

Towards a culture of maps appreciation in Ghana

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Abstract

This paper provides a broad insight into what maps are and the purposes they are meant to serve. It looks at the attitudes towards funding support for mapping activities and the relegation of map use and studies to the backburners in many institutions and organizations. The genesis and current state of mapping in Ghana is assessed and what the country is missing out by the inadequate use of maps in the planning, education, resource inventorying and decision-support systems expounded. Some major initiatives have been taken where some institutions now have custody of major databases that can be accessed. Also significant is the number of organisations both within the public and private domain that are deploying maps and geospatial techniques to strengthen the mapping infrastructure of the country.

Key words: Maps, geo-information, geographic information systems, spatial awareness

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Introduction

The Oxford dictionary defines a ‘map’ as a ‘flat representation of the earth’s surface or part of it’. It is a means of conveying geographical information. Kitchin *et al*, (2011) describe a map as a two-dimensional, spatial representation of the earth, and cartography is the science behind the creation of such maps. Maps have become increasingly relevant in our everyday lives and their use dates back to antiquity. Cartographic historians have written extensively about prehistoric maps which, range from the Babylonian maps scratched on clay through those associated with Greek, Chinese and Roman civilizations. These early works laid the foundation for modern maps or cartography in which projections were made to transform the curved surface to the plane in a consistent manner to enable different kinds of maps to be produced to serve specific purposes. Maps without doubt are some of the oldest forms of human communication (Harley & Woodward, 1987). For many centuries maps have been employed as literary metaphors and as tools in analogical thinking. In spite of the plethora of uses that maps serve, their emphasis for work in many institutions, such as the metropolitan, municipal and district assemblies (MMDAs) in Ghana have been found to be very minimal.

In Ghana, the application of maps is currently limited to a few organisations and individuals. As yet the mapping culture has not been fully assimilated into the socio-economic life of the people. Maps become relevant when map solutions are required to fix issues such as lands and other property delineations. Here, even the map “illiterates” begin to scramble for maps and plans employing the services of land surveyors and cartographic draughtsmen. In many cases the authenticity of the plans and documents are subject to several questions. The law courts are replete with cases of multiple site plans resulting from multiple sales of same lands leading to haphazard development especially in the urban areas.

Little has been written about the history of mapping in Ghana. As this article will show, the early records of maps were woven around the exploitation of natural resources. The slow pace in assimilating the culture of map use among Ghanaians and the potentials of modern technological application is what this article seeks to address. This article is a position one that highlights the gap in map usage and efforts underway for increasing map applications and awareness. It is structured to show the broad and varied purpose of maps, the attitude towards mapping in Ghana, the genesis of mapping in Ghana, the role of digital technologies towards modernization, attempts at Spatial Data Infrastructure (SDI) establishment, and the way forward for increasing mapping awareness in Ghana.

The varied purposes of maps

The literature is replete with examples of the general purpose of maps, but one fundamental fact is their power for visual communication. They have been used as special-purpose language for describing spatial relationships and are one of the finest means of recording and communicating information about the location and spatial characteristics of the natural world and of society and culture. Some would say that maps are the preserve of subjects like geography, geology, meteorology and cartography and that their use is found in these disciplines only. The truth is that maps are used throughout the sciences and humanities and in

virtually every aspect of day-to-day life. Millions of maps are produced and used annually throughout the world by scientists, scholars, governments and businesses to meet environmental, economic, political, and social needs. Even though maps have become increasingly present in our everyday lives, they inherently distort what they are representing. Mark Monmonier (1991) indicated that in order to be readable and understandable, maps must distort reality. He opined that “*to avoid hiding critical information in a fog of detail, the map must offer selective, incomplete view of reality. There’s is no escape from the cartographic paradox: to present a useful and truthful picture, an accurate map must tell white lies*”. This is borne out of the fact that maps need to simplify, or conceal the realities of a 3-D world in a 2-D map. It is noted however that the extent of the lies portrayed depends on the agenda of the mapmaker. This takes us to other type of maps that are subject to the agenda of the mapmaker and reflecting the assumptions of their creators or what Harley (1989) would describe as the ideological frame of their creators.

Maps are powerful instruments that influence our interpretation of the space around us and the phenomena that occur within it. In historical and contemporary contexts maps have been, and are used to create and perpetuate power, and to legitimize property and political claims. Maps, as with other forms of human communication, inevitably represent the interests, prejudices and goals of the people that create them and therefore, need to be interpreted with care. Denis Wood (1993), in his paper, *The Power of Maps*, takes us through a historical journey of how early maps clearly reflected the assumptions of their creators. He presents several examples: The Beatus map portrayed the 10th-century Christian world-view which included Paradise in the east and at the top, The 15th-century Ptolemaic maps which depicted a world which better served the interests of the nascent commerce centered on Europe, The 19th-century maps such as one from Carys atlas which embodied commercial and political concerns and oriental mapmakers who on the other hand placed China at the centre of the world.

