices and/or specific behaviours regarding the issues at stake. Methods deployed were group discussions, observations and feedback from a key informant. Recordings of all information were implied, which were needed as evidence to verify that the problem or need exists and to quantify the severity. The gathered data were analysed and interpreted in order to verify the decision regarding the need or problem to prioritise and to address.

Findings from the needs assessment should also be organised and prioritised based on criteria of importance and feasibility. This process should be tied to the context within which the

research study is conducted. Rating identified needs and problems in terms of relative importance and relative feasibility will ease the overall and final judgement. Some criteria to consider are stated in Table 10.2

It is also necessary to identify the variables that might either assist or undermine the intervention's effectiveness. Problems as well as opportunities related to the intervention should be anticipated in order to respond appropriately to these potential influences (CDC, 2001). A common method of discovering factors that can help or harm an intervention is a SWOT-analysis in which you identify strengths, weaknesses, opportunities, and threats that might affect the intervention.

TABLE 10.2: CRITERIA FOR PRIORITISING NEEDS AND PROBLEMS (Sort as cited by Caffarella, 1994:89)

Importance criteria	**Description**
Number of people affected	An estimate of how many people would benefit if the problem were addressed
Contribution to goals	The degree to which addressing the problem will contribute to the attainment of the study aim and community's priorities
Immediacy	The degree to which each problem requires immediate attention
Instrumental value	The degree to which one problem will have a positive or negative effect on addressing other problems
Magnitude of discrepancy	The desirable size of the gap between the current situation and a more desirable one
Feasibility criteria	**Description**
Efficacy	The degree to which an intervention can contribute to addressing the problem
Availability of resources	The degree to which the resources necessary to address the problem would be available if it is decided that the problem should be addressed
Commitment to change	The degree to which those with vested interest (research team, participants and stakeholders) are committed to addressing the problem

Secondary data gathering was also valuable at this point. The literature was consulted on theories and approaches regarding planning interventions, extension, community development, nutrition education and behavioural change. A summary of theories and intervention approaches to health-behaviour change in primary care were found in Elder, Ayala and Harris (1999), which includes:

- 'Health Belief model'
- Cognitive/Information processing

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- Theory of reasoned action
- 'Social learning theory'
- Social support theory
- Behaviour modification
- Self-management model
- Transtheoretical or 'stages of change' model.

These models and theories can be integrated into the process of nutritional intervention, explaining and predicting behavioural change. Application of these models is widely published within the field of community nutrition (Achterberg & Miller, 2004:40; Dennill *et al,* 2000: 127; Endres, 1999:345; Glanz & Eriksen, 1993:82). The models and theories should be reviewed and applied as a guideline to the process of intervention planning.

10.5.2.4 Transforming the data

Wolcott's (1994) term of transformation was adopted in this step. It refers to data management and expands beyond the mere description, analysis and interpretation of data. It includes verifying the findings with the participants, discussing and prioritising it, as well as analysing and interpreting. The process of analysis was not a distinct phase of the research process, but a continuous, reflective activity that informed and guided the processes of data collection, needs assessment, intervention planning, implementation and evaluation. Analysed data is also transferred to the designing phase. The bridge between the two phases within this step are therefore blurred and not set in cement.

The process of theorising refers to generating ideas and formulating themes for the design phase to follow. What were considered as ideas were substantial – it had to make sense in the particular context of this study. Some contemporary accounts of theorising are expressed in terms of 'theory building', where ideas are brought together and systematically ordered. It was an intellectual activity, which included speculation about the data, in order to create ideas, and to link the ideas with those of others. It was a conceptual move from the findings to a more general and abstract level of analytical thought. Theorising was therefore not seen as casual explanation but the translation of the identified themes and patterns into positively stated messages.

The focus was on tailoring the needs and problems and constructing it into relevant, effective and appropriate activities to improve the problem or address the need. It was called a 'nutritional' intervention, referring to the broad aspects that influence the nutritional situation and nutritional status of people. Such aspects include feeding practices, diseases, household

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food security, maternal and childcare, health services, environmental factors, education and information and poverty (Latham, 1997:9; UNICEF, 1992). The assessed factor in this study was hygiene and sanitation.

10.5.3 Phase 2

The design of the intervention was based on the outcomes of the situation analysis. The design was done logically with inclusion of goals, objectives, a facilitation plan (which included strategies, format, and available resources) and an evaluation plan. Realistic goals should be set in terms of a time frame that can contribute to an intervention's credibility. The objectives also form the basis of evaluation and are therefore key indicators of the success of the intervention. Designing and planning were done together with a key informant. She was actively involved in considering various options and constructing of plans. The participants further indicated and openly communicated their preferences, understandings and choices. A flexible and open design approach was therefore followed.

Strategies contained the learning activities and messages that needed to be conveyed. Consensus between all the involved stakeholders was needed in terms of all aspects included in the facilitation plan, in order to enhance success and efficiency. Learning activities were deliberate, strategic and practical. Messages within the facilitation plan needed to be field-tested to increase the likelihood that participants will respond positively to the messages. Testing is also needed to improve the messages' clarity, consistency, tone, or relevancy for the participants (CDC, 2001). A tangible product that contains the messages to be delivered was also needed. I decided on an educational poster to communicate and support the messages. The field worker participated in developing this teaching aid, to ensure that it was culturally acceptable. It was personalised by attaching a photo of each participant to her own poster. The focus of the posters was to change key behaviours as attained to the identified, prioritised needs and problems. Unsanitary practices and conditions (as observed and measured) were translated into seven core summative messages, which were imprinted on the posters.

