



Bangladesh Team

A case study in progress from the KIX-EAP learning cycle “Equitable Access to Education with Geospatial Data” held in collaboration with IIEP UNESCO

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Rokhsana Perveen, Deputy Director, Directorate Primary & Mass Education
Rokeya Akhter, Executive Director, South Asian Institute for Social Transformation (SAIST)



About case studies in progress

This case study in progress was drafted by a national team that participated in the KIX EAP Learning Cycle: Equitable Access to Education with Geospatial Data. Case studies in progress are ongoing and incomplete studies. As such, the KIX EAP Hub/ NORRAG does not guarantee the quality of the work nor the accuracy of the data.

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About the KIX-EAP Hub

The Global Partnership for Education (GPE) Knowledge and Innovation Exchange (KIX) is a joint endeavour with the International Development Research Centre (IDRC) to connect expertise, innovation, and knowledge to help GPE partner countries build stronger education systems and accelerate progress toward SDG 4. There are globally four KIX hubs or Regional Learning Partners, overseen by IDRC. The hub functions as a regional forum within KIX. NORRAG (Network for International Policies and Cooperation in Education and Training) is the Regional Learning Partner for the KIX Europe Asia Pacific (EAP) hub.

The KIX EAP hub facilitates cross-country knowledge and innovation exchange and mobilisation, learning, synthesis, and collaboration among national education stakeholders in 21 GPE partner countries in the EAP region. The hub also offers opportunities for peer learning and exchange by means of professional development and inter-country visits.

About the KIX EAP Learning Cycle Equitable access to education with geospatial data

This case study is a result of the KIX EAP Learning Cycle “Equitable access to education with geospatial data”. Organised by NORRAG and the UNESCO International Institute for Educational Planning (IIEP), this professional development course ran from 15 June to 16 July 2021. Across 5 weeks, this Learning Cycle enabled participants to apply basic mapping techniques on a geographic information system (QGIS), understand the geospatial dimension of educational planning and management, and challenge the different aspects of equitable access to education by harnessing the power of geospatial data in their daily work. 10 national teams from Afghanistan, Bangladesh, Bhutan, Cambodia, Kyrgyz Republic, Maldives, Moldova, Pakistan, Papua New Guinea, and Sudan took part in this Learning Cycle.



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1. Introduction

Bangladesh is a South Asian country that emerged as an independent country in 1971. Before that this piece of land was a part of India during British rule has had a long colonial experience. The total area of Bangladesh is 147,570 square kilometres and its geographical location is between 20° 34′ and 26° 38′ latitude and 88° 01′ & 92° 41′ east longitude.

Its population is 160.8 million (Bangladesh Bureau of Educational Information and Statistics [BANBEIS], 2017). Geographically this place is one of the largest deltas in the world. Bangladesh is now among the fastest-growing countries in the World. The transformation of the production structure is now from agriculture to industry and modern services. In 2018 Bangladesh qualified to graduate from the list of the least developed countries. In FY2020, per capita, Gross National Income already reached \$2064. Bangladesh has improved its Human Development Index (HDI) ranking by the United Nation Development Program [UNDP] (2020). According to the HDI 2020, Bangladesh now stands at 133rd position out of 189 countries. It has rich ancient culture both from the Bengali nationalities as well as ethnic communities.

Moreover, Bangladesh is improving in establishing a social system where there is no legal barrier to progress based on religion, gender, caste, and profession. Special attention is also given to ensuring the protection of children, the elderly, and the physically challenged. Its trend is to increase service sector activities in areas of transport, banking, real estate, ICT, healthcare, and education (Planning Commission, 2020).

Fig 1. Bangladesh Map in the Globe (Source: Google Map)



2. Education System in Bangladesh

Bangladesh has prioritized education as the most dynamic element to achieve expected development for the country. It has invested increasingly to achieve quality education and Bangladesh already achieved gender parity in Millennium Development Goal and is now committed to achieving Sustainable Development Goal (SDG), 4- 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' and associated Targets.

