

The Role of Constantinos Doxiadis in the Development of the Master Plan for Tema, Ghana

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Given Ghana's position as first independent nation in Sub-Saharan Africa, Prime Minister Kwame Nkrumah made a conscious effort to project the nation as an example of what Black Africa could accomplish, through largescale architectural projects. He took up the decision to build a new harbour together with a new town, Tema, as part of the Volta River Dam Project. In 1960, he hired prominent Greek architect and planner, Costantinos Apostolou Doxiadis, who radically revised what had been an earlier English plan. The current study investigates the role of Doxiadis in the development of Tema. It argues that his role transcended the provision of a master plan for Tema and involved several services to the government that went over and above that of a traditional planner. Using archival research, observations, interviews, and urban plan analyses, this study demonstrates not only how his ideas were implemented on the ground (Community 4), but also how these impacted developments that took place after the phase that involved his active participation. As the study shows by means of satellite imagery analysis, later and current community developments - undertaken by indigenous planners deviated - from the strict Ekistics approach that was adopted in the early stages.

Introduction

Constantinos Doxiadis arrived on the world stage at an opportune moment in history: the post WWII era. The end of the war met with enthusiasm not only to rebuild, but also to make a better world. In Greece, the cessation of the civil war (1943-1949) – which was itself an upshot of WWII ideological tensions – resulted in an opportunity to build back what had been lost. This was the moment when Doxiadis was appointed to a political position as the Director General of the Ministry of Reconstruction. In this capacity, he *'led every organisation that undertook the Greek Reconstruction program'*.¹ Subsequently, he was appointed as head of the governmental unit *'responsible for devising, implementing, and supervising development programs under the auspices of the Marshall Plan'*.²

During this period, Doxiadis won the hearts of many foreign technical experts with his practical know-how and his ability to get around bureaucratic bottlenecks and to deliver results. Given the nature of the Cold War battles for supremacy

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1. Lefteris Theodosis, *Victory over Chaos? Constantinos A. Doxiadis and Ekistics 1945-1975*, 2016, 50.

2. *Ibid*, 51.

between the USA and USSR, his ability to get results was part of a broader American campaign to demonstrate how their approach was the better path to ensuring human wellbeing. The success of their work in Greece would, as one American diplomat put it, bring about a 'new hope and new faith to freedom-loving people everywhere in the world.'³ The implication of this was that Doxiadis quickly became an ally in the quest for western and especially American dominance. He therefore made some very powerful friends among the American political elites who trusted his judgement and prudence.

These connections, particularly to various American Diplomats would prove useful. When Doxiadis lost his political position as a result of shifts in the Greek political landscape, he eventually became part of a constellation of experts seen by the West as an essential part of their cultural patrimony and public diplomacy to the rest of the world. The role of these 'ambassadors without portfolio' – which included artists, musicians, scientists, journalists among others – was to demonstrate to the world the supremacy of the American approach. To accomplish this, there emerged in the USA a network of organisations and institutions – Ford Foundation, Harvard University, the CIA and especially the Congress for Cultural Freedom – with the explicit purpose of influencing global opinion in favour of US-inspired democratic values. They organised or funded events (art exhibitions, musical shows, film festivals etc.) funded news publications.⁴

Through his connections to these organisations Doxiadis Associates (DA) received funding for several projects such as the Future Cities Research from the Ford Foundation.

Despite his training, prudence, and talent, it is these connections and the funding that were provided that formed the springboard for the global carrier that resulted in the design of more than thirty master plans all over the globe. Individuals such as Paul Hoffman whom he had met during his days as a politician came to head the Ford Foundation and proved indispensable in the support and commissions that came the way of DA.⁵

Around this same period, the dwindling of European supremacy and the emergence of America as a superpower with its anti-colonial rhetoric,⁶ provided much-needed impetus for anti-colonial struggles. These resulted in the gradual process of independence that swept across most of the global south and resulted in the birth of several new nations. The leaders of these new nations, now freed from the shackles of colonial rule, were keen to achieve the levels of economic growth and development that was seen as desirable. In this situation, Architecture and Urban Design played a critical role. Despite the newfound sovereignty in these 'new' territories, America and its western allies were keen to establish or maintain a foothold in these areas as a means of accomplishing various political interests. For

3. Ibid, 40.

4. Roland Burke, ""Real Problems to Discuss": The Congress for Cultural Freedom's Asian and African Expeditions, 1951-1959," *Journal of World History* (2016): 53-85; Sarah Miller Harris, *The CIA and the Congress for Cultural Freedom in the Early Cold War: The limits of making common cause* (Routledge, 2016).

5. Michelle Provoost, "New towns on the Cold War Frontier," *Eurozine/Lettre* (2006).

example, in Ghana and many newly independent nations like her, American interest brought these regions of the world into the crosshairs of Cold War ideological weaponry. The USA apart from its interest in asserting itself as a new super-power, was also interested in accessing the raw materials that abounded on the African continent.⁷

The convergence of these interests created the fertile grounds needed for the development of various projects that would demonstrate the desired level of development and create the opportunity for many European experts, some of whom had served the colonial governments just a few decades prior. Hence Doxiadis was one of several Europeans who came to countries such as Ghana to offer architecture and planning services.

Prior to his arrival in Ghana, he was involved in a number of noteworthy large-scaled projects such as the National Master plan for Greece, planning of Islamabad (new capital for Pakistan), and the master plan for Baghdad – capital of Iraq (Doxiadis Biography, n.d.).

Doxiadis was fundamentally interested in using various scientific and rational ideas in determining the ways in which cities are planned. These were based on a number of important studies that he conducted over the years. His PhD thesis on Greek cities, the Future Cities Project, the Human Communities Research Project. In this regard he established a number of educational organisations that functioned as an extension to his practice.⁸

These studies and his design for empirically grounded approach to planning is what gave birth to Ekistics – which he called the Science of human settlements. It was based on five key components of all human settlements: Nature, Man, Society, Shells and Networks.⁹

The implications of this for his planning was a hierarchical approach in which an entire city or city-region was built up gradually from a series of Community Classes. Each community class represented a scale of development that share a common public space: from a small cluster of houses sharing a street or square (Community Class 1) to an entire city (Community Class VI, comprising several Community Class 1, 2, 3, 4 & 5) which share a major civic and commercial core. It was this structure, encased, as it were, in a rationalist grid that he replicated in his projects.

This study investigates the role of Doxiadis and his design firm Doxiadis Associates (DA) in the development of Ghana's foremost harbour city. It argues that his role transcended the provision of a master plan for the city and involved several services to the government that went over and above that of a traditional planner. Furthermore, the study demonstrates not only how his ideas were implemented on the ground (Community 4), but also how these impacted developments that took place after the phase that involved his active participation. As the study shows by

7. Filippo De Dominicis, "To survey, control, and design: Doxiadis and Fathy on Africa's future and identity (1959–1963)," in *Routledge Handbook of Urban Planning in Africa*, 193-208 (Routledge, 2019).

