# Chapter Five
# A History of Chinese-Funded Pharmaceutical Factories in Tanzania

## 5.1 Introduction

Tanzania's healthcare situation at independence was terrifying, prompting President Julius Nyerere to christen diseases among the three main "enemies" of the country's development, next to ignorance and poverty.[1] Despite the government's commitments to fight diseases, it lacked essential "weapons." Successful preventive and curative measures required the sufficient spread of health education to the population, vaccination against troublesome diseases, and an adequate supply of medicines and medical equipment. Yet, the government depended on acquiring all its curative and preventive therapies overseas, which were costly and could not be afforded by a low-income country. Such challenges burdened healthcare systems and limited effective healthcare delivery in the country. Local production of pharmaceuticals, by contrast, would maintain the country's self-sufficiency, reduce medical imports, and prevent the loss of foreign currency. This chapter surveys the emergence and development of Chinese-funded pharmaceutical industries in post-colonial Tanzania, tracing their history and implications for Tanzania's health sector. It also provides an overview of pharmaceutical industrial development before the onset of Chinese-funded factories, tracing the evolution of pharmaceutical industries in the country chronologically. It further examines the extent to which Chinese-sponsored pharmaceutical factories promoted self-sufficiency and how it implicated the Sino-Tanzanian pharmaceutical knowledge exchange under the spirit of Southern solidarity. While local production of pharmaceuticals held great potential in view of Tanzania's self-reliance agenda, I argue that the Chinese-sponsored factories instead created new forms of dependency, especially on imported raw materials and technical experts.

1 Julius K. Nyerere, Foreword to *History of the Medical Services of Tanganyika* by David F. Clyde (Dar es Salaam: Government Press, 1962), I.


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## 5.2 Prelude to Chinese-Funded Pharmaceutical Factories, 1900s–1968

Industrialization in the colonial territories was less encouraged in Africa since the colonies produced agricultural raw materials such as sisal, cotton, tea, and the like for the metropolitan industries. At the same time, colonialists turned the colonies into a market for the consumer and producer goods of the colonial powers.[2] The colonial economy was geared towards serving the interests of the colonial states and the metropolitan nations. Nevertheless, pharmaceutical manufacturing companies set up production facilities and started manufacturing medicines in Africa during the colonial period. Serious investment in medicines production became visible in the 1930s, concentrating in Tanganyika, Kenya, South Africa, Zimbabwe, and Nigeria. Throughout the colonial period, investment in pharmaceutical industries was closely tied to multinational European companies that set up subsidiaries in their colonies. For instance, in 1930, Glaxo Company set up its base in Kenya. Likewise, in 1935, the Abbott companies established a pharmaceutical industrial base in South Africa, while in Nigeria, May and Baker companies established their firms in 1944.[3] Yet in some colonies, such as Tanganyika, simple pharmaceutical factories were established and run by the colonial authorities. The establishment of pharmaceutical industries in some African countries went hand in hand with colonial economic investments. The colonial governments encouraged the establishment of pharmaceutical industries in settler colonies to meet the demands of pharmaceuticals for settlers and laborers. Moreover, import challenges necessitated the colonial authorities to build pharmaceutical industries during the world wars to meet the local supply of medicines to military personnel and African troops.[4] However, throughout most of the colonial period, there were fewer initiatives to promote the local production of medicines in Africa. The administrations mainly sourced medicines from abroad, preferably from the colonial authorities' metropoles.

**2** URT, *Report on the Fifty Years of Independence of Tanzania Mainland, 1961–2011*, 104; also read Chapter 5 in John Iliffe, *A Modern History of Tanganyika* (Cambridge: Cambridge University Press, 1979).

**3** Geoffrey Banda, Samuel Wangwe and Maureen Mackintosh, "Making Medicines: An Historical Political Economy Overview," in *Making Medicines in Africa: The Political Economy of Industrializing Local Health*, ed. Maureen Mackintosh, Geoffrey Banda, Paula Tibandebage and Watu Wamae (London: Palgrave Macmillan, 2016), 8.

**4** Amon J. Nsekela and Aloysius M. Nhonoli, *The Development of Health Services and Society in Mainland Tanzania: A Historical Overview-Tumetoka Mbali* (Dar es Salaam: East African Literature Bureau, 1976), 8; Banda, Wangwe and Mackintosh, "Making Medicines," 10.

The history of pharmaceutical industries in Tanzania dates back to the German and British colonial eras. The two colonialists established small-scale factories producing preventive and curative medicines. Germans, for instance, produced the smallpox lymph vaccine in Dar es Salaam until they fled the territory during WW I. In 1928, the British colonial government took over the production of a vaccine for smallpox at the Vaccine Lymph Institute in Mpwapwa, Dodoma. The Institute was the only institution in East Africa specially designed to produce and research the smallpox vaccine. Before its establishment, vaccine lymph was sourced from outside the country, while a few were prepared in the medical laboratory in Dar es Salaam. With an area of ten acres, the institute was completed and commenced production in July 1928 at a total cost of less than £4000, including buildings, equipment, and residences, producing one million doses annually. The production goals were to manufacture enough vaccines sufficient for the territory and surplus to supply to other colonies, help generate revenues, and serve the cost incurred from the imported vaccines. However, the Institute was closed in 1944, prompting the territory's purchase of lymph from Kenya, where, through the 1947 Directors of Medical Services Conference, the Kenyan government was permitted to manufacture Biological Products on behalf of other Territorial Governments.[5]

The Amani Tropical Agricultural Research and Biological Institute and a cinchona tree plantation at Bomole, Tanga, gave a chance to the emergence of a simple pharmaceutical factory in 1914.[6] The Germans' initial goal of planting cinchona trees was not meant for raw materials to be locally used for the production of quinine. Instead, it was grown to satisfy German needs for industrial raw materials and research by the Amani Institute. However, the advent of the First World War (1914–1918) forced the Germans to establish a simple pharmaceutical industry in the territory. During the war, local supplies of quinine ran short because of the insecurity that prevented the Germans from importing more quinine from abroad. Thus, the Germans opened quinine factories in Kilosa and the Veterinary Laboratory at Mpapua, Tanga. The factories exploited cinchona barks

**5** "Centralization of the Production of Vaccine Lymph for East Africa at Mpwapwa, Tanganyika Territory," TNA. Acc. No. 450, Ministry of Health, File No. 204, Vaccine Lymph-Local Manufacturer and Distribution of, 1935–1946; "Letter from Director of Medical Services, 3 November 1948, Lymph Institute Mpwapwa, to the Chief Secretary, Dar es Salaam," TNA. Acc. No. 450, Ministry of Health, File No. 204/4, Manufacture of Vaccine Lymph – Buildings, 1948–1949; Nsekela and Nhonoli, *The Development of Health Services*, 9.

**6** Nsekela and Nhonoli, *The Development of Health Services,* 14; Stefanie Gänger, "World Trade in Medicinal Plants from Spanish America, 1717–1815," *Medical History* 59, no. 1 (January 2015): 47, https://doi.org/10.1017/mdh.2014.70.

grown in Kilosa and Amani Institute, respectively. Production trials commenced on a small scale in January 1914, when about 10 kilos were produced a month by the officer in charge. The factories at Kilosa and Tanga continued to operate throughout the War, producing quinine and other medicines.[7]

After the British takeover of the colony in 1918, the new colonial administration inherited the remains of the German cinchona trees. Tanganyika, a "conquered" territory, the League of Nations mandate was less valued for industrial investment by the British colonial government. In East Africa, British colonial policy preferred establishing industries in Kenya, a settler colony.[8] However, in 1942, the British government established a totaquina factory in Dar es Salaam using barks exploited from the old half-forgotten plantation and the cinchona just reaching maturity, which had been planted in different parts of the territory.[9] The British needed to establish the factory during the Second World War because Java, which was the leading supplier of quinine to the British colonies, had been occupied by the Japanese in February 1942. This deprived the British and their allies of the primary source of global quinine supply.[10] To alleviate the situation, the British government encouraged the production of drugs locally in the colonies. Hence, Tanganyika's existing cinchona plantations gained favor with the British. However, notwithstanding the quality of totaquina produced in Dar es Salaam, the British colonial government ceased its production in October 1947, followed by two years of decline after the end of WW II. The cessation implies that the factory operation was a wartime expedience – a short-term factory consistent with imperial policy, propelling the post-colonial government's dependence on imported medicines.[11]

At independence, the Tanzanian government attempted various ways to provide policy guidelines by which it would disengage itself from neo-colonial economic entanglement and thereby hasten its progress to achieve self-reliance. It was realized that importing medicines from abroad was the leading cause of the

**7** "Letter from the Acting Chief Secretary, September 20, 1922, to the Principal Medical Officer, Tanganyika Territory," TNA. Acc. No. 450, Ministry of Health, File No. 174, Cinchona, 1920–1935.

**8** Rune Skarstein, "Growth and Crisis in the Manufacturing Sector," in *Tanzania Crisis and Struggle for Survival*, ed. Jannik Boesen, Kjell J. Havnevik, Juhani Koponen, and Rie Odgaard (Uppsala: Scandinavian Institute of African Studies, 1986), 79.

**9** "A Memorandum on Cinchona Development and Research on Totaquina, 1944," TNA. Acc. No. 450, Ministry of Health, File No. 174, Cinchona Products, Maintenance and Supplies, 1943–1945.

**10** "A Memorandum from the Colonial Office of April 1, 1942," TNA. Acc. No. 450, Ministry of Health, File No. 174, Cinchona Products, Maintenance and Supplies, 1941–1942.

**11** "Letter from the Member for Finance, Trade and Economics, December 18, 1948 to the Director of Medical Services," TNA. Acc. No. 450, Ministry of Health, File No. 1063, Cinchona, 1944–1949.

scarcity of foreign currency.[12] Thus, in its First Five Year Development Plan (FYDP) covering the period 1964 to 1969, the Ministry of Commerce and Industries pledged to convert Tanzania from an agrarian and weak country, dependent upon the caprices of other countries, into an industrial and powerful country, fully self-reliant, and independent of exploiting countries.[13] To achieve this objective, the ministry, in its development plans, laid a firm industrial base.