Bangladesh has a centralized Education system administered by the Ministry of Education (MOE) with two divisions, the secondary and Higher Education Division and the Technical and Madrasa Division, and the Ministry of Primary and Mass Education (MOPME). The MOPME and Directorate of Primary Education (DPE) are responsible for planning and management of primary, mass, and pre-primary education. The MOE, DSHE, DTE are responsible for post-primary education (BANBEIS, 2017). The MOE and University Grant Commission (UGC) look after the overall management of tertiary education.

Table 1. Levels of education and educational authority

Levels of Education	Authority
Pre-primary (1 year)	Ministry of Primary and Mass Education
Primary (5 years)	Ministry of Primary and Mass Education
Junior Secondary (3 Years)	Ministry of Education
Secondary (2 years)	Ministry of Education
Higher Secondary (2 Years)	Ministry of Education
Tertiary (5 Years and More)	Ministry of Education & University Grant Commission

Primary Education in Bangladesh: Short Overview

Bangladesh Primary Education is a large department, controlling over 22 million pupils. Since independence in Bangladesh, educational management and institutional infrastructure have been developed to a certain degree, and in the last two decades, the education system of Bangladesh has increased significantly. It has a



very systematic administrative infrastructure with power delegation from the ministry to the school level. Ministry of primary and Mass Education control over the executive bodies, divisional offices, district-level offices, Upazila as well as schools. It has both administrative and academic lair.

Currently, its number of schools is 129,258, and the number of teachers is 354722. Its student enrolment is 20122337, net enrolment is 97.74 and primary education cycle completion rate is 82.10 (Ministry of Primary and Mass Education [MoPME], 2020). In the last decade, it made great strides in improving access to education however quality remains a challenge. Although its primary cycle completion rate is 82.10 5, its dropout rate is 17.90%. Although the government of Bangladesh has taken many initiatives for the inclusion of all children in the educational settings; a number of children are found outside the school (Directorate of Primary Education [DPE], 2009).

Current achievement of Primary Education in Bangladesh

- Achieved Millennium Goals
- Increased Pre-Primary Education Enrolment Rate now over 3.57 million;
- Total enrolment of Grades 1 – 5: 16.3 million;
- Primary cycle completion rate: 82.10%;
- Improved survival rate to Grade 5: 85.20%
- The enrolment of children with disabilities (98311) has improved in all types of schools;
- Student absenteeism has reduced; and
- The enrolment of children with disabilities has improved in all types of schools (MoPME, 2020).

Meaning of Equitable Access in the context of Bangladesh

Since the beginning of the journey of this country, The Constitute of Bangladesh recognized all children's education as its fundamental right in article 17 which states

‘The State shall adopt effective measures for - (a) establishing a uniform, mass-oriented and universal system of education and extending free and compulsory education to all children to such stage as may be determined by law; (b) relating education to the needs of society and producing properly trained and motivated citizens to serve those needs; removing illiteracy within such time as may be determined by law’ (Ministry of Law, Justice and Parliamentary Affairs [MoLJPA], 2016).

Constitutional aspiration forced the government to formulate an act in 1990 known as the ‘Compulsory Primary Education Act 1990’ to ensure primary education for all children in Bangladesh. Government adopts inclusive



education as a mechanism to reach those children who are not participating or not gaining equitable access to educational opportunities and ensure quality primary education as well. The recent policy document National Education Policy 2010 is the basis of all educational plans and programs. Consequently, the directorate of Primary Education defined access and equity as-

‘Access means a channel, a passage, an entrance, or a doorway to primary education. It has a two-way role: a. A physical approach; b. Utilization of existing facilities: It is not only essential to provide education facilities, but it is equally important that these facilities be utilized’ ((Ministry of Primary and Mass Education [MoPME], 2019, p-2)

