

THE OUTDOOR ENVIRONMENT OF KINDERGARTENS IN KHARTOUM STATE

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1-1 General Introduction

The term of Kindergarten which is originally derived from the notion of school as metaphorical garden alludes to the idea of children as unfolding plants. Scottish educationist and David Stow 1793-1864 whom the first encourage play activities for young children rather than still mechanistic training referred to this analogy with his Glasgow infant school in 1828 - the playground is a garden of Eden- (Markus, 1993). Kindergarten is important to place for socializing, where children learn the culture and social values these from their elders and where religious rituals and culture ceremonies take place (Hisyam & Suharto, 1978). Outdoor education is one way in which schools help the child to grow accordance with the general aims of education and specific aims of subject matter, through these medium the school can help the child live his today to the full and prepare him to meet an unknown tomorrow with knowledge ,skill and flexibility, Smith,1970 and U.N.SCO.1984 added that one of outdoor school learning objective is to live happily and healthfully in outdoor and learning worthy interests and skills which enrich living for that must be made a friendly atmosphere in which children will feel secure and happy. To make a good design achieve these goals the skills of engineering, architecture, horticulture, ecology, geology and social science must be work together to develop successful landscape design (Edmond, 1979).

In Sudan, till 2002 there is no scientific research on the relationship between the outdoor environment and landscape design in kindergarten.

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1-2 Concept of kindergarten

In Denmark and Sweden, the term of kindergarten relates specifically to facilities for children between 3 to 5 years old, whereas in U.S.A. it is identified the pre-school class attached to the elementary school and nursery schools sometimes are referred to as child care center or early learning center (Penn, 1994). Japanese and Spanish nursery school systems provide school kindergarten for 85% of children over 3 years, in France kindergarten, serve over 95% of children between 3 and 5 years old (Boyer, 1991 and David, 1993). In general, Dudek 1996 put the age of children in pre-school care in the range of 3 to 6 years old.

1-3 Importance of play ground

Titman 1994 emphasized that school that provides children chance to be connected to an outdoor environment on a regular basis, unfortunately, the outside space as an educational place for children is often neglected (Francise, 1990) or viewed as some left over (Cohen *et.al*, 1978).

1-4 The creators of play ground

Stine, 1997 stated that there are three players for creation the setting of children: the designer who make school form, teacher the maintainer of the environment and child who is often a major force in messing up the space all of them are interact and their interaction having impact on the planning, building and use outside educational environment. Stine, 1997 added that the designer's role is a critical one in the triangle of players whom together create a place.

Elgiae, 1986, determine 8m^2 per child as external space, the U.S.A. kindergarten are provide 3.25m^2 per child as interior space and about 7m^2 per child as external playground, Dudek, 1996 allows only 2m^2 per child as inertial space and 3m^2 as external space.

1-5 Contents of play ground

There is soft and hard material on the kindergarten playground.

a) Soft materials include plant, water and sand.

Plant materials are trees, shrubs, herbaceous (flowering plants and also vegetables) and lawns. Trees with large crown often plant in the front yard in clear space to provide shades for children as well as a wind break (Christiansen, 1999). Fruit trees are used for seasonal fruits and shade in the yard. The playground must be arranged with basically ornamental plants including flowering shrubs and herbaceous plants to get the green and other colors to the ground. The lawn in outdoor creates a green and safe playground; the vegetable garden needs small spot in the yard. Children become more observant of their surrounding as

protectors of growing things that create by digging in the dirt, planting seeds, watering and hoeing (Broman, 1982). All toxic plants must be avoided in kindergarten, In spite of this fact the majority of landscaping plants are safe. The sand area can be provided in sand boxes or pits, it must be moistened occasionally. Water usually provide by hoses, tube, birds bath, small ponds or a combination of limited water and lots of sand.

