Public Health (2005) **119**, 312–320

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PUBLIC HEALTH

JOURNAL OF THE ROYAL INSTITUTE OF PUBLIC HEALTH

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A community-based integrated nutrition research programme to alleviate poverty: baseline survey☆

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Received 24 June 2004; received in revised form 27 June 2004; accepted 16 August 2004
Available online 6 January 2005

KEYWORDS
Informal settlements;
Sociodemographic;
Malnutrition;
Poverty;
Household food security;
Participatory planning;
Integrated nutrition research project

Summary *Background*. The United Nation's Children Fund (UNICEF) has indicated that urban poverty is primarily found in squatter settlements. At present, 13.5% of all South African households live in informal settlements. The main hypothesis for this empirical study was that micromechanisms would not negatively influence food, nutrition and health of residents in an informal settlement in the Vaal Triangle, South Africa. This hypothesis was tested empirically against the UNICEF framework of the immediate, underlying and basic causes of malnutrition. The purpose of this study was to establish a situation analysis of children and women before designing any intervention.

Objectives. The objectives covered in this paper include Phases I and II of the project, namely planning of the project and determining the demographic and health profile of the sample as part of a situation analysis.

Study design. This is a community participatory project. After a strategic participatory planning workshop with stakeholders, a plan of operation document, guiding all field undertakings, was drawn up (Phase 1), followed by a cross-sectional baseline survey (Phase II), situation analysis (Phase III), and implementation of community-based intervention studies (Phase IV). Impact measurement will follow in Phase V.

Methods. After the planning meeting and obtaining consent, a pretested, structured demographic and health questionnaire was used to obtain data from 357 randomly selected households in an informal settlement. Data were statistically analysed for means and standard deviations.

Results. The findings of the workshop evaluation indicated that 100% of the participants ($n=34$) agreed that a need existed for this project, 74% ($n=24$) understood the relevance, and 64% ($n=22$) realized the importance for sustainable community development. In the baseline survey, 89% of the respondents lived in zinc shacks with two rooms or less (32.2%), three or four rooms (41.5%) or four rooms or more (26.3%). The household size was six people or more (33%), five people (18.5%), four people (21.3%) and three people or less (27.2%). The unemployment rate was 94.2% for respondents and 80.1% for their partners. The majority of households

☆ This material was previously presented at the Poverty, Food and Health in Welfare conference in Lisbon, Portugal in July 2003.

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(42.6%) had a monthly income of <R500 (US$71). The major health problems observed were chronic coughing (42%) and headaches (50.4%). Death of a child under 5 years of age was reported by 27.7% of respondents, of which 34.8% were stillborn, over the previous 5 years.

Conclusions. These findings confirmed that poverty and household food insecurity were major problems. As such, these results form the basis for planning and implementing sustainable community-based intervention projects to promote public health nutrition in the Vaal Triangle, South Africa. It is, however, important to ensure community participation during all phases of the project to ensure sustainability.
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Introduction

Globally, little research has been done on urban poverty, food insecurity and malnutrition. Project formulation and management is an important aspect in the fight against poverty, diseases and ignorance.[1] The United Nation's Children Fund (UNICEF) has indicated that urban poverty is primarily found in squatter settlements and slums.[2] Empirical data for this claim are, however, limited. At present, 66% (28 million people) of the South African population is urbanized, and the majority have been forced into informal settlements due to the low priority attributed to permanent housing for Africans. About 13.5% of all South African households are forced to live in informal housing. In South Africa, urbanization was identified as a central consideration in assessing environmental factors affecting health, as the policy of apartheid and the poverty it generated amongst blacks are the primary causes of urban and rural health problems in South Africa. Apart from the discriminatory legislation, other factors that contribute to squatting include structural violence, low wages and unemployment. The inhabitants of the informal settlements live in structures that offer only partial shelter against the elements.[3-6]