8. Theodosis, *Victory over Chaos? Constantinos A. Doxiadis and Ekistics 1945-1975*, 2016.

9. Doxiadis Associates, "The town of Tema Ghana: plans for two communities," *Ekistics* (1962): 159-171.

means of satellite imagery analysis, later and current community developments – undertaken by indigenous planners – deviated from the strict Ekistics approach that was adopted in the early stages. Furthermore, the study indicates that Tema continues to influence architectural pedagogy, more than six decades after the first group of student interns first visited the offices of Doxiadis Associates in Tema.

To accomplish these objectives, the authors adopted a pragmatist philosophical lens: an approach that allows issues to determine the right method that evaluates issues in terms of the success of their practical application.¹⁰ The implication of this was that the relevant data was gathered using multiple approaches. These included a reliance on archival material, mapping, philology and interviews. The community was purposefully selected because it was among the two to be developed first on the basis of Doxiadis' revised master plan as a prime opportunity for trying out some of the planning, design, and implementation methods selected from the different possibilities considered by the firm. The archival map of Community 4, Tema as shown in figure 1 was adopted and compared with reconstructed and updated maps and Community 4, Tema to reflect changes that has occurred in the community over time. The architectural theory of philology was applied to compare and analyse materials found in archives, pictorial representatives and buildings with a series of questions related to planned versus the existing with reference to the application of Doxiadis's theory of Ekistics. Leach¹¹ establishes this approach from Manfredo's theorization of architectural history and architectural history research as an approach where architectural historians use to inform architects of his age about the traditions they are coming from and provide them with a firm platform to project into the future. The objective of the method is to relate history and the present-day character of Tema Community 4 and project into the future of architectural practice in Ghana and in the pedagogy of architecture at Central University. Case Studies were conducted to ascertain the modification and changes that have occurred in the community classes proposed by Doxiadis. Interviews were conducted to ascertain the reasons for the changes in the planned communities by Doxiadis.

Following this introduction, the paper comprises three sections. In the first section the paper undertakes a brief historical narrative of Doxiadis in Ghana and how he came to win the Tema commission, as well the extent of work he did in the Ghanaian context. In the second an in-depth analysis of Community 4, as a way of understanding the ways in which his ideas were applied and how these have performed over time. In the third section, the paper explores the communities that were planned subsequent to the active involvement of Doxiadis Associates. Here, the study interrogates, using a visual analytical approach, how these were planned and the degree to which they were influenced by the Ekistics approach. It further looks at how the implementation of the Ekistics theory in Tema has influenced architecture education.

10. Gert Biesta, "Pragmatism and the philosophical foundations of mixed methods research," *Sage handbook of mixed methods in social and behavioral research 2* (2010): 95-118; John W. Cresswell and Vicki L. Plano Clark, "Designing and conducting mixed methods research," (2011).

11. Andrew Leach, *Choosing history: a study of Manfredo Tafuri's theorisation of architectural history and architectural history research* (Ghent University, 2006).

Doxiadis Associates (DA) in Ghana

It remains unknown exactly how Doxiadis came to be involved in the developments in Ghana. The hypothesis put forward by Provost¹², is that he must have been introduced to Nkrumah by one of the many European and American experts who were working in Ghana at the time as shown in Figure 1.

However, his initial foray into Ghana, which occurred through his representative EA Ftenakis in 1959, was to explore the possibility of providing planning and design services to the government of Ghana (Provost 2020). It was not for any specific project it seems. After all, large-scale projects such as Tema were already underway and were being spearheaded by a group of British architects like AES Alcock and a few indigenous architects like TS Clerk. The harbour was under the design arm of Sir William Halcrow and Partners (a renowned British engineering firm). However, what seemed like a small exploration in the beginning, very quickly resulted in a proposal for a series of in-depth research studies: 'a master plan for Accra, a regional development programme for the Volta River Dam project and a national housing programme'. In December 1959, DA submitted a letter with a proposal for Consultancy Services and by March 1960, a contract had been signed between DA and the Government of Ghana (GOG) for the 'submission of a programme for the development of the Accra-Tema region'. The studies that ensued were organised such that two teams, one in Ghana and the other in Athens, worked simultaneously to produce a series of detailed reports with their proposals for the regional development plan. In the DA characteristic fashion, the proposals were very ambitious and showed a scope of vision that would have implications for the entire nation. Subsequently, DA became involved in Tema, when Tema Development Organisation (TDO) invited the outfit to review certain aspects of the project: the policies for rents, the mechanisms for financing the project and the design of the road transportation system of communities 1, 2 and 3 whose implementation had started. This means that the involvement of DA in various projects in Tema – but also in Ghana – was due to the ability of Doxiadis to '*reformulate a modest request into a huge commission*'.¹³ In essence, he had an exceptional ability to make his patrons see needs they did not realise were there before.

12. Provoost, "Tema, Tema (GH): Constantinos Doxiadis," *DASH/ Delft Architectural Studies on Housing* 12/13 (2016): 194-205.

13. Ibid.



Figure 1. *Constantinos Doxiadis Meets Kwame Nkrumah for the First Time. An Event that Was Captured in the Ghanaian Times Newspaper of 7 April 1960*

Source: Provost (2020).

This ability to see and handle the largest of scales, combined with his penchant for mathematical analogies, statistical projections, systems thinking and diagramming, must have played a role in his appeal to someone like Nkrumah. As Provost diagnoses correctly, what seemed like his burgeoning interest at this time in an Africa-wide analyses would have appeared to Nkrumah as Godsent. To elaborate, around the same time that Nkrumah was pushing for a pan African agenda, for example through the organisation of events such as the All Africa People's Conference (1958 in Accra), there was an important shift in American Foreign Policy circles that had important overlaps with the vision of Osagyefo. In December 1960, Doxiadis met with Waldemar Nielson (one of the top political figures in the Ford Foundation) in New York to discuss, among other matters, Doxiadis's ongoing work on the City of the Future Research, which had been granted funding by the Ford Foundation in March of the same year. The two men 'agreed to disregard South Asia and Pakistan, and instead focus on Africa'. They saw an opportunity for a 'renewed Pan-African enthusiasm' that could be harnessed and which might help to establish 'programmes on a continental scale'.¹⁴ The funding from the Ford Foundation and the research that ensued, eventually culminated in various African continental visions such as the Pan-Africa Transport Plan, intended to link the entire continent via a series of highways.¹⁵ Certainly, this would have appealed deeply to Nkrumah who was at pains to demonstrate to his contemporaries the need for a united continent.