b) Hard materials including paving materials, chain-like fences, playing equipment metal storage and child-size chairs, which are familiar in outside educational setting (Stine,1997) Gravel as a paving material should be avoided, concrete or stone paving are clear, quick drying and pleasant to walk on, however any kind of paving must be well drained and all play equipment are best site on a surface of grass, and, fine bark or other soft material (Wright,1978). Allun and Johnson 1995 founded that about 18% out of 474 hazards came from the ground surface. A.L.S.C.O, 1991 and Wright, 1978 described the playground as following:

kindergarten must be built on a quite sites and must be far away from noisy places to protect children from noisy sound and other kinds of pollution also playground need to be somewhere fairly shelter from strong winds and should be at least partly shaded in hot and sunny climate, play area needs partly roofed to make a good protection against rain and glaring sunshine these can provide by wooden lattice work or plants growing by on a pergola. The purpose of this research to help designer think about the quality of the outdoor environment in kindergarten as learning place and to create a valued place where children learn .The investigation was intended to achieve the following objective:

- 1- To study the position of kindergarten in Khartoum state.
- 2- To suggest an ideal model for outdoor space of kindergarten.

2- Research Methodology

This research was conducted in 2002, three governorates in Khartoum state selected namely Khartoum, Khartoum North and Omdurman, and tow localities were selected from each one.

2-1 Site selection

The questionnaire was designed to gather information about the situation of kindergarten in the three governorates were selected. Bases of information that gather, classification, and counting of kindergarten were made, then six kindergartens selected as research sites named case study A. case study B case study C, case study D, case study E and case study F.

2-2 Site analysis:

1. General plan was drawn for each site, outdoor area per child calculated as:

Outdoor area /Number of children.

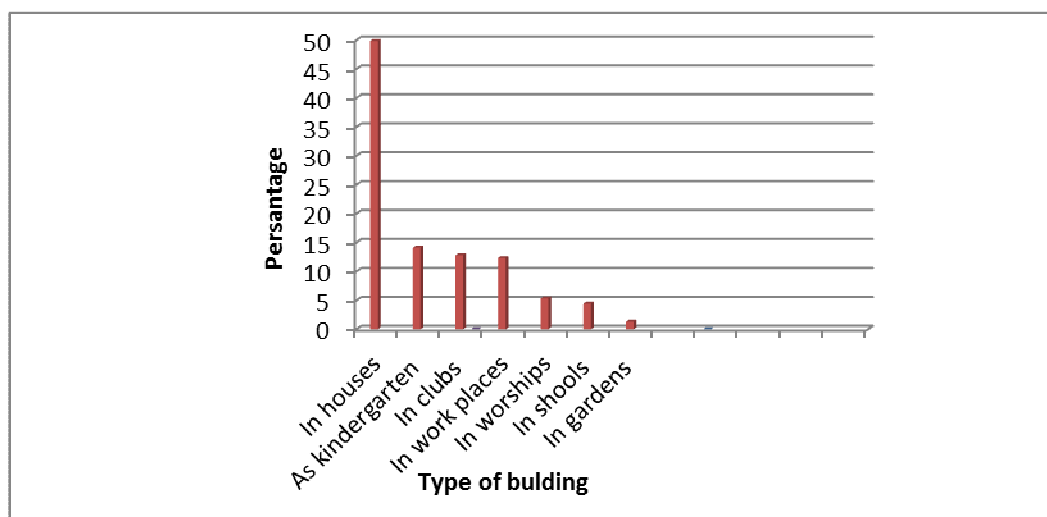
2. Determination the type of design used on each site.
3. Classification of plants and counting it per species in each kindergarten.
4. Approximation of the shaded area by measuring the diameter of the tree crown and then calculated the area under it.

