



Tanzania

National Health Research Priorities

2006-2010



Tanzania National Health Research Priorities, 2006-2010

Recommended Citation:

NIMR (2006) *Tanzania Health Research Priorities, 2006-2010*. National Institute for Medical Research, Dar es Salaam, Tanzania

Copyright

The National Institute for Medical Research (NIMR) holds the copyright of this document but encourages duplication and dissemination of this information for non-commercial purposes. Proper citation as recommended above is required.

Cover photograph

Research Assistants carrying out larval search as part of malaria study in Mvomero District, Tanzania

Editors

Leonard E.G. Mboera & Emmanuel A. Makundi

Acronyms

A4R	Accountability for Reasonableness
AIDS	Acquired Immuno-deficiency Syndrome
ARV	Anti-Retroviral
COHRED	Council on Health Research for Development
DOTS	Tuberculosis – Directly-Observed Therapy (Short-course)
EMOC	Emergency Obstetric Care
EPI	Expanded Programme of Immunisation
HIV	Human immunodeficiency Virus
HMIS	Health Management Information System
HRUTF	Health Research Users Trust Fund
IEC	Information Education Communication
IMR	Infant Mortality Rate
MDG	Millennium Development Goals
MKUKUTA	Mkakati wa Kukuza Uchumi na Kuondoa Umaskini Tanzania
MMR	Maternal Mortality Ratio
MoHSW	Ministry of Health and Social Welfare
NGO	Non-Government Organization
NIMR	National Institute for Medical Research
NSGRP	National Strategy for Growth and Reduction of Poverty
PMTCT	Prevention of Mother-to-Child Transmission
PPP	Public Private Partnership
STI	Sexually Transmitted Infection
TANHER	Tanzania National Health Research Forum
TB	Tuberculosis
U5MR	Under 5 Mortality Rate
URTI	Upper Respiratory Tract Infection
VCT	Voluntary Counselling and Testing

Foreword

The Government of the United Republic of Tanzania realizes the importance of health research in the provision of information for health planning and decision-making. It is this realization which led to the creation of the National Institute for Medical Research (NIMR) which was given broad mandate to oversee all matters pertaining to health research in the country and provide timely evidence-based information to the Ministry of Health and Social Welfare for decision making and planning.

Priority setting in health and health research is an important activity for better utilization of merger resources, particularly, in resource-poor countries like Tanzania. Since public investment in research is constrained by limited resources, it is very important to identify high priority areas in which to invest those resources. Tanzania has gone a long way in identifying national health research priorities since 1999. A process of documentary review, research, consultation and workshop of technical groups and stakeholders has resulted in the identification of the major health challenges. The outcome of the process led to the identification and development of the current national health research priorities under the guidance of the Tanzania National Health Research Forum.

It is a quite a challenge that the national priorities in health research should change over time. New health problems and new diseases continue to emerge and re-emerge. In recent years we have witnessed emergence of Ebola, HIV/AIDS, Hepatitis C, Severe Acute Respiratory Syndrome, Avian Influenza, Marburg fever and Chikungunya Virus Disease. In addition, the emergence of resistance strains of microorganisms including malaria parasites, Mycobacterium and Staphylococcus species, have been recognized. New methods of disease management and control are coming up. Introduction of antiretroviral (ARV) therapy for AIDS patients bring new challenges that need to be researched upon. Moreover, the needs to change drug and disease management policy require adequate supportive data. These examples, illustrate the changing dynamics of diseases of public significance, which necessitate similar changes in our focus and resource allocation.

Addressing the issues of priority setting is therefore a critical process in health research and given the current position, this document will greatly contribute to our better understanding of our priorities and accelerate our efforts toward achieving our national strategies for health improvement and therefore contributing effectively to the Millennium Development Goals. It is my expectation that this document will be used to guide and inform the development of research portfolios and research investment choices for Tanzania for the next five years.

PROF. DAVID MWAKYUSA, MP
Minister for Health & Social Welfare
October 2006

Acknowledgements

This document on health research priorities has been developed to promote the practice and conduct of health research that contributes towards the improvement of the human health and welfare of the Tanzania population. The document attempts to provide a framework and environment for health research to contribute effectively to health socio-economic development, and for evidence to lead to appropriate practice and policy formulation. It constitutes an important tool, ultimately should contribute to the improvement of health system and inform interventions geared towards a better life for all Tanzanians.

The contributions of various individuals and institutions are hereby highly acknowledged. I would like to thank Mr Josibert Rubona and Dr Elias Kwesi (Ministry of Health Directorate of Policy and Planning), Dr. Ahmed Hingora and Sam Nyaywa (Health Sector Programme Support) for their tireless support. Mr. Angelo Nkwera, Mrs Joyce Ikingura and Dr. Rwehumbiza Rwegoshora (National Institute for Medical Research) are thanked for their invaluable contribution in organizing workshops that culminated into the development of this document. Special mention is made of Mr. Gaspar Mponda, Mrs. Techla Mutemi and Rahelis Msuya (National Institute for Medical Research) for the logistic and secretarial assistance.

We are grateful to Dr. Gabriel Upunda (Chief Medical Officer, Ministry of Health and Social Welfare), Prof. Joseph Shija (Chair, Tanzania Health Research Forum), Prof. Yohana Mashalla (Muhimbili University College of Health Sciences), Prof. Gaspar Munishi (University of Dar es Salaam) and Mr. Paul Smithson for their technical and advisory assistance.

Last, but not least, thanks to all persons and groups that have been committed to seeing that the priority setting exercise is accomplished in time.

The financial support of the Ministry of Health and Danish International Development Agency is highly acknowledged.

Dr. ANDREW Y. KITUA

Director General

National Institute for Medical Research

Introduction to Health Research Priority Setting

Health-care priorities refer to the selection of health services that will be provided first in order to improve health benefits and the distribution of health resources. Health research priorities, on the other hand refer to diseases, condition and risk factors that produce a significant burden of disease but lack an effective intervention for their control (Bobadilla, 1996). Health research priorities also include the investigation of ways of improving the overall effectiveness of health systems. The health priorities of a country and the health research priorities are linked and overlap to some extent. However, they are not one and the same.

Due to transformation of the health care delivery system and disease dynamics and the need to address the pressing health and development challenges in the country, it is imperative that health research priorities be determined for Tanzania in both short and long term. Thus, there is need to revise health research priorities from time to time.

No matter how desirable health research is to society, there is always the problem of scarce resources and competing uses for available resources. In general the scarcity of resources means that not everybody's needs can be met. There is need to decide what should be dealt with first. This need to prioritise and so allocate resources optimally is particularly relevant in developing countries where there are relatively less resources and more basic needs.