The involvement of DA in Tema provided grounds for understanding how he came to displace the previous British experts. In his reports that followed and, in his diaries, (as shown by Provost) he was not impressed, to say the least. To the chagrin

14. De Dominicis, "To survey, control, and design: Doxiadis and Fathy on Africa's future and identity (1959–1963)," in *Routledge Handbook of Urban Planning in Africa*, 193-208 (Routledge, 2019), 198.

15. *Ibid.*

of the earlier British planners (such as Alcock who had designed it) and their local counterparts, Doxiadis did not think very highly of their approach. In one report produced by DA, they described communities 1 & 2 with words such as ‘haphazard’, ‘faulty alignment’ and ‘disorganised’. It goes on to indicate that the ‘the circulation of pedestrians has wholly neglected’.¹⁶ Moreover, according to the same report issued to the GoG in October 1961, ‘the areas that should have been occupied by higher income families owing to their proximity to the centre have been allocated to low-income groups which should be more to the NE side of the community, adjoining the industrial zone’.¹⁷

Despite what was obviously a development based a need to work at unusual speeds, it is certain that what was really at the heart of the trenchant critique was a difference of approaches.

Eventually, DA was commissioned by TDO as the main consultants for the Tema master plan in a letter issued on 8th March 1961. By the end of May, DA had been appointed, in another letter dated 26th May 1961, to be responsible for ‘both planning and implementation (excluding award of contracts) in connection with the development of Tema for the next four and a half years’.¹⁸ Not long afterwards, DA released its monthly report for the month of May (to the Government of Ghana Development Secretariat) in which they spelt out work undertaken so far, the personnel involved among others. By now they had provided the government with previous reports related to Tema, covering areas such as Tema Main Roads (DOX-GHA 6), Tema Town Centre (DOX-GHA 7), Economic Report on the Tema Township (DOX-GHA 9), Tema Town Centre Economic Report (DOX-GHA 13).¹⁹ These detailed reports were part of an integrated approach to the development of Tema which was considered better than the piecemeal approach previously used and was – from DA’s perspective – the reason they were brought onboard.²⁰

The involvement of DA in the development of plans for the Ghana of the 1960s was quite extensive. To begin with, they were attempted to ‘fix’ the so-called errors that had been identified in the first communities. For example, in communities 1 & 2, they proposed a retrofit. In the related report they gave to the Government of Ghana, DA reiterated their system of hierarchical planning and attempted to show how this might be superimposed on the pre-existing urban fabric as shown in Figure 2.²¹

16. DOX-GHA 24 Communities No.’s 1 and 2, Thoughts for Improvement, 10 October 61.

17. DOX-GHA 24 Communities No.’s 1 and 2, Thoughts for Improvement, 10 October 61.

18. MR-GHA 15 - Monthly Report Number 1, May 1961.

19. MR-GHA 15 - Monthly Report Number 1, May 1961.

20. MR-GHA 15 - Monthly Report Number 1, May 1961.

21. DOX-GHA 24 Communities No.’s 1 and 2, Thoughts for Improvement, 10 October 1961.

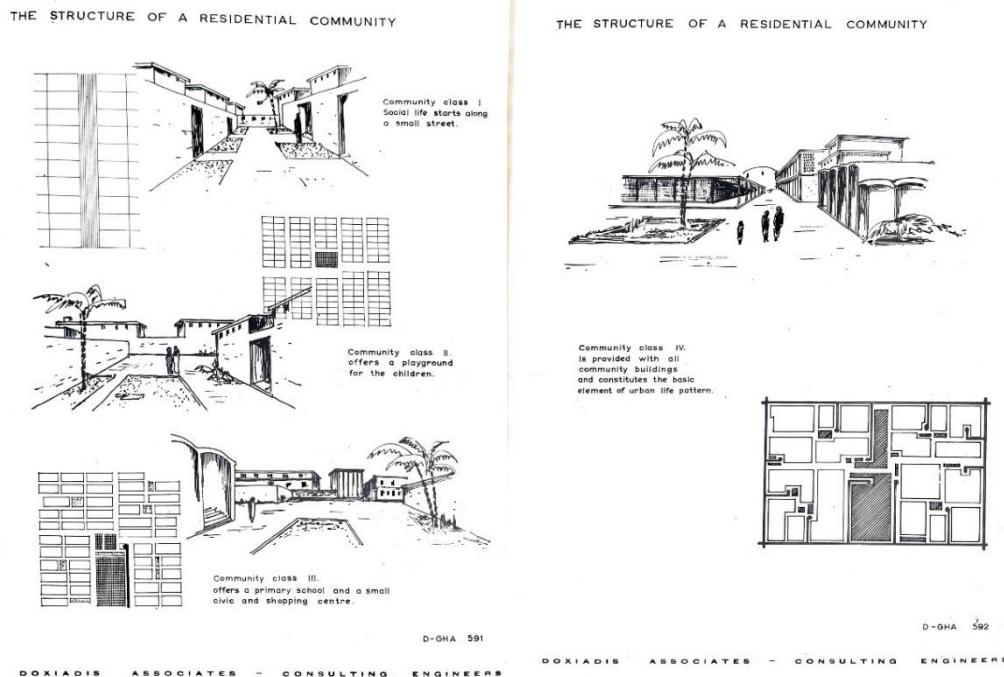


Figure 2. DA Report Indicating Their Approach to Not Only Planning New Communities, But Also for 'Fixing' the Older Planned and Implemented Neighbourhoods (DOX-GHA 24, 1961)

In Tema, they proposed a new master plan comprising 18 communities, each functioning as a neighbourhood. DA also proposed various housing typologies, and even details such as streetlights design (both layouts and the nature of the fixtures to be used).

Despite claims by Doxiadis to be pioneering a 'science of human settlements' called Ekistics, there were many overlaps between the master plan proposed by DA and the previous plan put forward by the team of Ghanaians and their British counterparts as shown in Figure 3. They were all designed such that they have a neighbourhood core of social infrastructure. All intended these neighbourhoods to be as free from through traffic as possible and both seemed to make as much room as possible for commuting on foot.

