National deworming program
Kenya's experience

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Executive Summary

INTRODUCTION: The national census of Kenya 2008 placed the total number of school age going children at 10,624,380 with 8,661,333 (82%) children currently attending school. A national mass fecal examination of 27,729 children from 395 schools, estimated intestinal parasitic worms infections to be five million (56.8%), and subsequently, a mass school deworming program was initiated. Evidence has shown that improved health status leads to increased productivity, educational performance, life expectancy, savings and investments, and decreased debts and expenditure on health care. Studies in the US have shown that worm infections lower’s literacy levels by 13% and lower’s earnings later in life by 43%. Research in Western Kenya showed that school-based mass deworming decrease absenteeism by 25%.

PROJECT DESCRIPTION: The school health programme is jointly coordinated by the Ministries of Education and Health in Kenya. The Programme implementation is guided by the national school health policy and guidelines. Two committees at the national level: the inter-agency coordination committee chaired by MOE and the national school health technical committee chaired by the MOPHS are multi-sectoral coordinating committees bringing together all the stakeholders. There are other line government Ministries and development partners involved in school health activities, and include Ministries of Medical Services, Water, Local Government and internal Security/Administration. Developmental and UN partners include the World Bank, DFID, UNICEF, GTZ, JICA, and USAID. Representation at the districts is by the district school health stakeholders committees and school health committees, which include the parents-teachers association and community representatives.

IMPLEMENTATION: The adaptation of training materials and training sessions was done in collaboration with teachers. The teachers with support from the technical committee did the actual deworming and health education to the parents-teachers associations and pupils. Integration of other school health programmes (water, sanitation and hygiene, health education and school meals) were also implemented through the same structures that compliment the deworming programme.
ACHIEVEMENTS: The first phase of the programme reached 45 districts targeted. Over 1,000 districts and division-level personnel were trained. Over 16,000 teachers in the targeted districts were trained on deworming process. Over 3.5 million children in 8,000 schools directly benefited from the program and were dewormed. The program recorded a huge success in terms of scope, and it was extremely cost effective. The deworming program had an overall cost of approximately $0.3 cents per child.

GENERAL LESSONS LEARNT: Effective coordination mechanism at all levels is crucial for a successful multi-sectoral programme. Community mobilization, sensitization and participation for programme acceptance and ownership are also a pre-requisite.

**Problem Space**

The Kenya Government has developed various policies and programmes for social and economic development. Many of these policies and programmes have been implemented achieving good results and impact; while some have ended up only at the policy level or with limited implementation. Implementation of policies requiring inter-sectoral collaboration both at national and international agreed health goals, including the Millennium Development Goals (MDGs) has been challenging. There is urgent need for the Kenya government and its development partners to renew commitment to these goals by, reinvigorating efforts and by strengthening the strong interrelationship among health determinants and social and economic development such as, governance, education, gender and culture, food security and nutrition, environment, peace, and security.

Ensuring adequate water supplies for human, industrial and environmental needs are critical to protecting human health, promoting sustainable economic growth, and ensuring peace and security. Kenya faces numerous challenges in preventing and controlling communicable and parasitic health conditions, which are mostly water-borne, resulting from poor sanitary and hygienic conditions. Soil Transmitted Helminthic (STH) infections occur almost in all impoverished communities of humid tropics and are found commonly in school aged children (Stephenson, 1994). The global disease burden of these infections quantified by index, disability adjusted live years (DALY), ranked first in 5-14 years age group for both males and females (World Bank, 1993). Consequences associated with these infections include, impaired growth and physical fitness, impaired information processing,
reduced retrieval of long memory and immediate recall and low overall cognitive ability\footnote{Nokes et al; 1993, Bovin et al; 1993}.

Several studies have been carried out in the country to assess the prevalence of helminthic infections in school children. Recent studies by\textit{Brooker in 2008} showed that intestinal parasitic worms affected an estimated five million (56.8\%) of school children in Kenya. Children aged 13-14 years old exhibited the highest prevalence of worm infection (70\%), with Ascaris lumbricoides being the commonest infection (75\%), followed by Trichuris Trichuria (51\%), hookworm (40.5\%) and Schistosomiasis Manson (8.1\%). A study using Geographical Information Systems (GIS), remote sensing, geostatistics and mathematical modeling, demonstrated spread of the infections in the country\footnote{Riley, 2007}. Low general education and health education was directly proportional to the degree of Soil-Transmitted Helminthes (STHs) infection, so was low socio-economic status of families of these children\footnote{Kan, 1992}. Subsequently, mass deworming was selected as an important cost-effective and cost-benefit activity, because intestinal worms damage children’s health, discriminate the levels of school performance, lowers academic achievement, hinders access to education, and reduces social competence and regular attendance.