In general, planning can be considered a rational response to scarcity and priority setting an integral part of planning. Unfortunately, there is limited literature about the theory of prioritising health research. In the health arena it has been recognised that priority setting is often not given sufficient attention (Green, 1972). Moreover, the important issue is not whether to prioritise, but *how* to prioritise (Mooney *et al.*, 1997). This assertion is made in the context of health care prioritisation and it applied equally well to health research prioritisation. Prioritisation is an expensive process in terms of time and money and is ongoing.

The need to set research priorities can be traced back to the Commission on Health Research for Development (COHRED) which showed the imbalance in health research spending, with only 10% of the investment being directed towards the problems which cause 90% of the burden of disease in poor countries (GFHR, 2002). Various model approaches for setting health research priorities have been advocated by COHRED, World Health Organization and others. All of these approaches share in common the following:

- That research must be *demand-driven*, responding to the needs and priorities of a broad group of stakeholders
- That priority should depend upon the *magnitude* of the problems, but should also embody *values* of social justice and equity. They may also be influenced by the *urgency* of the problems being researched.
- That the research priorities should be ethically, socially and politically *acceptable*
- That it must be *feasible* to undertake the research so selected.
- That new research must complement existing knowledge and avoid *duplication*.

Using this as a basis, the 1999 health research priority setting exercise in Tanzania went on to identify 10 priority areas for disease-focused research, health systems and socio-cultural problems in health. During the time, malaria, poorly trained personnel and food taboos in pregnancy were ranked at the top of the three lists of priority categories.

Research priorities need to be based upon a country's main health problems. Although cost-effectiveness and the burden of disease are necessary, but are not sufficient to identify priorities since people's judgments change when questions of values are introduced. For example, when should we prioritise an intervention that provides a small benefit to many versus one that provides a large benefit to only a few? Thus priority-setting is more than a mechanical process. It must be seen to generate results that people feel are *legitimate* and *fair* and which are *relevant* to practitioners (Daniels & Sabin, 2002). The authors propose four conditions (A4R) for rationing, termed as "accountability for reasonableness":

- **Transparency/Publicity:** Priority setting decisions and their rationale must be publicly accessible as justice cannot abide secrets where people's well-being is concerned. This means, decisions and the rationales for decisions such as coverage for new technologies or the contents of a drug formula must be accessible to clinicians, patients and potential health plan subscribers in a publicly administered system.
- **Relevance:** The ground for such decisions must be ones that fair-minded people can agree are relevant to meeting health care needs fairly under conditions of reasonable resources. That is, the decisions based on *reasons* upon which stakeholders can agree in the *circumstances*. Rationale for priority setting must rest on reasons (evidence and principles) that 'fair-minded' people can agree to be relevant in the context.
- **Revision/Appeals:** There must be mechanisms to challenges and resolve limit-setting decisions and opportunities to revise and improve policies in the light of new evidence or considerations that stakeholders may raise.

- **Regulation/Enforcement:** There must be some form of regulation to ensure that the other conditions are met. These regulations could come through governmental regulation, or be voluntary.

The A4R approach explicitly brings values into the process of setting priorities. Even though these values may sometimes conflict, the approach makes explicit the criteria, reasons and values upon which judgements have been based. The approach speaks directly to the public deliberations that is central to a democracy and seeks to educate the public about the need to set limits to health care.

The A4R framework for priority setting is a different approach to priority setting. It conceives priority setting as value based and decisions as a necessary compromise between fair minded partners. Continued reference to the 4 conditions of relevance, publicity, appeals/revision and enforcement/leadership has in a number of settings been shown to improve organisational performance.

Why setting priorities? In general, in the health arena there is a persistent gap between what should be attainable, given the present level of knowledge, capacity and resources. In the process of setting national health priorities focus is to be made on the fundamental questions of whose voices are heard, whose views prevails and whose health interest is advanced. It is also important that the country identifies priorities based on equity and social justice. Thus, the priority setting process should be an inclusive process and determined in consultation with all key stakeholders. This means, health research priority setting should be based on participation of various groups such as researchers, communities, policy makers, and the users of research findings.

National Institute for Medical Research

The National Institute for Medical Research was established by Act of Parliament No. 23 of 1979: *An Act to Establish the National Institute for Medical Research and to provide for the function and powers of the Institute in relation to the promotion of medical research*. The Act was officially signed by His Excellency Julius K. Nyerere, the first President of the United Republic of Tanzania on 8th December 1979.

The functions of the Institute are:

- 1) to carry out, and promote the carrying out of, medical research designed to alleviate disease among the people of Tanzania.
- 2) to carry out, and promote the carrying out of research into various aspects of local traditional medical practices for the purpose of facilitating the development and application of herbal medicine;
- 3) in co-operation with the Government or any person or body of persons, to promote, or provide facilities for, the training of local personnel for carrying out scientific research into medical problems;
- 4) to monitor, control and coordinate medical research carried out within Tanzania, or elsewhere on behalf of or for the benefit of the Government of Tanzania, and to evaluate the findings of that research;
- 5) to establish a system for the registration of, and to register, the findings of medical research carried out within Tanzania, and promote the practical application of those findings for the purposes of improving or advancing the health and general welfare of the people of Tanzania;
- 6) to establish and operate system of documentation and dissemination of information on any aspect of the medical research carried out by or on behalf of the Institute:

Moreover, according to the Act, the Institute is mandated to carry out, and promote the carrying out of research and investigation into the causes, and the ways of controlling and preventing the occurrence in Tanzania of particular diseases or a category of them, including (i) bacterial, viral, rickettsial, helminthic or protozoal, infective and parasitic diseases; (ii) non-infective diseases of the mental, nutritional, neoplastic, haematological, degenerative or other categories; and (iii) basic applied and operational research designated to provide effective measures for the control of diseases endemic in Tanzania.

The Act directs every person engaged or intending to engage, in medical research within Tanzania shall, at his own expense furnish to the Institute information

relating to that research and shall make available to the Institute copies of any relevant records or findings in such form and within such periods as may be prescribed.

Whereas the mission of NIMR is to conduct high quality and diversified research focusing on the priority health problems of Tanzania and Africa and spearhead African research agenda at the global level, its vision is to be the institution of excellence in the conduct of health research and provision of evidence based information to the Ministry of Health and other stakeholders for planning and implementation of effective health interventions for the provision of better and equitable health services to the Tanzanian populations.

Research focus

Since inception in 1979, NIMR has evolved from a disease specific approach research to the current wider mandate that includes all health research at the local, zonal, national and regional levels. NIMR's mandate at the local level includes working in close collaboration with the district Council Health Management Teams and health facilities to address local priority problems. At the national level, NIMR Centre's major responsibilities include supporting the Ministry of Health and Social Welfare, in disease control activities and building zonal and district capacities for health research and service delivery.

