

Recollections

The “Paired Learning by Doing” Approach for Capacity Building Derived from the China-UK-Tanzania Pilot Project on Malaria Control During 2015–2018

Shenning Lu¹; Xuejiao Ma¹; Wei Ding¹; Duoquan Wang^{2,*}; Zhengbin Zhou¹;
Kangming Lin³; Fei Luo⁴; Shan Lyu²; Ning Xiao²; Xiao-nong Zhou²

BACKGROUND

China's growing prosperity has led to an increased role in international affairs, particularly in global health cooperation. Alongside sending medical teams abroad, China's health authority is gradually expanding its South-South cooperation in public health. However, due to a late start in global health initiatives and limited experience in organizing, coordinating, and implementing intervention projects overseas, China still faces significant challenges in global health, particularly in the local context. Recognizing the longstanding partnership between the Chinese and British governments, they have identified global health as a new area of strategic cooperation. In 2012, the former UK Department for International Development (DFID) initiated a new type of health development cooperation project named the China-UK Global Health Support Programme (GHSP).

Malaria is a highly prevalent infectious disease that poses a significant threat to nearly half of the global population. The African Region of the World Health Organization (WHO) is especially susceptible, with approximately 95% of all malaria cases occurring in this region. Tanzania is among the four African countries that contribute to more than half of all malaria-related deaths, with a mortality rate of 4% (1). As a result, Tanzania faces substantial obstacles in the prevention and control of malaria. With the remarkable achievement in malaria control and elimination, China's extensive expertise in this field has played a pivotal role in shaping the basis of China-Africa collaboration.

The China-UK-Tanzania Pilot Project on Malaria Control signifies China's inaugural endeavor in public health cooperation in Africa. This project represents a significant milestone in the adoption of China's “going global” approach, building on the initial outputs of the GHSP. The primary aim of the pilot project is to apply

China's wealth of public health expertise and best practices in collaboration with developing nations. The project seeks to accomplish three main objectives: 1) document the lessons learned and experiences gained in implementing China's novel health cooperation model, 2) serve as a successful model for future bilateral and multilateral collaborations, and 3) support partner countries in enhancing global health capacities. The National Institute of Parasitic Diseases (NIPD) at the China CDC and the Chinese Center for Tropical Diseases Research (NIPD-CTDR) lead the pilot project, which engages 11 institutions in China and abroad, including the Ifakara Health Institute (IHI) (2). Following approximately three years of implementation, malaria cases in the intervention areas have reduced by over 80% (3). Additionally, the project has facilitated the development of an effective intervention strategy known as the “1,7-malaria Reactive Community-based Testing and Response” (1,7-mRCTR) approach through the sharing of Chinese anti-malaria technology and practices (4).

To accomplish its objectives, the pilot project implemented a novel approach to capacity building known as “Paired Learning by Doing”. This method involved close collaboration between Chinese employees, local experts, and staff members, with the goal of enhancing the capabilities of all individuals involved. Specifically, Chinese staff were paired with partners from the National Malaria Control Programme (NMCP), the IHI, and the local health system (5).

The project coordination committee and expert team provided technical assistance and evaluated the progress of the project. The “Learning by Doing” approach, specifically the “paired approach,” has been widely utilized and has significantly strengthened the capacity of Chinese healthcare professionals to engage in global health activities. Moreover, this approach has played a pivotal role in training a local team for malaria

prevention and control, thus ensuring the long-term sustainability of the project.