3- Result and Discussion

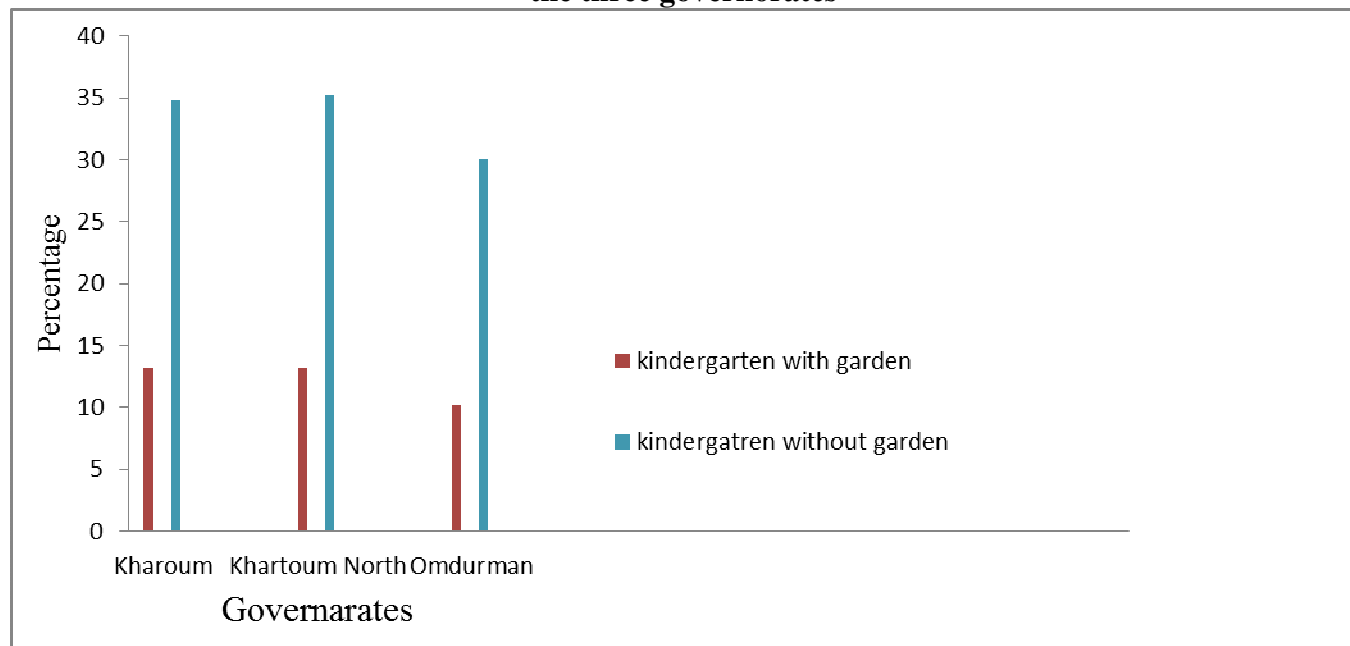
The study showed that 91.2% of kindergarten which belongs to the private sector and just 8.8% to the public sector. The number of kindergartens in Khartoum locality has seen higher than others localities of Khartoum state these may be due to the high number of well-educated people and foreign population in contrast with other localities, that indicates the good awareness of the importance of gardens to the local population.

Kindergartens that occupied houses displayed the highest percentage in the three governorates of Khartoum state (fig.1) it may for economic reasons and a lack of kindergarten specification. Kindergartens situated in clubs took the biggest area that owing to the fact that clubs are spacious and work only in the evening; therefore, children have taken the whole area as their disposal a good part of the day.

Fig1: Percentage of kindergarten according to the type of building they occupy



The study showed that only 36.6% of kindergartens enjoy the presence of garden that shown in **fig 2**.

Fig2: Percentage of kindergarten with garden compared with those without garden in the three governorates

It was clear from the survey Omdurman kindergartens took the smallest area when compared with other localities, this a result of planting trees more than lawns and so no complete garden could found. Khartoum north governorate score the highest percentage of kindergarten with lawns 38.8%, 60% of flowering plants, while others scored the highest number of fruit trees 19.1% and shad trees (54 %), that possibly due to the small of areas in Omdurman kindergartens which have not enough space for lawns.

The six case studies divided into three groups according to their area. Table 1 showed that the large area has a large outdoor space per child and no kindergarten is noticeably crowded with children, which made the place more convenient.

Table 1: Outdoor area per child in each of the three groups

	First group (200-500 m ²)	Second Group (500-1000m ²)	Third Group (Above 1000 m ²)
Average total area(m ²)	350	750	1250
Average building area(m ²)	150	200	300
Average of outdoor area(m ²)	200	550	950
Average of outdoor area per child (m ²)	6.1	12.2	14.6

Playground in all kindergartens under study that with green area in formal design, that because it is easy for construction and suitable for the small area., it is general features has a row of trees, formal shape of lawns and a repetition of plant materials. Both case studies A

and B have larger open space of lawns than other case studies, this enable children to run and play more freely, while in case C & D where lawn area surrounded by shrubs, children activates is noticeably limited, case study F has a big trees shaded area without lawn and children used the shaded area densely without any lawns area to enjoy in it. **Fig 3,4,5,6,7&8** show general plans of the six case study outdoor area.