The specific chosen educational tool also had to reflect the needs and wants of the participants, their literacy, entertainment preferences and main sources of information. Selecting and testing materials to find those most appealing and appropriate for the participants is at the heart of effective health communication (CDC, 2001).

The execution of the facilitation plan should be discussed with all the key partners involved. A weakness in this intervention is that I did not determine ways to maximise support and

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feedback from others like colleagues from the Department Consumer Science. Input from the key partners is also needed to ensure a successful evaluation plan. If you don't seek the viewpoints of stakeholders, the evaluation may overlook important elements that should have been evaluated. Or worse, evaluation findings may be ignored, criticised, or resisted because you failed to consider stakeholder perspectives (CDC, 2001). The evaluation plan consisted of criteria, indicators and methods for both process and outcome evaluation. It also included ways to analyse the evaluation data and reporting it back to stakeholders.

10.5.4 Phase 3

Implementation was done in four consecutive steps, with various activities involved.

10.5.4.1 Preparing

This step included the preparing of the research team and the recruited key informant in terms of content and messages to be conveyed. The content and messages were already planned and written into a facilitation plan. This was a necessary step to ease the learning process for the participants and to enhance their learning as far as possible. It also included training of the field worker and key informant regarding principles of adult education that were applied. A constructed set of principles (Green, 2002) was adopted, which included aspects applied to the adult learner, the learning situation (ambience) and the learning process.

10.5.4.2 Conducting, coordinating and integrating

Activities involved were the mobilising of resources, deploying of various strategies and the integration of the program with different other services in the area. Mobilising of resources (labour, skills, food, supplies, money, time, utilities, information, space and equipment) refers to all the arrangements that needed to be employed. Strategies refer to the specific activities that were planned. Strategies are usually selected to bring about behaviour change and should be mediated by local knowledge and contexts. Strategies can include information processes as well as the more conventional communication processes. Information dissemination is generally designed to inform unilaterally, for example through print and broadcast channels, where-as communication strategies use interpersonal, face-to-face channels such as group discussions, home visits, training and counselling (Smith, 1997). The issue, however, is no longer which channel to choose or which channel is best, but how to use a combination of channels to improve and support nutritional behaviours. Six different strategies were eminent, namely group information sessions, individual dialogue sessions, key informant trials, supporting a local tuck shop, competitions and educational support material. This intervention was integrated with a food-based strategy, which were mainly focused on home vegetable gardening.

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10.5.4.3 Revising

Unexpected problems will almost certainly arise during the implementation phase. Managing these problems and seeing them as either threats or opportunities requires effective communication with partners and other stakeholders so that everyone is aware of adjustments being made to original plans (CDC, 2001). Revising the facilitation plan as well as the conducted activities also depends on a monitoring system. Although a particular monitoring system was not in place in this intervention, it is a definite weakness that has to be overcome in future interventions and is therefore mentioned here.

Monitoring was done through regular visits, to motivate behavioural change, to improve the intervention process and to ensure efficient addressing of the specified need (hygiene and sanitation). The monitoring activities were also fed into the evaluation phase, as discussed in Chapter 8. Regular monitoring of activities and strategies of successfulness was important to enable the team to adapt or change the action plan when and if necessary. A part of this step was also to document all findings, to provide evidence of positive or negative outcomes and to improve the communication and collaboration of the research team.

10.5.4.4 Repeating and reinforcing

The activities were repeated and reinforced until a satisfactory level of change, improvement or development was observed and measured. It was also very important to repeat the activities until the desired outcomes have been reached as well as a satisfactory level of improvement, as stated in the objectives.

10.5.5 Phase 4

The purpose of evaluation was to generate knowledge, to make certain judgments or to make certain applicable improvements. The process and outcomes of the intervention were monitored and evaluated concurrently. Evaluation helped to ensure that objectives are met and that the related intervention is implemented as intended. It also helped to determine which behaviours have been changed as a result of the intervention and the extent that the health problem itself has been affected. Objectives in this study were set for the participating adult female community members to practice after the intervention had commenced. These practices were evaluated by the research team according to set criteria and indicators and by using methods such as observations with field notes, group discussions and key informant feedback.

In a more practical sense, the process of evaluation can strengthen interventions in various ways, namely by:

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- Revising and fine-tuning the initial design to take into account new priorities and opportunities
- Recognising and reinforcing successful activities to encourage those responsible and keep up momentum
- Ensuring that the intervention remains tuned to community needs
- Informing decision- makers about realities at the local level to help them modify policies where needed (Rietbergen-McCracken, Simpson-Hebert & Wood, 1998: 120).

Evaluation can also contribute to high-quality partnership outcomes. Outcome evaluation can determine whether educational objectives were attained. Evaluation can also identify spin-off benefits like greater visibility, new opportunities, additional investments to extend the reach or scope of the original goal, and to enrich the expertise and experience of partners. Common features of successful evaluation are: integrating process and outcome; identifying quantitative proxies for qualitative events; using logic models to identify key process variables; using cumulative graphs to chart temporal changes; emphasising feedback cycles for programme improvements; and that it should be responsive to the cultures of key stakeholders (Lansing & Kolasa, 1996: 813).