Although dramatic progress has been made in recent years in some areas of nutrition, 790 million people in the developing world and 34 million in developed countries are still undernourished and do not have enough to eat. Reducing hunger and malnutrition will remain a challenge as the International Model for Policy Analysis of Commodities and Trade (IMPACT) projects that malnutrition will persist in 2020 and beyond.[7-9] New information confirms an improved global nutrition situation, but the nutritional status is concurrently deteriorating in several countries, especially in Africa. Hunger and low intake of the major micronutrients remains widespread despite rapidly declining world food prices over the past 20 years.[8]

Furthermore, the rural population of the developing countries is projected to increase from 2.92 billion to 3.09 billion over the next 25 years, whilst the urban population is expected to double to 3.73 billion. This will result in corresponding shifts in poverty and undernutrition from the rural to urban areas.[1] As all efforts towards alleviating food insecurity in developing countries are being re-invigorated after the 1996 World Food Summit, the availability of accurate measures of food insecurity has become more imperative than ever.[10]

The major types of undernutrition that constitute problems of public health significance in South Africa are protein energy malnutrition, iron-deficient anaemia and vitamin A deficiency.

Ruel et al. suggested that research should be conducted to investigate the micromechanisms influencing food and nutrition in urban communities.[11] Issues that need to be addressed include: food sources and costs; income; urban agriculture; urban diets; health; childhood mortality, morbidity and malnutrition; child care; and food insecurity.[11] Studies have shown that the control of resources and intrahousehold relationships determine whether households are food secure.[12] Adelakan indicated that one of the solutions for malnutrition is capacity building in the areas of nutrition assessment, analysis, programme planning, implementation and evaluation.[13]

In South Africa, there is a paucity of data on the patterns and determinants of food insecurity, malnutrition and poor health in disadvantaged urban areas, especially in informal settlements. The growing peri-urban component of established towns and cities makes investigation into health in informal settlements a vital issue.[14] Therefore, a better understanding of such issues would supposedly provide information to programme administrators, researchers and policy makers to formulate appropriate responses to food insecurity, malnutrition and poor health in disadvantaged areas.[11]

In view of these facts, the Vaal Triangle Integrated Nutrition Research Project (VTNRP) was principally designed to act as a catalyst in identifying and analysing questions regarding economic growth, sources of livelihood, public health, and food and nutrition in informal settlements in South Africa, specifically in the Vaal Triangle.

Objectives of the project

The purpose of the VTNRP focuses on how to plan a community-based integrated nutrition research project as a strategy to alleviate poverty, with the following objectives:

- to determine the prevalence, magnitude and underlying causes of malnutrition;
- to evaluate the baseline survey results;
- to design, develop and undertake strategic community-based interventions;
- to evaluate the outcomes and impact; and
- to report the findings to the study community and the scientific community.

The scope of the project will focus on malnutrition and household food insecurity amongst informal settlement dwellers in the Vaal Triangle, South Africa. The Vaal Triangle is an industrial area situated approximately 70 km south of Johannesburg with a population of approximately 1.5 million, of which 51.3% are unemployed and 46.1% of households live in poverty.[15] The major research question is to what extent do micromechanisms influence food, nutrition and health of the informal settlement dwellers in the Vaal Triangle. This overall hypothesis will be tested empirically against the UNICEF framework of the immediate, underlying and basic causes of malnutrition.[16] The project beneficiaries will thus be the informal settlement dwellers, researchers, academics, policy makers, programme planners and the general public. The focus of this article is two-fold, namely reporting on the planning of the project and determining the demographic profile and health status of the informal settlement dwellers in a settlement, consisting of 1260 households, in the Vaal Triangle.

Worldwide, 33.6 million people are infected with human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS), and 23.3 million of these cases live in sub-Saharan Africa (SSA). Nutritionists must ensure that people with HIV/AIDS and their families have access to sufficient food to enhance their health status and to allow them to cope with the effects of prolonged medication.[17] For the purpose of this research project, AIDS will not be investigated as the researchers do not have the necessary skills to deal with the AIDS crisis. It is, however, necessary to take cognisance of the numerous effects that HIV may have on the nutritional status of a person or community, as the results of any project may be affected by this.