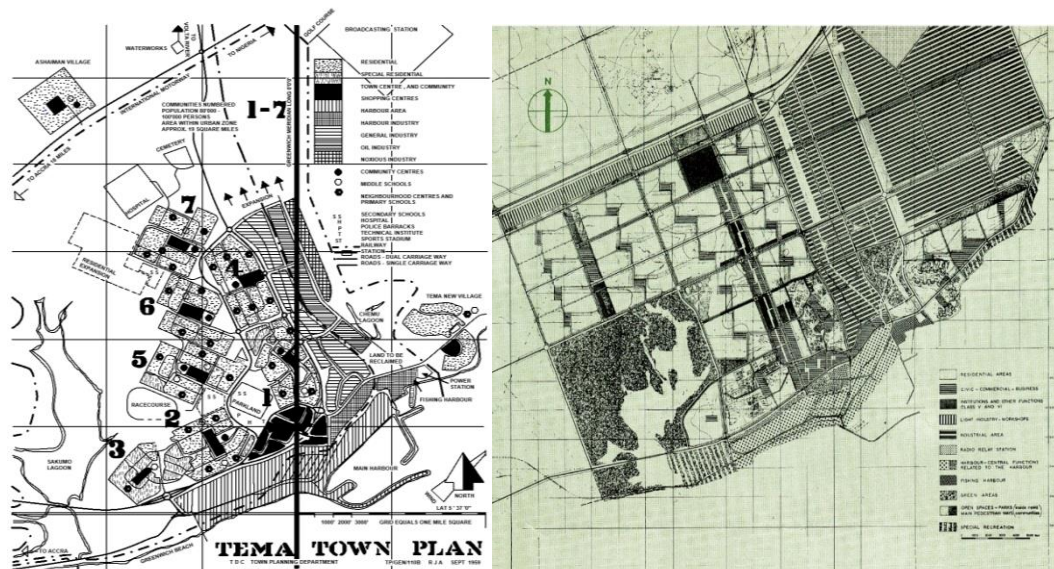


Figure 3. Juxtaposition of Older Master Plan Led by AES Alcock (left) and the New Master Plan (right) Developed by DA (DOX-GHA 24, 1961)

Beyond Tema, DA proposed a new master plan for Accra. Here too, even though a few years back in 1958, a new master plan had been proposed for Accra, DA critiqued it as incapable of dealing with the rate of population growth. Additionally, they decried the fact that it had not adequately dealt with, what they foresaw as the future merger of Accra and Tema as both cities expanded into a mega urban region. In response to this, they proposed a master plan that incorporated the new visions for Accra into the new master plan of Tema and ended up with a master plan covering almost the entire Greater Accra region: the first of its kind in the history of planning and architecture in Ghana.

Even larger than Accra-Tema, was the DA proposal for a largescale plan for Accra-Tema-Akosombo. In this vision, Accra was to serve as an important administrative node; Tema (with its harbour) was to act as the node of maritime trade and industrialisation; Akosombo with its hydroelectric power plant and man-made lake (the largest in the world at the time) was to act as a source of energy, but also as a means of opening up the eastern portion of the country through water transportation.

Doxiadis and Associates also developed lesser-known, smaller scale detailed interventions, some of which were for already developed portions of Accra. Two of the most interesting examples were for the Kwame Nkrumah Avenue (also designed in the 1958 master plan); and the Marine Drive – which was a proposal to maximise the opportunities offered by the expansive coastline of the capital (also originally designed as part of the 1958 plan and was subsequently redesigned by architects from the USSR)²².

More than spatial planning and architectural design, DA – due to the myriad specialities available to the organisation – provided services that included economic

22. In contemporary times the Marine Drive has been redesigned by Ajaye and Associates. It has also been a location of some scholarly interest. See for example Stanek (2020).

analysis and projections, planning codes, proposals for rental strategies, and strategies for management of the New Town of Tema. Moreover, they undertook several studies and designed proposals for various parts of Accra, Tema and Akosombo. These developments ensured a truly comprehensive approach programme.

With the overthrow of Nkrumah, the project(s) that he was in charge of took a hit. For example, Tema was paused for over a year, for the investigations of the new military government. Eventually however, work was resumed. As Provost asserts, the momentum was not quite the same afterwards. Through the 80's and 90's, after several political upheavals these developments were either shelved altogether or took a different turn. For example, in Tema, with the emergence of Neoliberalism and the privation of many State-Owned Enterprises, Tema Development Corporation (TDC) became privatised and the development of the other communities were more focused on meeting middle class needs and the strategies adopted in the original plans gradually shifted (a matter we shall return to).

Overall, the work of DA has been by far the most enduring planning and architecture legacy from a single entity on the Ghanaian landscape. In contemporary planning discourses, his name continues to come up as one of the biggest influences in planning – despite what seems to be a critique of his work by certain planners in places like TDC.

Community 4 in Focus: The Planned Versus Existing

Tema town was planned such that it can only develop towards North owing to the two obstacles, the lagoon to the west and the industrial zone to the east. The main arterial roads determine the direction of development. Community 4 is among the 19 communities of Tema which was originally planned and designed by Doxiadis Associates. The community is a synthesis of four community class III that encircle an area reserved for civic, commercial and business activities, as shown in Figure 4. A vehicular road network separates these activities from the community class III whiles connecting the communities at their centre.²³ The reserved area for the commercial and civic areas alongside the area reserved for parks recreational activities defined community 4, as shown in Figure 5. A total of 2,062 dwellings were provided for Community 4 with the breakdown as shown in Table 1. A basic pedestrian network was developed to link the west to east of community 4 to the harbour road with expected growth of commercial, residential and recreational expected to develop along this stretch since it was a major link for pedestrians to the industrial zone. DA proposed an underground tunnel for pedestrians and cyclist at the western end of the tunnel for people to move freely to work without having to cross the harbour road.²⁴ According to the Ghana 2021 Population and housing census, the population of Tema is 374,148 with a total number of people living in community 4 estimated to be 14,867 who live in the current layout as shown in

23. Doxiadis Associates, "The town of Tema Ghana: plans for two communities," *Ekistics* (1962): 159-171.

24. *Ibid.*

Figure 6 which is very different from the original proposal by Doxiadis Associates in Figure 5.

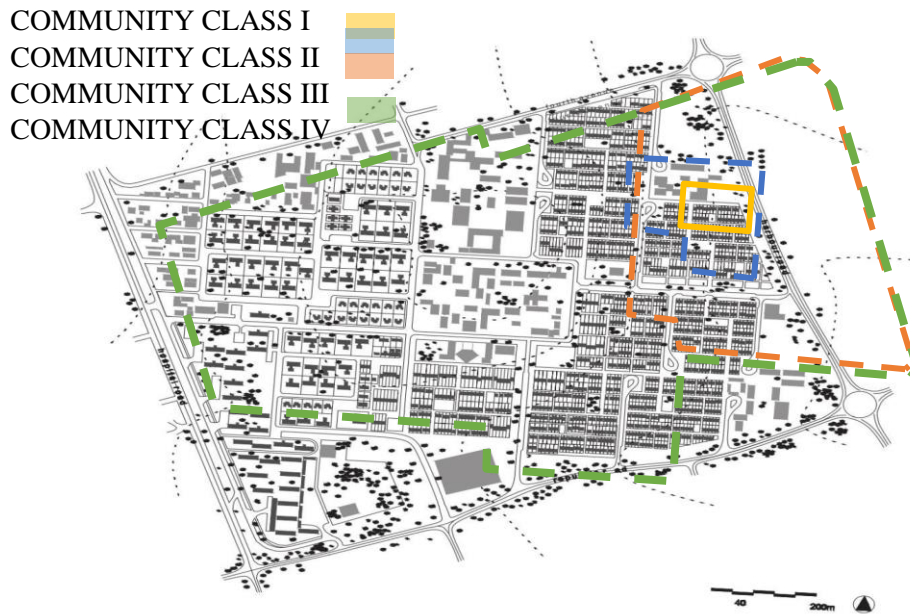


Figure 4. Doxiadis Associates Final Layout of Community 4 re drawn in AutoCad, Tema, 1961 (Provost 2016).