Consequently, the establishment of pharmaceutical industries was a part of the government's long-term plans, premised on the FYDP. These industries were founded when the government prioritized expanding healthcare to serve basic needs, raise life expectancy, and foster healthy communities. On the other hand, the government's stress on pharmaceutical industries aimed at remedying the country's dependency on imported drugs, which became expensive and unsustainable for a growing economy.[14] Indeed, the establishment of pharmaceutical factories presented an opportunity to save lives while creating jobs and improving the local economy. The industries anticipated prompting local production of packing materials, containers, boxes, printing work, medical literature, and other products demanded by the factories. Above all, these production jobs would also increase the country's export volume, creating industries that would ensure constant production to meet domestic needs and a surplus for exports, which would boost the country's economy.[15] This indicates that pharmaceutical industries were vital for the nation's development and for improving the standard of people's health, which assured a vigorous labor force to develop a sound economy.

Concrete steps to implement the government's plans to set up pharmaceutical industries were envisaged in the Second Five Year Development Plan (SFYDP) projected for 1969 to 1974. The government envisioned establishing three government-owned pharmaceutical factories.[16] Such commitment was bound by the government statement, which outlined its intent to practice the national politics of

**12** URT, *Second Five-Year Plan, 1969–1974, Programme for Industrial Development, Part I, July 1969*, 9; Interview with Cleopa David Msuya, July 6, 2018, Upanga, Dar es Salaam.

**13** "Ministry of Industries, Mineral Resources and Power, Budget Speech. The Fundamental Task of the Five-Year Plan and the Path of its Fulfilment," TNA. Acc. No. 469, Ministry of Commerce and Industries, File No. CIC 70/12 Speeches-Material, 1962–64, 1.

**14** "Proposal for the Setting up of a Factory to produce Pharmaceutical Products in Tanzania, 1964," TNA. Acc. No, 596, National Development Corporation, File No. D/3522/2, Pharmaceutical Project, 1966–1966.

**15** Interview with Cleopa David Msuya, Upanga, Dar es Salaam; "Memorandum, Tegry-Assia Pharmaceutical Ltd, April 20, 1966," TNA. Acc. No, 596, National Development Corporation, File No. D/3522/2, Pharmaceutical Project, 1966–1966.

**16** URT, *Second Five-Year Plan, 1969–1974, Programme for Industrial Development, Part I, July 1969*, 38.

self-reliance through the local production of pharmaceuticals.[17] Therefore, Mabibo Vaccine Institute and Keko Pharmaceutical Industries (discussed below) were established under the country's scheduled development agenda. These two factories supplemented the existing privately owned Mansoor Daya Industries, founded in 1962 (see below).

Before the assistance from the Chinese government, the Tanzanian government encouraged locals and foreigners to invest in pharmaceutical industries. Through its Three-Year Development Plan (TYDP) of 1961 to 1964, the government created favorable conditions for foreign capital by offering tariff protection and tax incentives. For instance, the Foreign Investment Act of 1963, among other commitments, gave immunity to foreign capital from nationalization without compensation. Furthermore, in January 1965, the government established the National Development Corporation (NDC), an industrial development and promotion organization which promoted private and public investments in the industrial sector.[18] Tanzanians and foreigners showed interest in investing in pharmaceutical industries. For instance, Mansoor Daya, a pharmacist in a retail pharmacy in Dar es Salaam since 1959, collaborated with the Tayford Laboratories of England to establish Mansoor Daya Chemicals Limited in 1962. The industry, the first to be established in post-colonial Tanzania, started its production in May 1965 with production facilities for tablets, granules, ointments, liniments, suspensions, and syrup.[19] Though it was a small-scale unit with an establishment cost of £12,000, its inauguration marked an important milestone in the fight against diseases and for the local production of pharmaceuticals. The unit manufactured drugs for preventive and curative measures targeting the demands consistent with the existing

**17** JMT, *Mpango wa Maendeleo wa Shughuli za Afya na Ustawi wa Jamii kwa Kipindi cha Miaka Mitano Kuanzia Julai 1, 1969 Mpaka Juni 30, 1974*, 18.

**18** URT, *Ministry of Industries, Mineral Resources and Power, Budget Speech. The Fundamental Task of the Five-Year Plan and the Path of Its Fulfilment*, 3; Rune Skarstein and Samuel M. Wangwe, *Industrial Development in Tanzania: Some Critical Issues* (Uppsala: Scandinavian Institute of African Studies, 1986), 4; Idrian N. Resnick, *The Long Transition: Building Socialism in Tanzania* (London: Monthly Review Press, 1981), 27; Jeannette Hartmann, "The Two Arusha Declarations," in *Re-Thinking the Arusha Declaration*, ed. Jeannette Hartmann (Copenhagen: Axel Nielsen and Son A/S, 1991), 113.

**19** Sudip Chaudhuri, Maureen Mackintosh and Phares Mujinja, "Indian Generics Producers, Access to Essential Medicines and Local Production in Africa: An Argument with Reference to Tanzania," *European Journal of Development Research* 22, no. 4 (2010): 8; also see Banda, Wangwe and Mackintosh, "Making Medicines," 19.

health challenges.[20] Nevertheless, production at Mansoor Daya Chemicals Limited was insufficient to satisfy the country's needs, prompting further investment calls.

Chinese-funded pharmaceutical industries in Tanzania were established shortly after the government endorsed the Arusha Declaration in 1967, which defined a socialist development course. Under the declaration, the state controlled the economy to overcome dependence on private parastatals. Thus, it nationalized privately owned industries to enable the government to own the primary means of production. Such policies discouraged local and foreign investment in pharmaceutical industries.[21] Yet, pharmaceutical industries funded by the Chinese government were compatible with the government's endeavor to have state-owned enterprises. In Africa, Tanzania was the first to get assistance from the Chinese government, and two industries, Mabibo Vaccine Institute (MVI) and Keko Pharmaceutical Industries (KPI), were built in 1968 (discussed below). Algeria followed Tanzania in line to receive Chinese assistance, and on December 22, 1976, consented with China to construct a factory for surgical instruments in Médéa.[22]

In the mid-1960s, when China committed to providing technical and economic assistance to Tanzania, it had already attained healthy economic and technological development domestically. After its 1949 liberation movement, China invested vigorously in industries for hospital equipment. The industries gave the government enough Chinese-made equipment to diagnose and treat diseases and facilitate surgical operations. Such investments transformed China's dependency on imported hospital equipment. By the 1970s, it imported only 1,500 kinds of medical equipment with 5,000 specifications to meet domestic needs. The Chinese government further established research institutes for medical equipment and built large factories in Beijing, Tianjin, and Shanghai, as well as in the provinces of Shaanxi and Sichuan, to produce enough medical equipment to cater to the needs

**20** Lawrence Mabele, "Kiwanda cha Madawa," *Tanzania Nchi Yetu*, November 1977, 12–13; "Industrial Studies and Development Centre, Some Facts about the Market for Medicinal and Pharmaceutical Products in Tanzania, 1965," TNA. Acc. No. 596, National Development Corporation, File No. D/3522/2, Pharmaceutical Project, 1966–1968.

**21** Kjell J. Havnevik, "A Resource Overlooked-Crafts and Small-Scale Industries," in *Tanzania Crisis and Struggle for Survival*, ed. Jannik Boesen, Kjell J. Havnevik, Juhani Koponen, and Rie Odgaard (Uppsala: Scandinavian Institute of African Studies, 1986), 269.

**22** "WHO, National Health Planning in Tanzania: Report on a Mission, August 1, 1973–April 28, 1974," WHOA, File No. TAN/SHS/002, 1972–1974-SHS/NHP, National Health Planning, 7; Gail A. Eadie and Denise M. Grizzell, "China's Foreign Aid, 1975–78," *The China Quarterly*, no 77 (Mar. 1979): 228; Dongxin Zuo, "Economizing Socialist Aid: China's Failed Surgical Plant in Algeria, 1973–80," *Technology and Culture* 63, no. 3 (July 2022): 724.

of the whole of China.[23] These examples imply that when China pledged to assist Tanzania with equipment and experts for the pharmaceutical industries, it had already made a step in producing them at home.

## 5.3 Mabibo Vaccine Institute (MVI), 1968–1984

> The most effective way to prevent many infectious diseases is through vaccination, but for now, all vaccines are imported from abroad. With the help of a friendly country [China], [Tanzania] seeks to establish a vaccine factory to manufacture locally two kinds of vaccines before the end of 1969.[24]

The preceding quotation underscores the government's commitment to establishing a vaccine plant to conform with its self-reliance agenda and the preventive healthcare campaign endorsed in the TYDP for 1961 to 1964 and the FYDP for 1964 to 1969, stressing the dual approaches of hygiene and vaccination.[25] Yet, since WW II, the country sourced all vaccines from abroad, causing an unavoidable delay and or spoiling the vaccines while on the way to Tanganyika, compromising the preventive health campaign.[26] Furthermore, before the local production of vaccines, the government relied on vaccines imported to the country by international organizations as grants. For example, from 1968 to 71, the United Nations International Children's Emergency Fund (UNICEF) and the WHO provided vaccines, transport facilities, vaccine kits, and medical equipment to support smallpox and tuberculosis eradication campaigns.[27] Yet, the granted vaccines did not cover the country's needs, costing the government more than Tshs. 2,000,000 for

**23** Hua Hsin, "Chinese Factory's Long March from Dustpans to Hospital Equipment," *Daily News*, October 19, 1977, 4.

**24** My translation from Kiswahili in JMT, *Mpango wa Maendeleo wa Shughuli za Afya na Ustawi wa Jamii kwa Kipindi cha Miaka Mitano Kuanzia Julai 1, 1969 Mpaka Juni 30*, 1974; also see URT, *Second Five-Year Plan for Economic and Social Development July 1, 1969–June 30, 1974, Volume I: General Analysis, 1969*, 173.

**25** URT, *Tanganyika, Development Plan for Tanganyika, 1961/62–1963/64, Dar es Salaam, 1962*, 18; URT, *Tanganyika, Five-Year Plan for Economic and Social Development, July 1, 1964–June 30, 1969, Volume II: The Programmes, 1964*, 118.

**26** "Letter from Senior Medical Officer, Western and Central Province, Tabora, December 24, 1949, to the Director of Medical Services, Small Vaccine Lymph," TNA. Acc. No. 450, Ministry of Health, File No. 204, Vaccine Lymph- Local Manufacture and Distribution of, 1946–1952.

**27** "Addendum to the Plan of Operation for the Development of Public Health Services in the United Republic of Tanzania (Tanganyika): BCG Vaccination, 1970," WHOA, File No. TANZANIA/UNICEF-5, 1968–1972-SHS, Development of Public Health Services; URT, *Ministry of Health and Social Welfare, Annual Report of the Health Division, 1967 Volume I*, 6.

purchasing vaccines from abroad yearly throughout the 1960s.[28] Consequently, China's assistance in the establishment of the vaccine factory was an imperative attempt to challenge the colonial policies, which gave less prominence to preventive healthcare and emancipation from dependence on imported vaccines from countries of the Global North. More importantly, the production rekindled hope that it would be possible for the government to combat TB and smallpox successfully, promote the country's self-reliance agenda, and preserve foreign currency.