‘Equity means equitable access to and participation in all management and program functions regardless of special characteristics including but not limited to gender, race, color, national origin, disability and age’ (MoPME, 2019, p-15)

Challenges in Primary Education:

Bangladesh primary education has achieved many criteria including millennium development goals, however, it still has some groups in the society, to which, the system could not access equitably. In other words, these groups are not participating the basic pre-primary and primary education that Begum, Perveen, Chakma, Dewan, Afroze & Tangen, (2019) and Nasreen & Tate, 2008 mentioned a list of groups are, children from coastal, hoar areas, flood-affected area, children are situated border area, tea garden), low cast children, Dalit groups, working children, children in domestic and subsistence work, street children, children living in urban slums, orphanage, institutions, child sex worker, children of a sex worker, children affected by trafficking. Besides these, lack of infrastructure, trained and qualified teachers, quality teaching, teaching materials are also challenging to some extent.

This knowledge report will focus on ‘dropout’ as an issue in this system. Dropout Children are considered a significant issue in the primary education system because the main goal of this department is to ensure quality primary education for all children of Bangladesh. According to APSC, (2019) dropout rate is defined as

‘proportion of pupils from a cohort enrolled in a given grade at a given school year who are no longer enrolled in the following school year’ (MoPME, p-13).



Currently, the dropout rate in primary education is, as mentioned in the previous section, 17.90%. This knowledge report will focus on some dropout children's pictures of the southern part of Bangladesh, two districts, named Barguna and Khulna. Research shows that more than one-third of the study participants considered accessibility as a determinant of dropping out of primary school children (DPE, 2009). Accessibility related to road and water communication for the catchment area children as well as for teachers or their supervisors coming from outside the catchment is a barrier to creating conducive learning opportunities in the following ways:

- Small children who do not know how to swim are not encouraged by parents to attend school in the rainy season (a problem in char and hoar areas).
- Teachers who are not locals dislike being posted in inaccessible areas
- Posts of teachers in some cases remain vacant for years.
- Teachers living outside the catchments or in an Upazila headquarters do not attend school 6 days a week
- Teachers also come late and leave early with the schools getting reduced contact hours DPE, (2009, p-22)

Educational Supply to reduce dropouts and improve equitable access:

- School infrastructure has improved: additional classrooms; WASH block; water supply; separate toilets for girls
- Almost all children (99.9%) have received their free textbooks in the first month of the school year
- Minimum standard set for 5 teachers in each school and accordingly created new teachers post.
- Provides stipends to about 10.06 million children
- The enrolment of children with disabilities has improved in all types of schools
- School feeding programs covered over 2.9 million children. Nutritious fortified biscuit is given during school hour (MoPME, 2020)