The first phase of national school health deworming programme was implemented in 2008-2009. The overall goal of the programme was to improve the health status of the children, increase enrolment in public schools and improve academic performance.

\textbf{Context}

Majority of the Kenyan population (90\%) is distributed in the rural areas, primarily in three clusters, the Lake Victoria basin, part of Central and Eastern Provinces and along the Indian Ocean on the Coastal belt. The Coastal belt of Kenya and the Lake Victoria basin have high humidity moistures suitable for STHs survival and growth. The levels of poverty in the country are quite high; the UNDP Human Development Report (2004) estimated that 54\% of the total country population is living in absolute poverty. Kenya suffers from under unbalanced global trade, reduced prices of the primary products that Kenya relies on for international trade, and a rising debt burden.
Economic development in Kenya is closely related to the proximity and intense interaction with Nairobi the Capital city and other major urban towns resulting in huge inequalities in the country between the rural and urban populations.

The areas of higher economic growth represents the southwest quadrant of the country, characterized by fertile high potential highlands, dense agricultural population and extensive settlement during the colonial period and contains all major urban centers. The formal employments of (83%) is concentrated in Nairobi and Mombasa, the two major towns in Kenya (Ominde, 1982). Literacy and education levels are also related to the geographical missionary and colonial settlements and education policy, which favored the highlands and districts in the Western parts of Kenya.

The health gaps within the country have widened due to inequality in new technology, unequal distribution of new and re-emerging health problems and inequitable provision of health services and care (Von-Shrinking, 2002). The development of drug resistance and people seeking health care too late or requiring sophisticated treatment complicates the situation more worse (WHO, 1999). The disease burden and poor indicators have been persistent and the biggest causes of morbidity are malaria, respiratory tract infections, diarrhea, intestinal worms, HIV/AIDS, anemia and malnutrition. Kenya's health systems are weak and inappropriate, they are replicas of what was inherited from the colonial era and are therefore unevenly weighted towards privileged elites and urban centers. Health facilities, services, and overwhelming majority of health workers are concentrated in urban centers. Only 40% of the rural populations have access to piped water. More than 50% of the populations do not have access to modern health facilities and 40% have no access to safe drinking water and sanitation.

The average expenditure in the health sector per year is 7% of GDP. Health care financing depends heavily (52% in Kenya) on out-of-pocket payments for services or financial assistance from bilateral and multilateral donors. Coast province, parts of Central and Eastern province and the Lake basin (Western and Nyanza) province have the lowest social-economic status, which exposes the population to high STHs infections.
The Kenyan health system also faces human resource scarcity. All categories, particularly doctors and nurses, are in short supply compared to the standards of population. Human resource crisis in the health sector caused by inadequate production in the country, inability to hire in others, brain-drain, poor motivation, conflict of interest, corruption, and misuse of resources has undermined the implementation of decentralized public health services.

Since 2003, the country has taken deliberate steps to improve the education standards in the country. This is majorly due to the recognition of the education as one of the driving forces of a country’s economy and social progress and also one of the major determinants to health. The introduction of free primary education (FPE) in 2008 in the country provided a good entry point for the school health programme. There was a supportive political good-will environment from the government and a conducive environment for collaborations among various government sectors and partners, hence the acceptance of the national school health (NSH) programme by many players.

Kenya has developed a road map document whose implementation focuses on three pillars; social, economic and political development (Vision, 2030). Vision 2030 is meant to take the Country to a level of medium industrialized Country with high quality standards of living. Health is currently, taken serious as a central focus for economic productivity and development. This economic roadmap was also instrumental in bringing together partners from various sectors for the school health programme.