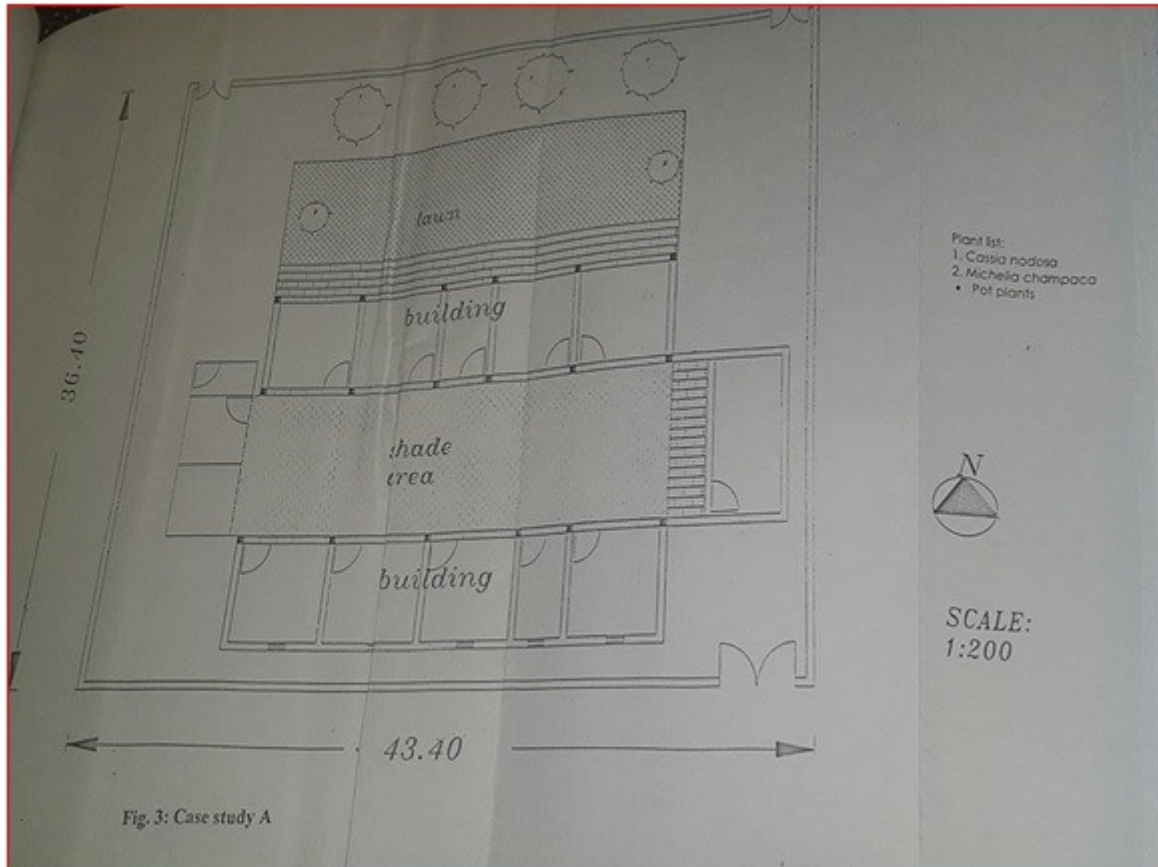


Fig. 3: Case study A

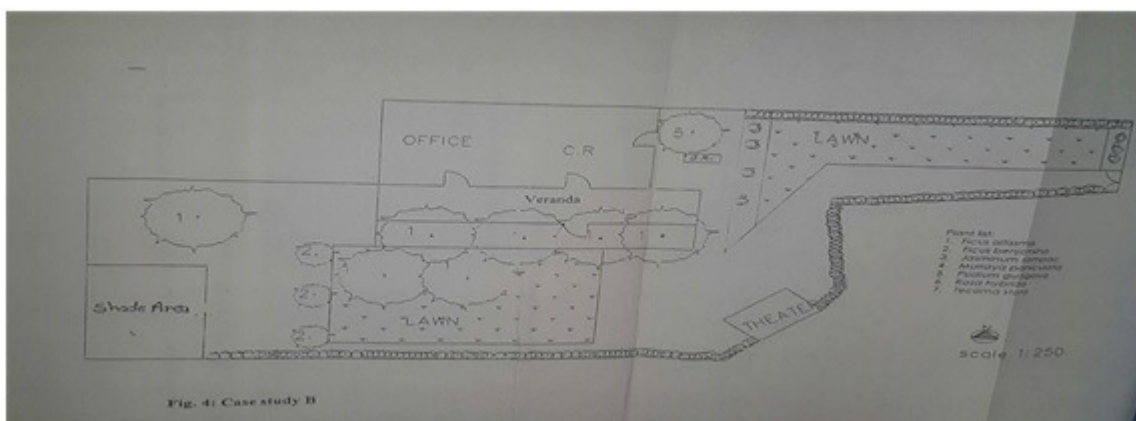


Fig. 4: Case study B

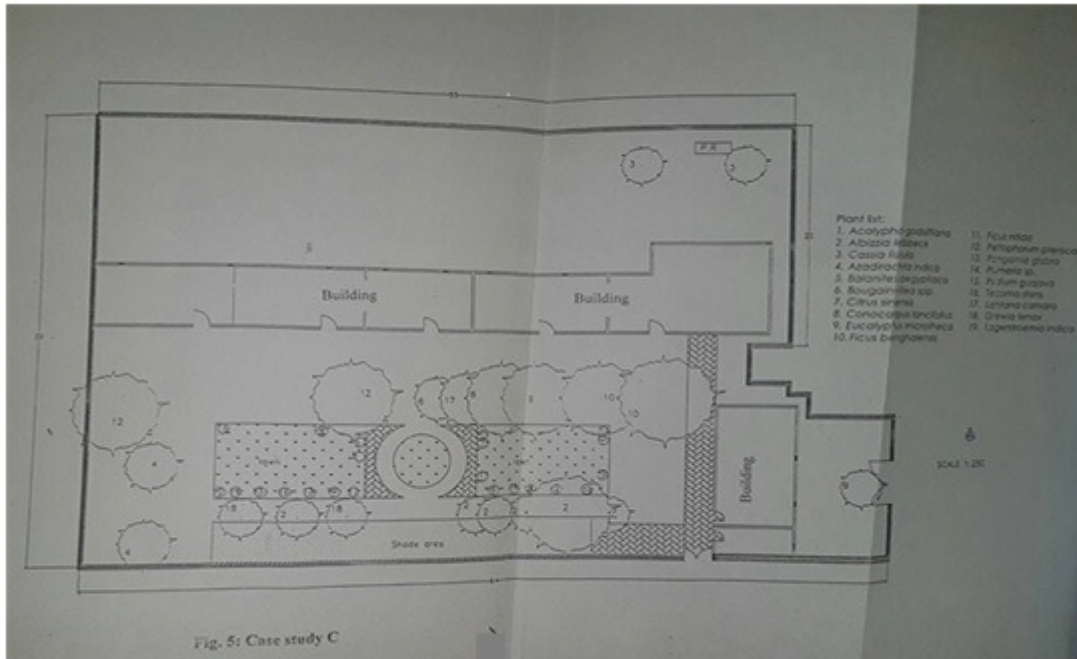