Outline of the procedures and methods

Planning the project

This is an integrated nutrition research project whereby a number of variables will be investigated. Before launching the project, a multimethodological research process was followed to facilitate planning.

The first step in the planning of the VTNRP was a literature survey of all the nutrition research undertaken in informal settlements in South Africa. Of the 53 articles sourced, only five focused on health care and nutrition, whereas the majority focused on housing and water supply. The local Department of Health was also contacted to determine the prevalence of malnutrition in the Vaal Triangle area. No definite data could be traced as the Vaal Triangle forms part of Gauteng province when national nutrition research projects are undertaken by the Department of Health. The informal settlement dwellers in the Vaal Triangle area were thus identified as a target population where nutrition research is urgently needed, as no previous nutrition research conducted could be cited.

The second step included a planning meeting, involving all stakeholders (community leaders, local and district government officials, delegates from the Departments of Health and Education), with the following objectives:

- to mobilize and get the study community into process;
- to gather and share experience from the study locations;
- to receive reports from the representatives from local government regarding ongoing interventions, problems and successes, and future strategies;
- plenary presentation of basic concepts of public health nutrition;
- to introduce and plan a community-based integrated nutrition project for informal settlement dwellers in the Vaal Triangle; and
- to determine strategies for the baseline survey.

This was a participatory workshop, and all participants were actively involved. A number of