Steps Towards Implementing a “Paired Learning by Doing” Approach in a Pilot Project

Recruitment of Chinese team members and pre-assignment training organization. According to the project work plan, young professionals recommended by provincial disease prevention and control centers or institutes of parasitic diseases, which are partners of the NIPD, underwent a series of interviews and evaluations. A total of 17 young experts, holding a bachelor's degree or higher in public health or sociology, were selected for the project from various provincial centers for disease control and prevention (CDCs) or institutes of parasitic disease. These included the Shandong Institute of Parasitic Disease, the Yunnan Institute of Parasitic Disease, Anhui Provincial CDC, Guangxi Zhuang Autonomous Region CDC, Chongqing CDC, and Sichuan CDC. The selected candidates possessed undergraduate or higher degrees in various fields such as malaria laboratories, epidemiology, vector biology, pathogen biology, information systems, and geographic systems. They were also proficient in foreign languages, facilitating effective communication and professional academic writing. All participants had prior experience in malaria control, either through working with the Global Fund to Fight Malaria or studying abroad, and were eager to contribute to global health. Prior to their departure from their respective locations, these professionals underwent training in China. The training sessions focused on the project's objectives, specific targets, and task assignment. Emphasis was placed on teamwork, effective communication and collaboration with local colleagues, as well as respect for local customs and culture. An annual project wrap-up meeting was held in Shanghai to review and summarize the project's progress and outcomes.

Assembling the Tanzania teams and pairing them with the Chinese teams in the field. Tanzania formed teams comprised of local experts in various disciplines, such as epidemiology, health statistics, vector biology, computer informatics, pathogenesis, and clinical medicine, to ensure efficient fieldwork. To promote ongoing collaboration and sustainability, Chinese professionals were paired with their Tanzanian counterparts. Team grouping was based on professional backgrounds including epidemiology,

health statistics, pathogen biology, vector biology, computer informatics, and financial auditing. This pairing facilitated joint discussions on implementation protocols, fieldwork participation, data analysis, and collaborative problem-solving for activities such as malaria surveillance, case testing, case treatment, and vector control. Each group worked in Tanzania for a period of 2–3 months and received 1–2 weeks of quarterly training to enhance their foreign aid capabilities. Training sessions allowed teams to update fieldwork progress, share experiences, discuss future plans and actions, analyze data, and negotiate solutions to project challenges. This approach fostered knowledge sharing and training opportunities between teams in both countries.

Training the paired trainer and local community health workers. During the initial phase, a total of 37 highly skilled young volunteers were recruited by the experts. This group included 21 field researchers, 4 microscopists, 8 community nurses, and 4 community doctors who had previous experience in community malaria control. The volunteers underwent a comprehensive training program consisting of 6 days of theoretical training followed by 8 days of practical training focused on malaria prevention and control. The training covered important aspects such as the objectives of the project, technological roadmaps, and fundamental intervention skills, including case management, vector control, and health education. This training served as a strong foundation for conducting baseline surveys, monitoring activities, and implementing interventions in the project areas.

During the Pilot Project, the support of the Talented Young Scientist Program (TYSP) of the Chinese Ministry of Science and Technology enabled a Tanzanian entomologist, Tegemeo Gavana, to work for one year in the laboratory of the NIPD. During this time, Gavana gained expertise in laboratory techniques of molecular biology, specifically in the identification of *Anopheles* species and testing for *Plasmodium* parasite infection from these mosquitoes. This knowledge and skill set laid a solid foundation for conducting vector tests in the project.

Throughout the interventions, the project also provided comprehensive training on malaria prevention and control techniques for healthcare professionals. This training covered various aspects, including laboratory testing for malaria, standardized case treatment, follow-up management, vector surveillance, parasite control, and information reporting. The primary objective of this training was to

enhance the skills of healthcare professionals in malaria prevention and control and to establish a local team capable of providing continuous and effective services in the community.

Rotation and management of Chinese field teams. Each year, teams comprised of 5 to 6 Chinese members are sent to Tanzania for a period of approximately 3 months, targeting the peak season of malaria transmission. At the conclusion of each rotation, the majority of the Chinese field team members are replaced while a selected few remain. From 2016 to 2018, a total of 32 individuals comprising 6 groups were deployed to provide on-site technical support in the country. The team leader is responsible for overseeing all activities in the field, ensuring adherence to the work plan, and fostering problem-solving skills among team members. Weekly team meetings are held to allow for progress reporting, analysis of collected data, discussion of field results, and resolution of project-related issues.