Planning

According to the mass fecal examination in Coast province, intestinal parasitic worms affect an estimated five million (56.8%) children in Kenya. School going children aged 13-14 years old exhibited the highest prevalence’s of STHs infection (70%). Through the help of Geographical Information Systems (GIS), 135 geographical targets that could benefit from mass deworming were identified. According to WHO guidelines, mass deworming should be undertaken in areas where the prevalence of worm infection is above 50%. Given the magnitude of the problem and the need to control the burden of STH infection, a decision to deworm school children was agreed upon as the best possible solution. This was to be carried out nationally through a sub-national deworming programme implemented in three phases.
The overall objective of the programme was to reduce the prevalence of STHs infections in the country. This was to be achieved through: deworming of all school age going children in 45 districts of high density STHs infections located in Coast, Nyanza, Western, Eastern and Central Provinces by June 2009 and training of District and Divisional officers and school teachers on the deworming process and personal hygiene in 45 districts.

The target population for deworming was 5-14 year old school age going children in 8000 schools. Also targeted for training were 1000 District and Divisional officers and 16,000 school teachers. Cluster sampling was used to select 45 districts randomly from the 135 districts targeted for mass deworming. The schools were grouped according to the zonal or divisional areas in their respective selected districts. All the school going and out of school pupils in the targeted age bracket were selected for mass deworming in the first phase. The records of the total number of pupils in all the schools were obtained from the Education Ministry database. An additional 25% more doses were allocated to each school to cater for out of school children.

There are several reasons for the selection of the mass deworming exercise through the school health programme. First, school-aged children suffer the highest intensity of worm infections, this was based on results of the situational analysis and GIS mapping. Secondly, easy accesses of the target population; schools are natural place’s to access a large number of children. Thirdly, the programme is cost-effective; the programme would use existing infrastructure especially teachers trained to administer deworming tablets to their pupils.

Finally, the existing political will at that time was supportive to have the programme implemented and use deworming as an entry point to other school health programmes e.g. water, sanitation and hygiene.

The first phase of deworming was planned to take place from October to November 2008. However, this was not possible because, the Kenya Certificate of Primary Education (KCPE) examination was taking place in October 2008. To avoid disrupting schooling during the examination period, the National Deworming Steering Committee canceled and rescheduled the exercise to November. The exercise could not also take place in November, because the planned dates for the activity were also coinciding with the bi-annual child health weeks (malezi-bora) held in early November. The
other reason for postponements was to allow room for the trainings of masters’ of trainers, who eventually trained the Districts stakeholders and the teachers from the selected schools on the deworming process. The Ministry of Education chaired the national deworming steering committee, which has the mandate of coordinating the deworming activities. The training of teachers went a long way in demystifying any misconceptions or rumored myths in the communities resulting in very high acceptance rates. The community leaders played a pivotal role of advocating for deworming activity at all levels of society.

The exercise was coordinated by the ministries of education and public health and sanitation. They provided 30 national masters of trainers to initiate the training program in the Country. The Ministries of medical services, water, local government and internal security and administration played an essential role at the district level during the implementation process. This program has benefited from the participation of a number of development partners. Support from the World Health Organization, World Bank, DFID and UNICEF have been very essential. Others included; Deworm the World, Feed the Children, KEMRI-Welcome Trust, The Partnership for Child Development, Innovations for Poverty Action and JICA who were members of either the National School Health Interagency coordinating Committee (NSH-ICC) or the National School Health Technical working group (NSA-TWG) or both.

At the district level, the District Medical Officer of Health, District Clinical Officer, District Public Health Officer, District Nutrition Officer, District Education Officer and 2 Education Officers received the training. The above district trained team cascaded the training to the Divisional teams which included; Divisional Public Health Officers, Clinical officers in charges of Health Facilities, Nurses in charges of Dispensaries, area Educational Officers and TAC Tutors. The trained Divisional teams finally trained the Head Teachers, School Health Teachers, Parents, Pupils and Community in a cascaded pattern. Also involved in the planning and implementation of the programme are the parents, pupils and the community through existing parents-teachers association and community structures.

The involvement of the various sectors and partners was guided by the National School Health Policy and Guidelines launched in 2008. This provided for clear cooperation and partnership mechanisms in implementing school health programmes.
The national school health policy and guideline documents launched in 2009

The coordinating mechanisms are clearly elaborated in the two documents above, and have been used to ensure the implementation of the program through various committees.