The Mabibo plant was co-financed by the Tanzanian and Chinese governments. Tanzania received China's support in the form of "Technical Assistance," whereby the Chinese government covered expenses related to experts for technical work and all equipment needed for production and construction work. In return, the Tanzanian government provided funds to erect the plant buildings worth Tshs. 1,000,000.[29] The plant was located at Mabibo, a few miles outside the city center of Dar es Salaam in the Kigogo area. President Julius K. Nyerere officially inaugurated the plant on April 23, 1971.[30] About 70 Tanzanians manned the factory under the supervision of Chinese experts who taught them the art of vaccine manufacturing (Figure 12). Production commenced in January 1971, and the first production was issued to Kisarawe District in March 1971 for TB prevention. Up to 1972, about 500 people were vaccinated in Kisarawe District.[31] Regrettably, some industrial equipment sourced from China was found unsuitable in hot climate regions such as Dar es Salaam. The hot weather lowered the quality of the vaccine produced in liquid. As a result, in 1974, the plant changed its products from a liquid form into tablets and procured new equipment for drying the liquid-made vaccines into tablet form (Figure 12). The MVI produced enough vaccines to satisfy the country's needs and a surplus, which was sold to nearby countries. Its production capacity was 1.5 million doses of freeze-dried vaccine for smallpox and 250,000 doses of Bacillus Calmette-Guérin (BCG) vaccine for TB per year.[32]

**28** Marcelino Komba, "Tanzania takes a Step Towards Self-Reliance in Drugs," *The Nationalist*, May 4, 1971, 3.

**29** "A Special Report, Chinese Medical Assistance to Tanzania, May 12, 1972," TNA. Acc. No. 450, Ministry of Health, File No. HEA/90/5 Technical Assistance China; "Dar to Have a Vaccine Plant, Government Moves to Combat Smallpox, Tuberculosis," *The Nationalist*, August 22, 1970, 8.

**30** Komba, "Tanzania takes a Step Towards Self-Reliance in Drugs," 3.

**31** "A Special Report, Chinese Medical Assistance to Tanzania, May 12, 1972," TNA. Acc. No, 450, Ministry of Health, File No. HEA/90/5 Technical Assistance China.

**32** "A Special Report, Chinese Medical Assistance to Tanzania, May 12, 1972," TNA. Acc. No. 450, Ministry of Health, File No. HEA/90/5 Technical Assistance China; Ellen Rhobi Binagi, "Madawa ya Kinga Yatengenezwa Mabibo," *Tanzania Nchi Yetu*, Novemba 1977, 13.

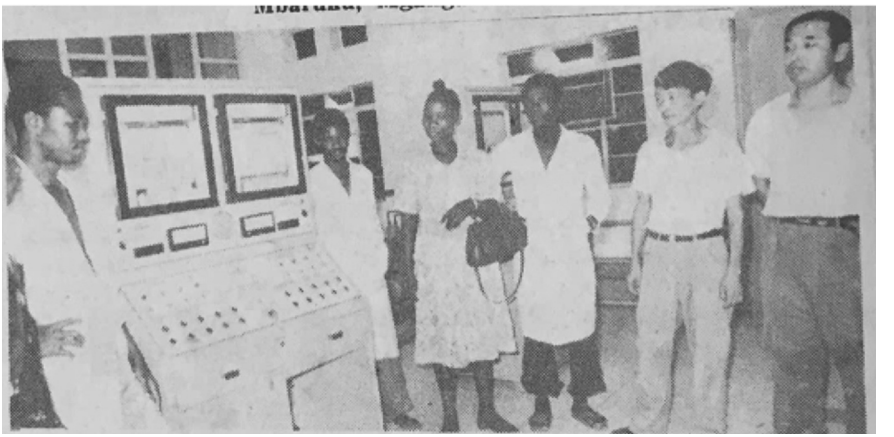

**Figure 12:** Local and Chinese workers standing beside a vaccine dryer, 1977. Source: Ellen Rhobi Binagi, "Madawa ya Kinga Yatengenezwa Mabibo," *Tanzania Nchi Yetu*, Novemba 1977, 13 (printed with permission).

The MVI began with the production of BCG for TB, followed by the freeze-dried vaccine for smallpox. The government dearly needed these two vaccines to curb smallpox and TB, which were spreading alarmingly. The incidences of smallpox and TB were a threat not only to the Tanzanian population but to many countries of the Global South. For instance, in 1958, the World Health Assembly endorsed the Smallpox Eradication Programme (SEP) to fight the epidemic. With its frightening spread rate, the WHO paid much attention to SEP from 1966 onwards.[33] The production of vaccines at MVI responded to the global health challenges. In Tanzania, incidences rose during WW II and accelerated further after independence. The WW II military requirements caused a considerable dislocation of the rural epidemiological services, allowing smallpox cases to increase markedly in many parts of the country, predominantly south and east of Lake Victoria (Table 10). Yet, it took until 1968 for the Tanzanian government to launch a robust campaign against smallpox and ensure that all newborns were inoculated.[34] The government's regulation was obligatory given the mounting incidences of smallpox. The

**33** Randall M. Packard, *A History of Global Health: Interventions into the Lives of Other Peoples* (Baltimore, MD: Johns Hopkins University Press, 2016), 129–145.

**34** URT, *Ministry of Health, Annual Report of the Health Division 1965 Volume I,* 6; W. l. Kilama, A. M. Nhonoli and W. J. Makene, "Health Care in Tanzania," in *Towards Ujamaa: Twenty Years of TANU Leadership*, ed. Gabriel Ruhumbika (Dar es Salaam: East African Literature Bureau, 1974), 212.

1965 annual report of the Health Division shows the incidences of smallpox more than doubled from 1,461 cases in 1964 to 3,017 cases in 1966 (Table 10). Such a rise occurred despite the vaccination campaign, which was underway. In 1964, for instance, the government inoculated about 1,500,000 people. The number of inoculated Tanzanians rose to 3,131,555 out of more than 11,000,000 people by 1965.

**Table 10:** Annual returns of smallpox cases and deaths in mainland Tanzania, 1937–1967.

| Year | Notified Cases | Deaths | Cases/Mortality Per cent |
|---|---|---|---|
| **1937** | 1,478 | 31 | 2.1 |
| **1938** | 1,095 | 27 | 2.4 |
| **1939** | 579 | 27 | 4.7 |
| **1940** | 156 | 5 | 3.2 |
| **1941** | 92 | 6 | 6.5 |
| **1942** | 90 | 4 | 4.4 |
| **1943** | 201 | 2 | 1.0 |
| **1944** | 5,755 | 38 | 0.6 |
| **1945** | 12,285 | 1,815 | 14.7 |
| **1946** | 12,671 | 1,935 | 15.2 |
| **1947** | 2,960 | 616 | 20.8 |
| **1948** | 1,206 | 209 | 17.3 |
| **1949** | 10,45 | 169 | 16.1 |
| **1950** | 6,390 | 345 | 21.0 |
| **1951** | 855 | 139 | 16.2 |
| **1952** | 370 | 34 | 9.2 |
| **1953** | 1,200 | 54 | 4.5 |
| **1954** | 928 | 28 | 3.0 |
| **1955** | 542 | 15 | 2.8 |
| **1956** | 605 | 21 | 3.5 |
| **1957** | 856 | 38 | 4.4 |
| **1958** | 1,176 | 94 | 7.9 |
| **1959** | 1,442 | 158 | 10.9 |
| **1960** | 1,584 | 83 | 5.2 |
| **1961** | 914 | 45 | 4.9 |
| **1962** | 1,048 | 53 | 5.0 |
| **1963** | 867 | 49 | 5.6 |
| **1964** | 1,461 | 102 | 7.0 |
| **1965** | 2,759 | 213 | 7.7 |
| **1966** | 3,017 | 171 | 5.7 |
| **1967** | 1,629 | 150 | 9.2 |

**Source: URT,** *Ministry of Health*, *Annual Report of the Health Division*, *1965*, Volume I, 7; "WHO, Smallpox Eradication: Assignment Report, 1972," WHOA, File No. TANZANIA-1801, 1970–1974-CDS2, Smallpox Eradication, 21.

Yet, the 1965 report shows that smallpox epidemics affected several regions, such as Mwanza, which reported 490 cases, Mbeya 475, Kigoma 407, Shinyanga 354, and Iringa, which recorded 309 cases. Other regions, such as Tabora, Singida, and Mtwara, reported not more than 100 cases, while the incidences in other areas were less sporadic.[35] This increasingly smallpox epidemic in the mid-1960s incited the importation of vaccines and made the need for the local production of vaccines appealing.

Furthermore, TB was also a severe threat to the Tanzanian government. The 1967 annual report of the Health Division shows that TB incidences were rampant in all regions of Tanzania. Numerous TB cases among both outpatients and inpatients were reported in Mwanza, Tanga, Kilimanjaro, and Arusha Regions (Table 11).[36]

**Table 11:** Tuberculosis incidences by 1967.

| Region | Population | Total No. T.B. Beds | Total No. B.C.G. Vaccinations | Outpatients | Inpatients | Total |
|---|---|---|---|---|---|---|
| **Arusha** | 601,515 | 84 | 198,822 | 672 | 1,054 | 1,726 |
| **Kilimanjaro** | 650,533 | 246 | 37,670 | 629 | 1,329 | 1,958 |
| **Coast** | 781,267 | 230 | 24,475 | 647 | 678 | 1,958 |
| **Dodoma** | 708,422 | 84 | 856 | 178 | 182 | 360 |
| **Iringa** | 683,555 | 102 | 1,565 | 299 | 468 | 767 |
| **Kigoma** | 470,773 | – | 40 | 132 | 130 | 262 |
| **Mara** | 535,882 | 60 | 2,503 | 559 | 242 | 801 |
| **Mbeya** | 955,891 | 120 | 65,114 | 42 | 218 | 260 |
| **Morogoro** | 683,061 | 100 | – | 97 | 487 | 584 |
| **Mtwara** | 1,032,896 | 226 | – | 432 | 1,442 | 1,874 |
| **Mwanza** | 1,057,965 | 170 | 112,439 | 452 | 2,569 | 3,021 |
| **Ruvuma** | 392,812 | 100 | 8,540 | 733 | 587 | 1,320 |
| **Shinyanga** | 888,209 | 95 | – | 297 | 113 | 410 |
| **Singida** | 454,749 | – | – | 582 | 320 | 902 |
| **Tabora** | 552,339 | 73 | – | 149 | 36 | 185 |
| **Tanga** | 769,304 | 196 | 3,955 | 960 | 1,084 | 2,044 |
| **West Lake** | 658,079 | 120 | 314 | 183 | 1,429 | 1,612 |
| **Totals** | 11,876,982 | 2,016 | 456,343 | 7,043 | 12,368 | 19,411 |

**Source:** URT, Ministry of Health and Social Welfare, Annual Report of the Health Division, 1967 Volume I, 10.

**35** "WHO, Smallpox Eradication: Assignment Report, 1972," WHOA, File No. TANZANIA-1801, 1970–1974-CDS2, Smallpox Eradication, 22; URT, *Ministry of Health, Annual Report of the Health Division 1965 Volume I,* 2.