Based on our future plan, the Institute will continue and initiate new activities in order to successfully meet its objectives. Thus the Institute will continue with research activities on its traditional disease areas, but will also strengthen its capacity in basic research, clinical research, zoonotic diseases, non-communicable diseases, laboratory quality assurance, as well as establishing national and zonal health information centres for major communicable diseases.

The established mechanism for research coordination at the national level in the name of Tanzania National Health Research Forum, and the support of the Ministry of Health and Social Welfare through the established Health Research User's Trust Fund has, over the years, spearheading health research priority setting.

Tanzania National Health Research Forum

The Tanzania National Health Research Forum (TANHER forum) established in February 1999, is a mechanism composed of partner institutions in health research and their representatives. It is an inclusive body, which ensures that each partner has a clearly defined role, is considered an asset and share the ownership of the mechanism. Its functions are based on the Essential National Health Research (ENHR) strategy which ensures that evidence-based information is utilized correctly in the policy and decision making process, enhancing the provision of better and equitable health. The Forum is a consultative and advisory body to policy and decision making as regards to health research coordination, undertaking, collaboration, dissemination of health research results and enhancing the utilization of research results for policy and decision making. It is a non-political, non-religious, voluntary body dealing only with issues of health research and development in Tanzania.

The vision of the Forum is to be an effective mechanism relevant to the generation and utilization of evidence based health information. Its mission is to provide consultative and advisory services to researchers and policy and decision makers so as to enhance health research undertaking, collaboration, dissemination and utilization of research findings. The current members of the TANHER Forum include:

- National Institute for Medical Research
- Bugando University College of Health Sciences
- Tanzania Commission for Science and Technology
- Muhimbili University College of Health Sciences
- Tanzania Food and Nutrition Centre
- Hubert Kairuki Memorial University
- Tropical Pesticide Research Institute
- Christian Social Services Commission
- Sokoine University of Agriculture
- Bugando Medical Centre
- Kilimanjaro Christian Medical College
- Muslim Council of Tanzania
- Ministry of Education and Vocational Training
- Ministry of Community Development, Gender and Children
- Human Rights Centre
- Mbeya Referral Hospital
- The Media

During the first priority setting exercise of 1999, the Forum played a great role in coordinating the identification of research priorities. The forum was established upon realizing the lack of a strong mechanism for coordination of health research resulting into duplication of efforts and little sharing of knowledge and skills in Tanzania (Kitua *et al.* 2000). The conduct of research within environments with very different goals was seen as problem for a number of developing countries. Tanzania realized this problem and moved forward to address it by establishing the Forum.

Currently, Tanzania has four academic and eighth dedicated research institutions which undertake basic and clinical research (Kitua *et al.*, 2000). These institutions were created independently and until recently had their own mandates and competed with each other for donor money and other opportunities. However, it was possible to bring them under the Tanzania National Health Research Forum. The forum has so far managed to forge unity among its members by providing a means by which they can work together to set the national health research agenda, both in 1999 and 2005.

Health Research Users' Trust Fund

The Health Research Users' Trust Fund (HRUTF) was established at the time of Tanzania National Health Research Forum inauguration. A total of \$200,000 was mobilized and HRUTF was formed with initial support from the Swiss Development Cooperation (SDC). This was sufficient to fund around 10 small research projects per year, with an emphasis on capacity building. However, SDC support ceased after 2003, leaving only the Ministry of Health and Social Welfare fund HRUTF to the tune of about TShs. 50 million per year. The inadequacy of funding for research has been the principal constraint in translating the 1999 priorities into research implementation.

HRUTF has been supporting scientists with modest amount of money to develop research proposals originating from experienced problems in the country. The fund has been advertising themes in local newspapers in order to solicit demand-driven research proposals from local scientists and communities. Health research proposals that qualified for funding had been selected on the basis of their scientific merit; impact of results to the community, feasibility, ethics adherence and cost implications. Several district council health management teams (CHMTs) and health research institutions (including Muhimbili University College of Health Sciences, Open University of Tanzania, Ifakara Health Research and Development Centre and National Institute for Medical Research) have benefited from this fund.

Previous Experiences in Priority Setting in Tanzania

The inception of the ENHR concept in Tanzania took place in 1991, following the formation of the Commission of Health Research and Development (COHRED) and the launch of the Global ENHR initiative. The idea of focusing on essential health research for a country with meagre resources like Tanzania was extremely appealing and it was thus agreed by stakeholders that the initiative should be supported and implemented to the fullest. Among the earlier activities of the Tanzania ENHR was the formation of a steering committee and NIMR being chosen as the secretariat due to its mandate as regards health research in Tanzania. Following this formation, the first priority setting workshop was held in 1992 to outline the country's main health research priorities. One of the deficiencies of the Tanzania ENHR forum as observed by the workshop, however was that the participation was not broad based focusing mainly on health research institutions and allied health academic institutions. There was little or no involvement of the community or the private sector. Furthermore, there was no systematic follow-up on the workshops recommendations to ensure their implementation. Consequently the then proposed research priorities were never approved and endorsed as national priorities. The tradition of each institution developing its own priorities continued.

Nevertheless, NIMR managed to establish the Health Research Users Trust Fund, a fund allocated to conduct priority research as defined by users. The users in this case being the Ministry of Health and Health Providers at Regional and District levels. The fund was inaugurated with seed money from the Ministry of Health and the Swiss Development Cooperation.

The second workshop was held in 1999 and brought together 40 members from government institutions, research institutions, academia, faith based and non-governmental organizations, media and traditional healers. Data for priority setting was obtained from 45 of the 113 districts of Tanzania. The data was collected using self-administered questionnaires. The questionnaires were sent out to all the District Medical Officers and although only 40% returned the completed questionnaires, they were considered to be adequate representation of the Tanzanian situation.

Once the criteria were developed, the workshop was divided into three working groups of about 15 people. The groups worked separately using the district-derived data to define the priority health problems in terms of diseases, health systems and social cultural aspects. Once each group had completed the work,

consensus on the priorities was obtained through plenary presentations, discussions and finally combining the ranks.

The exercise was followed by defining health research priorities under each identified priority problem. Again this was done freely through group work followed by consensus obtained through plenary discussions and rank combination to arrive at a single priority list. The identified priority health research problems in 1999 are summarised in Table 1.