The National School Health Inter-Agency Coordinating Committee (SHN-ICC) is responsible for the coordination, resource mobilization and advocacy of the comprehensive school health program, and comprise’s of relevant key ministries (public health and sanitation, finance, planning, local government) and key developmental partners. The Committee is chaired by the Permanent Secretary of the Ministry of Education.

The National School Health Technical Committee (SHN-TC) is an inter-sectoral committee, responsible for providing technical advice to the SHN-ICC. It is made up of key line Ministries (education, medical services, water, local government, gender and social services, agriculture and finance) and other implementing partners. The committee is responsible for monitoring health trends, related legislation changes and health programmes, and is chaired by the Permanent Secretary in the Ministry of Public Health and Sannitation.
The Kenya Medical Research Institute - Eastern and Southern Center of International Parasite Control (ESACIPAC), provides evidenced based information through research to support the program. The national school health guidelines provide clear policy directions in the eight school health thematic areas, these are: Values and life skills; Gender issues; Child rights, child protection and responsibilities; Water sanitation and hygiene; Nutrition; Disease prevention and control; Special needs, disability and rehabilitation; and School infrastructure and environmental safety.

The various government sectors and development partners through the National School Health Inter-Agency Coordinating Committee (SHN-ICC) contributed most of the resources for the program. The two Ministries of education and public health and sanitation were the coordinators of the programme. The ministry of water and irrigation and the ministry of local government provided safe drinking water and logistical support to the schools. The ministry of internal security and administration provided security especially in some of the hard to reach and insecure areas. The ministry of medical services provided the deworming drugs, while the ministry of public health and sanitation provided the health staff for training resource persons.

The community gave consent for the children to be dewormed, provided safe water for administering the drugs and supported the children physically by accompanying them to school. The community also formed groups to inform and educate other members on the health messages they were receiving.

WHO provided technical support especially in the planning, monitoring and evaluation of the programme; the World bank, DFID and UNICEF provided financial support, which was very essential to the success of the activity. Deworm the World provided technical assistance, funding support, secured and managed the donation of deworming pills from Feed the Children. KEMRI-Welcome Trust provided crucial scientific information and support. The Partnership for Child Development supported the development of training materials and the Master Training sessions. Innovations for Poverty Action provided logistical support for the rollout and for the analysis of program data. JICA has been a long-term partner of school health in Kenya and has supported deworming efforts for many years. This programme is truly as example of successful cooperation and partnership among a wide range of government and non-governmental stakeholders.
The National School Health Policy and Guidelines was successfully launched nationally in 2008. The organization structure is envisaged in the two documents. The implementation of the policy will be done through various committees. The National school health deworming guidelines had been developed before the deworming exercise in (2006). Therefore the deworming process was guided by the national deworming guidelines of Kenya. However, the comprehensive National School Health implementation strategic plan has been developed and officially launched in 2011. Subsequent phases of National deworming will make use of this document.

The chart below demonstrates the National School Health training programme in a cascading process.
Implementation

The National Deworming Programme was launched on April 22, 2009 at a colorful and successful event presided over by both Ministers of Education and Public Health and Sanitation, and attended by Honorable Ministers, Assistant Ministers and Permanent Secretaries of both Ministries. All participants made speeches demonstrating their strong and firm support of the deworming programme. The deworming programme received extensive media coverage.

Among the preparatory activities was the training of the master trainers, the core team that rolled out the program. Thirty (30) Master Trainers were selected, one-third from the Ministry of Education, one third from the Ministry of Public Health and Sanitation, and one third from KEMRI. The training of 30 National level Masters of Trainers on deworming was done in May 2009. Ministry of public health and sanitation, ESACIPAC with support from Deworm the World and PCD coordinated this training session. Training of the Districts and Divisional teams and the school community followed thereafter.

Minister for Education Hon. Professor Sam Ongeri and Minister for Public Health and Sanitation Hon. Beth Mugo officiating at the launch of the School Health strategy documents
Community mobilization activities to inform and educate the community were also carried out in various social functions and gatherings (churches, mosques, chief baraza’s, etc.).