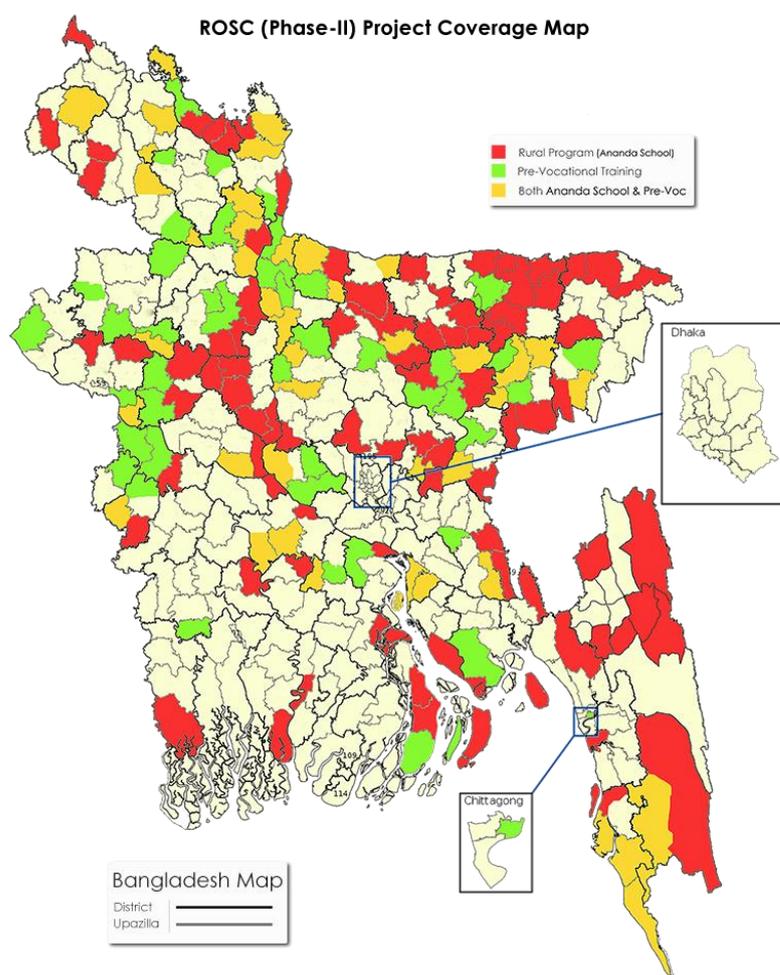
Reaching out of School Children (ROSC) Project: Phase I

The Government of Bangladesh, with support from development partners (International Development Association, Swiss Agency for Development & Cooperation (SDC), and other Development Partners) has undertaken the “Reaching out of School Children (ROSC) Project” in 2004 to give a chance to be educated to the children who dropped-out from school or never went to school for primary education ever. The project blends formal education with non-formal means of delivery to the young learners, providing them with an opportunity to complete grade five and transition to secondary education.

Major components of the ROSC project include the following: improving access to quality education for out-of-school children, communications and social awareness, project Management and Institutional

Strengthening and monitoring, Evaluation and Research. As a consequence of PEDPII, the key objective of this project was to use demand-side mechanisms to support the Government of Bangladesh in achieving its National Education for All (EFA) goals. In particular, the project aims to provide access to primary education and ensure retention of disadvantaged children who are currently out of school, improve the quality and efficiency of primary education, especially for these children and strengthen the capacity of and building of learning centers and related organizations.

Fig 2. Reaching out of school children project coverage



Source: Reaching Out-of-School Children (ROSC) Phase-II
(Source: Directorate of Primary Education: www.rosco-bd.org)

Reaching out of School Children (ROSC) Project: Phase II

ROSC Phase II has been designed to include three more components along with the Rural Program Ananda School and Pre Vocational Skill Training or both, as shown in red, green, and yellow color respectively in the above map. The new programs are designed as follows, especially for the urban areas.

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- Urban Slum Children Education Program (USCEP)
 - Children Domestic Worker Education Program
 - Reading Skill Developments

On the map, Dhaka Metropolitan City has been shown as the yet-to-be-targeted area of the running ROSC programs. Despite the remarkable progress of economic growth and social transformation as well as educational opportunities at the primary and secondary levels, many school-aged children are still left out of school, particularly those from poor households and under-served areas. To address these underserved areas, poor households, and disadvantaged groups, ROSC II is scaling up the Urban Slum Children's Education program. 50,000 new learners are being targeted from the urban slums of all the city corporation areas of the country.

The Urban Slum Children's Education Program scale-up activities will be implemented by qualified NGOs who will act as Implementing Agencies (IAs). 10 NGOs have been finally selected based on their competencies, presence in the field, capacity, and other agreed qualifications. It will deliver a formal primary curriculum for grades 1-5 through a nonformal approach adopting a three-year accelerated education model to complete primary education. In this regard, very good micro-planning may help to undertake specific programs to address the disadvantaged group of communities, particularly the floating people residing in Dhaka Metropolitan City.