Table 1: Health Research Priorities 1999 (Kitua *et al.*, 2000)

Disease /Condition	Health Systems	Social Cultural Issues
1. Malaria	1.Lack of trained staff personnel	1.Food taboos in pregnancy
2. Upper respiratory tract infections	2. Lack of equipment and drugs	2.Poor latrine use
3.Diarrhoeal diseases	3. Lack of transport	3.Poor economic status due to alcoholism and laziness
4. Pneumonia	4. Underfunding.	4.Polygamy
5. Intestinal worms	5. Ignorance and low health education	5.Ignorance and high illiteracy
6.Eye infections	6.Impassable roads	6. Sex inequality
7. Skin infections	7. Lack of rehabilitation of facilities and buildings	7.Witchcraft
8. Sexually transmitted diseases	8. Lack of water supply	8. Inheritance of widows
9. Anaemia	9. Poor environmental sanitation	9. Low acceptance of family planning and high fertility
10. Trauma/Injuries	10. Inadequate health facilities	10. Use of local herbs

The workshop recognized that research priority setting is a dynamic process requiring periodic updates. It was emphasised that representativeness of data is important and all efforts should be made to ensure that the data is spatially representative. It was felt that additional data particularly from the community is important in enhancing the priorities during subsequent revisions. It was also felt that the HMIS is the central source of routine data and would be useful in ascertaining disease burden, in various areas and should be used in subsequent priority setting exercises.

The Priority Setting Process

Before engaging in a national priority setting process, it is important to consider the environment within which it should take place. Key questions include: who is involved in research for health in the country? How do policy makers perceive research? What is the capacity available to do, use and fund research? (COHRED, 2006). Involvement of multiple stakeholders in priority setting is of fundamental importance both for the credibility of the process and to give the best possible chance for implementation of priorities.

In as much as possible, the process involved the community through a number of studies (Makundi et al., 200), scientists and disease programme managers and policy-makers. However, bringing together these diverse groups has several challenges. These include: how to involve members of the community – who may not have the “right” expertise in the eyes of the health research and policy community – in a way that creates a meaningful exchange with research and political players; how to best involve the private sector or donors – and ensure a contribution or realignment of their agendas to national priorities; how to best link the technical and political sides of the debate; how to bring together multiple sectors, such as health, science and technology, agriculture and ensure a holistic approach to health and health research.

The methods for setting priorities are categorised into rational and incremental. The rational method for setting priorities involves collecting all available information on what is needed and what is possible (Ronayne, 1984), identifying objectives and collecting data on what value is placed on these objectives by various groups. The incremental approach takes into consideration politics and ideology. According to Foltz (1996), the rationalist approach is particularly well represented in the health sector and is employed to set priorities.

Since the mid 1990s, a number of methods for measuring the magnitude of health problems and their distribution in a country have emerged. In parallel with this, several models for defining research priorities have been suggested and applied. Common features of most of these tools and methods are estimations of health problems, identification of gaps in the knowledge about ways to eliminate them and of research needed to control them. The focus is on past and current health problems. Common criteria for the choice of priorities include the possibility to address the problem through research, the feasibility and cost of the research and the potential outcome, impact and cost-effectiveness of interventions resulting from the research.

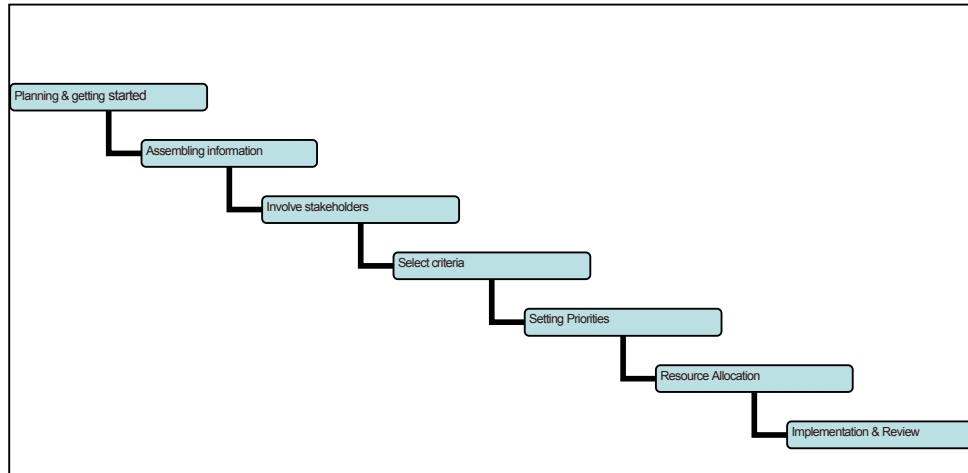


Figure 1: Seven Steps in Selecting Health Research Priorities (Adapted from COHRED Tool Kit)

Priority setting exercise in Tanzania followed the seven steps in the prioritisation process adapted from COHRED (Figure 1). The methods employed in the setting health research priorities in Tanzania ranged from extensive literature review to employing Health Management Information System (HMIS) that provided data on the burden of disease in the country.

Several studies have explored on community health priorities in Tanzania (Makundi *et al.*, 2004a,b; Mboera *et al.*, 2004, 2005). However, most of them have identified diseases as the most important health problems as perceived by respective community. In a study in Moshi and Temeke districts, malaria, diarrhoea, accidents, and intestinal worms were ranked by highest among the major public health problems (Makundi *et al.*,2004a). In a recent study in Mpwapwa, malaria, diarrhoea, typhoid fever and pneumonia were ranked high among health problems in adults, whereas the most important health problems among children were identified to include malaria, diarrhoea, pneumonia and anaemia (Mboera *et al.*, 2004). Similarly, major disease problems among the communities in Dodoma district included malaria, HIV/AIDS, diarrhoeal diseases and eye infection (Mboera *et al.*, 2005). Interesting, the communities in Dodoma identified several other factors as among the major public problems. These include lack of health facilities, poverty, famine, lack of water supply, poor health services and poor communication (Mboera *et al.*, 2005). Findings from such studies were useful in the health priority setting exercise as they reflected the community opinions on the areas that need further research and solutions.

In addition, various workshops were held at various stages in the process of setting priorities in health research. The outcomes of such workshops are summarised below:

Priority setting symposium during the 20th Annual Joint Scientific Conference Arusha, March 1-4, 2005

The symposium was organised under the auspices of Tanzania National Health Research Forum involving 72 stakeholders from Tanzania and key collaborating partners from abroad. During the symposium, four papers were presented including:

- *A Review of National Research Institutions in Tanzania* - by Dr. Rose Kingamkono (Tanzania Commission for Science and Technology)
- *Priority Setting for Health Research: A Review of Current Priorities-* by Dr. Mwele Malecela (National Institute for Medical Research)
- *Community Involvement: Articulating Community Voice in Priority Setting Process-* by Mr. Emmanuel Makundi (NIMR).
- *Determining gaps in health research priorities in Tanzania* by Dr. Leonard Mboera (NIMR)

During the discussions, participants recommended a need to form a Task Force to synthesize what has been done in priority setting activities in Tanzania from 1999 - 2005 and submit the findings to National Stakeholders. It was also during the meeting a theme for 21st Annual Joint Scientific Conference to be held in 2006 was proposed to focus on health research priority setting.