**36** URT, *Ministry of Health and Social Welfare, Annual Report of the Health Division, 1967 Volume I,* 10.

Undoubtedly, the production of vaccines at the MVI was a notable achievement. Nevertheless, in 1979, the WHO declared the eradication of smallpox, and subsequently, the MVI condensed the production of the freeze-dried vaccine. At the same time, 50 employees out of 70 left the plant. The production of the BCG vaccine continued, but after the Chinese experts left, the quality of the vaccines produced by local workers with limited experience and expertise no longer met the WHO requirements. In such a context, the production of the BCG vaccine halted in 1982, and a few remaining personnel, left unoccupied, abandoned the factory.[37] In 1980, Mabibo was handed over to the National Chemical Industries (NCI) through the Ministry of Industries with a view to rehabilitation. In 1984, it was considered the most suitable site for housing the Extended Program of Immunisation (EPI) in Tanzania. As a result, all but three of the buildings were handed over to the Ministry of Health for EPI. In July 1986, the remaining three buildings were handed over to EPI by NCI for their use. Thus, Mabibo has not been available for vaccine production ever since.[38]

## 5.4 Keko Pharmaceutical Industries (KPI) and Production for Self-Sufficiency, 1968–1997

The Keko plant was established with assistance from the Chinese government in 1968 as a unit under Tanzania's Ministry of Health and Social Welfare. It was a medium-scale unit with facilities that produced tablets, capsules, and infusions for therapeutic purposes. Its foundation stone was laid in 1973 by the first Vice President, Aboud Jumbe. The construction of KPI was divided into two phases. Phase one was completed in 1972, while the second phase was done in July 1975. Trial production started in 1975 after completing civil works and machinery installation.[39] The Chinese government assisted in founding KPI following the request by Tanzania's Ministry of Health in 1967. The plant was built at the cost of Tshs. 9.9 million, the government of Tanzania contributing a sum of Tshs.

**37** United Nations Industrial Development Organization (UNIDO), *Programme for Production of Vaccines in Africa, Technical Report: Programme for Production of Vaccines in Tanzania, Prepared for the Government of the United Republic of Tanzania, on January 6, 1986*, 5.

**38** UNIDO, *Establishment of a Formulation-Filling Plant for Bacterial Vaccines for Veterinary Application Technical Report, Findings and Recommendations, Prepared for the Government of the United Republic of Tanzania, on November 13, 1991*, 9.

**39** "A Special Report, Chinese Medical Assistance to Tanzania, May 12, 1972," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko); "Kiwanda cha Dar Kutoa Madawa Mwaka Ujao," *Uhuru*, Novemba 3,1973, 1.

5.1 million for civil works and the remaining Tshs. The Chinese government provided 4.8 million in machinery, raw materials, and technology. KPI was a production wing of the Ministry of Health before its transfer to the Ministry of Industries under the National Chemical Industries (NCI) in May 1980, beginning to produce commercially.[40]

The factory had five main sections: Quality Control, Tabletting, Injection, Administration, and Accounts. These sections were manned by 100 employees, including three registered pharmacists, two chemical laboratory technicians, two medical laboratory technicians, production assistants and auxiliaries, laborers, cleaners, and watchmen. Its production capacity was 105 million tablets, twelve categories of injections contained in 10 million ampules, and five categories of intravenous infusions contained in 40,000 vials per year. The plant was committed to producing highly needed drugs consistent with health challenges. Its trial production list included about 35 varieties of medicines.[41] However, in 1977, production was reduced to 25 products. The management realized there was little demand for some products while others were uneconomical. For instance, eye drops were in less demand due to fewer eye cases. The production of some drugs was phased out as they were perceived to be unpopular with many users. Among the 25 listed products, not all were routinely produced. Some drugs were made only on special requests.[42] There was an increase in the production of the seriously needed medicines at the plant. The available figures show that aspirin and dextrose were in high demand, raising their production tremendously. For instance, the production of aspirin rose from 20 million tablets in 1975 to 35 million in 1977. Similarly, the production of dextrose rose from 2,000 tablets in 1975 to 15,000 in 1977.[43] These few glimpses reveal that the production focus responded to the economic demands following the most common diseases.

The plant's management and production shook, recording several malfunctions and losses immediately after the Chinese pharmaceutical technicians handed over management and production to Tanzanians in June 1976. For in-

**40** "National Chemical Industries, Brief Notes on Keko Pharmaceutical Industries Limited, 1981," TNA. Acc. No. 638, Chemical Industries, File No. GM/6/F/80, Keko Pharmaceutical Industries Ltd, 1985, Special Surveys and Reports.

**41** "Letter from the Office of Planning and Development Department of the Tanzania Investment Bank to the Director, Keko Pharmaceutical Plant, March 18, 1978, Production of Keko Factory," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko); "Kiwanda cha Madawa Kitajengwa Mjini Dar," *Uhuru*, Septemba 21, 1972, 5.

**42** "Pharmaceutical Plant, Keko, Production List," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**43** "Pharmaceutical Plant, Keko, Production List," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

stance, in 1977, the plant recorded a loss of Tshs. 90,673.83. Inadequate supply of raw materials, poor management, and insufficient skilled personnel were the primary causes of malfunctions and production losses.[44] Yet, the shortfalls reveal that the conditions for a successful handover were unsatisfied. The production trends show that the target was not realized throughout the 1970s and early 1980s (Table 12). It was not until 1981 that tablet production reached 130 million, and in 1983, the production of infusion turned to 125,000 liters. The production target at KPI was realized and exceeded its initial capacity in the 1980s when the government received loans and grants from Nordic and other countries of the Global North. The loans and grants enabled the government to purchase raw materials and modern equipment, which replaced Chinese production technology.[45] With modern machines, for instance, KPI successfully switched the production of infusion from glass bottles to polypropylene bags in 1982, increasing production to 2,000 bags from 500 bottles daily.[46] This increase in production implies that the availability of raw materials and modern machines was imperative for pharmaceutical industries' efficiency and sustainable development.

Nevertheless, from the late 1980s to the early 1990s, traditional donors of the global North reduced their loans and grants to the Tanzanian government, negatively impacting pharmaceutical production at the plant.[47] Reductions in loans and grants were prompted by liberal politics, which promoted a free-market economy and privatization of government enterprises. Such policies favored privatization and private corporations, discouraging financial and material support of government-owned factories. As a result, under a free market economy, the government-owned pharmaceutical industries failed to keep pace with the privately owned and imported pharmaceuticals, which were cheaply sold and collapsed.[48] Production records show a tremendous drop in the KPI in 1988, which became worse throughout the 1990s. These drops imply that the assistance the Tanzanian government received from the Nordic and other traditional donors of the Global North in the 1980s did not sustainably enhance the operational capacities of pharmaceutical industries. The only advantage of the time was that while

**44** "Pharmaceutical Plant, Keko, Production Report Year July 1977–June 1978," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**45** "Letter from the Secretary, Central Tender Board, February 5, 1979 to the Director, Keko, Pharmaceutical Plant, request for Purchase of Oil-Fired Steam Boiler and Pressure Vessel," TNA. Acc. No. 450, Ministry of Health, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**46** "Infusion Administration set, October 2, 1982," TNA. Acc. No. 450, Ministry of Health, File No. HEI.10/15, Pharmaceutical Plant (KEKO), 1980–1982.

**47** JMT, *Hotuba ya Mheshimiwa C. D. Msuya (MB.), Waziri wa Viwanda na Biashara, Akiwasilisha Bungeni Makadirio ya Matumizi kwa Mwaka 1994/95*, 15.

**48** Interview with Cleopa David Msuya, July 6, 2018, Upanga, Dar es Salaam.

government-owned pharmaceutical industries registered little success, privately owned industries supplied the market requirements considerably more. For instance, the Mansoor Daya and Shellys Ltd. pharmaceutical industries increased their production of tablets from 35,535 million tablets in 1989 to about 47,596.7 million tablets in 1990.[49] The promising performance of the privately-owned pharmaceutical industries justified the need to privatize government-owned pharmaceutical industries. As a result, in 1997, the government sold Keko to a private investor who owned 60% of the shares, with the remaining 40% retained by the government.[50]

**Table 12:** Production trends at KPI, 1976–1990.

| SN. | Year | Tablets (Millions) | Infusions Litres (Thousands) |
|---|---|---|---|
| **1** | 1976 | 83.13 | 25.69 |
| **2** | 1977 | 85.36 | 27.75 |
| **3** | 1978 | 66.37 | 24.93 |
| **4** | 1979 | 100.00 | 24.93 |
| **5** | 1980 | 103.45 | 25.00 |
| **6** | 1981 | 130.00 | 37.15 |
| **7** | 1982 | 200.00 | 26.78 |
| **8** | 1983 | 180.00 | 125.00 |
| **9** | 1984 | 335.31 | 185.57 |
| **10** | 1985 | 44.23 | 202.77 |
| **11** | 1986 | 276.98 | 494.43 |
| **12** | 1987 | 371.77 | 398.92 |
| **13** | 1988 | 201.62 | 630.79 |
| **14** | 1989 | 362.73 | 376.89 |
| **15** | 1990 | 305.89 | 500.78 |

**Sources:** Created by the author based on data from TNA. Acc. No. 638, Chemical Industries, File No. KPI/8, Keko Pharmaceutical Industries Ltd, Company Plan, 1985, 38; File No. KPI/6, Keko Pharmaceutical Industries Ltd, 1988, Company Plan, 1, and File No. KPI/5, Keko Pharmaceutical Industries Ltd, 1991, Company Plan, 44.