Fig. 5: Case study C

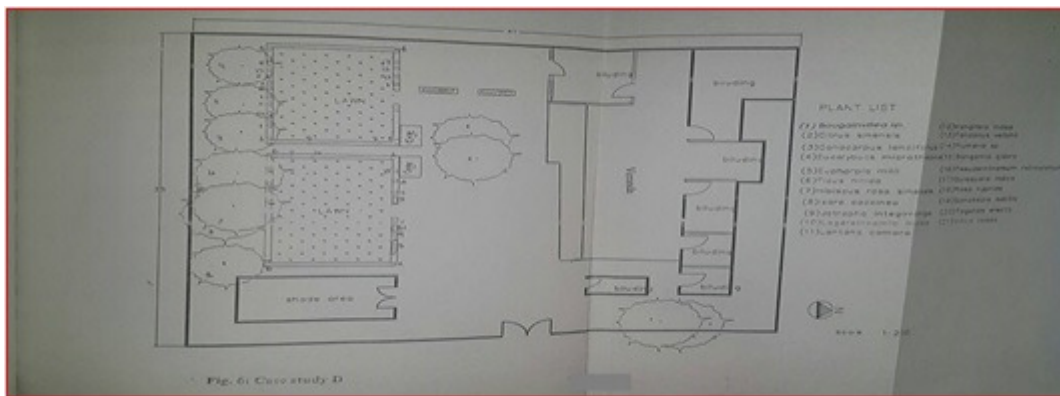


Fig. 6: Case study D

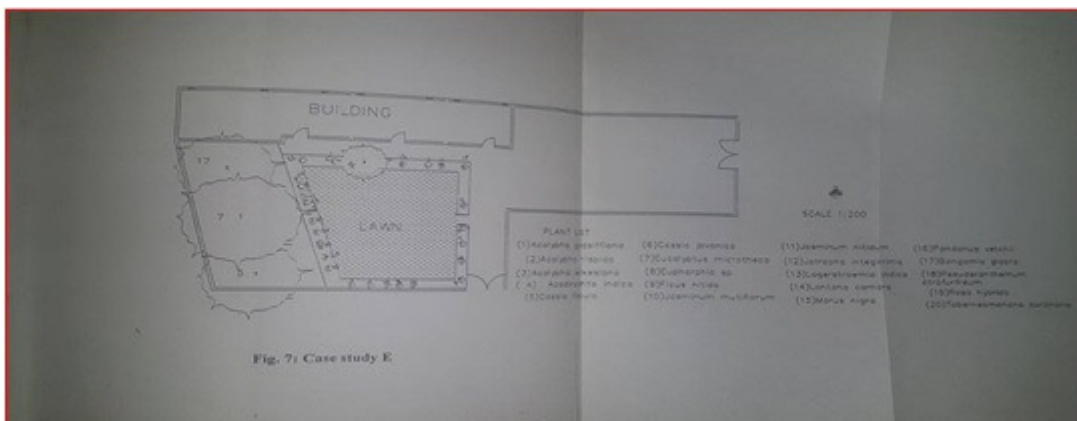


Fig. 7: Case study E

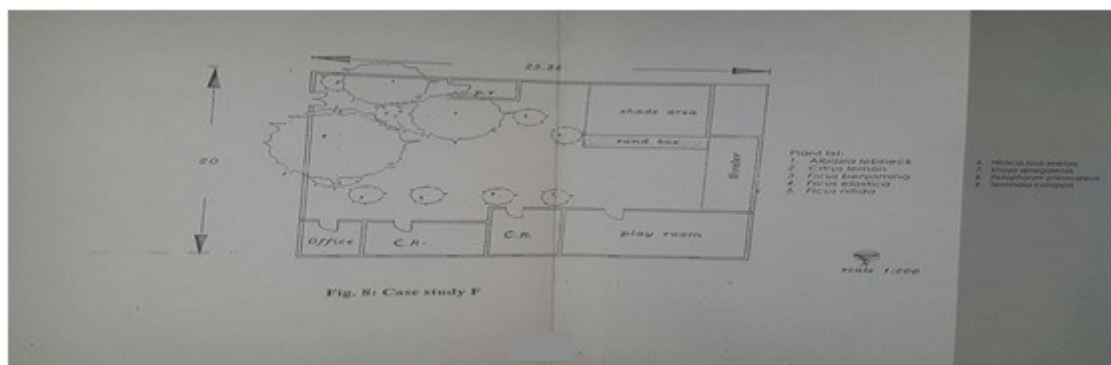