One way to evaluate the success of a community-based intervention that combines intervention and basic research is to consider how well both the intervention and the basic research components are able to meet the specific aims and are able to do so in a way that is found to be respectful, beneficial and participatory to the partners involved in the intervention (Brakefield-Caldwell & Parker, 2000: 55). Evaluation also plays an important role as an empowerment tool. Effective projects are motivational as well as diagnostic. They energise participants and direct attention to what is working and what may be in need of some refinement. Evaluations provide information that documents effective practices but also focus on motivating partnerships to improve practices through identifying and overcoming barriers.

Various measures for evaluation can be used, for example improvement in dietary intake, health behaviour, and even functional improvements such as well-being. Changes in certain conditions like nutritional status, natural environmental awareness, and health care, can be measured as well as impact assessment regarding social and environmental aspects. Capacity building can be measured in terms of the number of completed research studies, involved scientists and career developments made. More relevant to the participants involved, capacity can be measured in terms of job performance. Personal ownership of the intervention should also be measured but can only be done so over an extended period of time.

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10.5.6 Dissemination

The community was continuously kept informed about the outcomes of the formal and informal evaluations. They were rewarded for whatever positive changes had taken place with either incentives or a celebrative event. The field worker was recruited to assist the other community members in keeping up the good work. Jenkins (1998:111) stated that, if needed, the intervention has to move into a second phase to incorporate additional changes. These would reflect the addressing of the other identified needs. Other postgraduate students were involved in these particular activities, and these needs were incorporated into their particular research studies. The media, however, were not included in dissemination activities.

Some extract parts of the study were prepared for dissemination among the academic population. Various electronic sources can also be considered for dissemination. It can be electronically forwarded to the global applied research network (GARNET), which has a topic network on hygiene behaviour and a working group on the promotion of sanitation. The Development gateway (www.developmentgateway.org) can also be considered. This is an interactive portal for information on development issues, efforts and opportunities. The communication initiative on planning models (www.comminit.comT) is another possibility for dissemination.

10.5.7 Handing over

Community-based hygiene promotion programmes are by definition long-term (Appleton & Van Wijk, 2003:30). This particular intervention was done between November 2001 and December 2004. Progress is a gradual process especially where no particular cohesion or leadership like steering committees exist. It was very difficult to decide when to terminate the intervention. The key informant indicated that the community do not want us to leave, for reasons of attention, feeling important and incentives that were received. Time was the main factor involved when the decision was made to withdraw. Another master's student will however, implement a product development study (showing them how to process the sweet potatoes from their vegetable gardens). The managers from the guesthouse on the farm were interested in continuing with some aspects of the intervention, especially the vegetable gardens. They were also committed to continue monitoring and motivating community members regarding the recommended hygiene and sanitation practices.

Researchers also have to move on. There are much more to be done and many other communities to help and needs to be addressed. Handing over is therefore a very relevant, final step.

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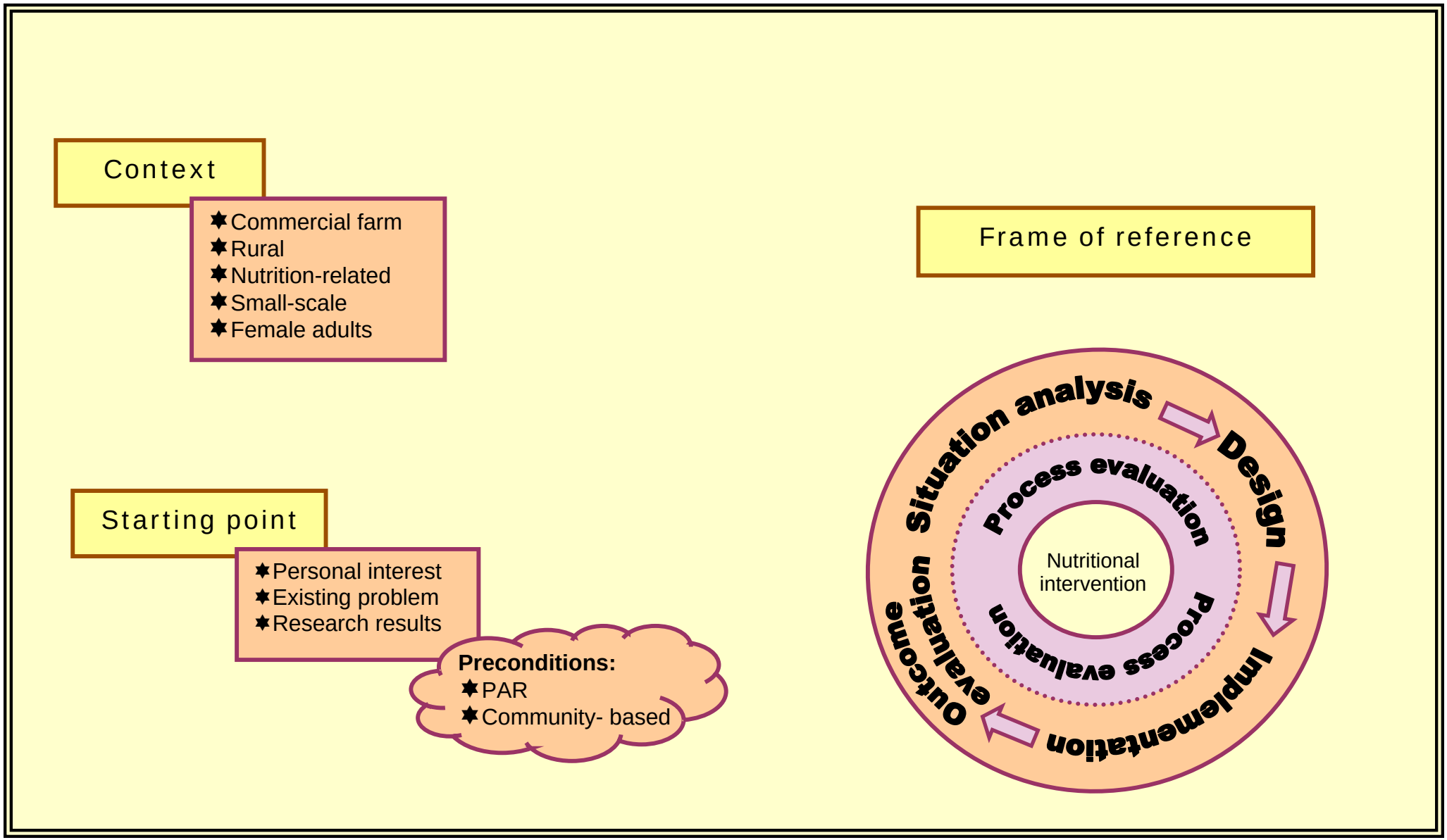