John Pickles (2004) focused on the work that maps do, how they act to shape our understanding of the world, and how they code that world. He further explained how the map describes the world as exposed to our method of questioning. He thus see maps as unstable and complex texts; texts that are not authored or read in simple ways. Rather than a determinate reading of the power of maps that seeks to uncover in a literal sense the authorial and ideological intent of a map (who made the map and for what purpose).

In the epic film, *The King and I*, the young prince and heir to the throne of Siam (now Thailand) was not happy about the fact that his country was depicted on a world map much smaller than England. To him Siam should have been depicted larger than any other country. Arguably, from the nationalist and ideological standpoint, he was right. Like this prince, many people have used maps for special purposes and especially for political and other strategic reasons. There is however need for care in interpreting maps, especially when the data shown in them are doctored for reasons which cannot be easily verified. On the other hand, a faulty map could have serious repercussions on plans and decisions that are based on it. For example, the Israeli Air Force in 1996 shelled a UN post in Southern Lebanon, killing over 100 civilians and blamed it on an outdated map or the result of gross technical and/or procedural errors (BBC, 1996).

They explained that it was "due to incorrect targeting based on erroneous data" (Wikipedia, 2013).

Maps can be seen as 'power tools' (Rocheleau, 2005) whose creation and use often reflect current power relations, but which have the potential to be wielded in order to advocate for certain interests and perhaps even change control over space and place. Maps have served important roles in the opening of frontiers and colonizing lands. Early explorers charted new territories on maps. Settlers relied on maps for the appropriation of lands. Property owners have relied on maps for the proper acquisition of their holdings. The role of maps in the exploration of the unknown is still evident in the exploration of resources such as oil and other minerals. Writing on the inherent power of maps to help create the places they are presumed to describe and represent, Culcasi (2008), citing the works of Timothy Mitchel (1991) and Anne Godelwska (1995), indicated how maps were key to the European colonization of Egypt. According to them mapping was not only the key to imperial disciplinary power, but also helped to create the idea of Egypt as different and exotic (for European consumption). In a similar vein, maps were used by colonizers of the New World to, "depict the unfamiliar in such a way that it could be grasped by those who had not seen it and therefore maps enabled the existence of America" (Harley, 1990b). Edney (1997), showed how maps were used by British imperialists to obtain knowledge of India which enabled them to govern and rule the territory, whilst creating the idea of India in the minds of the British.

Pictures delivered by satellites have been composed into maps for the study and understanding of myriads of spatial problems and this has tremendously improved the ways in which earth resources are being exploited, managed or monitored. Maps have therefore been used to gain access to and facilitate exploitation of resources in Ghana.

Maps as store of information

One of the reasons for the use of maps is that they are a means of recording and storing information. A map is a scale model of reality that we build, using a set of conversions and rules. Once we construct a map, we can use it to answer questions about the reality it represents.

It has been ascertained that over 85% of the data that we deal with contain spatial elements and can best be analyzed using tools which include maps. Governments, businesses, and society at large must store large quantities of information about the environment and the location of natural resources, capital assets and people. Maps let us recognize spatial distributions and relationships and make it possible for us to visualize and hence conceptualize patterns and processes that operate through space. They allow us to convey information and findings that are difficult to express verbally.

Driving home the virtues of maps over verbal communication of spatial forms, Keeble (1966) stated that "...planning surveys and analysis of surveys and planning proposals have to be represented graphically; though this graphic presentation must be supplemented by words and figures (statistics), they are subordinated to it. Planning deals with land (space) and land use are, for most of the part, best described and analyzed by maps, plans and models. Even though

written and spoken communications are important, they can only partially and imperfectly perform much work that is simply and efficiently performed by graphical means”.

The state of archived maps in Ghana

While state and its institutions are often required to archive their published materials with a library or archives, there is often little requirement for archiving maps. In Ghana, there exists a collection of maps dating from 1938 to 1954 in the National Archives. These are maps showing administrative districts of the Gold Coast, forest reserves, communication networks, and police magistrate districts, among others, at a scale of 1:1,000,000 and 1:3,000,000. A collection of cadastral maps of major towns of the then Gold Coast at a scale of 1:625,000 published in 1908 are also available (Agyepong *et al*, 1989). Unfortunately, there has not been any attempt to acquire and store maps since 1954. The inability of the Public Records and Archives Administration Department to conduct this acquisition has been explained away by the lack of funds. A major setback for the map archives of Ghana was the one suffered in the fire outbreak in March 2012 at the offices of the Survey and Mapping Division of Lands Commission in Accra. Records which include maps and records of surveys carried out since colonial era were burnt largely beyond recovery (Ghanaweb, 2012).

