Converting MUET into Green Campus - Initiative towards Stable Growth – A case Study of MUET, Jamshoro

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Abstract: Over the past some decades, environmental attention & sustainability has become most discussed topic in national & international arena. This issue resulted in the number of concerned companies to grow rapidly, producing green products. Climatic change concern is most common factor recognized in proposing & producing the green areas specially in universities for ecofriendly & sustainable campus. Mehran University is one of the leading universities in Pakistan & also renown in international globe. This research revolves around conversion of MUET into green campus & explore developing themes which follow the green campus initiative and to validate critical factors for implementation through both quantitative and qualitative research approach. This will help in changing the climatic conditions within the campus, and will initiate towards creating bearable environment for students even in harsh climate of Hyderabad & will help in taking concrete initiatives as recommendations would be given by researcher for sustainable growth of green campus.

Keywords *Environmental attention, Sustainability, Climatic changes, Green campus.*

1. Introduction

University is an entity that consumes a valuable amount of energy, where the level of energy-saving living practices remains lower than in housing environment, it is a scaled-down form of an urban system. University campus has all the elements which a city has, including infrastructure, transportation, built environment, systems which are powered by energy and later on discharge waste products. Because of all these factors, university campus can serve as a testbed to analyze the effectiveness of green systems and green features that could be applied to future cities.

University students will be the decision makers of society in the future. Students need to be educated to have sufficient knowledge and a proper set of values to vote for competent representatives who will enact green initiatives. Since a university trains future decision maker and often fosters environment-friendly education, it would be advisable to build green campuses where students can practice green living. Consequently, it is essential to transform the currently energy-wasteful university campuses into green campuses, to tackle the urgent issues of carbon dioxide emissions, and global warming, and to enhance people's health and well-being.

However, in South Korea, the universities' plans and initiatives for sustainability are not comprehensive, are not systematic, and are insufficient. For a more sustainable university, then, it is necessary to study the advanced plans and initiatives of other universities. According to the UI Green Metric World Universities, MUET is positioned at 294 in the global ranking, this ranking takes into consideration the campus site, energy and climate change, infrastructure, water, waste, education, and conveyance of the universities. Figure # 1 shows the google earth master plan of MUET. It has been observed from research that a large number of university students suffer from stress and depression due to the hectic university life. As per the assessment done by the national college health, about 65% were severely stressed out due to the burden loaded over them.

In the same assessment 32% of students went into depression due to the extreme pressure of university life. MUET is the educational hub for more than 7000 students, 2000 faculty and resides 1000 other persons. with an area of around 800 acres & from which around 70% area is open without any landscape or greenery which in harsh climate create problem for the students, Hyderabad bear up to 45° temperature in summer season & as the total land of MUET is concerned it seems a barren land. But if utilized the natural resources with small initiatives can be transformed into green campus which will not only help in changing the environment of MUET but also help in minimizing the energy costs.

Hyderabad has a tropical wet and dry climate (semi-arid climate) with annual mean temperature of 26.6 °C & monthly mean temperatures ranges 21–33 °C . Summer season is hot and humid, where sometimes temperatures often exceed 40 °C between April and June. The coolest temperatures occur in December and January, when the lowest temperature occasionally dips to 10 °C (50 °F). May is the hottest month in which daily temperatures range from 26 to 39 °C. December is the coldest, & temperatures vary from 14.5 to 28 °C.

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Fig# 1: Satellite plan of MUET, Jamshoro

2. AIM OF RESEARCH

Aim of research is to:

- Convert MUET into green campus,

For this purpose, objectives include:

- Documenting the uncovered area of MUET,

Analyzing the type of plants, grass & sorting out type of plants suitable for MUET, according to its climatic condition

3. Methodology

Both qualitative & quantitative methods were used in this research, documentation of uncovered areas of MUET, through master plan was done by author. The type of plants cheaply available was documented through surveying the local markets, & the suitable plants were listed out along with their specification for MUET, the questionnaire was distributed among the students, to get the idea what students desire at their campus & according to their respond, the masterplan & layout will be designed. Literature regarding the green campuses were reviewed, and the concerned data was modified for the research