3. Micro Planning for Equitable Education by Using Geospatial Data

Micro planning is based on school mapping, which approaches a need for detailed information and planning at the local level, this being a more viable framework than national or macro-planning. The approach seeks micro-level variation and planning accordingly. Its focus is on local conditions, local constraints, and local solutions.

Three phases of school mapping are required for education planning and Management by using the Geographical Information System John M. Mendelsohn, 1996, IIEP, UNESCO publication:

- A diagnosis of local schooling conditions, projections of needs, and proposals for reorganization.
- Regional, or even national, norms are required against which to make proposals for reorganization.
- The most important goal of school mapping is to rationalize school resources by using geographical units of analysis.

Spatial databases consist of any number of spatial objects. For example, a spatial database and pool planning might consist of all the schools in a region, roads, electricity lines, telephone lines, districts, school catchments. areas, census areas, water points, and school hostels. Each school, hostel, road, or school catchment area is treated and stored as a separate spatial object, and each object is labeled with a unique label or geocode.

Some programs, however, treat spatial objects as raster data. The area covered by the map or spatial database is then divided into several grid cells, the position of each grid cell being controlled by a set of coordinates identifying its location. The positions of spatial objects are determined by whether they are in or out of a grid cell. Areas are often called polygons in GIS terminology. They are units that circumscribe distinct pieces of ground, for example, districts, regions, census blocks or enumeration areas, land parcels, and catchment areas. Polygons often lie adjacent to one another and share boundaries, such that two districts are next to each other. A series of lines are used to describe the boundaries of a polygon.

In an education application, one may have a set of polygons representing census numeration blocks. For each block, attributes could be generated by aggregating information recorded during the last census: numbers and proportions. of children at school, levels of income, estimates of fertility and mortality rates, proportions

of homes with children at school but not having electricity so that students would find it hard to do homework. The first and simplest. The way is to attribute data to the GIS's databases. Each spatial object would then have a record listing all the tributes provided for that object, for example, total enrolment, type of school, principal's name, etc. To do this, the data has to be entered into the GIS's database, manually or by importing the data into the system. A few outputs are presented below done with some available statistics of Annual Education Census 2019 of the whole country of Bangladesh and Dhaka District's School Information from BANBEIS.

Fig.3 QGIS Map 1: Administrative Boundary Level 3 of Bangladesh using Layers

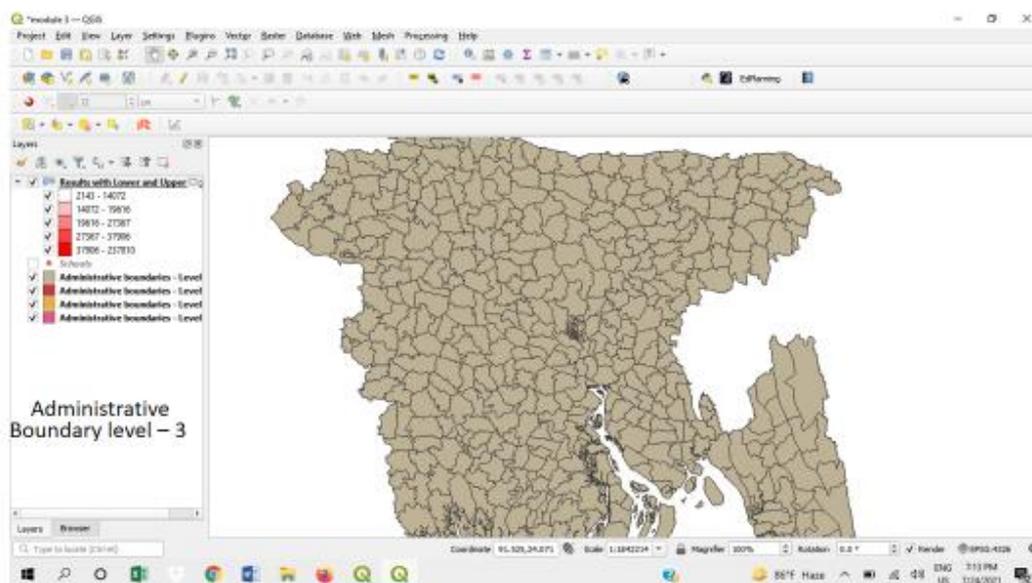


Fig. 4 QGIS Map 2: Administrative Boundary Level 0, 1, 2, 3 of Bangladesh using Raster and Pixel