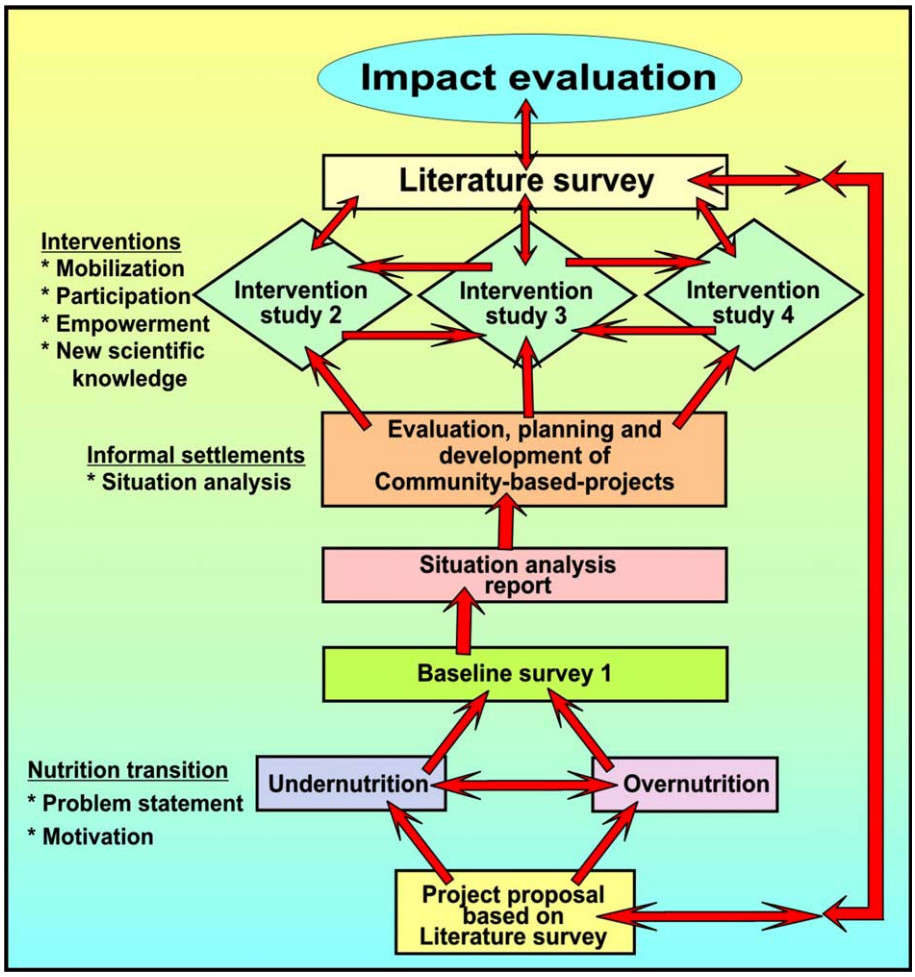

Figure 1 Conceptual framework of the Vaal Triangle Integrated Nutrition Research Project.

participatory methods were applied throughout the workshop. The facilitating methods included lectures, brainstorming, discussion, simulations and group work, as well as case studies and plenary presentations.

During the third step, the VTNRP proposal and the conceptual framework for the project (Fig. 1) were developed in close consultation with experienced international community nutrition researchers to meet international standard criteria for project evaluation. A project plan of operation (PPO) document to guide all field undertakings was also drawn up. The PPO includes guidelines on the identified target areas, needs to be analysed, and methods to be employed. This project is classified as technical and scientific with the potential to result in developmental impact of the target population.

Ethical considerations

The ethics committee of the Vaal University of Technology approved the study. The protocol was submitted in accordance with the existing policy for research in the institution.

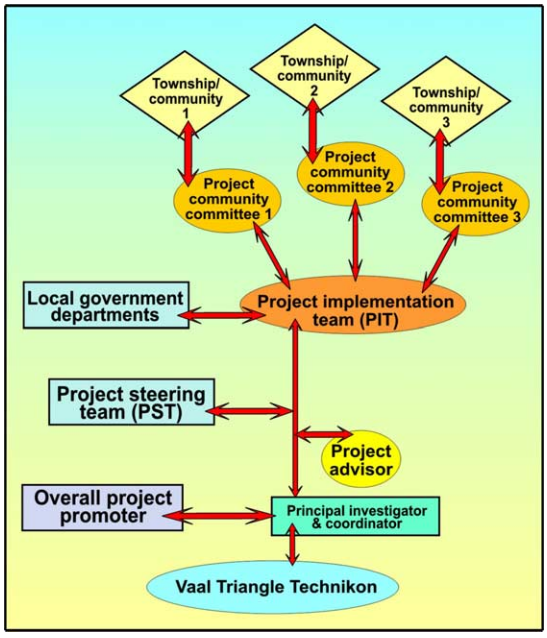

Figure 2 Theoretical model of the Vaal Triangle Nutrition Research Project administration.

Project management and control

Project supervision and co-ordination

For easy communication and logistical operation of the project, the head office of the project was based at the Vaal University of Technology. A theoretical model of the project administration was designed (Fig. 2). The principal investigator (i.e. the overall administrator and co-ordinator of the project) worked closely with the overall project promoter whose responsibility was to ensure that all necessary participatory processes were adhered to.

All administrative tasks and correspondence were executed through the project co-ordinator's office. The project supervision team, consisting of the study promoters of postgraduate students and chaired by the principal investigator, guided the research assistants to meet the standards required for their qualifications.

Project steering committee

A project steering committee, consisting of stakeholders from the relevant sectors of the district council, study promoters and the project advisor, will be formed (Fig. 2) to plan and co-ordinate the intervention studies to address the needs to be identified in the situation analysis. This will be done during Phase III.

Project implementation team

A project implementation team, consisting of research assistants and representatives from the study community, will run the operational research activities of the project in close consultation with the project co-ordinator and study promoters (Fig. 2).

Project community committees

Three project community committees, consisting of six community representatives from the study community, will run daily activities of the project after implementing the intervention studies (Fig. 2).