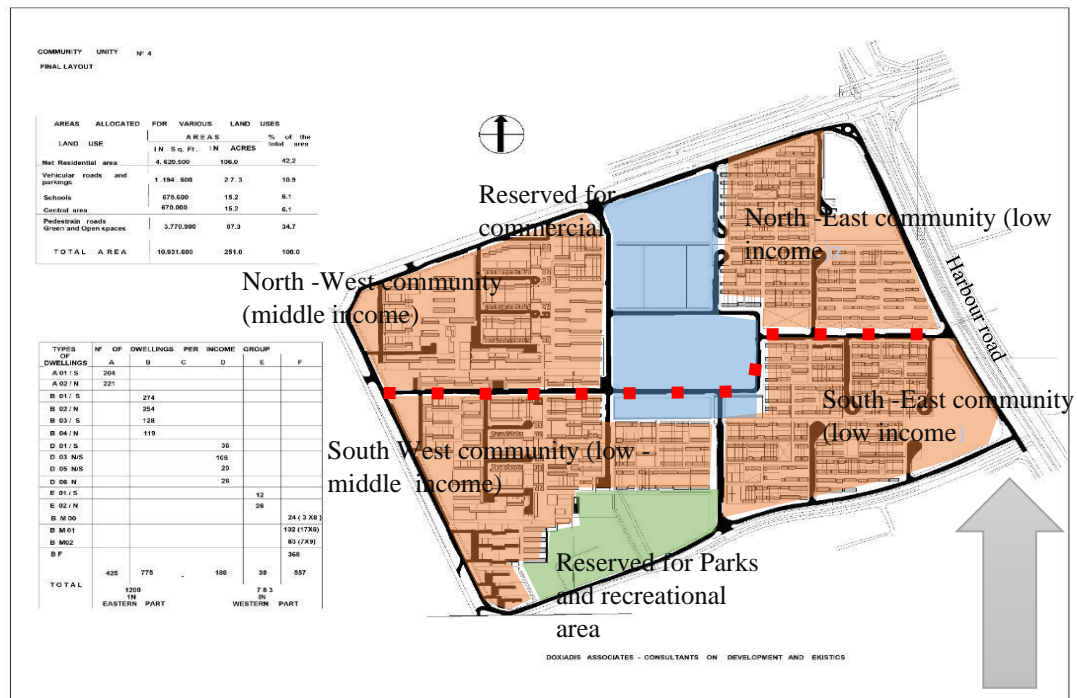


Figure 5. Final Layout of Community 4 Proposed by Doxiadis Associates re drawn in AutoCad, (Doxiadis Associates 1961)

Table 1. Breakdown of housing distribution as proposed by Doxiadis Associates

Community Class Location	Number of Dwellings
North -East community (low income)	609
South -East community (low income)	625
South -West community (low -middle income)	558
North -West community (middle income)	270

Source: Doxiadis Associates, 1962



Figure 6. Current Layout of Community 4 (Google Maps 2022)

Planning, Configuration and Property Sizes

The Doxiadis triennial report, May 61-64, stated that the most urgent task of all, however, was providing shelter for the least wealthy groups, who, incidentally, would also be the workers building the city's physical environment and material wealth. One story housing type were designed for the lowest income areas directly adjoining the industrial area. Low- and middle-incomes would, on the other hand, be accommodated in tall apartment buildings along the central zone.

Doxiadis Associates applied a grid iron system in the planning of Community 4 based on the ekistics theory which is the quest to build this community to the optimum size which respects human dimensions. The application of the theory in the planning of community 4 has evolved over time which has affected the size, quality and character internal and external spaces. The changes in character can be seen in the layout structure, building character, pedestrian and vehicular network. Since the ekistics theory perceived no point in resisting development and accommodate technology evolution and the needs of man in the settlement the original layout has changed in character to accommodate such evolutionary needs. The initial idea had specific areas designated for buying and selling, separated from the residential area but can be accessed by all from any side of the community. As the population

increased, people have opened up shops in front of their homes to make a living and also meet the needs of the current population. In a typical experimental housing nucleus, Figure 7, there are major extensions made on the housing nucleus to occupy green areas left at the foreground of the house. The housing extensions shown in Figure 8, to accommodate needed commercial, retail and residential spaces. The quality of the frontages for the commercial, retail and residential extension varies with taste, income levels and need of the individuals responsible for the extensions, as shown in Figure 9. The extensions sit at the boundary of their households leaving the pedestrian network 4 meters as proposed by DA. The extensions although have replaced green areas along the walkway provide shade the walkways. The vehicular roads provided in community 4 was planned to increase in proportion to the rise in income levels as such the block of plots even for the lowest income levels was served by cars one side and the other side of the block served with pedestrian walkway.²⁵ Currently the individuals on the side of the blocks with pedestrian walkway who own cars park along the street and walk to their homes. Doxiadis' planning of the community took into consideration how the inhabitants would move around the community and interact with one another. The residents of the community have no issues with vehicular and pedestrians' movements.

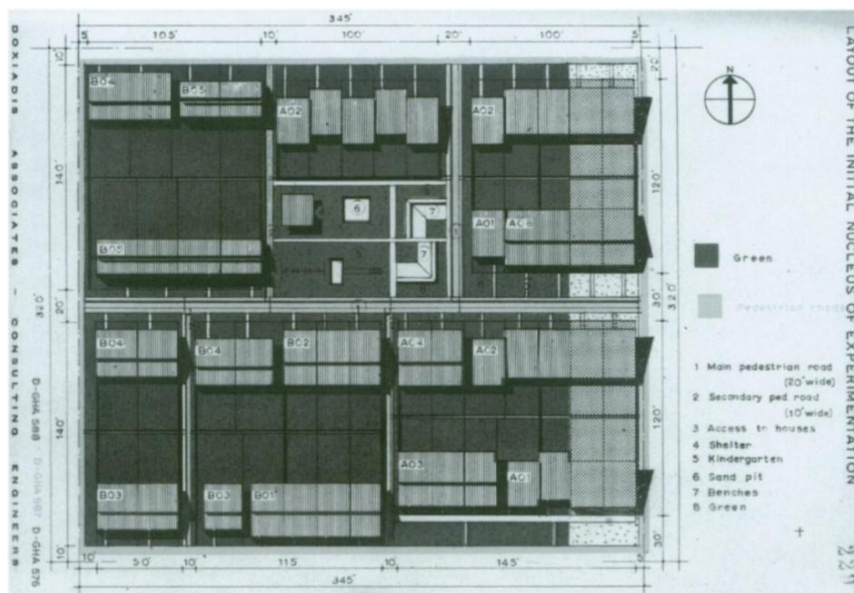


Figure 7. *Layout of Initial Nucleus of Experimentation in Communities 4 and 5 (Doxiadis Associates 1962)*

25. Ibid.



Figure 8. *Current State of Nucleus of Experimentation in Communities 4 Tema*
 Source: Author, 2022.