Other preparations included the prepositioning of the supplies drugs (Mbendazole and Albendazole) and establishment of transportation and communication logistics mechanisms in each district. Also developed and preposition before the actual implementation of activities were the recording, reporting and monitoring tools. The actual deworming then commenced in June 2009; while the data analysis done at the national level and dissemination of the report to various stakeholders, was in August 2009.

A national deworming training manual had been developed by the ministry of Public Health and Sanitation. This was then ratified to suit the uniqueness’ of the local situation and adapted by the National School Health Technical Committee, to guide the entire process. The program was designed to cover the whole country, to be implemented in three stages each of 45 districts. This was mainly due to limited financial support, inadequate human resources, geographical expansiveness of the area and sustainability of logistics and supplies.

We will now talk briefly about the planning and logistics behind the deworming rollout. First, the training plan was designed and scheduled. The training materials had been previously designed and adopted by, the ministries of public health and sanitation and education and partners. Organizing the materials and sorting by district, was quite a tedious process, but proper advance planning ensured that the rollout went smoothly and each district received enough materials for the training program. The pictures below shows some of the training materials used in the program.
All the training materials were organized into pre-sorted boxes with proper quantities for each district. The number of trainees from each district determined the quantity of training materials required for each district. On the other hand the estimated number of children targeted for deworming from each district, determined the number of doses of dewormers for every district. Finally, all the logistics relating to personnel, transport, trainings were planned according to the size of the district and the distance from Nairobi the central point.

Not only was the program a huge success in terms of scope, it was also extremely cost effective. The cost to the Government of Kenya was only approximately $ 0.24 per child. This was supplemented by approximately $ 0.06 per child from development partners. Therefore, the deworming program had an overall cost of approximately $ 0.3 per child. This includes all programme costs; social mobilization, training, logistics, deworming drugs, monitoring, printed materials, etc. As demonstrated, deworming is a highly beneficial and extremely cost-effective intervention.
Evaluation of results and impacts, including on social determinants and health inequities

The programme successfully reached all 45 districts targeted in Phase I. Over 1,000 districts and division-level personnel received training, and over 16,000 teachers around the country were trained on deworming process. However, most importantly, over 3.5 million Kenyan children from over than 8,000 schools directly benefited from the program and were dewormed!

The national deworming programme was being monitored and evaluated throughout the entire process (process evaluation). Process evaluation mainly concentrated on tracking down the planned activities accomplishments and their set targets. The monitors appointed by the national team attended a selection of training sessions and deworming days around the country to monitor the process. In addition, the program had built-in mechanisms for district and division level personnel to monitor activities in their areas. The key performance indicators (KPIs) included: number of training sessions, number of participants trained, number of doses of dewormers distributed and number of children dewormed etc.

Another important aspect of the programme was the deworming forms that were filled in on deworming days. These forms were included in the training materials. Forms were filled out at each school and sent to the Area Education Officers, who then summarized the data and forwarded them to the District Education Officer (DEO). The DEO then collated all the information from the district and submitted a report to the ministry of education headquarters. Data from the Area educational officer and district levels were entered into the computer, cleaned, summarized and analyzed to provide information on the progress of the program.

An evaluation analysis was conducted by the Ministry of Public Health and Sanitation, and JICA in 2010 in Coast province using a checklist and key informant interviews administered to teachers and parents respectively. The preliminary findings indicated reduced absenteeism or dropout rates, improved hand washing practices and use of sanitary facilities both at home and at school. The retention rate of pupils at school had increased and the general health and academic performance of children improved. However, the actual mass stool examination to assess the current rate of worm
infestation is planned to take place in 2012.

A growing body of research identifies strong links between children’s health, social and educational outcomes; it also notes the reciprocal benefits of access to quality of education on the individual and family health status. The overall improvement of the student’s class attendance is expected to positively affect health outcomes, specifically in areas child and maternal health. Studies conducted in the country have shown a strong relationship between the education level of girls and subsequent child and maternal mortality, with higher (primary level) education levels being directly linked to better outcomes in child and maternal health, which are among the worst in these areas in the country.

Not only was the program a huge success in terms of scope, it was also extremely cost effective. This has prompted the two ministries; of public health and sanitation and education, to include school deworming among the high impact interventions activities. A performance contract has been drafted for both the two Chief executive Officers (CEOs) from the two ministries; to reach 3.5 million children for deworming in the year 2010. Deworming activity has been inserted in the annual operational plan 2010/2011 of the two ministries to regularize this activity in the country.