Priority Setting Workshop, Bagamoyo, April 13 –14, 2005

The purpose of this workshop was to exchange experience of priority setting issues focusing on methodological aspects and share findings for a number of research activities undertaken in Tanzania 1998 – 2005. Centre for International Health, University of Bergen in Norway and NIMR jointly organized this meeting. Eight presentations were made, followed by discussion sessions.

The outcome of the Workshop included formation of three working groups specializing in different areas; Ethics in Priority Setting, Economics of Priority Setting and Human Resources.

Priority Setting Planning Workshop, Tanga, August 14-16, 2005

During the workshop there was a joint agreement on how to move forward the priority setting process of health research in Tanzania. Key stakeholders for National Stakeholders meeting on priority setting were identified and contacted. Terms of reference to facilitate National Stakeholders Workshop were jointly developed between NIMR and MoHSW. The joint planning meetings between NIMR and MoHSW were considered necessary in order that MoHSW took over the steering wheel in terms of leadership of the process of setting priorities in Tanzania and ensure that issues of national interest are taken fully on board. In the Tanga workshop, participants were able to identify broad areas and topics, bearing in mind a variety of criteria. The Tanga workshop proposed two major categories of health research areas: Biomedical and Health Systems research.

Priority Setting Stakeholders Workshop, Arusha, October 10-12, 2005

The important contribution to the current national health research priorities were synthesized and agreed during the stakeholders workshop held in Arusha in October 10-12, 2005. This stakeholder's workshop was attended by 58 participants including researchers, academia, policy-makers, and journalists, representatives of non-governmental organizations, international bilateral organizations and development partners.



Members of a Technical Group in group photography at Panori Hotel in Tanga, August 2005

In this workshop, deliberations made at the Tanga Workshop were revisited and discussed at length in relations to experiences from other countries. The following were agreed:

- To use the two principal groupings agreed in Tanga, namely “**biomedical research**” and “**health systems research**”
- To take as a starting point the broad research areas and topics identified in Tanga
- To aim in the first instance to put **broad research areas** into ranked priority. Thereafter, to look at more detailed research topics.
- To undertake the priority ranking exercise in two groups, one for biomedical, and one for health systems.
- To use explicit criteria in the ranking exercise

Participants considered list of potential criteria, which would be used for ranking. These were based upon the IDRC/WHO list, plus some additions. Some of these were dropped because they are more suitable for selecting between specific

research questions, rather than between broad areas of research. Others were dropped because participants felt they were not especially relevant. There was a consensus that the exercise needed to be manageable and that too many criteria would make it too complex. In the end, it was agreed that the following **four criteria** would be used:

- **Magnitude of the problem.** In the case of biomedical research, this would correspond to burden of disease. In the case of health systems research, it would be a subjective judgment based on participants' expert knowledge of the health system situation in Tanzania.
- **National Policy Commitments.** This includes areas highlighted in the MDGs, *MKUKUTA*, and the Health Sector Strategic Plan
- **Relevance.** The area of health research must be relevant to solving problems and achieving health impact.
- **Urgency.** Health research issues which are highly time sensitive (e.g. research regarding combination therapy for malaria)

There was also a debate about whether these four criteria should be formally weighted to carry out the exercise. While many saw the benefits of weighting for the purpose of transparency and objectivity, it was felt that this would be difficult to do in practice. For example, some topics might be selected because they were "non-negotiable" on the basis of one or other criteria, even if they did not score highly on others. It was also recognized that without a scientific basis for the initial weighting, we might find an outcome, which did not "fit" with participants' expectations. In this case the exercise would need to be repeated until the weightings were judged to be "fair". For this reason, participants agreed that they would undertake the ranking exercise using the four criteria, but that the relative weighting was a matter of subjective judgment.

Before proceeding to group work for the ranking exercise, participants adopted "ground-rules", including the need to elect a chair and rapporteur, keep to time, and conduct discussions in an inclusive and democratic fashion. The group work commenced the following morning, guided by a facilitator for each of the groups.



Participants of the Stakeholders' Workshop held in Arusha, Tanzania, October 2005

The stakeholders' workshop reviewed the process and products of the priority areas selected in 1999 and the products of the three previous workshops reported above. It also made reference to the 2005 Health Sector Review, the National Strategy for Growth and Reduction of Poverty (NSGRP, 2005), the preliminary findings of the Demographic Health Survey of 2004/5 (TDHS, 2005), and the Health Sector Strategic Plan of 2003-2008. They concluded their work into two categories of health research, biomedical and health systems researches.

On **Biomedical Research**, the following areas were identified: Communicable Diseases of major public health importance; Communicable diseases neglected and/or of local priority; Non-communicable diseases; nutrition; maternal and child health; basic research; disease control; gender; environmental health; product development and evaluation; occupational health; and traditional and alternative medicine. On **Health Systems Research**, the following broad areas were identified: human resources; health financing; reproductive and child health; service delivery; health information systems; decentralisation; health policy; inter-sectoral collaboration; drugs, medical equipment and supplies; socio-cultural determinants; HIV/AIDS; essential health intervention packages; international funding initiatives; and public private partnership.

Priority Areas for Health Research in Tanzania

Ranking research areas in order of priority

The ranking of the priority areas for health research was done in a workshop held in Arusha in October 2005. Participants self-allocated to two groups of roughly equal size; one for Biomedical Research and one for Health Systems Research. All participants were given a set of cards on which to write the names of the research areas. Guided by the facilitator, and bearing in mind the four criteria, each participant shuffled the cards into a rank order of priority and marked the cards with their respective rank number.

Groups were allowed to come up with additional suggestions not included in the Tanga listing. However, as these were not available to all group members at the outset of the exercise, they were put under a separate “other” heading rather than being included in the final ranking.

The cards were then collected up and the rapporteur computed for each research area how the group members had ranked it. An aggregate group ranking was then obtained by taking the frequency that a particular topic had been ranked 1st, 2nd etc and calculating the final tally. Table 2 and 3 present the results in summary form.

Table 2: Scoring for Biomedical Research

Rank	Health Problem	Score*
1	Communicable diseases (Major public health importance)	208
2	Communicable diseases (Neglected/Local importance)	198
3	Maternal and Child Health	160
4	Disease Control	144
5	Non communicable diseases	138
6	Nutrition	119
7	Basic Research	112
8	Environmental health	98
9	Product development	90
10	Gender	70
11	Traditional medicine	63
12	Occupational Health	44

* The higher the score, the higher the priority

Finally, these results were summarised into a single table. The Biomedical Group considered their top three categories to be “Highest Priority”, the next four “Medium Priority” and the final 5 “Lower Priority”. The Health Systems group

considered the top five to be “High Priority”, the next five “Medium” and the remaining four “Lower priority” (Table 4).