The Effects and Implications of the “Paired Learning by Doing” Approach

The novel “Learning by Doing” approach, specifically in the form of “paired,” has proven to be an essential and effective element contributing to the success of the Pilot Project. This approach can be utilized when cooperation partners are able to establish mutual understanding from the outset. By fostering close collaboration and mutual learning through paired interactions in the field, the approach has significantly enhanced the capacity of both Chinese and Tanzanian members. Consequently, upon their return home, many Chinese team members received promotions. Notably, following their participation in multiple aid projects in Africa, some members from the Anhui and Shandong provinces assumed leadership positions within their respective organizations, while others became recognized experts in China’s foreign aid programs.

In addition to the aforementioned outcomes, there are broader implications of the “Learning by Doing” approach in the context of pairing individuals.

Establishment of a global health talent pool in China. This initiative involved the selection of highly skilled professionals from various provincial centers for disease control and prevention, such as the NIPD, Shandong Institute of Parasitic Disease, Yunnan Institute of Parasitic Disease, Anhui Provincial CDC, Guangxi Zhuang Autonomous Region CDC, and

Chongqing CDC. These experts were carefully chosen for their comprehensive perspective and practical experience in healthcare. By actively addressing real-world challenges within the project and engaging in on-site communication and coordination with the WHO, Tanzanian experts, and non-governmental organizations, they gained invaluable knowledge and expanded their horizons. To ensure efficient project management and foster the professional growth of the team, the project implemented a robust project management framework which included expert committees, a project officer, field working groups, and community volunteer teams.

Improvement of the capacity of local healthcare services. The successful implementation of the Pilot Project owes much to the efforts of 37 dedicated and talented young volunteers who formed a community worker team in Rufiji District, Tanzania. Their contribution laid a strong foundation for the project’s seamless progress and subsequent effective malaria control measures. In addition, 50 local staff members received comprehensive training on indoor residual spraying (IRS) techniques to control infected areas and eliminate Anopheles larvae. Furthermore, 37 clinicians, medical workers, and volunteers underwent training in case management, vector control, and health education. These interventions resulted in the development of a cadre of skilled professionals and technical staff members. Notably, two Tanzanian experts were given the opportunity to study and work in China, thanks to funding from the Chinese government’s TYSP. After completing their diplomas, they returned to their homeland to spearhead efforts in training local personnel on malaria control techniques.

Enhancement of local capacity for malaria control and strategic implementation. In order to align with the infrastructure and health conditions of the local community, expert discussions were held between Chinese and Tanzanian professionals to modify the Chinese “1-3-7” approach to the 1,7-mRCTR approach for malaria prevention and control. This collaboration involved local institutions engaged in malaria prevention and control, as well as the establishment of mobile microscopic examination stations. Furthermore, a locally-tailored electronic reporting system was developed based on the Open Data Kit (6), which is similar to the Chinese disease surveillance system. Researchers in the field can now utilize this system to gather epidemiological information on reported malaria cases, enabling prompt detection and reporting. The implementation

of this system has not only boosted the efficiency and effectiveness of malaria control efforts but has also bolstered the monitoring and management capabilities of local institutions. This adaptation has resulted in a significant reduction in malaria cases and has reinforced the capacity for local control (7–8).

Leveraging the Involvement of Private Sectors

Moreover, a productive platform for international cooperation has been established, facilitating successful collaboration among various stakeholders. By means of active communication and coordination, Fosun Pharma was engaged in the cooperation and donated 500,000 Chinese Yuan worth of Dihydroartemisinin and Phosphate Pipleraquine (D-ARTEP), an oral artemisinin-based medication. This initiative has not only rescued numerous local patients but also elevated the standardized cure rate for malaria (3,9).

CONCLUSION

The successful implementation and sustainable development of the Pilot Project rely on the capacity building approach known as “Learning by Doing” through the “paired” method. This approach has effectively facilitated mutual learning between personnel from China and Tanzania, enabling them to collaboratively address local challenges. Additionally, it equips the project team with the necessary skills, knowledge, and resources to deliver the project and ensure its long-term sustainability.