4. DATA FROM QYESTIONNAIRE SURVEY:

Among 200 students, questionnaire was distributed, some of them were handover as hard copy and other who were not available were asked to fill it through digital means. 80% students were seems quite irritated from the un availability of some basic facilitates outside the department within the vicinity of MUET, including water tap, charging slots, sitting area at waiting points, students included in their statement that when they are running late and standing in harsh season it seems quite vulnerable to be in direct contact with sun without any shade which effect their skin & heath,

Female students were seems to be more conscious about their skin & they desired to have green belts & covered walk ways as much as possible within the campus which will reduce their stress. Employers were also seeming to be aware of energy problems but students due to their outdoor activities were more towards the initiative of transforming campus into green environment with the help on green spaces, utilization of natural resources for energy efficiency in departments & usage of waste water for irrigation in order to minimize the water usage. Table # 1 shows the questionnaire survey response where as In table # 2, we can see the proposed facilities for students & employee of MUET, listed by the researcher.

Table # 1: Questionnaire survey at MUET

Serial #	Questions	Responses	
1	Do you feel the need of green belts?	Yes	85%
		No	15%
2	What problem do you face in summer season?	Sun radiation	70%
		Unavailability of water	65%
		Less Vegetation	60%
		Sitting spaces	80%
		Uncovered waiting areas	80%
3	What facilities you want in MUET?	Green belts	60%
		Covered walk ways	50%
		Covered bus bays	45%
		Drinking water taps	65%
		Trees	70%
		Wifi	75%
		Charging plugs	70%
		Covered Waiting areas	80%

Table # 2: proposed facilitates by researcher for transforming MUET into green campus.

SERIAL #	PROPOSED FACILITIES
1	Green belts between roads
2	Covered space for Bus points
3	Semi covered sitting areas with charging plugs
4	Drinking water taps
5	Trees/ plantation
6	Covered walk ways
7	Solar panels/ wind fans
8	Waste water treatment plant

5. RESULT & DISCUSSION

In this scenario the result & discussions are divided into parts which are discussed in detail below:

Documentation of MUET area:

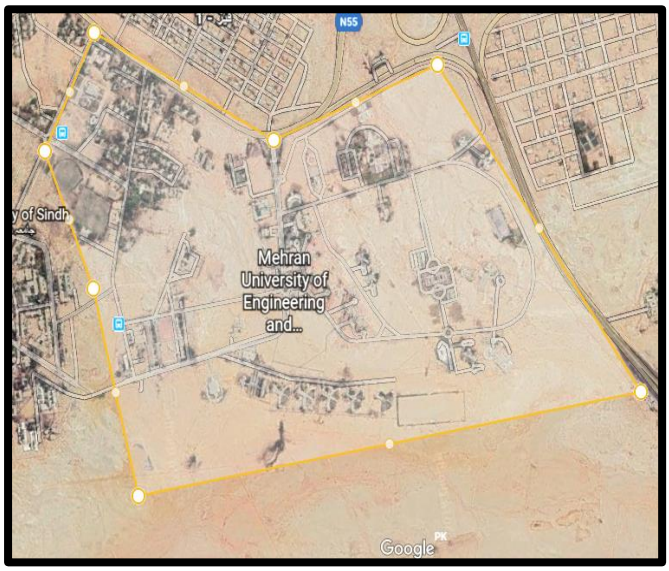

Figure # 2: Area of MUET, Jamshoro Source: google ear

Figure # 2 shows the total area of MUET which is around 857 acres, the yellow highlighted part is MUET, whereas figure # 3 & figure # 4 shows the covered areas (departments & other built environment) & uncovered land respectively, the overall campus bears contours which can be utilized for

gardening. In figure # 3, the blue highlighted part is the covered area of campus, which include departments, offices, residence & other facilities within the vicinity of MUET. Whereas in figure # 4, the green highlighted part is the uncovered, contoured part of campus, which should be converted into plantation by cheaply available plants which can help in healing the environmental problems.