Table 3: Scoring for Health Systems Research

Rank	Health Problem	Score*
1	Human resource	32
2	Reproductive and Child Health	78
3	Health Service Delivery	96
4	HIV/AIDS	103
5	Health financing	105
6	Drugs/medical Supply	112
7	Health Information	121
8	Health Policy	153
9	Essential Health Interventions	169
10	Decentralisation	185
11	Socio-cultural determinants	185
12	Inter-sectoral Collaboration	187
13	Public-Private Partnership	214
14	International Funding Initiatives	227

* The lower the score, the higher the priority

During plenary discussions, the issue of socio-cultural determinants of health was deliberated. In conclusion, participants felt that it can and should be an aspect of any of the research areas – either in Biomedical or Health Systems research. It was therefore agreed to represent it in the final summary table as a “cross cutting area” so that its importance is not lost (Table 4).

Table 4: Summary of Research Areas: Highest (H), Medium (M) and Lower (L) Priority

BIOMEDICAL RESEARCH		HEALTH SYSTEMS RESEARCH	
H	Communicable Diseases, Major	H	Human Resources for Health
H	Communicable Diseases, “Neglected”	H	Reproductive and Child Health
H	Maternal and Child Health	H	Health Service Delivery
M	Disease Control	H	HIV/AIDS
M	Non-Communicable Diseases	H	Health Financing
M	Nutrition	M	Drugs and Medical Supplies
M	Basic Research	M	Health Information
L	Environmental Health	M	Health Policy
L	Product Development	M	Essential Health Interventions Packages
L	Gender	M	Decentralisation
L	Traditional and Alternative Medicine	L	Inter-sectoral Collaboration
L	Occupational Health	L	Public Private Partnership
		L	International Funding Initiatives
SOCIO-CULTURAL AND DETERMINANTS OF HEALTH			

It was also agreed to take note that the groups had suggested additional areas, although these were not included in the ranking. New areas suggested included:

- Leadership
- Drug Abuse

- Disability
- Disease Surveillance

Finally, there was some discussion about how the use of criteria had worked in practice. Some participants suggested that by proceeding directly to ranking by subjective judgement the groups had worked on “gut feeling” rather than explicitly using the criteria. The consensus was that groups had internalised the criteria and that their judgement should be trusted.

Research topics under priority areas

Two groups were then formed to propose research topics under the two priority areas. The groups were tasked with moving beyond the broad research areas selected to consider more specific research topics. The purpose of this exercise was two-fold. First, by proposing more specific research topics, participants would give a fuller impression of what sort of research is envisaged under the “headline” description of the broad areas. Second, it would provide a preliminary indication of what are considered the top priority research topics (by this group of stakeholders) within each of the broad areas. It was recognised that this listing of topics would be indicative rather than definitive. It would not exclude the possibility of additional topics being added. Moreover, even some of the research “topics” are somewhat general in nature and would need to be further elucidated into even more specific *research questions*. It should be further emphasised that the topics are not necessarily listed in order of priority.

The results of this exercise are presented in Table 5. The Biomedical Group managed to come up with topics for all of the priority areas ranked High and Medium.

Table 5a: Topics by priority area in Biomedical Research: High Priority

BROAD AREA	SELECTED TOPICS
Communicable diseases of major public health importance	<ul style="list-style-type: none"> ■ <i>Respiratory infections</i> ■ <i>Malaria and other arthropod –borne infections</i> ■ <i>Water-borne infections (including rotavirus)</i> ■ <i>Tuberculosis</i> ■ <i>HIV/AIDS</i>
Communicable diseases of local priority	<ul style="list-style-type: none"> ■ <i>Vector-borne diseases (Lymphatic filariasis, Onchocerciasis, Schistosomiasis, African Human trypanosomiasis, Tick-borne relapsing fever, Plague)</i> ■ <i>Hookworm and other, intestinal worms</i> ■ <i>Zoonoses (beef tapeworm, hydatid disease)</i>
Maternal and Child Health	<p><u>Maternal Health</u></p> <ul style="list-style-type: none"> ■ <i>STIs including HIV/AIDS</i> ■ <i>Pregnancy related disorders</i> ■ <i>Women related cancers</i>

	<ul style="list-style-type: none"> ■ <i>Traditional birth attendants</i> ■ <i>Anaemia in pregnancy</i> <p><u>Child Health</u></p> <ul style="list-style-type: none"> ■ <i>Childhood infections</i> ■ <i>Neonatal disorders</i> ■ <i>Malnutrition</i> ■ <i>Growth and development</i> ■ <i>Accidents and injuries</i> ■ <i>Childhood cancers</i> ■ <i>Helminthic infections</i> ■ <i>Mother to child transmission including HIV/AIDS, rubella, syphilis</i>
--	--

Table 5b: Topics by priority area in Biomedical Research: Medium Priority

Disease Control	<ul style="list-style-type: none"> ■ <i>Vaccine trials</i> ■ <i>Clinical drug trials on host (malaria, HIV, papilloma virus, TB)</i> ■ <i>Vector control (malaria, filariasis, sleeping sickness, tick-borne relapsing fever).</i> ■ <i>Behavioural interventions (STI, HIV, diarrhoea)</i> ■ <i>Environmental manipulation (malaria, filariasis and schistosomiasis vectors)</i>
Non-Communicable Diseases	<ul style="list-style-type: none"> ■ <i>Cancers</i> ■ <i>Mental health</i> ■ <i>Cardiovascular diseases</i> ■ <i>Diabetes</i> ■ <i>Accidents and injuries</i> ■ <i>Substance abuse (alcoholism, drug abuse)</i> ■ <i>Geriatric disorders</i> ■ <i>Neurological disorders</i>
Nutrition	<ul style="list-style-type: none"> ■ <i>Protein energy undernutrition and overnutrition</i> ■ <i>Micronutrients and diseases</i> ■ <i>Nutrition and HIV/AIDS/TB</i> ■ <i>Diet related disorders</i> ■ <i>Early childhood nutrition including breastfeeding</i> ■ <i>Nutrition and the elderly</i>
Basic Research	<ul style="list-style-type: none"> ■ <i>Molecular biology and genetics</i> ■ <i>Immunology</i> ■ <i>Biology and ecology (host, parasite/ pathogens, vectors)</i> ■ <i>Pharmacokinetics</i>

The Health Systems Group managed to come up with topics for the top five priority areas. For most of the remaining areas, they also revisited the proposals put forward at Tanga and suggested some additions and amendments. The product of their deliberations is summarised below in Table 6.