The failure of KPI and other domestic pharmaceutical industries to meet national demands made the government spend most of its foreign currency on purchasing drugs and other medical equipment abroad. Available financial information dis-

**49** JMT, *Hotuba ya Mheshimiwa C. D. Msuya, (MB.), Waziri wa Viwanda na Biashara, Akiwasilisha Bungeni Makadirio ya Matumizi kwa Mwaka 1991/92*, 13–14.

**50** Robert M. Mhamba and Shukrani Mbirigenda, "The Drugs Industry and Access to Essential Medicines in Tanzania," *EQUINET Discussion Paper Series,* 83 (July 2010): 14.

closes that the total costs of imported medicinal and pharmaceutical products rose with time. For instance, the expenses surged from Tshs. 34 million in 1971 to Tshs. 120 million in 1977.[51] Inevitably, the mounting costs of drugs and equipment overwhelmed the Tanzanian government's budget. For example, in the 1990/1991 financial year, the funds required to purchase medicines amounted to Tshs. 6.2 billion. Yet, the government afforded only 35% of it, relying on the rest on loans and grants from multilateral lenders and donor countries.[52] In 1990, the government predicted that the costs of purchasing medicines and medical equipment would shoot to at least Tshs. 8 billion by 2000. However, the actual cost turned out to be Tshs. 10 billion, Tshs. 2 billion higher than the government's forecasts. Worse still, the costs further increased to Tshs. 30 billion in 2004/2005 and to Tshs. 53 billion in 2008/2009, respectively, realizing that the government's endeavor to save foreign currency through the local production of pharmaceuticals was marginally attained.[53]

## 5.5 Raw Materials for Pharmaceutical Industries

A constant supply of raw materials is imperative for the pharmaceutical industry. Yet, many African countries did not take investment in raw materials seriously after political independence. As a result, the production of pharmaceuticals on the continent leaned towards the secondary and tertiary levels, meaning that the industries produced finished dosage forms from imported raw materials and excipients, as well as packaging and labelling finished products.[54] With limited ex-

**51** "The Pharmaceutical Industry, 1970," TNA. Acc. No. 596, National Development Corporation, File No. D/1000/4, Vol. 1 Projects General, 1969–1974; "JMT, *Mpango wa Pili wa Maendeleo wa Shughuli za Afya na Ustawi wa Jamii kwa Kipindi cha Miaka Mitano Kuanzia Julai 1, 1969 Mpaka Juni 30, 1974*," TNA. Acc. No. 589, Orodha ya Majalada ya Mtu Binafsi, Bhoke Munanka, File No. BMC. 10/03, Speeches of Ministers and Junior Ministers, 18; "Kiwanda cha Madawa Kitajengwa Mjini Dar," *Uhuru*, Septemba 21, 1972, 5; "Arusha Drug Plant to Save 48m/-" *Daily News*, November 9, 1977, 3.

**52** JMT, *Wizara ya Afya, Hotuba ya Waziri wa Afya Mhe. Prof. Phillemon M. Sarungi, MB. Kuhusu Makadirio ya Matumizi ya Fedha kwa Mwaka 1992/93*, 30.

**53** JMT, *Wizara ya Afya, Hotuba ya Waziri wa Afya Mhe. Anna Margareth Abdallah, MB. Kuhusu Makadirio ya Matumizi ya Fedha kwa Mwaka 2005/2006*, 8; JMT, *Wizara ya Afya, Hotuba ya Waziri wa Afya Mhe. Prof. David Homeli Mwakyusa, (MB.), Kuhusu Makadirio ya Matumizi ya Fedha kwa Mwaka 2008/2009*, 68.

**54** African Union (AU), *Pharmaceutical Manufacturing Plan for Africa, Third Session of the African Union Conference of the Ministers of Health: Strengthening of Health Systems for Equity and Development in Africa, April 9–13, 2007* (Johannesburg: African Union 2007), 7; East African Community, *East African Community Regional Pharmaceutical Manufacturing Plan of Action (2012–2016)*, 17.

ceptions for South Africa, Egypt, and Ghana, production at the primary level, which involved manufacturing active pharmaceutical ingredients (APIs) and intermediates from basic chemical and biological substances, did not exist. Up to 2012, 95% of APIs were imported to Africa.[55] Thus, many post-colonial African industries produced generic medicines, which means copies of original branded medicines. The enterprises purchased chemicals in bulk and turned them into a form suitable for patient administration. The medicines produced contained the same dosage form, therapeutic effect, delivery route, known risks, and side effects as the originator drug.[56] This situation limited the development of pharmaceutical knowledge and innovations in many African countries. It further aggravated the dependency on foreign brands and prompted the repatriation of the economy by purchasing APIs overseas.

While Mansoor Daya Chemicals Ltd. utilized raw materials from overseas, primarily from England, the Chinese-funded Mabibo Vaccine plant relied on China for its raw materials.[57] At that time, the Chinese did not supply all the vaccine-related raw materials. Instead, some were sourced from the Netherlands and exported to Tanzania according to the factory's demand. The imported raw materials for the vaccine factory were explicitly intended for manufacturing TB vaccines, whereas the production of smallpox vaccines made use of locally produced raw materials.[58] In the case of the Keko plant, it commenced production using a stock of raw materials provided by the Chinese government as a grant.[59] While this grant facilitated the production launch, it also constituted a market entry strategy for Chinese pharmaceutical raw materials in Tanzania. KPI utilized raw materials it received from China for a while and promptly began purchasing such raw materials, mainly in China (Table 13).[60]

The table appended below shows that KPI imported more than 60% of its raw materials from China and purchased a few in India, the Netherlands, the United

**55** UNIDO, *Pharmaceutical Manufacturing Plan for Africa: Business Plan* (Addis Ababa: UNIDO, 2012), 54.

**56** Banda, Wangwe and Mackintosh, "Making Medicines," 11; also see J. V. S. Jones, *Resources and Industry in Tanzania: Use, Misuse and Abuse* (Dar es Salaam: Tanzania Publishing House, 1983), 95; Mhamba and Mbirigenda, "The Drugs Industry," 9.

**57** Mabele, "Kiwanda cha Madawa," 12–13.

**58** Binagi, "Madawa ya Kinga Yatengenezwa Mabibo," 11.

**59** "Ripoti ya Quality Control, 1976/77," TNA. Acc. No. 450, Ministry of Health, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**60** "Ripoti ya Quality Control, 1976/77," TNA. Acc. No. 450, Ministry of Health, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**Table 13:** Varieties of raw materials imported for KPI and the importing countries, 1977.

| SN. | Name of Raw Material | Importing Country |
|---|---|---|
| **1** | Thiamine Hydrochloride | China |
| **2** | Chloramphenicol | China |
| **3** | Neomycin Sulphate | China |
| **4** | Procaine HCL | China |
| **5** | Phenobarbitone | China |
| **6** | Sulphacetamide Sodium | China |
| **7** | Ascorbic Acid | China |
| **8** | Ephedrine HCL | China |
| **9** | Glucose Oral | China |
| **10** | Mannitol | China |
| **11** | Magnesium Stearate | China |
| **12** | Aspirin | China |
| **13** | Vitamin C | China |
| **14** | Dextrose Monohydrate | India |
| **15** | Dextrin | India |
| **16** | Aminophylline | India |
| **17** | Ferrous Sulphate | India |
| **18** | Starch | Netherlands |
| **19** | Talcum Powder | Netherlands |
| **20** | Indigo Carmine | Netherlands |
| **21** | Lemon Yellow | London-UK |
| **22** | Cochineal | London-UK |
| **23** | Tetracycline HCL | Geneva-Switzerland |

**Source:** "Ripoti ya Quality Control, 1976/77," TNA. Acc. No. 450, Ministry of Health, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

Kingdom, and Switzerland. By the 1970s, Chinese enterprises were unable to produce all the raw materials necessary for pharmaceutical production.[61] Anecdotal evidence shows that aid-recipient countries gave the Chinese government the privilege to import manufactured goods and industrial raw materials in appreciation of the support and cooperation they received. For instance, in Zanzibar, a government official assured the Deputy Ambassador of China to Tanzania: "Often

**61** "Ripoti ya Quality Control, 1976/77," TNA. Acc. No. 450, Ministry of Health, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

when we want to order [products], we first ask China, and if they do not have, we inquire to other countries."[62] The dominance of Chinese-made pharmaceutical raw materials throughout the 1970s implies that the procurement processes favored Chinese companies.

The findings of this study show that the necessary purchase of raw materials for pharmaceutical industries caused the government to spend considerable sums of foreign currency that were not allocated to its budget. Raw materials were costly, with soaring prices each financial year (Table 14). Investment in pharmaceutical industries marginally reduced the government's spending on imported medicines from abroad, but increased demand for foreign currency to purchase pharmaceutical raw materials. The available financial reports show that from 1981 to 1985, the funds spent on purchasing pharmaceutical raw materials rose tremendously. For instance, the costs for pharmaceutical raw materials at KPI alone rose from Tshs. 19 million in 1981 to Tshs. 24.7 million in 1982. The cost further increased from Tshs. 30.13 million in 1983 to Tshs. 37.66 million in 1984. The grant for raw materials that the KPI received from Nordic countries in 1984 lowered the costs of importing raw materials from Tshs. 37.66 million in 1984 to Tshs. 20.05 million in 1985.[63] This implies that the local production of raw materials for pharmaceutical industries was essential in saving foreign currency.

Dependence on imported raw materials for pharmaceutical industries was challenging. In addition to the costs incurred, as raw materials were transported by ship, it took at least three months to receive the goods in the Dar es Salaam port. Procurement processes were usually bureaucratic, which further discouraged purchases and delayed importation.[64] Moreover, imported raw materials raised production costs, which led to higher prices for Tanzanian-made drugs. Yet, fewer initiatives were made by the Tanzanian government to counter import dependence on its local industries. In his address to the national conference of the ruling political party *Chama Cha Mapinduzi* (CCM), Chairman Julius. K. Nyerere

**62** My translation from Kiswahili in "Mazungumzo na Balozi wa China, August 7, 1970," ZNA. Group Index. DO. Ministry of Trade and Industry, File No. DO10/4, 1969 April to 1970 August, Maelezo ya Mkutano na Balozi wa Uchina; also see Andrea Azizi Kifyasi, "The Goals of China-Africa Medical Cooperation: A Case Study of Tanzania, 1960s-2010" (Master's diss., Zhejiang University, July 2016), 19.