FIGURE 10.2: APPLIED FRAME OF REFERENCE

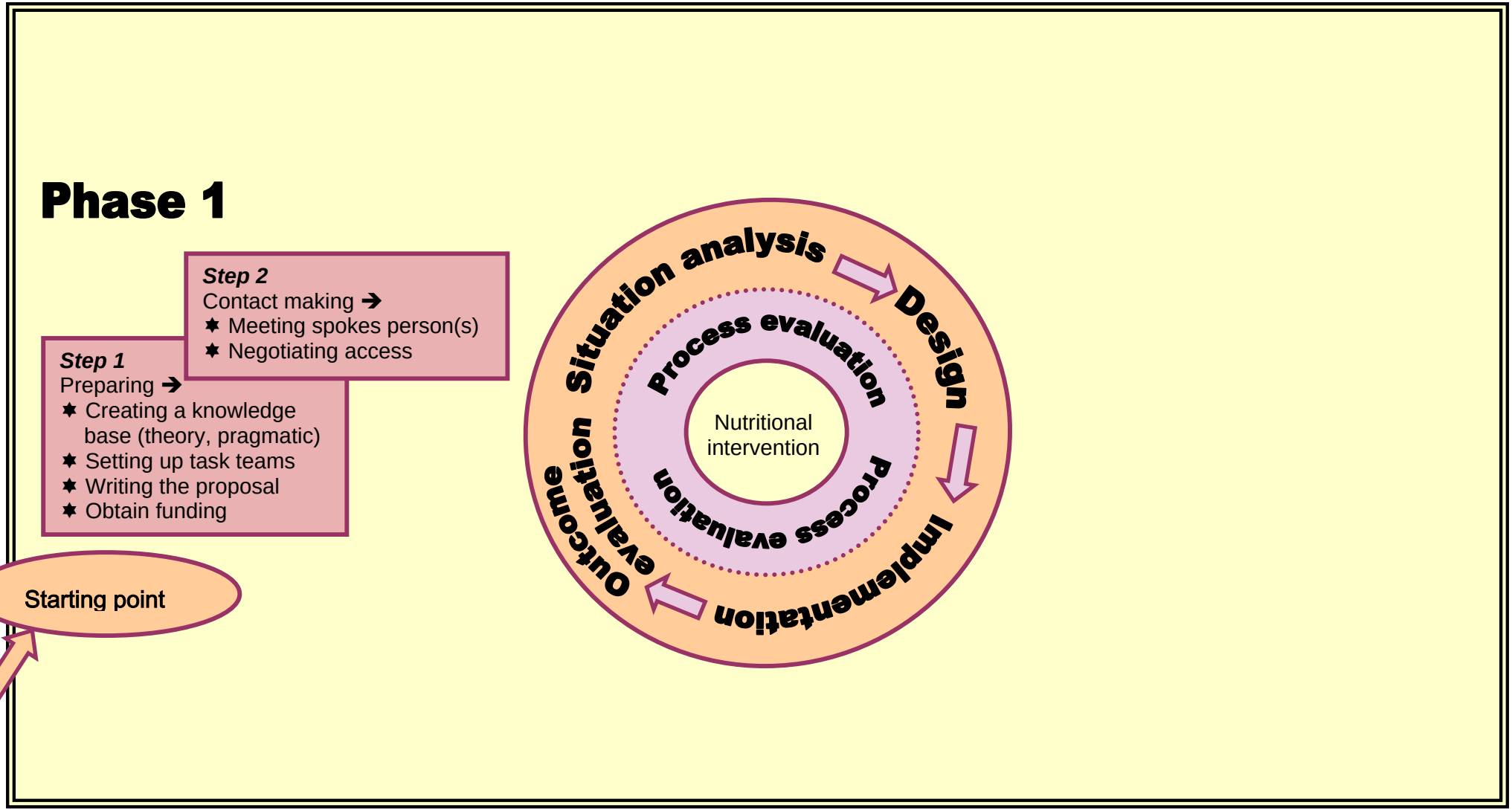

FIGURE 10.3: FOCUS ON SITUATION ANALYSIS (PHASE 1)