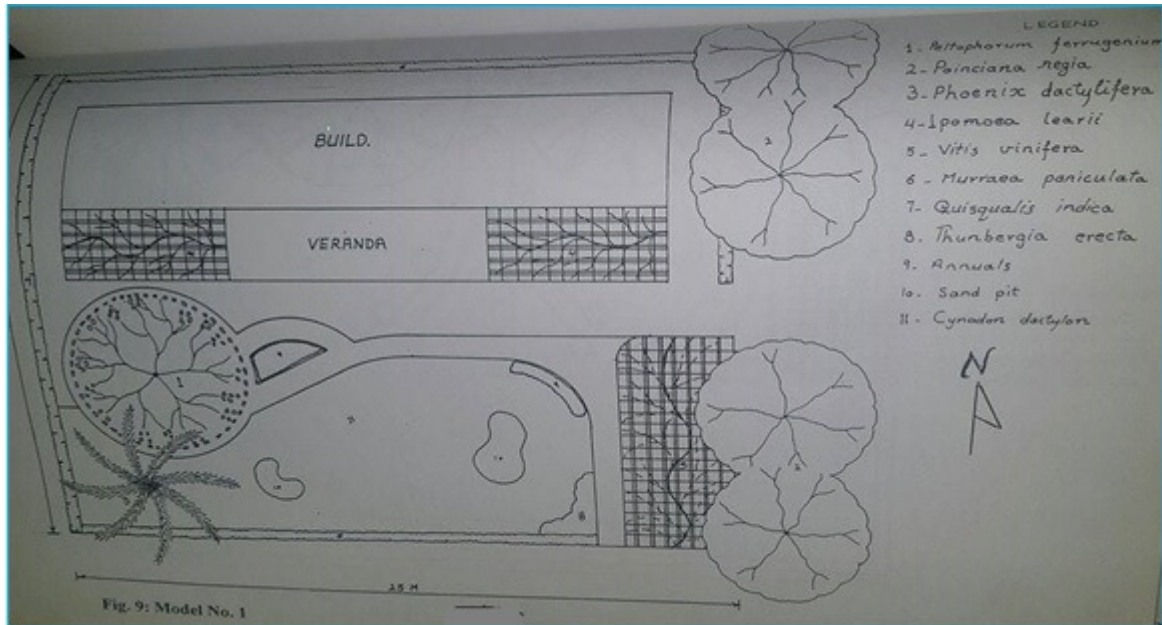


Fig.8: Case study F

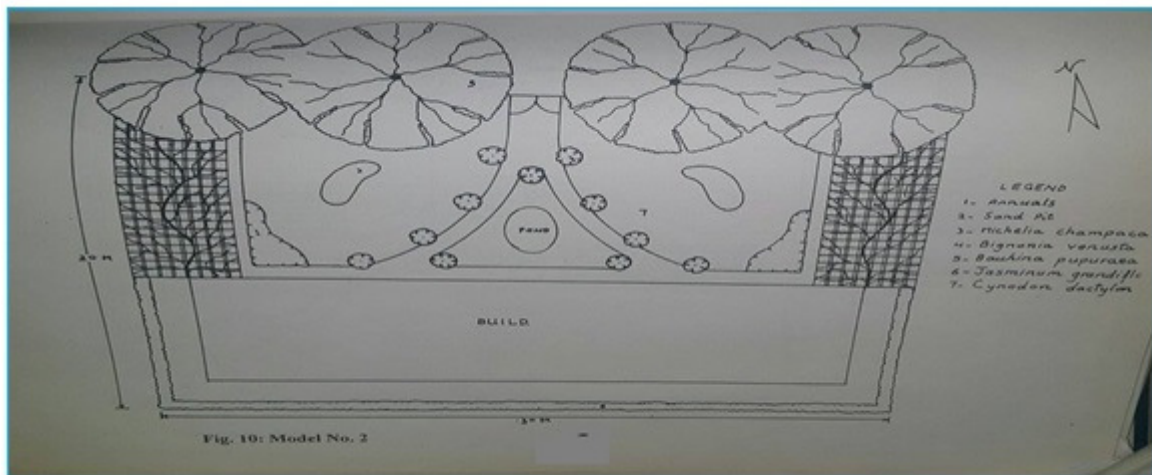
The study appeared that herbaceous flowering plants used in the majority of cases study except in case A where there is wall container garden with four kinds of flowering herbaceous plant and in case D two kinds of it grown in borders.