**63** "Brief Notes on Keko Pharmaceutical Industries Limited, 1981," TNA. Acc. No. 638, Chemical Industries, File No. GM/6/F/80, Keko Pharmaceutical Industries Ltd, 1985, Special Surveys and Reports; also see TNA. Acc. No. 638, Chemical Industries, File No. KPI/8, Keko Pharmaceutical Industries Ltd, Company Plan, 1985, 8.

**64** "Letter from the Director, Pharmaceutical Plant, Keko, July 24, 1978, to the Manager of Import Licencing Department, July to December Foreign Exchange Allocation of Industrial Raw Materials," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**Table 14:** Prices of Pharmaceutical raw materials, 1976–1979.

| Sn. | Raw Material | Price in Kg. for 1976/1977 | Price in Kg. for 1977/1978 | Price in Kg. for 1978/79 |
|---|---|---|---|---|
| **1** | Chloroquine Phosphate | 205/00 | 292/00 | 342/00 |
| **2** | Talc – Powder | 5/00 | 11/25 | 13/00 |
| **3** | Starch White (corn) | 12/50 | 14/00 | 16/00 |
| **4** | Aminophylline | 86/50 | 93/60 | 104/00 |
| **5** | Aspirin (granulated) | 20/50 | 28/00 | 35/85 |
| **6** | Tartaric Acid | 20/50 | 26/50 | 42/00 |
| **7** | Ethanol | 5/00 | 10/00 | 10/50 |
| **8** | Tetracycline Hydrochloride | 192/50 | 266/50 | – |
| **9** | Chloramphenicol Levo | 203/50 | 299/60 | 454/50 |
| **10** | Phenobarbitone Sodium | – | 79/20 | 151/90 |
| **11** | Aluminium Hydroxide | – | 169/75 | 213/75 |
| **12** | Ephedrine Hydrochloride | 216/00 | 234/00 | 257/65 |
| **13** | Dextrose Anhydrous B.P | 13/80 | 13/80 | 13/80 |
| **14** | Mannitol | 29/50 | 39/00 | 39/00 |
| **15** | Ferrous Sulphate | 11/75 | 12/15 | 12/50 |
| **16** | Riboflavin | 26/50 | 26/50 | 26/50 |
| **17** | Nikethamide | 118/30 | 225/00 | 225/00 |
| **18** | Chloramphenicol Succinate | – | – | 1,062/00 |
| **19** | Sodium Chloride 0.9% | 475/00 | 475/00 | 475/00 |
| **20** | Vitamin B | 207/00 | 250/00 | 250/00 |

Prepared by the author using data from "Wizara ya Afya, Kiwanda cha Madawa Keko, March 26, 1980," TNA. Acc. No. 450, Ministry of Health, File No. HEI.10/15, Pharmaceutical Plant (KEKO), 1980–1982.

confessed: "We have paid little attention to the possibility of the local development of these minor but essential inputs [industrial raw materials] [. . .]. The problem of the import-dependence of our industries has never been given sufficient weight in our decisions [. . .]."[65]

The disappointments of *Mwalimu* Nyerere prompted the Ministry of Industries and Commerce to develop a plan to tackle the question of obtaining raw materials. Subsequently, in its Third Five-Year Development Plan, the ministry proposed to increase the production of pharmaceutical industries to reach at least 40% of the actual needs of medicines in the country using locally produced raw materials and vowed to reduce the importation of pharmaceutical raw materials and promote local production. Yet, the ministry planned to consent to import a few varieties of raw materials that could not possibly be produced in Tanzania.

**65** URT, *The Address Given to the National Conference of Chama cha Mapinduzi by the Chairman, Ndugu Julius. K. Nyerere, on October 20, 1982, at Diamond Jubilee Hall, Dar es Salaam*, 44.

With such projections, the government anticipated producing more than 80% of the demand for medicines locally by 1986.[66] Unfortunately, such dreams did not materialize. The importation status after 1986 remained similar to that of previous years, with the government importing more than 90% of medicines and all of its raw materials for chemical industries.

Undeniably, the question of raw materials posed a significant challenge to the development of pharmaceutical industries. Some scholars argue that the production of pharmaceutical raw materials in Africa – and Tanzania, in particular – was impossible. For instance, J. V. S. Jones maintains that the production of commonly used drugs in Tanzania, such as aspirin and chloroquine, demanded a large bank of intermediate chemicals, such as sulphuric acid, caustic soda, and chlorine. It also needed reagents such as acetic acid, acetic anhydride, benzene, ethylene, alcohol, and others, the production costs of which a non-industrialized and low-income country like Tanzania could not afford. He added that the country further lacked a strong quality control team to guarantee a high standard of purity for the chemicals.[67] Despite the merits of Jones' observations, I argue that Tanzania had the potential to produce some pharmaceuticals using locally produced raw materials while importing a few that could not be produced in the country. For instance, the production of quinine sulfate could have been eased by the presence of cinchona plantations established during the German and British colonial periods. Suleiman Mbonea Mlungwana, a long-time employee at KPI, admitted that local production of some raw materials was possible, but the goodwill of political elites and donors was missing.[68]

The possibilities of producing raw materials locally would have been learnt from the Democratic Republic of Congo, where a Belgian-established pharmaceutical factory, Pharmakina, produced quinine sulfate using cinchona bark yielded in the Kivu and Ituri provinces. The factory began manufacturing quinine using locally grown cinchona barks in 1944 and currently produces 80% of the world's quinine.[69] *Mzee* Mlungwana contended that the Pharmakina fed KPI with quinine salts from the 1990s to the present.[70] Information from the MoH shows that up to 1985, cinchona was grown in the Tanga Region, the north-eastern part of Tanza-

**66** URT, *Hotuba ya Ndugu Basil P. Mramba, (MB.), Waziri wa Viwanda na Biashara, Akiwasilisha Bungeni Makadirio ya Matumizi kwa Mwaka 1981/82*, 19.

**67** Jones, *Resources and Industry in Tanzania,* 97.

**68** Interview with Suleiman Mbonea Mlungwana, June 6, 2018, KPI Headquarters.

**69** "Letter from the Director of Regie Congokina, June 30, 1945, to Medical Department of Tanganyika Territory," TNA, Tanganyika Secretariat, File No. 32780, Manufacture of Quinine in Tanganyika Territory, 1944–1945.

**70** Interview with Suleiman Mbonea Mlungwana, June 6, 2018, KPI Headquarters.

nia, especially at Amani in Lushoto and Handeni Districts. For instance, by 1985, there was a large-scale production of cinchona in Dindira, which had 940 acres and produced 36 tons yearly. Similarly, the Balangai cinchona farm, which had 700 acres, produced 62 tons yearly. At the same time, Moga, where 24 acres of cinchona were planted, produced at least 756 kilograms of cinchona bark annually.[71] Nevertheless, the cinchona bark produced in the post-colonial period was not locally utilized. Instead, the bark was exported overseas. In February 1985, the Principal Secretary of the Ministry of Health, Julius Sepeku, complained to medical researchers about the repatriation tendencies and vowed to encourage the use of cinchona bark for the local production of quinine.[72] Yet, records documenting the local use of cinchona following the Ministry's commitments could not be found.

## 5.6 Economic Crisis, China's Reform and Opening-up Policy, and the Fate of Pharmaceutical Industries, 1978–1990s

The period from the late 1970s to the 1980s was a memorable time in Tanzania's history. The country's economy suffered under several predicaments, including the Uganda-Tanzania War of 1978 to 1979, which, in turn, affected the survival of several local industries.[73] The government faced a severe foreign currency deficit during and especially after the war, severely affecting the pharmaceutical industries. For instance, production at KPI dropped from 335.31 million tablets in 1984 to 44.23 million in 1985.[74] It was ill-fated that the crisis occurred when China's assistance to Tanzania was less forthcoming. At the end of the 1970s, China lost interest in Africa following its reform and opening-up policy adopted in 1978. Projects funded by the Chinese government in Africa were abandoned, with China providing neither guidance nor financial assistance. Under the new policy, the Chinese authorities had set aside ideological and political interests in favor of economic gains. From 1978 onwards, the Chinese government did not pledge to spon-

**71** "Mimea ya Quinine ipo Mingi," *Uhuru*, February 28, 1985, 3; Maximillian Julius Chuhila and Andrea Azizi Kifyasi, "Green Imperialism: Cinchona and the Biomedical Campaigns in Colonial Tanganyika, ca.1900s," *International Journal of African Historical Studies* 57, no. 2 (September 2024): 207.

**72** "Wizara yataka Quinine Itengenezwe," *Uhuru*, February 27, 1985, 3.

**73** T. L. Maliyamkono and M. S. D. Bagachwa, *The Second Economy in Tanzania* (London: James Currey, 1990), 4.

**74** TNA. Acc. No. 638, Chemical Industries, File No. KPI/6, Keko Pharmaceutical Industries Ltd, 1988, Company Plan, 1.

sor massive projects as it used to in the previous decades. Instead, it preferred joint ventures for selected industrial projects with which it had developed a close friendship, including Tanzania.[75]

Under the joint venture policy, the Chinese government was devoted to taking control of projects established under its sponsorship. Accordingly, it assisted Chinese enterprises in penetrating the African market, investing, and running enterprises under the government's sponsorship.[76] Some Chinese-funded projects in Tanzania, including the Friendship Textile Factory, were taken over by Chinese enterprises in the 1990s, as the Tanzanian government possessed less than 50% of the shares, which enabled Chinese enterprises to exercise the management of the industries entirely.[77] I could not find the reasons that prevented Chinese enterprises from taking control of pharmaceutical industries. However, profit return was the determining factor for China's commitment to a joint venture, and it seems the Chinese government did not see any potential from the pharmaceutical industries, abandoning them entirely.[78]

China's reduction of assistance to Africa and Tanzania, in particular, weakened the economic and political strength of Nyerere's government. Moreover, *Mwalimu* Nyerere, a close friend of Mao Zedong, perceived the open-door policy as an open betrayal of Maoism.[79] Before officially endorsing the policy, Nyerere sent to China a delegation led by Prime Minister Edward Moringe Sokoine in September 1978 to negotiate the new forms of Sino-Tanzanian diplomatic relationship. Chinese officials informed Sokoine that their economy was affected by several predicaments, such as earthquakes and declining coal and iron production. Thus, while the Chinese government focused on reviving the declining economy, it allocated limited resources to foreign assistance. In 1978, the government

**75** Yanzhong Huang, "Pursuing Health as Foreign Policy: The Case of China," *Indiana Journal of Global Legal Studies* 17, no. 1 (Winter, 2010): 111; Li Anshan, "China's New Policy toward Africa," in *China into Africa, Trade, Aid, and Influence,* ed. Robert I. Rotberg (Washington DC: Brookings Institution Press, 2008), 7; "Letter from Principal Secretary, Ministry of Foreign Affairs, November 30, 1982, to the Assistant Minister, Ministry of State (Planning) of Zanzibar, Joint Venture with China," ZNA. Group Index. DO. Ministry of Trade and Industry, File No. DO5/25, 1976 March to May 1983, Mahusiano na Nchi za Nje-China.