Figure 9. *Current State of Nucleus of Pedestrian Network in Communities 4 Tema Compared with the Planned*
 Source: Author, 2022.

Experimentation was essential when large housing programs were to be implemented.²⁶ One of the first suggestions of Doxiadis Associates to the Government of Ghana was the application of continuous experimentation. As a first step the government approved the construction of several experimental houses in Community

26. Doxiades Associates, "ACCRA-TEMA-AKOSOMBO REGIONAL PROGRAMME AND PLAN INTERIM REPORT," *Ekistics* (1961): 235-276.

No. 4.²⁷ According to Doxiadis Associates (1962), a number of the experimental homes built by Doxiadis and Associates adopted methods and materials for houses to test their quality and construction cost so that the best solutions could be adopted for further developments. This construction methods and materials has stood the test of time with various stages of renovations, maintenance works, removal and additions to the houses.

The housing units for the communities 4 were standardized types of houses. They were proposed for external and internal reasons. By external reasons, factors such as speed and economy, which was achieved only through the application of mass production techniques. These are necessarily based on the standardization of dimensions, design and construction. By internal reasons, the need for unity and rhythm, the need to establish a common measure and order, since both these elements are needed if we are to realize a large-scale.²⁸ Uniformity was avoided by varying combinations in the grouping of the houses from the arrangement of a small number of houses up to the layout of a vast residential community as shown in Figure 10.

In order to avoid monotonous in the urban landscapes of Tema community 4 and 5 Doxiadis envisioned the provision of an adequate number of dwelling typologies and, additionally, the variation of combinations in the grouping of houses.²⁹ The diversity of form in the individual housing units was achieved by setting aside many elements to be added by the inhabitants themselves. In this way, even houses constructed by the same building contractor will come to differ from each other and develop an air of individuality. The elements to be left to the owner's initiative included colour, light structures, such as screens and fences.³⁰

27. Viviana d'Auria, "From tropical transitions to ekistic experimentation: Doxiadis Associates in Tema, Ghana," *Positions: On Modern Architecture and Urbanism/Histories and Theories* 1 (2010): 40-63.

28. Ibid.

29. Ibid.

30. Doxiadis Associates, "The town of Tema Ghana: plans for two communities," *Ekistics* (1962): 159-171.



Figure 10. Doxiadis Associates, *Communities 4 and 5 Experimental Housing in Tema 1961*

Source: Doxiadis Associates, 1962.

Character of place defines place as where life occurs because of conception, action and physical attributes (Norberg Shulz, 1979). A character of a place can be measured in uniqueness and it tells a story of its richness and density in social, economic, cultural and historical environment.³¹ People make places and character is as much about people and communities as well as the physical fabric. Character of a place is a dynamic concept and changes over time in the advent of new materials, technology, and changing spatial needs of users. The sheltered spaces proposed by Doxiadis Associates have undergone various alterations by users of the spaces which has transformed the overall character of the design proposed in 1962. Figures 11 to 15, show the changes in the character of building type A01 from the design stage to date

31. K. Kropf, "Urban tissue and the character of towns Urban Des," *Int* 1, no. 3 (1996): 247-63; Kevin Lynch, *The image of the city* (MIT press, 1964).

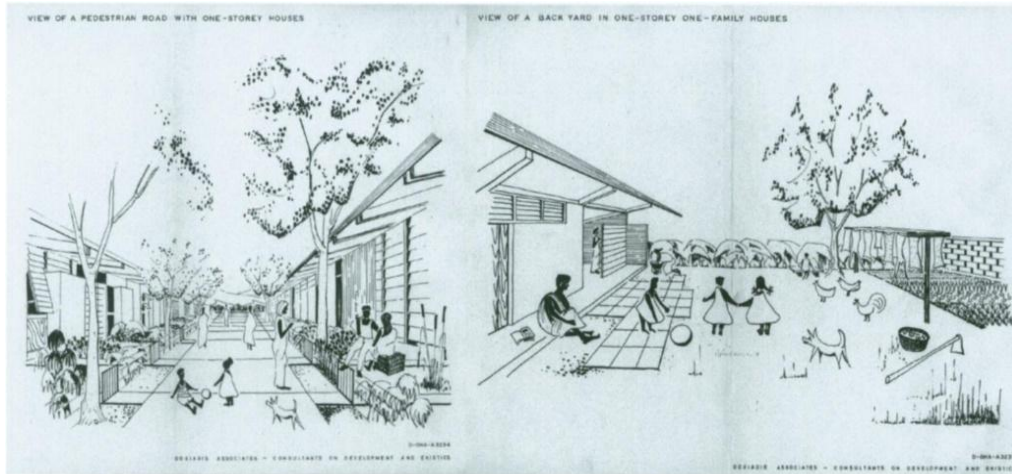


Figure 11. Doxiadis Associates, *Views of One-Story Houses: Pedestrian Roads and Backyards Tema, 1962* from *Doxiadis Associates, Vol. 56* (D'Auria, 2010)