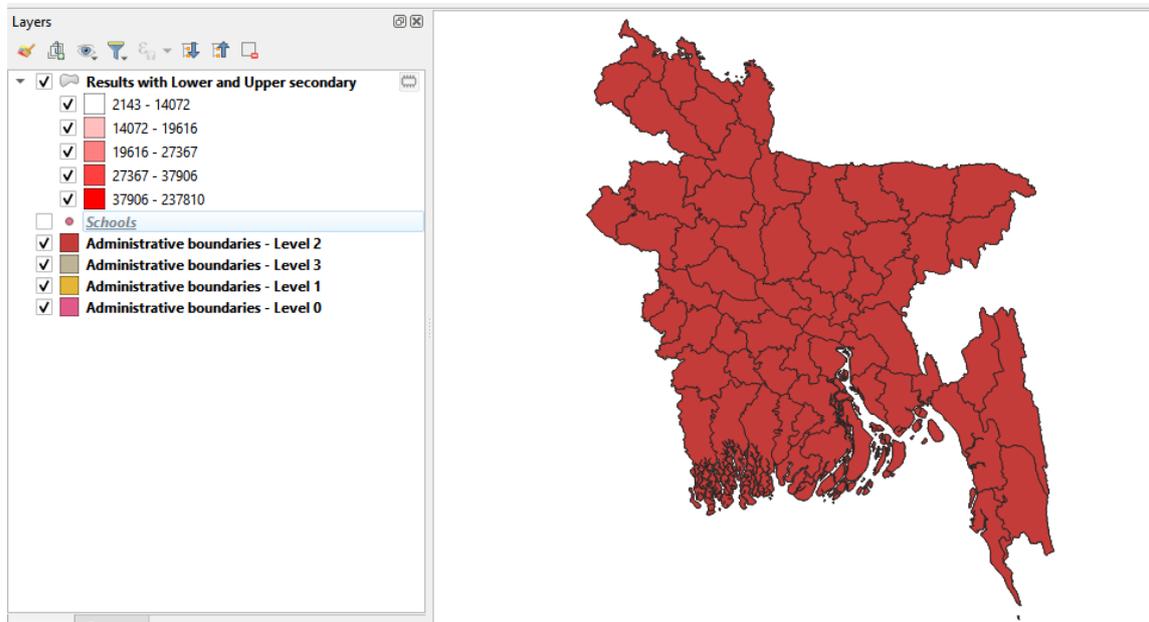


Fig. 5 QGIS Map 3: Isochrones for Pointing All Schools in Different Regions of Bangladesh