Another dimension of the mapping challenge is the lack of financial support for production and update of stocks. In Ghana, for example, the latest topographical maps of the country were produced with data acquired in 1972. It is on these maps that geospatial or location data required for planning and important decisions are still based. While 92% of Europe has been mapped at a scale of 1:25,000, only 2% of Africa is mapped at 1:25,000 (Bernhardsen, 1992). Many countries have moved into the production of base maps at the scale of 1:10,000 but Ghana's stock of topographical maps are of 1:50,000 scale.

Map reading or map interpretation is taught at the secondary or senior high school level only after a little foundation at the primary and Junior high school where it comes under the ambit of social studies. At the secondary school level, it is only students of geography that have the privilege of studying some aspects of map reading. There is little emphasis on map construction which technologies like GIS could easily provide. The only other level at which mapping is taught is the tertiary and especially in the geography, geodetic/geomatics and geology departments. Researchers outside these departments, who would want the use of maps, do so to strengthen explanations they wish to make or illustrate their study areas. Even then, in many cases, it is the draughtsmen who are contracted to produce the maps for them. Students with low mapping education and studying GIS have had to grapple with the basics of map appreciation and construction even though the technology has promoted and democratized cartography. ESRI (2013) has produced useful materials on introduction to map design to aid beginners in GIS.

Many Ghanaians have difficulty reading maps and would prefer to ask for directions – what Gartner (2012) would refer to as “acoustic” and or “semantic descriptions”, instead of referring

to maps. Gartner opined that people are not able to act in space properly if they have a distorted awareness of the space and it has been shown that if a person is using a map, it feeds him and allows him to act in space. This is spatial awareness. He concluded that if people are aware of the space which they are in, they can make better use of that space.

The poor mapping culture in Ghana is explained by the lack of maps, the poor naming of streets and lack of home addresses. Local authorities and utility providers have had to deal with low revenues due to poor inventory of households and properties; the result of inadequate information, which maps could have easily provided. Numerous planning challenges that confront local authorities have been brought about by the lack of relevant geo-information, much of which could have been obtained from maps and from which geographical relationships could be ascertained for general knowledge, education, planning and informed decision-making.

Genesis of mapping in Ghana

In Ghana, surveying and mapping started mainly on the note of exploitation of resources, particularly minerals in 1901 under Major A.E.G. Watherson and Captain F. G. Guggisberg (who later became known as Governor Guggisberg). Earlier works done by George Ekem Ferguson in 1890s resulted in map products that were to determine Ghana's borders in the north. The first map of the then Gold Coast Colony was published in 1907 on the scale 1:125,000 but it was limited to the area south of latitude 7⁰ N. In 1908, the Survey Department was established and mandated, among other things, to provide maps and map substitutes as well as spatial information for the exploration and exploitation of the natural resources of the country (Agyepong *et al*, 1989).

Maps in a large measure constituted the basis for the colonization of the territory and exploitation of its resources, especially timber and minerals. The use of maps today has not departed from the original purpose for their construction and use. This is because governments and their agencies, private individuals, entrepreneurs, etc have continued to rely on maps to have knowledge of where things are, what they are, how they can be reached by means of roads or other transport, and what things are adjacent and nearby (Zeiler, 1999). Maps have informed planning and policy decisions.

Today, various methods are being used for the construction of maps aided by technologies that easily facilitate data capture, storage, design and construction. The study of maps has been part of the geography curricula taught in Ghanaian schools some years ago. The curricula were extensive and deep which made geography learners all-round students. For this reason, unfortunately, it was thought that maps were associated with the study of geography and hence non-geography students had limited knowledge of maps and maps appreciation. This notion led to a dangerous situation where map appreciation has become limited and permeated the activities of only a few institutions which require maps as instruments for data storage and analysis and particularly for planning, decision making and general education. The notion negates the fact that geography permeates everything as long as humans operate in space. For this reason too, institutions whose works would have been enhanced by the use of maps have

consigned geography and maps to the backburners and have therefore temporized on the development of capacities and the use of technologies that would enhance their works. Jack Dangermond, stated that knowing where things are, and why, is essential to rational decision-making (Syiem, 2012). He was referring to the power of GIS to deliver the means for people to know about the world around them and to use that information to make better decisions for themselves and their surroundings. In deed we cannot make informed decisions about spatial phenomena or resources without knowing where they occur and why they occur, and the most effective way of achieving these is through the use of appropriate tools, including maps.