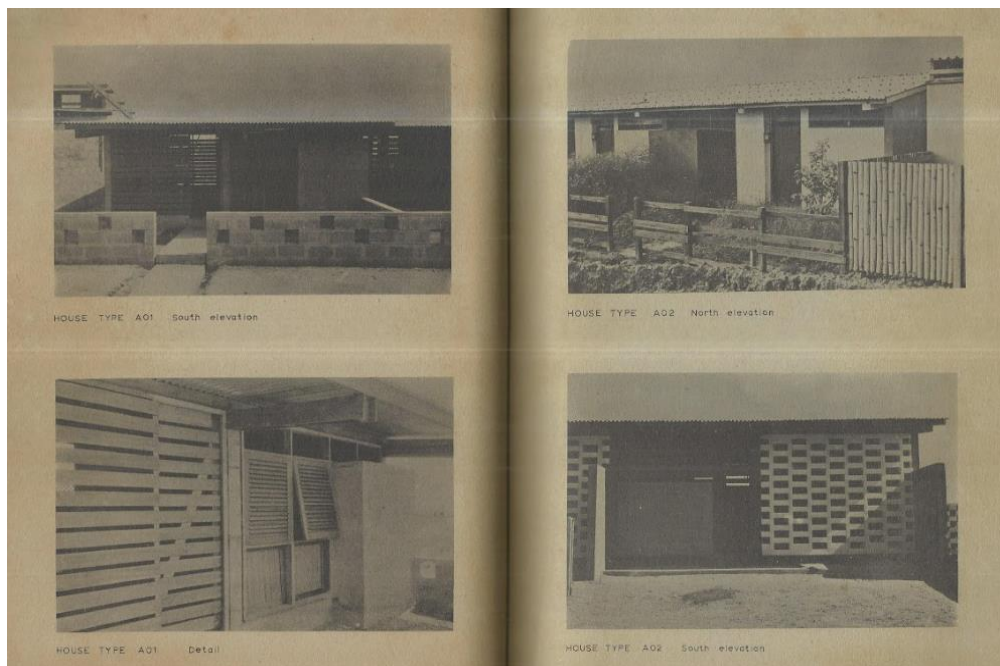


Figure 12. Doxiadis Associates *Experimental Housing Type A01 and A02 Built in Community 4, Tema, 1962*

Source: Doxiadis Associates, 1962.

In designing the first house types for Tema Community 4, examples shown in Figure 13, their layout was planned to suit the social habits of the occupants. The three main functions taken into account were:

- a. The functions of outdoor space (Outdoor family activities).
- b. The functions of sheltered space.
- c. The functions of indoor space (Bedroom, living-room, guestroom).

The house type shown in the example are intended to accommodate families with not more than three members but currently an average number of persons per house is 7.1 as at 2010 Ghana population census. The overall residential density in the community is currently estimated at 100 persons per acre compared to the original density which was 41 persons per acre. The increase in the household demographics is a contributing factor to the changes in the original design by Doxiadis. These changes affected the three main functions taken into consideration. The outdoor spaces for family spaces are now converted to extra bedrooms or retail outlets. The function of the indoor spaces has seen transformation in increased window sizes and changes in materials with extensions to increase spatial sizes. The sheltered spaces have seen major renovation works over time.

A study conducted on the overall visual character of the external features of the houses revealed that the homes were separated with hedges to promote interaction and community bonding. This also gave a sense of security, as everyone felt safe in their homes and no one could enter a compound without being seen. The space provided in front of the house has been used for extensions and the hedges replaced with fence walls.

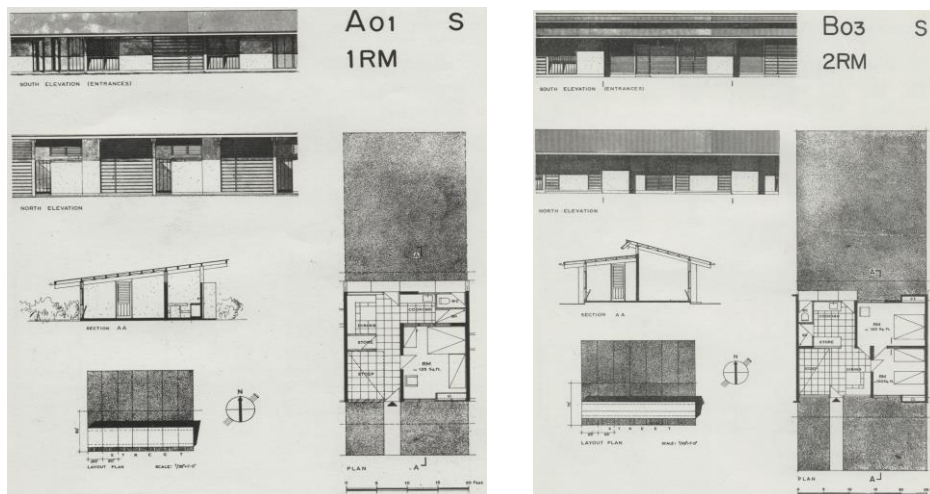


Figure 13. Doxiadis Associates Experimental Housing Type A01 and B03 in Community 4, Tema, 1962

Source: Doxiadis Associates, 1962.



Figure 14. Doxiadis Associates and T.D.C., Experimental Housing Unit in Community 4 as at 2010 (D'Auria, 2010)



Figure 15. Doxiadis Associates and T.D.C., *Experimental Housing Unit in Community 4 Presently* (Author, 2022)

A number of the experimental homes built by Doxiadis Associates adopted various construction methods and materials for the houses to test their quality and construction cost so that the best solutions can be adopted for further developments taking into consideration all the relevant factors such as simplicity of construction, thermal insulation, ventilation, house function in relation to family life and economy.³²

Tema Beyond the Original Master Plan

The master plan for Tema made consist of 26 planned communities, each having roughly 1500–2000 homes.³³ Prior to Doxiadis arrival in Ghana to be involved in the planning and development of Tema, Tema Development Organization (TDO, founded in 1952 and organized as a corporation by 1960) and its collaborators had developed communities 1 and 2. Community 3 had been planned and its construction was in progress. Doxiadis' involvement in the production of a revised master plan for Tema was in consultation with Tema Corporation and TDO. Doxiadis and Associate was assigned the consultant in charge of the overall planning, design and supervision of the then Tema land acquisition area which was up to community 18. He designed and supervised the development of communities 4 and 5 up to the level of detailing out the experimental housing and the street character with his Ekistics planning theory. Aspects of community 6 was supervised by him but had changes with regards to the typology of buildings.

32. Doxiadis Associates. "The town of Tema Ghana: plans for two communities," *Ekistics* (1962): 159-171.

33. Paul Asabere, The demise of the rent-controlled public housing programmes of Ghana: The story of the tema development corporation," *Urban Studies* 44, no. 10 (2007): 1919-1935.



Planned by Doxiadis Associate (D.A)
Community detailed and individual
housed designed and supervised by D.A.