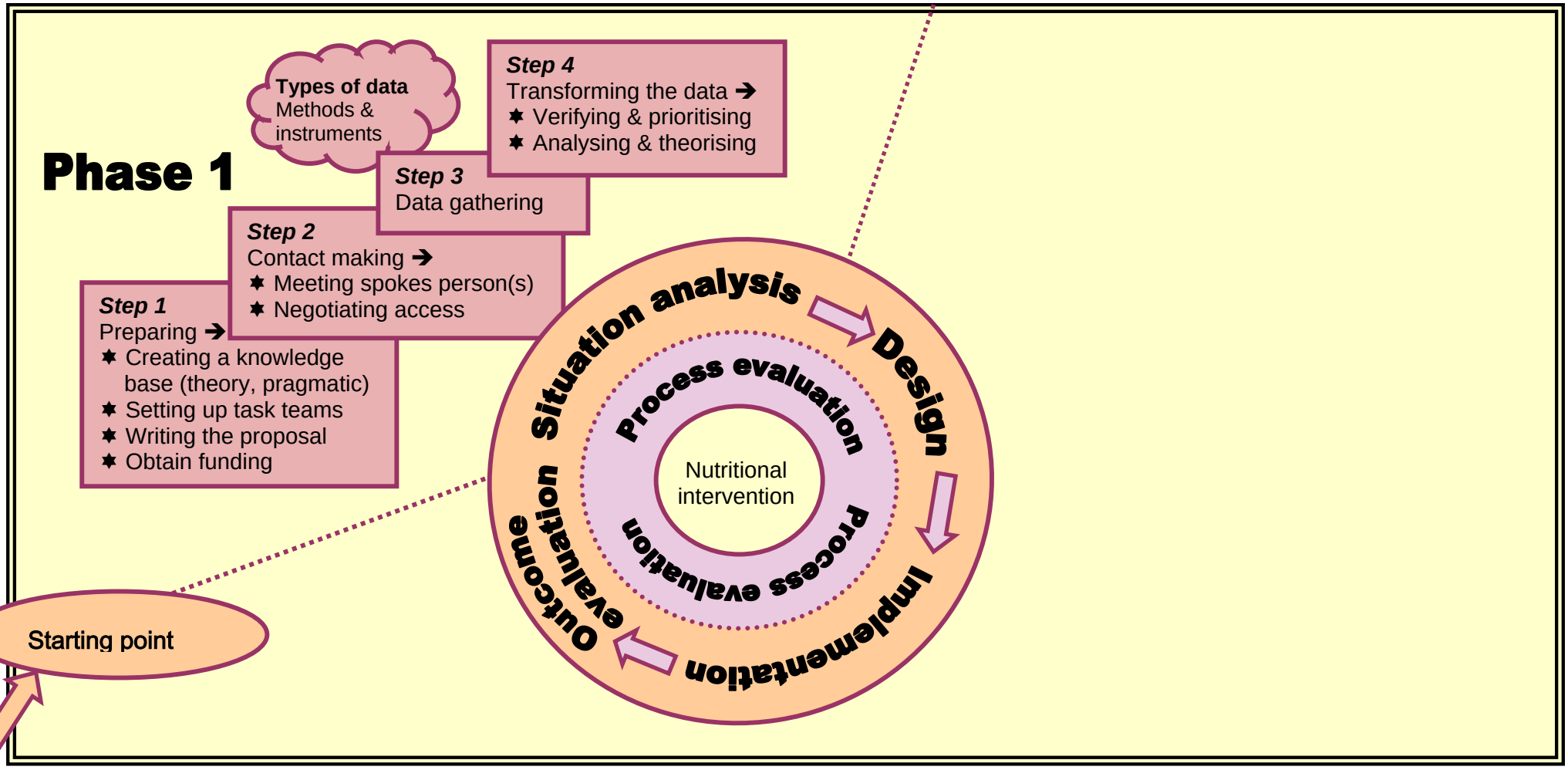

FIGURE 10.4: FOCUS ON SITUATION ANALYSIS (PHASE 1) (continued)