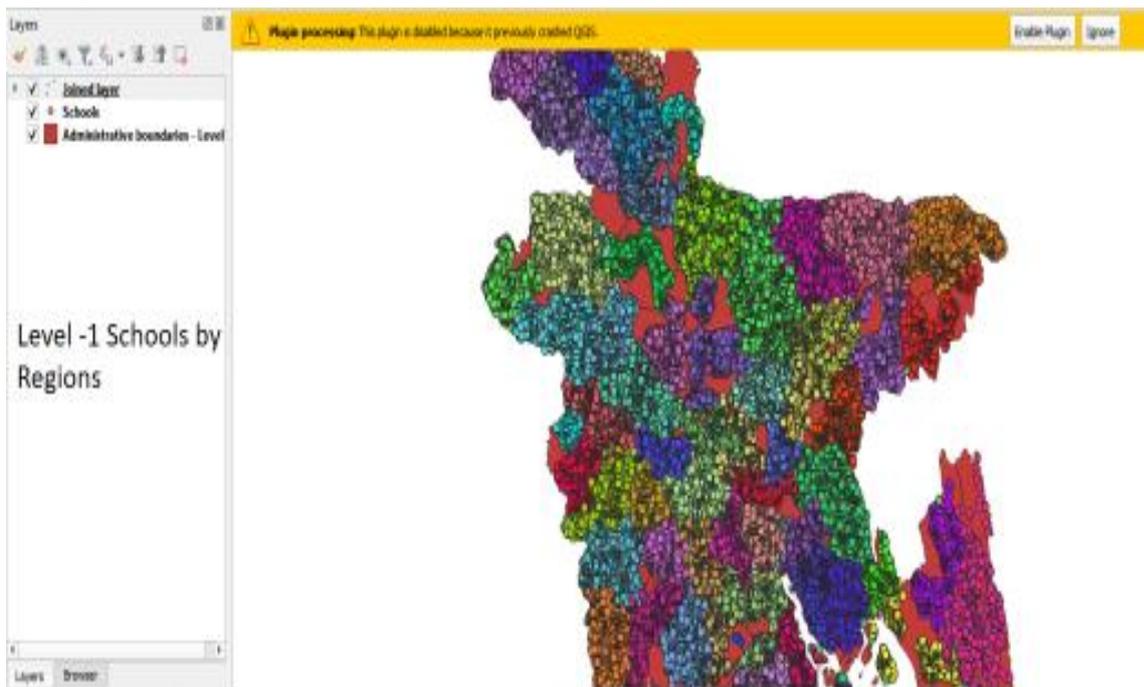
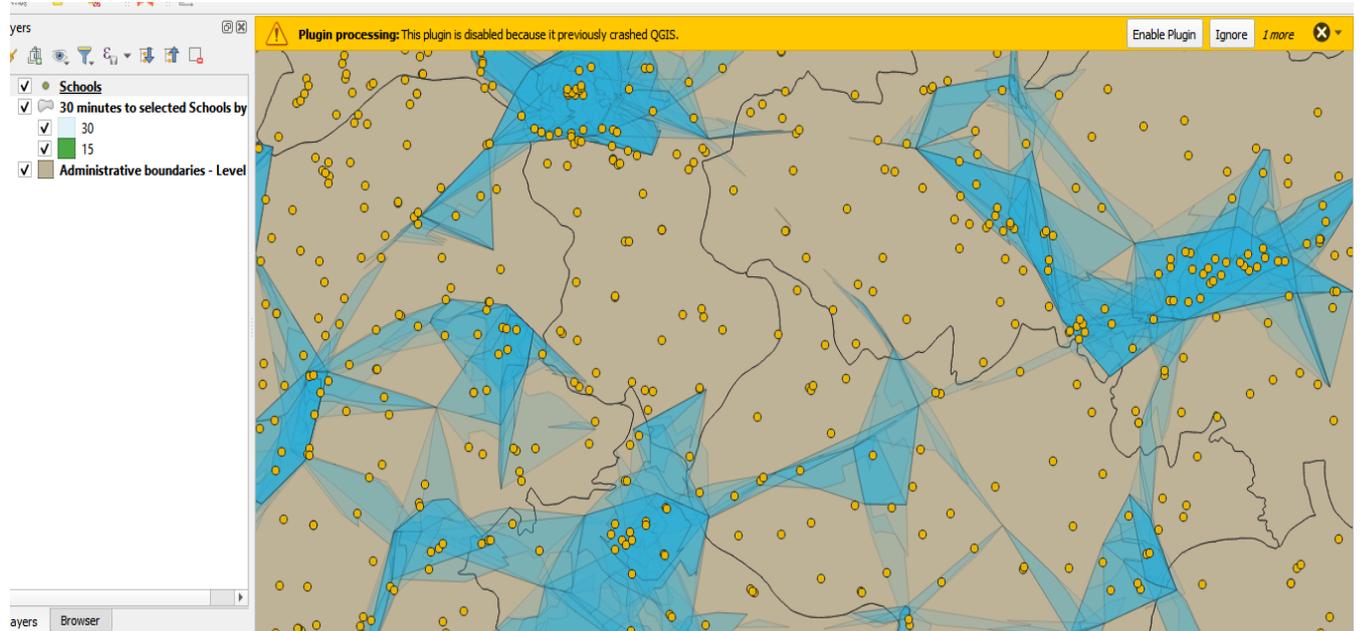