**Follow-up and lessons learned**

The national deworming programme faced several challenges. First, the programme had a very short timeframe, since it began planning in January 2009 and only had six months to achieve very ambitious goals (covering 45 districts) by June 2009. Of course, reaching remote areas is always a challenge, but the dedicated team of Master Trainers who endured long and difficult journeys all over the country overcame this. The size and scope of the programme was also a challenge, and required a significant amount of planning and coordination to ensure that it ran smoothly. Reaching children out of school was noted to be a challenge, as special arrangements had to be made for this. Finally, demands on staff time were also a challenge, since other programmes such as child health weeks (Malezi Bora) were taking place at the same time and all the health staff were required to participate in this activity. Fortunately, all of these challenges were overcome and the programme was a great success. There were opportunities to this programme; political good will especially
towards the educational sector following the introduction of Free Primary Education (FPE) in Kenya, which has attracted huge external funding. The excellent coordination of NSH stakeholders contributed immensely to the success of the programme.

Of course, the most important outcome of the programme is the impact it will have on improving the health and education of our children. If we can continue this successful programme, we are confident that we will see marked improvements in children’s health, school attendance and educational achievement. Impact evaluation will be conducted after the completion of a three years period. The success testimonies and best practices experienced in the first phase of implementation are being cascaded to the second phase of deworming. For example, the masters trainers trained during the first phase of deworming are being utilized as facilitators in the second phase of deworming.

Given the success of the first phase of the programme, what is the way forward?

We have several important goals for 2011-12. First, it is important to expand the geographic reach of the programme to include more districts that are vulnerable to worm infection. With additional surveys and evidence from KEMRI-Welcome Trust, we will be able to expand the reach of the programme to a wider population. In order to maximize the impact of deworming, it is also important to undertake two rounds per year in the areas with the highest prevalence rates. As this presentation has shown, the first phase of the national deworming programme has been an enormous success, thanks to cooperation and participation from a wide range of stakeholders. We hope to build on this successful foundation in 2011 so that we can reach more children and have an even bigger impact on child health and education in Kenya.

Other programs have also utilized the existing collaboration structures and mechanisms to introduce various programs targeting children. These include food supplemental feeding and nutrition programmes, sanitation and hygiene programs focusing on provision of pit latrines and proper waste disposal units supported by the community and initiated through school health programs and gender empowerment programmes.
The scope of the scale up of the programme is limited due to inadequate human and financial resources. The programme requires intensive coordination of various stakeholders. The preliminary preparation of the programme is very crucial, in terms of printing training materials, forecasting for the appropriate dewormers for each school and cumulatively for the whole district, training of master’s trainers and arrangement for reliable transportation, particularly in a hostile terrain infrastructure. Lack of clear accountability mechanisms also presented a challenge, during the implementation of the second phase of deworming activities, donor funds were misappropriated and various donor agencies withdraw their support for the programme. Currently the program is experiencing financial constraints.

In the short term, these donors will continue to provide deworming tablets for Soil Transmitted Helminthes. However, in the long term, the Ministry of Public Health and Sanitation has committed itself to providing sufficient drugs for the programme to continue. Health education and water sanitation and hygiene (WASH) interventions are ongoing and further training is being carried out. Deworming and vitamin “A” supplementation has been integrated as one package under the Early Childhood Development (ECD) Programme. Other programmes in schools such as WASH, School meals and mass medical screening are also supporting deworming activities. The integration of this programme into existing routine childhood development programmes and the general acceptance and contribution to the programme by the community will ensure its sustainability into the future.

In subsequent phases, we also want to address the serious problem of schistosomiasis along the coastal and Lake Victoria areas. We currently have a stock of Praziquantel, donated by Feed the Children through Deworm the World, which is sufficient to do one round of treatment, and we expect to get further stocks from these donors. Deworming is very important to achievement of MDG2 of universal education for all by 2015. Children who has been dewormed, enjoy an improved health status and therefore have an increased enrolment in schools. The donor community and other nuclear stakeholders have already shared this report. Integration of deworming policy and interventions into the East African Community (EAC) health policies is currently under discussion.
Pupils receiving their deworming tablets from teachers in two separate schools