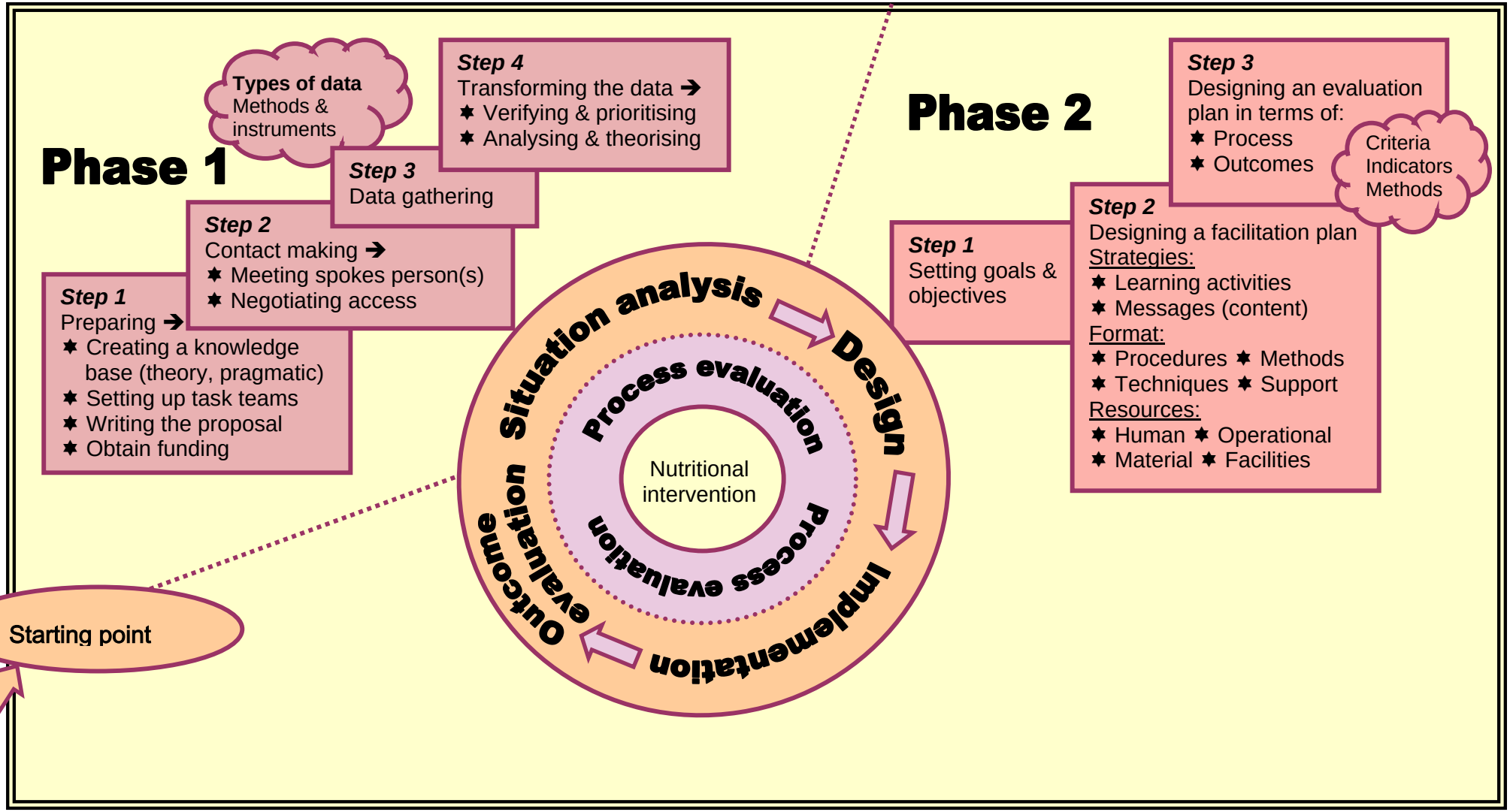

FIGURE 10.5: FOCUS ON DESIGN (PHASE 2)