Poisonous plants took about 23% of plants used in the six case studies, this percentage seems quite high, some of it may be ease to remove, especially in case A (almost of them planted in pots), in case studies B,C,D and F these plants kept far enough from children. The outdoor area, in the six case studies, are bigger than the indoor areas, however, some area which are seldom used by children, but it does not see to make a big different in the outdoor area per child as in case study A,C, and D, because the number of children was already not very high. The area that shaded by trees took about 446.6m² this suitable spaces for play on it that shown in case of D, whereas in the case of F there is a small tree area shaded by trees, although the design depends on the trees but the smallness comes from the bad distribution of trees.

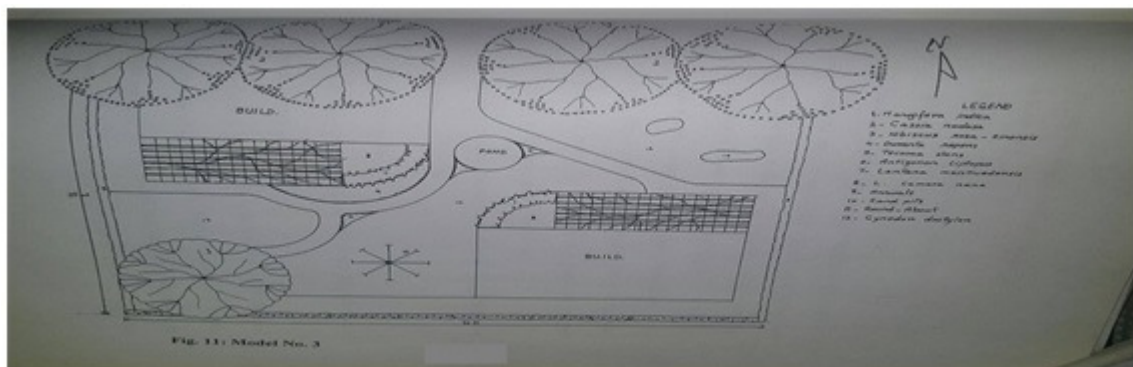
There are three models shown in fig 9, 10&11 are designed to fulfill children's need for a playground. These models designed to solve some problems as loss of lawn space, good distribution of trees, uses fruit trees, flowering shrubs and annual plants, uses sandpits and water elements. Table 3 summarized some features of suggested models.



Model 1



Model 2



Model 3

Table 3: Summarizes some features of the three models

	Model 1	Model 2	Model 3
Total area (m ²)	500	600	750
Outdoor area (m ²)	353	425	582
Shaded area (m ²)	About 105	About 161	About 190
Lawn area (m ²)	About 80	About 85	About 90
Plants materials used	<i>Peltophorum ferrugenum</i> <i>Poinciana regia</i> <i>Phoenix dactylifera</i>	<i>Bauhinia pupuraea</i> <i>Michelia campaca</i>	<i>Mangifera indica</i> <i>Cassia nodosa</i>
Trees			
Vines	<i>Ipomoea learii</i> <i>Vitis vinifera</i>	<i>Bignonia venusta</i>	<i>Anignon liptopus</i>
Herbaceous plants	Different kind of Annuals	Different kind of Annuals	Different kind of Annuals <i>Lantana montivedensis</i> <i>Lantana camara</i> (<i>nana</i>)

4-Conclusion

The study showed that:

- The kindergarten in Khartoum and Khartoum north governorates are almost similar in number but both had more kindergartens than Omdurman.
- Kindergartens that occupy houses have the highest percentage compared to those purposely designed as kindergarten and those occupy other kinds of buildings.
- Only 36.6% of the total number of kindergarten enjoys the presence of gardens, all these are designed informal type.
- Flowering and shaded trees take the highest number compare to other kinds of plants.
- The vegetation in the cases understudies is 23 kinds of trees, 26 kinds of shrubs and 4 kinds of flowering herbaceous plants in addition to the lawns, which in all cases under study was *Cynodon dactylon*.
- Sand was distributed in the playground and water element was noticed just in case study B.
- When looked at fences, in a case study A, it was a container wall garden, in case B made of iron grill backed by plant hedge and in all other cases it was a brick wall.

- Some poisonous plants from Apocynaceae, Euphorbiaceae, Moraceae families were founded. Moreover, the spiny plants *Balanites aegyptiaca*, *Bougainvillea Sp.* and *Rosa hybrid* were founded too.

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