Monitoring and evaluation

The project advisor will work closely with the project co-ordinator concerning project review meetings, and preparation of progress and annual reports. Regarding monitoring tools, additional appropriate tools for project monitoring and ongoing evaluation will be designed to compliment the project activities.

Sampling for the baseline survey

At the planning meeting held with all the stakeholders, one informal settlement was identified as the pilot study for the larger project, based on the size of the settlement (1260 houses) and its geographical positioning. A location mapping was performed to identify all households by streets and household numbers.

Baseline measurements

Before the baseline survey, introductory visits were made to the informal settlement for observation purposes. The researchers were accompanied by the municipal councillors who provided information regarding the number of houses in the area (1260) and street maps. Households were visited to observe general living conditions, environment, types of housing, roads and services, namely water, electricity, waste management and clinic availability.

After the exploratory visits, a public meeting was held with the whole community to obtain consent for the project to be undertaken. For practical and logistical reasons, 357 households were selected at random for the baseline survey. A total of 315 questionnaires had to be completed by the caregivers of the household for a 25% representation of the informal settlement population. Extra households were selected to make provision for possible dropout during the project.

Sociodemographic and health questionnaires were compiled in English and tested for reliability. Eight data enumerators were recruited as field workers. A training manual was developed, and an intensive training workshop was conducted for training of all data enumerators to ensure a high standard of research. Various participatory facilitating methods were used in the training including case studies, role plays, brainstorming, communication skills, and application of the Triple A cycle.

The variables investigated in the baseline survey included the following:

- demographic data such as age and gender of subjects in the household, home language, education, food processing and preparation, and caring practices in the household;
- physical and infrastructure data such as the residence setting, number of household

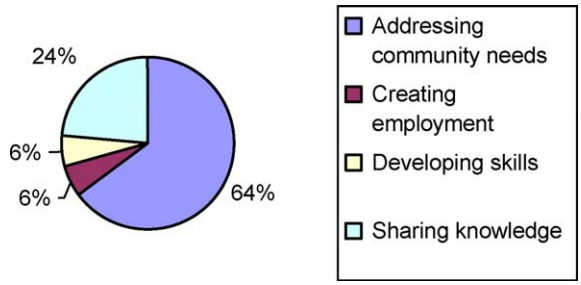

Figure 3 Relevance of the project (planning meeting).

members, number of rooms, number of rooms used for sleeping, water storage, fuel usage, household pests, and perceptions related to environmental sanitation services; and
- socio-economic data such as health, food, food procurement behaviour, employment status, household assets and environmental sanitation.

Data analyses

All field data were captured onto an Excel® spreadsheet by a well-trained and committed data capturer. A qualified statistician was consulted for analysis and interpretation of the data output. Data analysis of the questionnaires was performed using the Statistical Package for Social Sciences for Windows (version 10.1) program. Descriptive statistics (frequencies, means, standard deviations and confidence intervals) were determined.

Results

Outcomes of the strategic participatory planning workshop

The results of the first strategic participatory planning workshop with key stakeholders indicated that 100% ($n=34$) of the participants agreed that a need existed for this project.

Seventy-four percent ($n=25$) understood the relevance of the planning workshop, and 64% ($n=22$) realized the importance for sustainable community development (Fig. 3).

Thirty-nine percent of the key stakeholders thought that the impact of the project would be on community involvement, 22% on both research and networking, and 13% on education (Fig. 4).

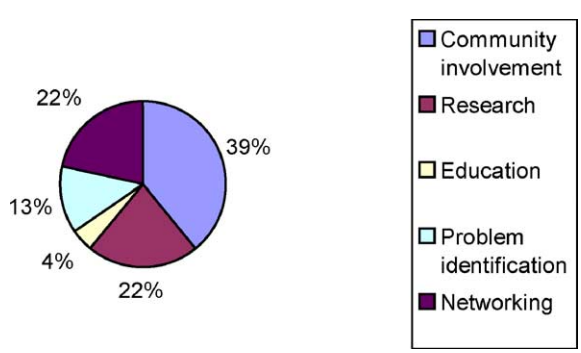

Figure 4 Impact of the project (planning meeting).