**76** See, Menghua Zeng, "An Interactive Perspective of Chinese Aid Policy: A Case Study of Chinese Aid to Tanzania," (PhD diss., University of Florida, 1999), 198.

**77** Menghua, "An Interactive Perspective," 198.

**78** Some scholars claim that the Chinese government never abandoned projects it funded in the country, see Rwekaza Mukandala, "From Proud Defiance to Beggary: A Recipient's Tale," in *Agencies in Foreign Aid: Comparing China, Sweden and the United States in Tanzania*, ed. Goran Hyden and Rwekaza Mukandala (New York: St. Martin's Press, 1999), 55.

**79** Interview with Joseph W. Butiku, July 9, 2018, Dar es Salaam.

also projected that it would reach the highest level of development, comparable to that of superpower nations, by 2000. Hence, the government of China utilized most of its resources internally to promote economic growth.[80] To this end, it is apparent that the reform and opening-up policy targeted China's development into an economic superpower, shelving Mao's political interests.

The hardships outlined above no doubt weakened China's economy. Nevertheless, as this study has shown, international aid had also been motivated by the struggle for diplomatic recognition between Mainland China and Taiwan, which, following China's admission, had reached a satisfactory end. Thus, diplomatic support from African countries was not a primary motivation to provide aid. Instead, Chinese authorities desired sophisticated industrial technology, which African countries could not provide. The Chinese authorities found it imperative to reconcile with the United States and attract foreign direct investment (FDIs) to obtain advanced technologies and capital for its diffusion to domestic firms. Only industrialized countries in the Global North could provide that. It was not until the mid-1990s that China acquired technology and advanced industries that seemed to promise their elevation to "superpower" that Africa again became of great importance – but this time, only because it had abundant raw materials needed for Chinese industrial development, market for Chinese goods, investment potentials for Chinese firms and vying for political recognition in multilateral institutions.[81]

China's abandonment of pharmaceutical industries prompted the Tanzanian government to turn to donors of the Global North. From the 1980s, countries like the United Kingdom, Denmark, Sweden, Finland, Norway, and the Netherlands emerged as significant donors and technical advisors to the industrial sector.[82] Their interventions decreased China's influence on pharmaceutical industries. For instance, they advised on and formatted KPI with new European-made machines and technologies. The machines installed by Chinese technical experts were perceived to be small-scale, crude, outdated, and unable to keep pace with the growing technology and production demands. Thus, in 1980, Chinese produc-

**80** "Ziara ya Waziri Mkuu ndugu E. M. Sokoine, Mb. Katika Jamhuri ya Watu wa China kati ya Tarehe 12/9/1978 hadi 15/9/1978," ZNA. Group Index. DO. Ministry of Trade and Industry, File No. DO5/25, 1976 March to May 1983, Mahusiano na Nchi za Nje-China.

**81** Peter J. Buckley, Jeremy Clegg and Hi Tan, "Knowledge Transfer to China: Policy Lessons from Foreign Affiliates," *Transnational Corporations* 13, no. 1 (April 2004): 31; Huang, "Pursuing Health as Foreign Policy," 111; Deborah Brautigam and Xiaoyang Tang, "Going Global in Groups": Structural Transformation and China's Special Economic Zones Overseas," *World Development* 63 (2014): 80–81.

**82** Alf Morten Jerve, "The Tanzanian-Nordic Relationship at a Turning Point," in *Re-Thinking the Arusha Declaration*, ed. Jeannette Hartmann (Copenhagen: Axel Nielsen and Son A/S, 1991), 171.

tion technology at KPI was phased out and replaced by European technology.[83] The phasing out of Chinese technology was a big blow to the South-South knowledge production and exchange agenda. Yet, China's abandonment of Africa from 1978 to 1995 influenced some countries, including Tanzania, to reorient their economic destiny toward the Global North.

During these diplomatic shifts, Tanzania's industries came to rely increasingly on raw materials from Northern countries, while imports from China decreased. For example, in 1984 and 1990, the governments of Norway and Sweden donated to KPI raw materials.[84] Some traditional donors of the Global North attempted to rescue Tanzania's pharmaceutical industries through loans. For instance, the World Bank gave Tanzania a loan of USD 10 million in 1990 and USD 26.5 million in 1993 to purchase essential medicines, medical equipment, and raw materials for pharmaceutical industries.[85] The donation of raw materials and drugs to Tanzania was beneficial since it invigorated the production activities of the government pharmaceutical factories. However, it covertly paved the way for the prompt penetration of such goods into the Tanzanian market.

The preceding exposition illustrates attempts by countries of the Global North to revitalize local pharmaceutical industries through loans and grants. However, such assistance did not sustainably maintain the efficiency of the government-owned pharmaceutical industries. The question of pharmaceutical raw materials was answered by loans and grants of raw materials purchased from abroad, preferably from donor companies.[86] Additionally, the insufficient production of medicines by local pharmaceutical factories was addressed through loans to purchase medicines abroad and by donations of some essential medicines.[87] These kinds of assistance did not provide a lasting solution to the existing drug shortages, and the production of pharmaceutical industries collapsed. Instead, they exacerbated the government's debt burden. Loans received by the government from the World Bank and other traditional multilateral lenders were meant

**83** Interview with Suleiman Mbonea Mlungwana, June 6, 2018, KPI Headquarters, Silver Sendeu, June 12, 2018, Kimara Bonyokwa.

**84** TNA. Acc. No. 638, Chemical Industries, File No. KPI/8, Keko Pharmaceutical Industries Ltd, Company Plan, 1985, 39; TNA. Acc. No. 638, Chemical Industries, File No. KPI/6, Keko Pharmaceutical Industries Ltd, 1988, Company Plan, 6; TNA. Acc. No. 638, Chemical Industries, File No. KPI/5, Keko Pharmaceutical Industries Ltd, 1991, Company Plan, 6.

**85** JMT, *Wizara ya Afya, Hotuba ya Waziri wa Afya Mhe. C. S. Kabeho, MB. Kuhusu Makadirio ya Matumizi ya Fedha kwa Mwaka 1990/91*, 21–22.

**86** TNA. Acc. No. 638, Chemical Industries, File No. KPI/6, Keko Pharmaceutical Industries Ltd, 1988, Company Plan, 6.

**87** JMT, *Wizara ya Afya, Hotuba ya Waziri wa Afya Mhe. C. S. Kabeho, MB. Kuhusu Makadirio ya Matumizi ya Fedha kwa Mwaka 1990/91*, 21–22.

for consumption and not production. Purchased medicines and equipment were consumed or used, and once finished, the government applied for the next supply. Donors' assistance was less extended to projects capable of building and maintaining the ability of the Tanzanian government to produce pharmaceutical raw materials and enough medicines through its local industries. The subsequent section illuminates how the Sino-Tanzanian technical cooperation formed since 1964 implicated the pharmaceutical knowledge exchange between technicians from the two countries.

## 5.7 Pharmaceutical Industries and Knowledge Exchange

On June 16, 1964, the Chinese and Tanzanian governments signed agreements on economic and technical cooperation, in which the government pledged to offer economic aid and transmit its production technology to Tanzania through equipment, goods, and technical experts.[88] The modes of the knowledge exchange were through long- and short-term training of Tanzanian technicians in China, as well as short-term training via special classes in Tanzania and through on-the-job training.[89] Accordingly, the Tanzanian government anticipated that the signed cooperation agreements would address the shortfalls of skilled personnel.

At its establishment, MVI and KPI recruited Tanzanians to work with Chinese technical experts to share knowledge. Many recruits graduated from the University of Dar es Salaam, majoring in chemistry, engineering, and biology.[90] Recruits for the MVI worked with Chinese technical experts from 1971 to 1979. In the case of KPI, the recruits joined 13 Chinese technical experts in 1975 and worked together until 1976. Archival and oral testimonies show that neither the training of technical students in China nor training in the formal classes at the factory premises was provided. Instead, on-the-job training was privileged. The Chinese government assumed local workers would swiftly learn pharmaceutical knowledge

**88** "Protocol to the Agreement on Economic and Technical Co-operation Between the Government of the People's Republic of China and the Government of the United Republic of Tanzania," TNA. Acc. No. 596, National Development Corporation, File No. D/3822(A), Agricultural Tools and Implements Factory, Chinese.

**89** Li Anshan, "Technology Transfer in China-Africa Relation: Myth or Reality," *Transnational Corporations Review* 8, no. 3 (2016): 186, http://dx.doi.org/10.1080/19186444.2016.1233718.

**90** Interview with Suleiman Mbonea Mlungwana, June 6, 2018, KPI Headquarters; Silver Sendeu, June 12, 2018, Kimara Bonyokwa.

and skills while on the job.[91] Effective on-the-job training involves theory and practice, integrating trainers and trainees. Consequently, language as a medium of communication was a valuable training tool. Yet, Chinese technical personnel could neither speak English nor Kiswahili fluently. Thus, they mostly passed pharmaceutical knowledge to the locals through gestures.[92] This technique was used by Chinese technicians working on other Chinese-funded projects. Philip Snow writes that in the Tanzania-Zambia Railway (TAZARA) project, "a [Chinese] technician would assemble and dismantle a piece of machinery and encourage his African apprentices to follow suit until they got the procedure right."[93] This informal way of transmitting knowledge to Tanzanian staff lasted until June 1976 for the KPI and until 1979 for MVI. On September 8, 1976, and in 1979, Chinese technical personnel completed their assignment and left the country. Since then, the management and production activities at KPI and MVI were left to Tanzanian personnel.[94]

Scholarships, which had allowed Tanzanian students to train at Chinese universities for certain periods, were not a solution. Following the Great Proletarian Cultural Revolution, the Chinese government closed all higher learning institutions from 1966 to 1970.[95] Therefore, it was not until 1972 when about 200 Tanzanian and Zambian students received Chinese government scholarships to pursue their studies in transportation, locomotive speciality, and railway engineering.[96] Scholarships for other specializations and to other countries resumed in 1974, three years after the handover of the MVI and two years before the handover of the KPI to Tanzanians. Furthermore, in 1978, two years after the handover of KPI, China adopted the open-door policy, which diminished its interest in Africa. The new policy affected the Chinese government's scholarship program for African students. For instance, scholarship opportunities dropped from 121 in 1978 to 30 in 1979.[97] Thus, opportunities for pharmaceutical technicians from Tanzania to

**91** "Ripoti ya Quality Control, 1976/77," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko), Interview with Suleiman Mbonea Mlungwana, June 6, 2018, KPI Headquarters; Silver Sendeu, June 12, 2018, Kimara Bonyokwa.