Maps for development planning

The need for maps as instruments for planning was amply demonstrated in Ghana's Seven-Year Physical Development Plan (1963-1970) drawn by the Ministry of Lands and published in September 1965 (Ministry of Lands, 1965). The entire plan was rendered in map form, providing detailed perspectives for such sectors as agriculture, industry, water supply, electrification, transportation, population, infrastructure, education and health. Interestingly, the maps illustrated projections from 1963 to 1985. With the overthrow of the regime of Dr Kwame Nkrumah in 1966, this plan was aborted. Since then no national physical development plan has been laid out employing the use of maps and other illustrations with much details.

Another attempt at the use of geospatial or location data to illustrate existing (or current) conditions and the outcome of plan proposals for local governments was enunciated in the framework for plans developed by the National Development Planning Commission (NDPC) in 1995. The format required a synthesis of the localities' problems, objectives and goals through sectoral inputs for the plans (NDPC, 1995). Unfortunately, not many of the planning officers in the metropolitan, municipal and district assemblies have developed capacities for the construction and use of maps to achieve this laudable framework. Where capacities exist at all, there is a deficiency in facilities, poor funding and the lack of relevant and committed personnel. It is also noted that not many of the political and administrative heads of the MMDAs see the relevance of maps as medium of storage of geo-information and as tools required for inventorying resources and for spatial planning and informed decision making.

The budgets for planning and drawing offices are often very low and in many cases at the mercies of those who control the purse of the MMDAs. It is for the lack of requisite data and appropriate data packaging tools that many of the MMDAs still grapple with plan development. Many a time, they have to fall on consultants whose interventions are only meant to offer spell-of-moment solutions which do not augur well for sustainable planning and development. At the end of their consultations, the MMDAs are left with nothing but to wait for the next plan and then consult again.

Automated mapping and spatial data infrastructure initiative

What has given impetus to the construction of maps in recent years is the advent of digital technologies that enable data capture or entry, storage, analysis, manipulation, retrieval, display and transmission. Digital methods of map production mean data delivery is faster and easily

customized for clients or users. Earth orbiting satellites deliver multi-purpose datasets at different resolutions on daily basis throughout the world. For this, there are now available, large stocks of data on climates/weather, vegetation, agriculture, mineral and timber concessions or generally the environment. The same stocks of data are being employed for planning, resources inventory, and monitoring among other purposes. Out of these are made several thematic map products. This has also led to the liberal use of maps by many organizations some of which can be assessed upon contact with the custodian agencies.

Digital techniques have led to an increase in individual map creation and the generation of data for their construction. Computer systems are certainly changing the way cartographers produce maps. At the same time they are also raising some interesting conceptual and intellectual challenges for the future. In the past decades, the dropping costs of computers and network charges and the ready availability of computer mapping software is alerting information professionals to emerging issues of permanence of geo-information. One such mapping system involves GIS, a technology that is revolutionizing geographically referenced information capture, storage, analysis and presentation. The usefulness of GIS is its ability to store and combine spatial data from different sources in a structured manner to perform various manipulations and to present the resulting information in the form of maps. The primary fields in which GIS have been successfully implemented are planning, maintenance and monitoring of spatial objects.

Proliferation of Maps

Post-independence era has led to a proliferation of mapping institutions in Ghana, as various institutions require the use of maps to address specific issues relating to their mandates and which are designed to facilitate their operations. Ghana is reputed to be among the most advanced African countries regarding the implementation of digital methods for handling and analyzing spatial information (Ezigbalike, 2004). One of the reasons is an early realization of the need to collaborate with the different institutions involved in production and use of spatial data to identify common needs and standards, and the initiation of various projects to support this goal.

A great impetus to the production of maps using automated methods was provided within the framework of the Ghana Environmental Resource Management Project (GERMP) and the Environmental Information System Development (EISD) implemented by the Environmental Protection Agency (EPA) from 1993 to 2000. The project was aimed at providing a versatile and inter-operable geographic database directed towards decision-makers and similar persons who need to have an overview of the country for large area planning purposes. This initiative led to the production of information on land use, landownership, soils, meteorology and topography (digitalization of 351 topographic maps) of Ghana. Key institutions that were involved in this project included the Survey Department (now Survey and Mapping Division of Lands Commission), Remote Sensing Applications Unit (now Centre for Remote Sensing and Geographical Information Services (CERSGIS)) of the University of Ghana, Soil Research Institute of the CSIR, Land Commission, and Meteorological Services Agency. The datasets

and their details are now available with the custodian organizations and could be accessed. Researchers would have to complement existing stock of digital maps with field investigations (for example, using GPS receivers), since some of the information depicted on most of the maps is rather old and requires radical update.