Results of the baseline survey

Characteristics of the respondents

The results indicated that the majority of respondents were the mothers (76.4%) of the household, Sotho speaking (67.8%), and had a low level of education (only 28.2% attended high school or college).

Living conditions. The results further showed that 89.9% of the respondents lived in zinc shacks with two rooms or less (32.2%), three or four rooms (41.5%) or four rooms or more (26.3%). The households consisted of six people or more (33%), five people (18.5%), four people (21.3%) and three people or less (27.2%). The majority of respondents resided in the informal settlement permanently (88.5%) and had been residing there for more than 5 years (88.8%).

Socio-economic status. The results showed that 94.2% of respondents were unemployed and 59.1% had been unemployed for more than 3 years. Fifty-eight percent of households had a monthly income of less than R1000 (US$143). All of the households had access to clean, safe water, electricity and toilet facilities.

Procurement patterns. Monthly food shopping was done by the majority of households (61.6%), mainly at the spaza/tuck shops in the area (55.5%). The majority of households (38.1%) had a weekly food expenditure of less than R50 (US$7).

In most households, the mother was responsible for total household expenditure (68.3%), food procurement decisions (83.8%), food preparation (81.8%) and feeding the children (79.6%).

Health status. The major health problems experienced by the caregivers were chronic coughing (42%) and headaches (50.4%). Death of a child under 5 years of age was reported by 27.7% of respondents, of which 34.8% were stillborn, over the previous 5 years.

In total, 71.8% of the respondents never smoked and 72.7% did not drink alcohol.

The majority of households used the mobile clinic (74.9%) that visited the informal settlement on 3 days each week. Most respondents visited the health facilities on foot (79.7%).

Discussion

This study was conducted to determine the feasibility of a community-based project and to determine the demographic and health profile of the residents of an identified informal settlement in the Vaal Triangle, as part of a situation analysis for planning suitable and sustainable interventions to address the needs of the community in alleviating poverty.

As indicated earlier, a participatory approach was followed during Phases I and II of this project. This approach is increasingly receiving attention in the field of public health as it supports the core principles of public health as a science dedicated to improving the health and wellbeing of communities in the fight against poverty.[18] This approach enhanced the design, conduct and conclusions of the study as all the stakeholders were involved in all the steps followed for project planning and data collection, resulting in collective ownership and co-operation throughout the project.

The baseline survey results showed that poverty was prevalent in this community. This was proved by the fact that 89.9% of respondents lived in a non-permanent zinc shack and had been living like this for more than 5 years (88.8%). Although the average household size was 4.9 people, the houses were small and only 26.3% of the households had four or more rooms. Problems such as rodent infestation (53.2%), dampness (30.8%), cold (9.8%) and rust (6.7%) were experienced on a permanent basis.

Furthermore, the socio-economic status of these people was also poor and indicated towards poverty. This was demonstrated by the fact that only 5.8% of the residents and 19.9% of their spouses were employed. The majority of respondents indicated that they had been without a job for more than 3 years (59.1%), yet only 10.1% of respondents were of retirement age (60 years and older). The majority of households (58.3%) had a monthly income of less than R1000 (US$143), which also indicated that they lived in poverty.

Household food insecurity was another problem identified in this community. Most respondents (61.6%) indicated that they procured food once a month, mainly from the local spaza/tuck shop in the area (55.5%). Due to the fact that 58.3% of households spent less than R100 (US$14) on food per week for an average household size of 4.9 people, this implied that each household could only spend R2.90 (US$0.41) per person per day on food. This is equivalent to two-thirds of a loaf of bread or half a litre of milk. In most instances, the mother was responsible for the food procurement decisions (83.8%), food preparation (81.8%) and feeding of the children (79.6%). It may thus be concluded that with this limited amount of money available for food purchases, malnutrition may be present in this sample.