Table 6a: Topics by priority area in Health Systems: High Priority

BROAD AREAS	SELECTED TOPICS
Human resources for health	<ul style="list-style-type: none"> ■ <i>Adequacy of staffing levels</i> ■ <i>Design and test incentive packages for hardship areas</i> ■ <i>Recruitment and retention</i> ■ <i>Impact of lengthy procedures in recruitment</i> ■ <i>Investigation of labour market competitiveness</i> ■ <i>Leadership factors affecting human resource management</i> ■ <i>Factors of the current human resource management</i> ■ <i>Human resource performance</i> ■ <i>Labour market and effects to human resource training</i> ■ <i>Graduate tracer studies</i> ■ <i>Declining interest in medicine a post graduate level</i>
Reproductive and Child Health	<ul style="list-style-type: none"> ■ <i>Factors mitigating against safe motherhood</i> ■ <i>Factors determining place/choice of delivery by 'skilled workers'</i> ■ <i>Availability and effectiveness of EMOC services</i> ■ <i>Adequacy of peri-natal and neonatal care</i> ■ <i>Infant and child feeding & breast feeding practices</i> ■ <i>Factors contributing to neonatal and perinatal morbidity and mortality</i> ■ <i>Status and adequacy of post natal and post abortion care</i> ■ <i>Factors causing variations in MMR and IMR and U5M across regions and districts</i>
Health Service Delivery	<ul style="list-style-type: none"> ■ <i>I.E.C and behavioural change communication</i> ■ <i>Physical conditions of buildings and impact to services</i> ■ <i>Distribution of health facilities</i> ■ <i>Quality of health services (Technical and clients aspects)</i> ■ <i>Referral system</i> ■ <i>NGO co-ordination and working relationships</i> ■ <i>Equity</i> ■ <i>Supervision, monitoring and evaluation</i> ■ <i>Roles and contribution of traditional medicine to service delivery</i> ■ <i>Levels of utilization of health services</i> ■ <i>Integration of services</i> ■ <i>Capacity of districts to control distribution of resources</i> ■ <i>Market forces and effects to decentralization</i>
HIV/AIDS	<ul style="list-style-type: none"> ■ <i>Scaling up of intervention (VCT, PMTCT, ARV interventions)</i> ■ <i>Issues of equity on interventions</i> ■ <i>Stigma and discrimination</i> ■ <i>Co-ordination of activities on HIV interventions especially by NGOs</i> ■ <i>Impact on health service delivery system</i> ■ <i>Effectiveness of current interventions</i> ■ <i>Socio-cultural aspects on HIV transmission including behavioural change</i> ■ <i>Traditional healers practices</i>
Health financing	<ul style="list-style-type: none"> ■ <i>Resource mobilization and impact</i> ■ <i>Resource allocation at different levels</i> ■ <i>Benefit incidence analysis</i> ■ <i>Studies on financial accountability to tax payers</i> ■ <i>Cost and expenditure tracking studies</i>

Table 6b: Topics by priority area in Health Systems: Medium Priority

Drugs and Medical Supplies	<ul style="list-style-type: none"> ■ <i>Drug importation</i> ■ <i>Storage and distribution</i> ■ <i>Rational use of drugs</i> ■ <i>Drug policy implementation</i> ■ <i>Key gaps in essential supply system</i>
Health Information Systems	<ul style="list-style-type: none"> ■ <i>HMIS</i> ■ <i>Effectiveness and efficiency of tools for decision support and adoptive management</i> ■ <i>Health information systems, information technology and communication systems in the Health Sector</i> ■ <i>Research on information uptake</i> ■ <i>Utilization of health information for policy and decision making</i>
Health Policy	<ul style="list-style-type: none"> ■ <i>Effective use of evidence in policy and decision making</i> ■ <i>Causes of limited utilisation of research findings to inform policy and decision making</i> ■ <i>Capacity building in policy analysis</i> ■ <i>Evaluation research relating to implementation of various programmes</i>
Essential Health Intervention Packages	<ul style="list-style-type: none"> ■ <i>Applicability, success or failure</i> ■ <i>Resource availability</i> ■ <i>Status of intervention</i> ■ <i>Cost effectiveness</i> ■ <i>Scaling up of major interventions (Malaria, TB-DOTS, EPI)</i>
Decentralization	<ul style="list-style-type: none"> ■ <i>Mismatch between roles and qualification of officials at decentralised structure</i> ■ <i>Effect of current organizational structure to effective decentralization</i> ■ <i>Community involvement and participation</i> ■ <i>Effectiveness of Health Boards and Committees.</i>
Socio-cultural determinants	<ul style="list-style-type: none"> ■ <i>Food taboos in pregnancy and child/infant health</i> ■ <i>Female Genital Mutilation</i> ■ <i>Gender issues</i> ■ <i>Sexual abuse</i> ■ <i>Inheritance of widows</i> ■ <i>Early marriage</i> ■ <i>Social constructs (taboos, customs, beliefs, traditions)</i>

Table 6c: Topics by priority area in Health Systems: Low Priority

Inter-sectoral collaboration	<ul style="list-style-type: none"> ■ <i>Sectoral problems as implications of the implementation of MKUKUTA</i> ■ <i>Conflicting regulations/legislation authority</i> ■ <i>Sector wide Approach to programming, synergies, collaboration, resource sharing, synchronizing programmes and projects</i> ■ <i>Duplication of efforts and roles</i> ■ <i>Inter- Sectoral issues under MDGs related to:</i> <ul style="list-style-type: none"> ○ <i>Environmental sustainability</i> ○ <i>Nutrition</i> ○ <i>Sanitation</i> ○ <i>Water safety access</i>
Private- Public Partnership	<ul style="list-style-type: none"> ■ <i>Contract management</i>

(PPP)	■ <i>Challenges for PPP</i>
International Funding Initiatives	■ <i>Impact of existing initiatives</i> ■ <i>The implication to the national priorities</i> ■ <i>Sustainability and Coordination</i>

Conclusions

In Tanzania, health research has been identified as an important tool for development. Priority setting is therefore, considered as an essential process for effective health research as it allows targeting efforts on limited problems with greatest impact on the health of a population. It also ensures effective and efficient use of limited resources, which is a common feature of developing countries.

Health research not only leads to improved health but also serves to boost socio-economic development. In Tanzania, as in the rest of the world, there is concern about the optimal allocation of scarce health research resources. Before 1999, there was little evidence of explicit prioritisation for health research. Individual researchers were at liberty to decide on the problems to research upon. This was the likely reason why the bulk of the research funding was directed to biomedical research while other important areas of health research were neglected. These neglected areas included health policy, health information systems, health education and promotion as well as the relationship between developmental policy and health.

The list of health problems in Tanzania is too long if we are to research on all of them because of the limitations in human, financial and time resources. It is for this reason that prioritisation of health problems for research is a fundamental process in health research undertaking.