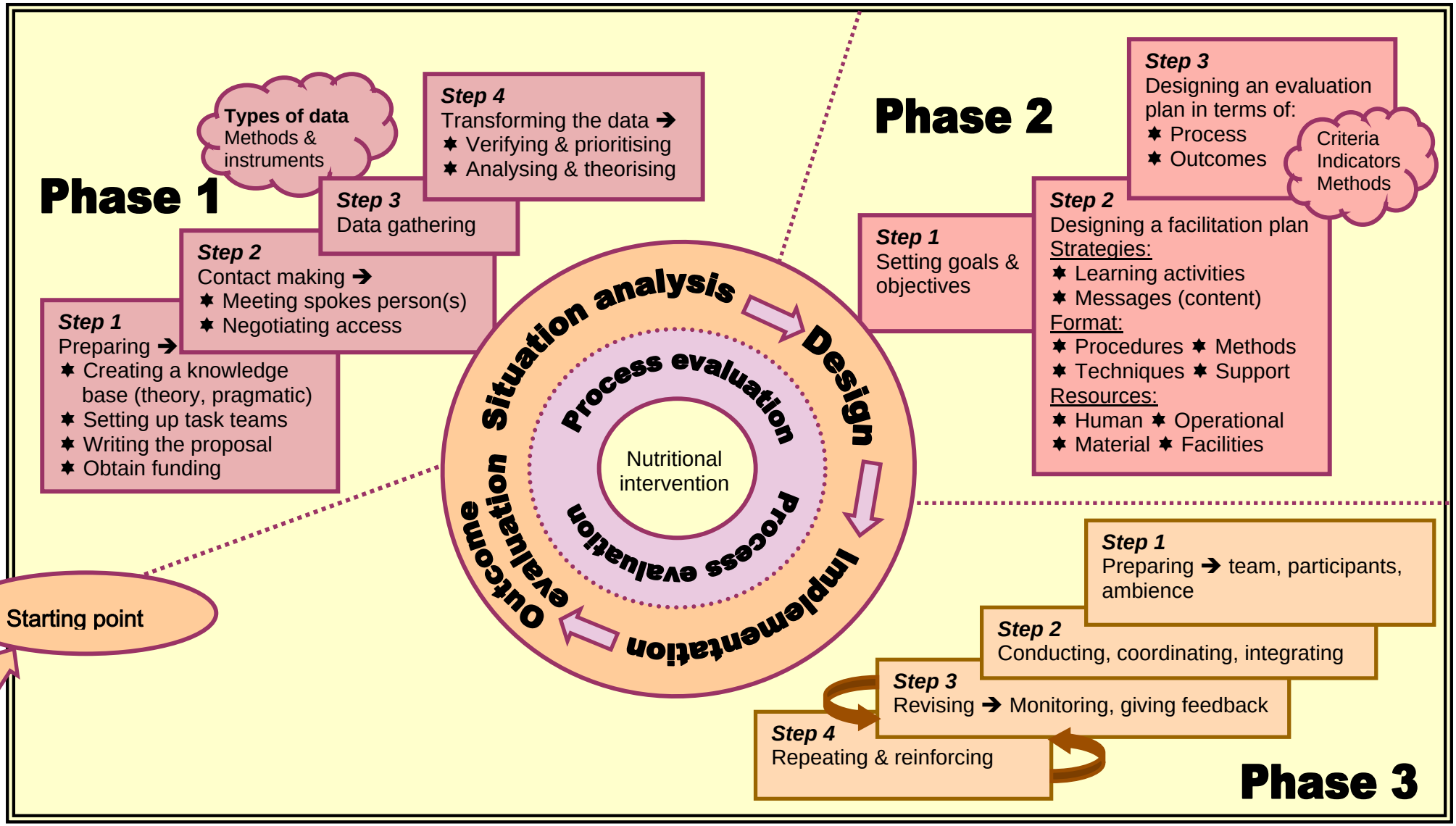

FIGURE 10.6: FOCUS ON IMPLEMENTATION (PHASE 3)

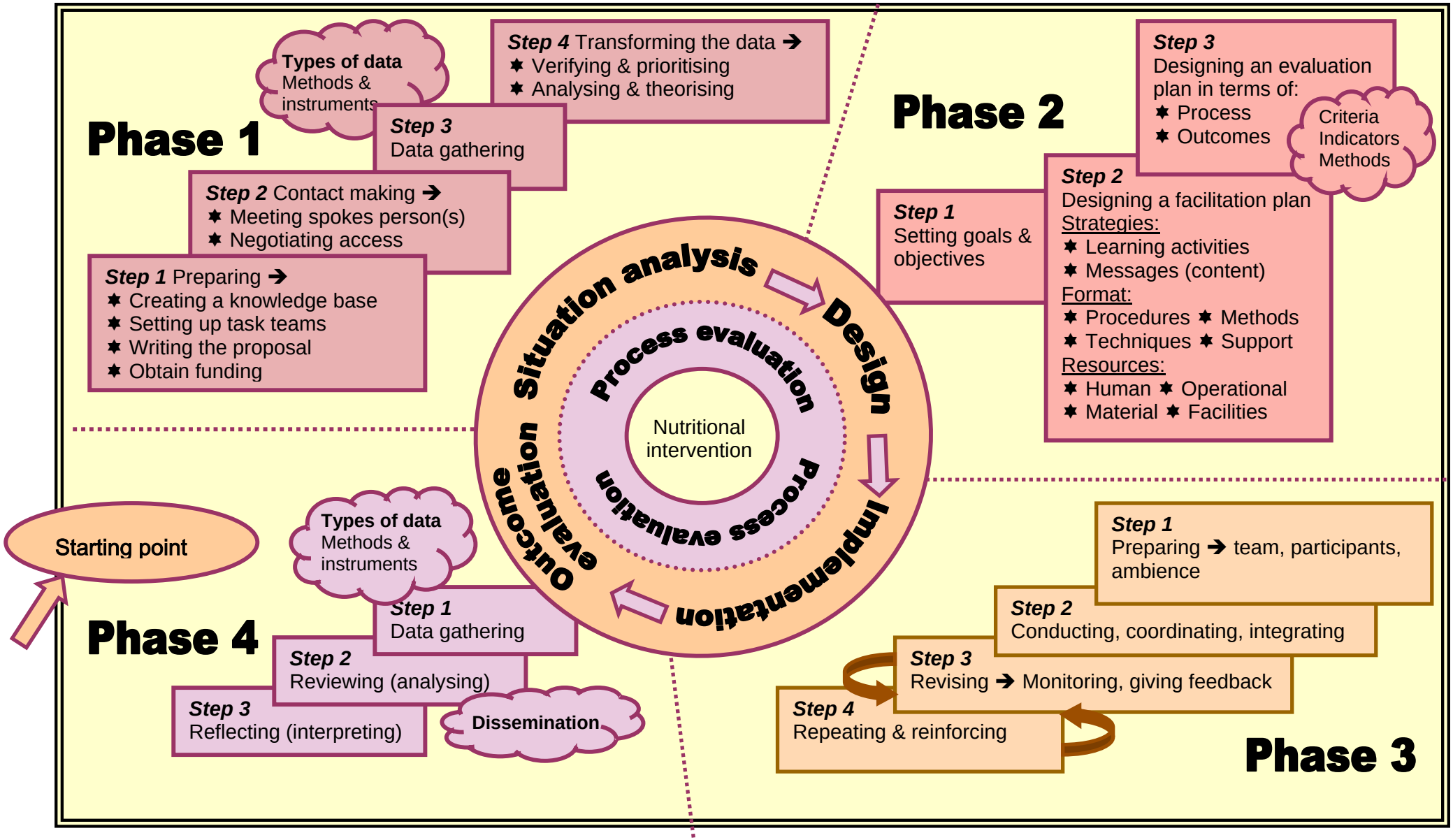

FIGURE 10.7: FOCUS ON EVALUATION (PHASE 4)