The health status of the respondents was also compromised. Although cigarette (15.2%) and alcohol (27.3%) consumption was not very high amongst the respondents, environmentally, this area suffered the highest pollution in the country due to steel and fuel factories in the area. The waste removal service was almost non-existent and very dusty as most of the respondents only had gravel roads (88.2%). Although all the respondents had access to clean, safe water and toilet facilities, electricity was expensive and most respondents could not afford it. Most food was prepared on coal stoves, which are also expensive.

Although most households used the mobile clinic (74.9%) for preventative and curative medical care, this facility was only available for 3 days each week. The nearest hospital was 5 km from the informal settlement, and the majority of respondents walked to the health facilities (79.7%) due to a lack of money to pay for public transport. The most prevalent diseases in this area were chronic coughing (42%) and headaches (50.4%). Antenatal care was a problem as 27.7% of all households had experienced the death of a child under 5 years of age over the past 5 years. Of these, 34.8% were stillborn which indicates poor maternal health.

These results confirm the corresponding shifts in poverty and undernutrition from rural to urban areas as described by Haddad et al.[1] In South Africa, undernutrition continues to be the main problem that children face. This form of malnutrition is caused by poor food intake and increased infections in young children. The underlying causes are household food insecurity, inadequate care for vulnerable groups such as mothers and children, and insufficient essential human services including health, education, water, environmental sanitation and housing.[2,18]

Conclusions and recommendations

These findings confirmed that poverty and household food insecurity were the major problems in this community. Malnutrition may also be a problem. Therefore, these results formed the basis for planning and implementing sustainable community-based intervention projects. The focus of all intervention studies should be to reduce urban poverty, malnutrition and household food insecurity, but it is impossible to undertake all the proposed strategies at once. A participatory approach must be followed when strategies are prioritized and phased in to ensure meeting the community priorities and needs, as well as for

sustainability. Community approval and participation must be ensured for all the proposed activities.

The strategies that will form part of the intervention studies are as follows:

- Increased agricultural productivity through improved farming methods, land development and supporting enterprise development. This will address the underlying causes of household food insecurity;
- Dietary diversification by means of novel product development to address specific nutritional needs. This will address malnutrition as a result of household food insecurity; and
- Nutrition education as an umbrella for the abovementioned strategies.

Simultaneous training programmes, aiming to provide skills, should be implemented to support the effectiveness and sustainability of the community-based interventions. As the mother performs most of the important functions in the household and a great majority of these women are unemployed (94.2%), the focus for knowledge and skills training programmes should aim to uplift their livelihood and improve the community infrastructure. Creation of awareness of good health and hygiene practices will improve the wellness of the local community. Women can benefit from the knowledge of health practices in an underprivileged area and can, in turn, improve the quality of life in their community by means of enhancement of early childcare and education opportunities.

Furthermore, public health control measures, including immunization, control of infections, education and the support for practice of personal hygiene and sanitation, need to be promoted in collaboration with the local health authorities. This is a huge undertaking and researchers must take caution when planning and preparing the project protocols.

It is thus important that the development principles of sustainability, equity, productivity and replicability form the underlying basis of all projects. Furthermore, the following recommendations are made:

- It is essential that all key role players, especially the community, are involved in project planning and implementation;
- The needs of the community must be established before any project or intervention can be planned;
- It is important to stay focused on the community needs and project objectives throughout the project;
- Ongoing feedback and progress reports to the community, as well as other role players, are essential for the success of this project; and
- An integrated approach must be ensured throughout the project.

Acknowledgements

We hereby acknowledge the following for their co-operation in the project to date: the Departments of Education and Health in the Vaal Triangle; Sedibeng local council; Vaal University of Technology and National Research Foundation for funding this project; Michelle Wright for data capturing and data analyses; and Verena Nolan for statistical analyses of the data.

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