Building upon the achievements of the Pilot Project, a follow-up initiative called the China-Tanzania Demonstration Project on Malaria Control, funded by the BMGF, was carried out from 2019 to 2023. The aim is to replicate the success and extend the work beyond the Pilot Project. This inclusive approach of “Learning by Doing” through “paired” collaboration has the potential to serve as a model for future South-South health development cooperation projects.

doi: 10.46234/ccdcw2023.133

Corresponding author: Duoquan Wang, wangdq@nipd.chinacdc.cn.

¹ National Institute of Parasitic Diseases, Chinese Center for Disease Control and Prevention (Chinese Center for Tropical Diseases Research); NHC Key Laboratory of Parasite and Vector Biology; WHO Collaborating Centre for Tropical Diseases; National Center for International Research on Tropical Diseases, Shanghai, China; ² National Institute of Parasitic Diseases, Chinese Center for Disease Control and Prevention (Chinese Center for Tropical Diseases Research); NHC Key Laboratory of Parasite and Vector Biology; WHO Collaborating Centre for Tropical Diseases; National Center for International Research on Tropical Diseases; School of Global Health, Chinese Center for Tropical Diseases Research, Shanghai Jiao Tong University School of Medicine, Shanghai, China; ³ Guangxi Zhuang Autonomous Region Center for Disease Control and Prevention, Nanning City, Guangxi Zhuang Autonomous Region, China; ⁴ Chongqing Center for Disease Control and Prevention, Chongqing, China.

Submitted: May 15, 2023; Accepted: July 25, 2023

REFERENCES

1. WHO. World malaria report 2020: 20 years of global progress & challenges. <https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2020>. [2022-3-22].
2. Ma XJ, Ding W, Wang DQ, Duan L, Huang LL, Wang B, et al. Achievements and challenges of China-UK-Tanzania pilot project on malaria control. *Chin J Parasitol Parasit Dis* 2020;38(3):360–5. <http://dx.doi.org/10.12140/j.issn.1000-7423.2020.03.016>. (In Chinese).
3. WHO Regional Office for Africa. Fostering the China-Africa cooperation for the elimination of Malaria. 2019. <https://www.afro.who.int/news/fostering-china-africa-cooperation-elimination-malaria>. [2022-12-3]
4. Mlacha YP, Wang DQ, Chaki PP, Gavana T, Zhou ZB, Michael MG, et al. Effectiveness of the innovative 1, 7-malaria reactive community-based testing and response (1, 7-mRCTR) approach on malaria burden reduction in Southeastern Tanzania. *Malar J* 2020;19(1):292. <http://dx.doi.org/10.1186/s12936-020-03363-w>.
5. Ma XJ, Lu SN, Wang DQ, Zhou ZB, Feng J, Yan H, et al. China-UK-Tanzania pilot project on malaria control. *China CDC Wkly* 2020;2(42):820–2. <http://dx.doi.org/10.46234/ccdcw2020.179>.
6. Steiner A, Hella J, Grüninger S, Mhalu G, Mhimbira F, Cercamondi CI, et al. Managing research and surveillance projects in real-time with a novel open-source e Management tool designed for under-resourced countries. *J Am Med Inform Assoc* 2016;23(5):916–23. <http://dx.doi.org/10.1093/jamia/ocv185>.
7. JieMian News. Every year, 10 million Tanzanians contract malaria, and a group of Chinese want to change it. <https://www.jiemian.com/article/2385352.html>. [2018-8-15]. (In Chinese).
8. Wang DQ, Chaki P, Mlacha Y, Gavana T, Michael MG, Khatibu R, et al. Application of community-based and integrated strategy to reduce malaria disease burden in southern Tanzania: the study protocol of China-UK-Tanzania pilot project on malaria control. *Infect Dis Poverty* 2019;8(1):4. <http://dx.doi.org/10.1186/s40249-018-0507-3>.
9. SouHu. Fosun pharma supports malaria prevention and control cooperation projects in Tanzania. https://www.sohu.com/a/329632776_100207077. [2019-7-26]. (In Chinese).