Fig. 6 QGIS Map 4: Buffers around school locations to point out the distance from populated areas that are related to student's convenience in reaching schools in Dhaka Metropolitan City



While it is known that human populations are not evenly spread, the only way of avoiding this difficulty is to have spatial data with a very fine resolution. If an additional set of information on the locations of villages, farms, and towns was available, it could have been used to adjust the proportions of the population to each grid block. Examples given here have involved overlaying points (schools) with polygons (grid squares) and one set of polygons (enumeration areas) with another set (grid squares).

The above map shows 140 schools inside Dhaka District in yellow dots, the administrative boundaries are visible in gray color lines, and schools are surrounded by light blue color buffers means 30 minutes away by walking to school from the populated area and comparatively deep blue buffer area around the schools are meant 15 minutes' walk. So, most schools are located within a convenient distance of the populated area. Yet most schools are not identified by the 15- or 30-minutes walking distance. More exercise is required with the authentic dataset for quality output to be effectively utilized in any policy advocacy.

4. Conclusion and Recommendations

In the GIS world, the ability to produce customized maps is called Automated Mapping (AM). This usually refers to the production of maps regularly as conditions change, for example, in the education world is to produce customized maps showing the location and names of schools that meet certain criteria (John M. Mendelsohn, 1996). In many cases, considerable resources are wasted, providing activities and resources to schools in areas where they are hardly needed, while more deserving schools elsewhere remain in need. In these situations, GISs can be important planning tools by mapping indicators of the need to show just which micro-areas require assistance the most (John M. Mendelsohn, 1996).

The GIS can calculate the area of each latitude/longitude grid square, allowing the population data to be expressed in densities. For our purposes, the number of children not attending school could be shown as the number of children per 100 square kilometers. An obvious assumption in this analysis is that the population is evenly or homogeneously distributed in each enumeration area (John M. Mendelsohn, 1996). Thiessen polygons are created by GISs to solve this problem. Maps showing the positions of schools and Thiessen polygons may be useful in showing areas where children have to walk unnecessarily large distances. Such maps would also help set zoning criteria in urban areas, and in zoning primary schools as feeders to secondary schools. These polygons provide only estimates of catchment areas, based on the assumption of equal distance to each school. Additional information and a better degree of resolution would be achieved if spatial data on the locations of settlements were overlaid with the polygons. That analysis would provide information on the comparative number of settlements within the catchment area of each school (John M. Mendelsohn, 1996).

Furthermore, where the disadvantaged people like sweepers reside or floating people who have migrated to urban areas for daily jobs to survive might not have scope to send their children. There may be several reasons behind that, such as children are also working, could be there being no school close to the slum area, or they cannot send their children to the same government schools where the urban people send their children. So in Dhaka Metropolitan City, there are more than seven thousand slums scattered all over the Upazilas. In a few slums, there are NGO interventions for reaching out to school children. But there should be a comprehensive analysis that will supplement Government Project ROSC to make an effective micro plan for urban slum intervention. A more specific spatial dataset must be developed by government institutions under the Ministry of education. More training is required for skilled people to prepare a clear GIS map to recommend several school structures to build, teachers training to provide adequate quality services to the vulnerable children making school environments interesting to them. To ensure reaching out to school children, the number of school shifts may be increased.





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