The Government of Tanzania has been participating in evidence-based research by funding various health research projects, particularly with wider implications. However, many times fund available for health research is not sufficient and is guided by international agenda. It was important in this exercise that various stakeholders took part in identifying priority areas for health research. The most important challenge remains in understanding the attitudes and practices among all concerned including researchers, policy makers, health providers, communities and other partners in health research.

There is evidence that in many countries government policy has been influenced by health research. There are also quite a large number of evidence-based researches in Tanzania, which have been influencing government policies particularly in recent years (Kitua, 1999; Mubyazi & Gonzalez-Block, 2005). The recent change in the first line antimalarial drug in 2001 is one of such glaring examples. The planned changes of sulfadoxine-pyrimethamine to artemether

combination therapy to be effected later in 2006 are also based on evidence collected through researches.

There is need for a strong advocacy group to bring forth the research output more clearly and with wider implications. There is also a need for policy at more disaggregated levels to involve local level government authorities including the district Council Health Management Teams, civil societies and communities in our research efforts (Mboera *et al.*, 2005).

Health being a crucial subject not only for healthy living but also for better livelihood, there is need to address the poorer and vulnerable sections of society, so that we can draw attention of policy makers and even populist measures of political parties could benefit poor. This can also address the issue of improving equity in health research. We can do more and more research in collaboration with government departments so that government could own the research output.

Priority setting involves a weighting of values, which different stakeholders consider to be important (Ham, 1995). A number of values can be identified that can guide decision-making and usually include: effectiveness, efficiency, impact, equity and prevention. Health research should therefore, involve all stakeholders including civil society, at all levels. To this end, partnerships should be developed at local, national, regional and global levels.

Prioritisation is an integral part of planning and each country needs to determine its health research priorities. However, prioritisation is a complex procedure with various approaches. In Tanzania this was done from either a health problem or a health systems approach and tackled on a systematic, step-wise manner. This approach included the consideration of factors such as technical feasibility, availability of various resources and capacity, national and international agenda, as well as sustainability of proposed health research. An effective priority setting approach is expected to meet the objective of the national health system. It should aim to achieve maximum health benefits to the population it serves within the available budget and respective specific equity considerations (COHRED, 2006). Criteria for priority setting should respond to the different challenges involved in the process. They should help national health research system, such as: basic *versus* applied research; public *versus* private research; health needs *versus* political interests; national *versus* international funding; public *versus* private funding (COHRED, 2006).

A priority setting process should help promote equity in health and development. To be effective, it is important to have agreement on the values and criteria that should influence health research priorities. The process should use fairness and

legitimacy as key ethical elements. Legitimacy is achieved by ensuring the participation of the relevant stakeholders in the process.

Priority setting process in Tanzania used the Essential National Research Approach. This involved systematic analysis of health needs, community and professional expectations. It involved researchers, policy makers, national disease control programme managers, health care providers, community and donors. This was done in a participatory and transparent process.

It is envisaged that all research and development institutions and donors in Tanzania will utilise this document as a guide to national priority areas for health research.

References

- Bobadilla, J.L. (1996) *Priority Setting and Cost Effectiveness*. In: Janovsky, K. ed. *Health Policy and Systems Development*. An agenda for research. World Health Organization; 43-60, Geneva.
- COHRED (2006) *Priority Setting for Health Research: Toward a Management Process for Low and Middle Income Countries*. Council on Health Research. Available at: www.HealthResearchForDevelopment.org
- ENHR (1997) *Essential National Health Research and Priority Setting: Lessons Learned (1997)*. Council on Health Research and Development (COHRED) document 97.3: June 1997, Geneva.
- Foltz, A. (1996) *The Policy Process*. In: Janovsky, K. ed. *Health Policy and Systems Development. An agenda for research*. 207-223. World Health Organization, Geneva.
- GFHR (2002) *The 10/90 Report on Health Research 2001-2002*. The Global Forum for Health Research.
- Green, A. (1972) *An Introduction to Health Planning in Developing Countries*. Oxford: Oxford University Press: 13: 185.
- Kaplan, G.A., Haan, N.H., Syme, L.S., Minkler, M. & Winkleby, M. (1987) *Socio-economic Status and Health*. In: Amier, R.W., Dull, H.B., eds. *Closing the Gap. The Burden of Unnecessary Illness*. Oxford University Press, New York, Oxford.
- Kitua, A.Y. (1999) Antimalarial drug policy: making systematic change. *The Lancet* 354, 2.
- Kitua, A.Y., Mashalla, Y.S. & Shija, J.K. (2000) Coordinating health research to promote action: the Tanzanian experience. *BMJ* 321, 821-823.
- Makundi, E.A., Haram, L., Norheim, O. & Setel, P. (2004a) Community social valuation: lay people's understanding of physical disability in two communities in Tanzania. *Tanzania Health Research Bulletin* 6, 18-24.
- Makundi, E., Norheim, L., Haram, P. Setel, P. & Kvale, G. (2004b) Community social valuation: use of nominal group technique in ranking of health conditions from two communities in Temeke and Moshi Districts in Tanzania. *Tanzania Health Research Bulletin* 6, 41-50.
- Mboera, L.E.G., Kamugisha, M.L., Barongo, V., Rumisha, S.F., Msangeni, H.A., Molteni, F. & Kitua, A.Y. (2004) Community knowledge, perceptions and practices on malaria in Mpwapa District, central Tanzania. *Tanzania Health Research Bulletin* 6, 37-41.
- Mboera, L.E.G., Rumisha, S.F., Senkoro, K.P., Mayala, B.K., Shayo, E.H. & Kisinza, W.N. (2005) *Research on Knowledge Systems: Determination of Strategies and Approaches for a Successful Improvement of Gaps for Health Knowledge in Tanzania*. National Institute for Medical Research, Dar es Salaam, Tanzania.
- Mooney, G.H., Irwig, L. & Leeds, S. (1997) Priority setting in health care: unburdening from the burden of disease. *Australia-New Zealand Journal of Public Health* 21, 680-681.
- Mubyazi, G.L. & Gonzalez-Block, M.A. (2005) Research influence on antimalarial drug policy change in Tanzania: case study of replacing chloroquine with sulfadoxine-pyrimethamine as the first line drug. *Malaria Journal* 4, 51.
- NSGRP (2005) *National Strategy for Growth and Reduction of Poverty*. Vice President's Office, United Republic of Tanzania, Dar es Salaam, April 2005.
- Ronayne, J. (1984) *Science in Government*. Edward Arnold. London.
- TDHS (2005) *Tanzania Demographic and Health Survey*. National Bureau of Statistics and ORC Macro.
- Zwi, A.B. & Mills, A. (1995) Health Policy in Less Developed Countries: Past Trends and Future Directions. *Journal of International Development* 7 (3), 299-332.