**92** Interview with Suleiman Mbonea Mlungwana, June 6, 2018, KPI Headquarters.

**93** Philip Snow, *The Star Raft: China's Encounter with Africa* (New York: Cornell University Press, 1988), 163.

**94** "Ripoti ya Quality Control, 1976/77," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**95** Parris H. Chang, "The Cultural Revolution and Chinese Higher Education: Change and Controversy," *The Journal of General Education* 74, no. 3 (1974): 187.

**96** Li, "Technology Transfer in China-Africa Relation," 186.

**97** Li Anshan, "African Students in China: Research, Reality and Reflection," *African Studies Quarterly* 17, Issue 4 (Feb. 2018): 11.

get trained in Chinese pharmaceutical colleges were minimal. In contrast, the Chinese government channeled its scholarships to students studying for the TAZARA project since, compared to other projects, the prosperity of TAZARA had a higher geopolitical value in the eyes of the Chinese government, in line with Mao's directives that "education must save politics."[98] While previous scholarship has used the TAZARA case to justify that Chinese-sponsored projects in Africa went hand in hand with adequate knowledge transmission to the personnel of the recipient country, the MVI and KPI cases show that there were no effective means of knowledge exchange to the local personnel. The sophisticated art of making medicines needed more systematic knowledge exchange than simplified on-the-job training.[99]

The management and production at KPI and MVI, led by Tanzanian staff, were crucial assignments to test the efficiency of the on-the-job training. Unfortunately, from the beginning, the factories faced technical and managerial hurdles, signaling that local personnel could not run the factories effectively. The two factories faced a severe shortage of experts and updated knowledge on the part of the existing personnel. For instance, soon after the Chinese left, the production of vaccines at MVI was found to be below WHO standards. This situation discouraged the government, and the factory was closed shortly after.[100]

Passing on pharmaceutical knowledge through on-the-job training was insufficient. Such challenges resulted from feebleness in structural and systematic processes in the establishment and operation of the factory. Pharmaceutical industries utilized equipment and machines that demanded more expertise to operate effectively. They, therefore, required highly trained and experienced personnel. Nevertheless, the government established the industries without industrial (technical) pharmacists and experienced managerial personnel. Graduates who took over the industries from the Chinese experts lacked effective production and managerial skills. This was because the relevance of the science and engineering knowledge produced at local universities was limited to grounding scientific theories, which were vital for founding pharmaceutical industries. Yet, the knowledge produced lacked application skills. Thus, college graduates who took over produc-

**98** Chang, "The Cultural Revolution and Chinese Higher Education," 187.

**99** Li "Technology Transfer in China-Africa Relation"; also see Liu Haifang and Jamie Monson, "Railway Time: Technology Transfer and the Role of Chinese Experts in the History of TAZARA," in *African Engagements: Africa Negotiating an Emerging Multipolar World,* ed. Ton Dietz, *et al.* (USA: Brill, 2011).

**100** UNIDO, *Programme for Production of Vaccines in Africa, Technical Report: Programme for Production of Vaccines in Tanzania, Prepared for the Government of the United Republic of Tanzania, on January 6, 1986*, 5.

tion and managerial activities needed specific industrial training to gain production skills through short formal training and further studies.[101]

Pharmaceutical manufacturing was a complicated process involving many stakeholders whose investments needed financial and technical preparations before starting production and commercialization. An effective manufacturing system requires specialized skills in several disciplines, such as pharmacy, chemistry (analytical, organic, synthetic and medicinal), biological sciences (biochemistry, microbiology and molecular biology), life sciences (medicine, pharmacology and toxicology), management (strategy, financial and management accounting, operations, logistics and commercial laws), and information and communication technology (ICT).[102] These specializations were dearly missing in post-colonial Tanzania. Moreover, successful pharmaceutical services included clinical (hospital, retail pharmacies) and industrial (technical) pharmacies. Regrettably, during the German and British colonial eras, Tanganyika developed these services in one-way traffic, specifically in the field of clinical pharmacy. Throughout the colonial period, medical training focused on a few cadres, dispensing auxiliaries, and rural medical aids. It was not until 1940 that the British colonial government introduced courses in chemical analysis and pharmacy assistantship. Moreover, such attempts were interrupted by WW II and thus were, in the end, in vain. Therefore, the colonial medical schools only trained pharmaceutical cadres for hospital and retail pharmacies.[103] In the post-colonial period, the Tanzanian government did not shift the paradigm. Instead, it proceeded from where the colonialists left off by establishing training schools for the same medical cadres. The post-colonial government failed to realize the need for industrial (technical) pharmacists, who were the pillars of the development of pharmaceutical industries. Pharmaceutical technicians were responsible for drug discovery, manufacturing, quality control, and utilization.[104]

Until 1972, Tanzania had only five African pharmacists who had trained abroad and were hired by the Mansoor Daya and Mabibo Vaccine plants. It was

**101** UNIDO, *Programme for Production of Vaccines in Africa, Technical Report: Programme for Production of Vaccines in Tanzania, Prepared for the Government of the United Republic of Tanzania, on January 6, 1986*, 41.

**102** UNIDO, *Programme for Production of Vaccines in Africa, Technical Report: Programme for Production of Vaccines in Tanzania, Prepared for the Government of the United Republic of Tanzania, on January 6, 1986*, 41.

**103** "Letter from the Director of Medical Services, June 5, 1946, to the Chief Secretary, Dar es Salaam," TNA. Acc. No. 450, Ministry of Health File No. 675 Medical Training Centres; also see Nsekela and Nhonoli, *The Development of Health Services*, 40.

**104** "Pharmaceutical Production Technician Training, June 15, 1978," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

not until 1974 that the Muhimbili University of Health and Allied Sciences (MUHAS) launched the School of Pharmacy. The school began as a department in the Faculty of Medicine of the Medical College. Subsequently, in July 1974, the school commenced a three-year course on pharmaceuticals with an annual intake of 16 students. It was established with the assistance of the British Council, the United Nations Development Programme (UNDP), and the WHO. They assisted in the form of experts, equipment, and fellowships.[105] Consequently, the school was established three years after MVI was handed over to the Tanzanian government and two years before the handover of KPI. Not surprisingly, the industries faced technical challenges caused by the lack of skilled local personnel shortly after the handover. Archival sources show that many job applicants lacked the required qualifications. For instance, KPI advertised a vacancy for production auxiliaries in June 1976, but up to June 1978, there were no qualified applicants.[106]

Given that the Chinese experts had spent more than five years studying to qualify, it is not surprising that a few months of training and on-the-job coaching proved insufficient. The 2012 United Nations Industrial Development Organization (UNIDO) report affirms that pharmaceutical knowledge is complicated, and it would take at least three years or more to train a college graduate with an essential qualification in relevant disciplines and convert the trainee into a skilled pharmaceutical operator.[107] Information available illuminates that local experts could not efficiently use and repair some machines, including the pharmaceutical freeze-dry, ovens, and autoclaves installed by the Chinese, because they were all instructed in Chinese, and the short training could not equip them with helpful operation and maintenance knowledge. Worse still, Chinese experts did not leave any maintenance manuals for local technicians to use. Thus, only Chinese experts could effectively use and repair the machines, prompting regular requests and hir-

**105** "WHO, Assignment Report: Medical School, Dar es Salaam, July 1968–August 1974," WHOA, File No. TAN-HMD-001, 1974–1979-HMD 5, Training of Health Personnel, 5; "WHO, National Health Planning in Tanzania: Report on a Mission, 1st August 1973–28th April 1974," WHOA, File No. TAN/SHS/002, 1972–1974-SHS/NHP, National Health Planning, 16; Charles A. Mkonyi, "Emergence of a University of Health Sciences: Health Professions Education in Tanzania," *Journal of Public Health Policy* 33, no. 1 (2012): S54; Interview with Rogasian L. A. Mahunnah, July 21, 2018, Dar es Salaam.

**106** "Pharmaceutical Plant, Keko, Production Report Year July 1977–June 1978," TNA. Acc. No. 450, File No. HE/I/10/15, Pharmaceutical Plant (Keko).

**107** UNIDO, *Programme for Production of Vaccines in Africa, Technical Report: Programme for Production of Vaccines in Tanzania, Prepared for the Government of the United Republic of Tanzania, on January 6, 1986*, 42.

ing Chinese experts for help.[108] Generally, ineffective production and managerial knowledge exchange prompted the country's dependence on foreign technicians, which was inconsistent with socialist policies, which upheld self-dependency. Thus, the Chinese pledge to teach Tanzanians to "fish" and not give them "fish" did not yield sustainable results.

## 5.8 Conclusion

This chapter has shown how China, an emerging donor of the Global South, pledged to assist Southern countries in the spirit of the South-South solidarity agenda. Its assistance was expected to promote self-dependency in African countries and cherish the South-South cooperation, which perceived economic and technological self-sufficiency as the primary weapon in the fight against imperialism, colonialism, and neo-colonialism. Nevertheless, this chapter has shown that China's assistance in the establishment of pharmaceutical industries in Tanzania instead sustained the country's dependency on pharmaceutical raw materials and technicians from China. Such dependencies were caused, for instance, by the ill-conceived mechanisms of knowledge exchange, which failed to pass on sufficient technical knowledge and managerial skills to local personnel. Moreover, capacity building for the local production of pharmaceutical raw materials remained marginal while the country relied heavily on periodic imports. The chapter has maintained that aid provided only short-term relief to technological, economic, political, and social challenges facing recipient countries. Thus, the collapse of Chinese-funded pharmaceutical factories was partly caused by problems with imported technology and the dependency created by it. In the absence of loans, grants, and technical experts from the donor countries, production and management of the government-owned pharmaceutical industries declined, essentially underscoring the problematic nature of reliance on grants and the goodwill of other countries.

**108** "A Letter from Karakana ya Dawa, KPI to Katibu Mkuu Wizara ya Biashara of 14 Mei, 1980 titled Uagizaji wa Vipuri Kutoka China. TNA. Acc. No. 450, Ministry of Health, File No. HEI.10/15, Pharmaceutical Plant (KEKO), 1980–1982.