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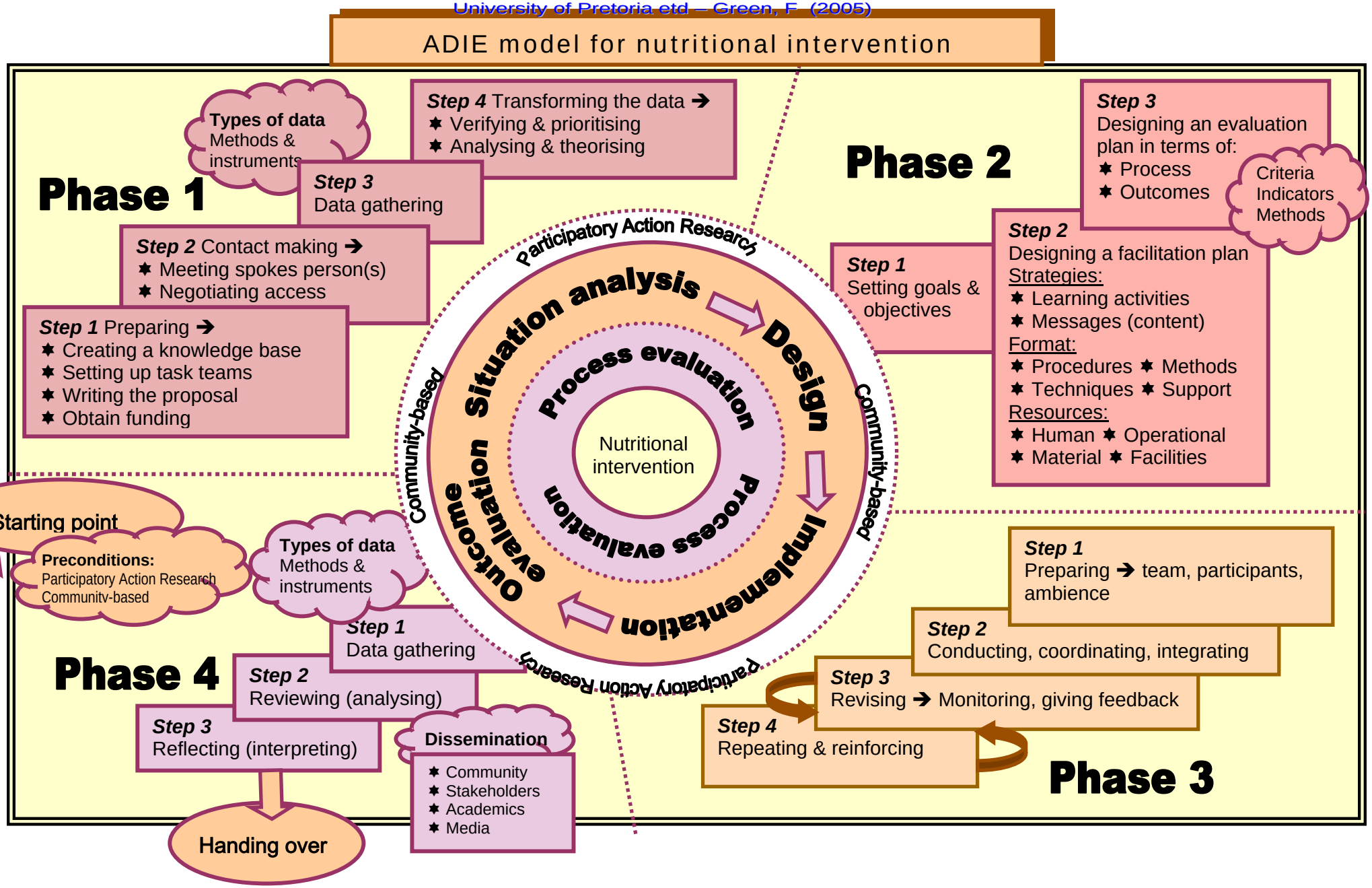

FIGURE 10.8: FINAL COMPREHENSIVE MODEL FOR NUTRITIONAL INTERVENTIONS

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10.6 DISCUSSION

My thinking has expanded during the development of this *model*, eventually resulting in the proposed ADIE *model* as presented in Figure 10.8. The *model* was drawn from previously applied models and was grounded in research. It was further enriched with comments from a panel of external evaluators as well as specifically selected literature sources. In my thinking, this *model* can be considered comprehensive and ready for pragmatic testing in other commercial farms in South Africa. It can even be considered a methodological framework for a large-scale national project to improve the nutritional situations of farm workers and their families living on commercial farms. Testing within other settings (schools, work sites) and contexts (individual behaviour change) can also be considered.

This *model* is comprehensive and logical and can therefore be considered as a teaching tool for researchers and scholars. It is a practical, methodological framework that can be used as guideline for similar projects in future times. It addresses the entire continuum of processes involved in developing valid and reliable interventions for rural communities. It also provides a basis for managerial functions in order for better, more successful programmes to be developed.

Principles of evaluative research have been incorporated from the starting point to measure the success of the process as well as the outcomes of the intervention. A specific phase focusing on design has been included to emphasise the importance of proper planning based on the outcomes of the analysis-phase. The *model* also shows how and where research and action can be successfully combined with the participation of community members. Community-based interventions are not an iterative process to be continued by researchers, but a process that need to be handed over to the community for them to continue. This *model* clearly shows this point. This *model* should be chosen only if it fits in with the values, preferences and belief systems of the research team, as well as the approaches integrated into the research design of the study. Other criteria to consider are:

- Using PAR as research paradigm
- Assisting local people in their own problem-solving activities
- Rearranging the *model* to suit the demands of the particular community
- Addressing a number of components simultaneously.

As in the words of Blaise Pascal (1623-1662): *"Let it not be said that I have said nothing new... the arrangement of the subject is new"* (School of mathematics and statistics, 2003).