Many other institutions both in the private and public sectors including tertiary academic institutions are turning out multi-purpose geo-information sets and producing maps and map products on the different aspects of the economy including mining. This is very enlightening but it is important that these islands of geo-information producing institutions and agencies put together their products for viewing through a metadata service in a unified platform for the information of users. In this way, sources of data for geo-information could be easily accessed to avoid duplication and also avoid a situation whereby data is produced and kept waiting for the user.

Fortunately, this initiative has been boosted by a proposal and preparatory work towards the setting up of a framework for SDI (Spatial Data Infrastructure) called Ghana National Framework for Geo-Information Management (NAFGIM). When implemented, NAFGIM will be a national organization that would take the form of an electronically networked interdisciplinary, inter-agency and cross-sector institutions and agencies engaged in the production and or use of spatial information. It would be expected to complement and enhance the mandate activities of these institutions through the provision of a coordinated data discovery and distribution service (Agyepong, (undated).

The way forward for increasing mapping awareness

Maps are products for daily living directing the public at large and governments to move around. Maps are also important tools for the administration to demarcate areas for specific purposes. Whether in planning, transportation, commerce, leisure, or exploration, maps are necessary tools since they provide the necessary geographical references. Dasgupta (2012) opined that it would not be wrong to say that geography provides the leitmotif to human existence. Maps are products designed to improve spatial awareness and it has become necessary to promote the tools and improve capacities that would enable citizens become stakeholders in mapping.

The way forward is to increase citizens' participation in mapping. Dasgupta (2012) has written well on the subject of non-experts becoming increasingly active in geospatial information provision and thus narrowing the gap between them and the experts (surveyors and cartographers). He has also discussed the resources that are currently in use to facilitate the observation, recording and reporting of geographic features or events. In Ghana, the proliferation of computers among the educated and the increasing use of mobile telephony and other similar devices among the populace, appear to be a means of volunteering varied forms of location data.

It has become common for some media houses to rely on the general public through call-in programmes and other social media to observe, record and report events or features that are

spatial in character. Information on occurrences such as traffic jams, road accidents, fire outbreaks, broken utility facilities and crime, are easily volunteered with the locations provided and this is used as follow-up by the relevant agencies to provide appropriate response. These are examples of volunteered geographic information. Google Map Maker provides tools that enable a volunteer to enter data that can be reviewed or moderated. ArcGIS-online which is a web-based and light weight GIS is primarily designed with the general users' direct on-screen interaction with the map in mind (ESRI, 2012a). Tools exist for establishing the local map content by attaching push pins and text annotations directly to the digital map and for adding additional information about the mapped objects into an associated database. A number of graphic symbols are available for mapping different types of objects in the neighbourhood. This can be done as a collaborative effort by different users that are working together to update local maps in order to increase spatial awareness and to facilitate and take part in local planning efforts (ESRI, 2012b, Yaakub *et. al*, 2004).

The use of cellular phones with functionalities that enable tracking and mapping is a trend among the youth who as a way of adventure are tracking routes to locations of interest and exchanging the data among friends. This is certainly an essential way of increasing mapping awareness. The geography contents of school curricula at the basic level require a critical look and emphasize greatly on spatial awareness using maps as tools. Through this, maps and mapping could be considered part of larger geographical enquiry.

Conclusion

A culture of map production and use is meant to increase individual awareness of the space within which he/she operates. Even though map literacy has not been heightened among the larger populace in Ghana, we cannot deny the fact that in some ways, people have learned to live with mental maps which have enabled them master their environment. It is said that our illiterate ancestors were able to take stock of their land properties vast as they were through the use of landmarks, such as streams, swamps and trees, among others. No paper work was done then. With modernization, it is the responsibility of geographers, GIS practitioners and cartographers to take the lead in ensuring that map literacy is promoted. Government is encouraged to incorporate technologies that promote map production and usage as tools for data storage and information dissemination in her developmental programmes. It is encouraging to note that Ghana has been named among the most progressive in ICT adoption (Ghanaian Times, 2013). A report by the International Telecommunications Union indicated that 14 percent of Ghanaians were internet users, up from 10 percent in 2010. Growth has been recorded in mobile broadband subscription as well. These positive indicators attest to the future of spatial awareness as people would want to employ ICT in various ways to improve their circumstances and use of mapping functionalities to get around.

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