Planned and developed by TDC

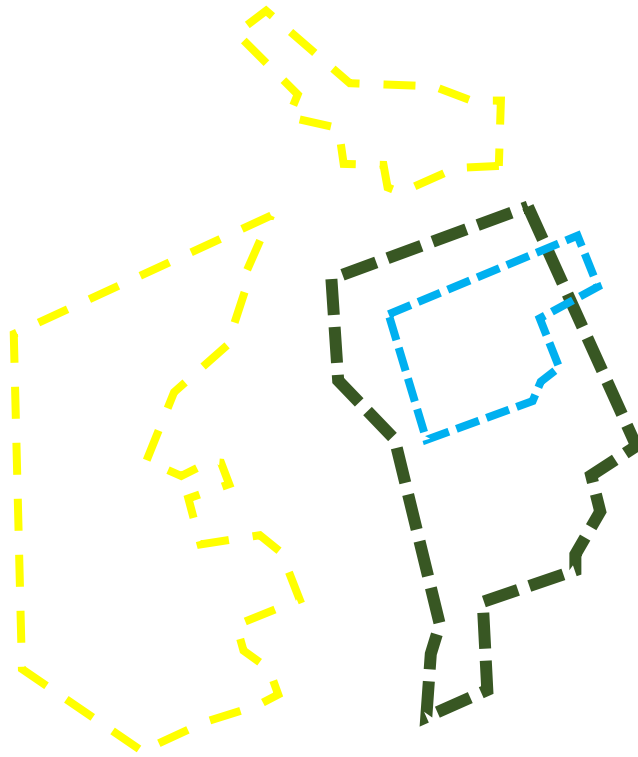


Figure 16. Tema Acquisition Area
Source: Yeboah, 2016.

Communities 7 to 26 were developed by TDC with no changes made to the original layout proposed by Doxiadis for communities 7 to 12, an example shown with the layout of Community 8 in Figure 17. Lands were sold to individuals to build their homes. Communities 7 to 12 adopted the original road networks proposed by DA to define their community class system with changes made from highly pedestrianized accesses to vehicular accesses to individual homes. The strict adherence to north and south orientation of buildings was one of DA design principles which was adhered to. Communities 7 to 12 adhered to the zoning principles of DA and had a civic or commercial area at the center of the community with cluster of residencies around it. Each cluster as well had a core which was an open space and green area. These clusters came together to form the community class systems.

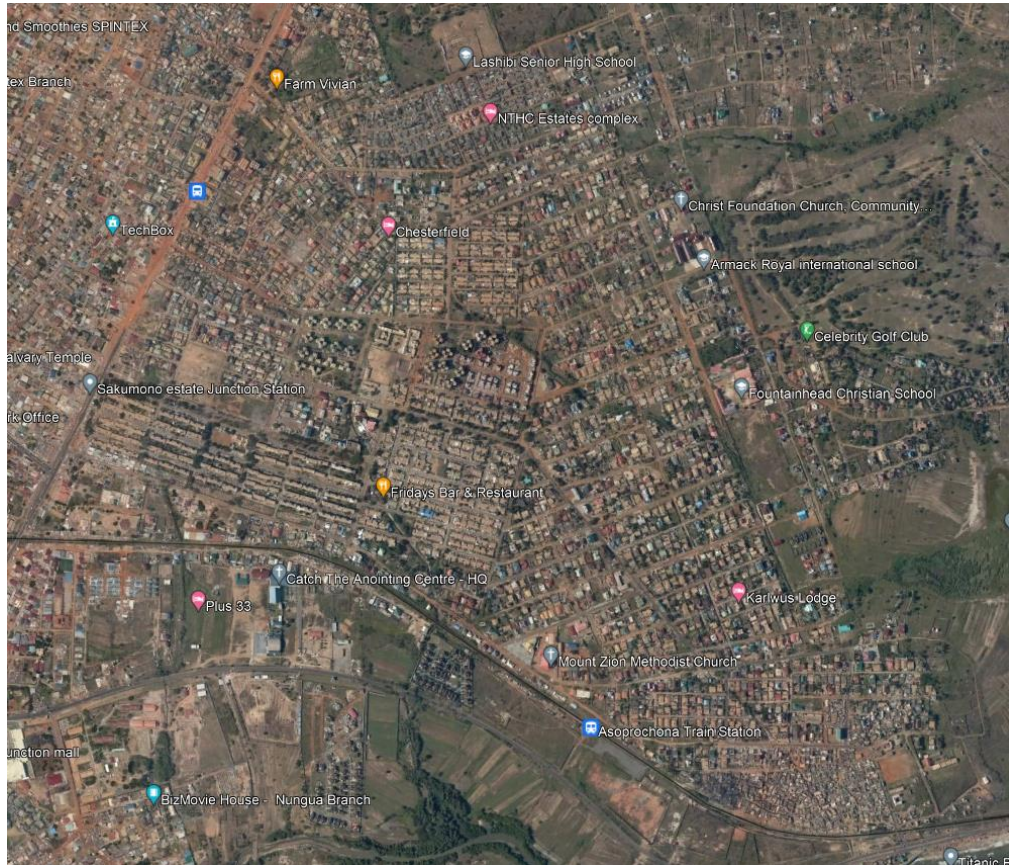


Figure 18. *Layout of Community 13 Planned and, Developed by TDC (Google Map, 2023)*

It is worth noting that, the only two Architecture schools in Ghana, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi and Central University (CU), Miotso, have studied the Tema. CU have studied this area for the urban survey and planning studios for the past eight (8) years as shown in Figure 19. These studies have revolved around the Doxiadis Ekistics theory in the planning of Tema's with emphasis on layouts and zoning relationships, urban morphology, open spaces, streetscapes, building typologies, urban regeneration and transformations and treasures. Tema being one of the biggest planned cities in Ghana has played a major role in Architectural education being the main source of literature and existing evidence for studying the planning and evolution of cities in Ghana.



Figure 19. *Physical model of Tema Community 1 Built as Part of of 2022 Urban Survey 2 Classes for 3rd and 4th Year Studio Assignments (CUSADe 2022)*

Therefore, the pedagogical value of Tema cannot be overemphasised. Once the project started, several Ghanaians visited the site. Of particular interest were the architecture students from KNUST who visited and eventually interned with DA. These eventually became a vital part of the body of indigenous professionals who took over the planning of Tema and other parts of the country when the generation of European architects brought in explicitly to support local inadequacies had departed. After nearly seventy years, Tema continues to serve as an example of planning and architecture for students in the two schools of architecture in Ghana. Despite the fact that it's been several years, since the early planning came to a close, it continues to serve as a space of collaborative work and teaching.

Conclusions

The multifaceted nature of the success of development of Doxiadis Ekistics theory in Tema, Ghana can be broadly measured in four main areas, namely, political, social, economic and cultural.

It was successful politically as it achieved the objectives set out by the President Dr Nkrumah. It was difficult to measure the socio economic and cultural impacts as the population which moved into the communities were not socially or culturally cohesive. In economic terms, the planned programme development has over the years been taken over various types of commercial activities in front of the houses. In spite of this blight, Doxiadis' main theories of providing a functional community class system and commercial core has been adopted in communities 7 to 12 and

some aspects of community 13 however, communities 14 to 26 have not been influenced by his theories.

The Architecture schools in Ghana, due to their proximity and emphasis on sustainability, research and development, are in a unique position to take some of the modified Doxiadis Ekistics theories as templates forward after sixty years of its implementation in Tema, Ghana.

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