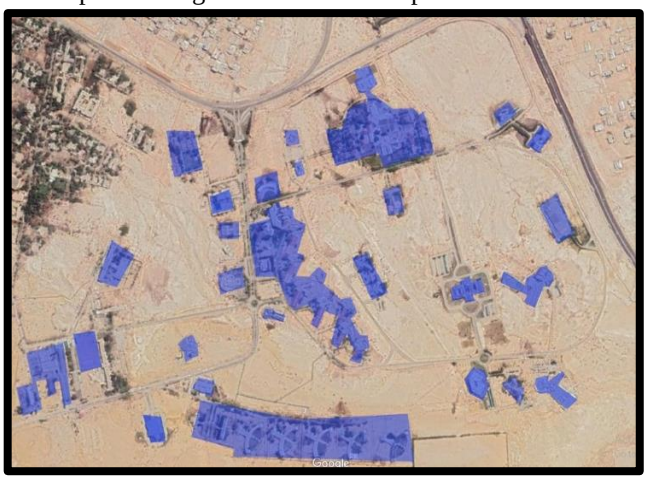

Figure # 3: covered areas of MUET

Figure # 4: uncovered/open spaces of MUET

6. Documentation of Plant types

According to Sindh forest department, Hyderabad & Jamshoro bears only 2 nurseries. Hyderabad bears hot & humid climate, the trees, shrubs & plants which are cheaply available are listed in the table # 3. The names, used by the local public are used in table # 3 in order to coordinate easily with the public.

Table # 3: Cheaply available Plants & Trees in Hyderabad, Sindh.

PLANTS		TREES
Irises	Rose (variety)	Neem
Daisy family	Jasmine	Jujuba
Daffodil	Water Lili	Ber
Aloe Vera		Jamun
Gainday ka phool		Jungle jalebi
Sun flower		Kikar
Cactus		

7. Other proposed facilities

Other than plantation & greenery, the initiatives which should be taken to convert the MUET into green campus includes:

- **Green belt:**

Green belt will comprise of grass which will take less water to grow, this green belt will run across all the departments & will cover all the roads. Figure # 5 shows the path which will be dedicated to green belt, it will be 3'-0" wide. Green color line shows the pathway for green belt in MUET.

Figure # 5: Pathway for green belt.

Solar panels:

Solar panels will be installed on most of the department's roof, facing the high sun which will help in minimize the energy use. Figure # 6 shows the points where solar panels would be installed, Brown color indicate solar panel area.

Figure # 6: Solar Panels points at the roof of buildings

Drinking water taps:

In harsh climates, waiting for their particular route buses & other transport facility, students indicate the problem of un availability of drinking water within the premises of waiting, so the author proposed drinking water taps, which can be seen in figure # 7, blue color shows the drinking water tap points for the students.

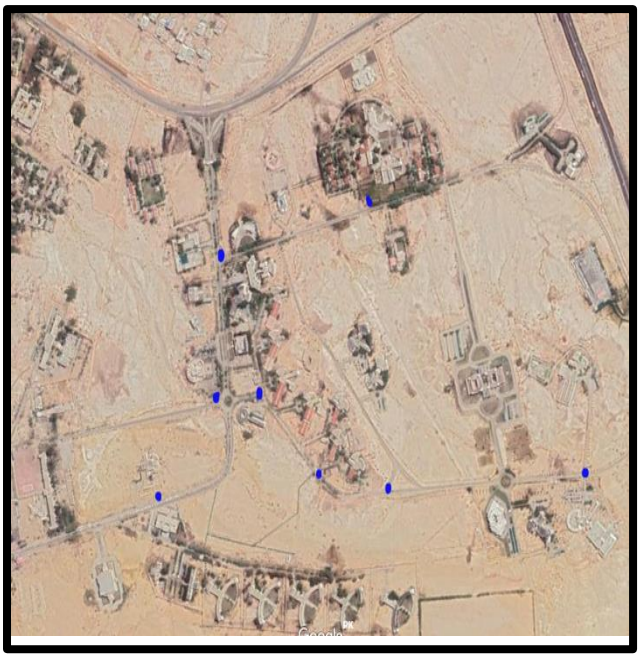

Figure # 7: Drinking water taps

Sitting spaces:

Sitting spaces are essential for students as they have to sometimes walk from & to the different departments, in this regard author suggested to proposed covered & semi covered sitting spaces which will help in relaxing & resting in harsh climate. Figure # 8 shows the areas where the sitting spaces would be designed for students**.**

Figure # 8: Proposed sitting spaces point

8. RESEARCH SCOPE:

The scope of research is only to convert MUET into Green campus, along with the usage of local & cheaply available resources.

9. FUTURE RECOMMENDATION:

In this pipe line, the research can be led to extra ordinary level, which can include the model of conversion for any university or educational institute into green built environment including plantation & energy efficient buildings, one can calculate the daily energy usage of MUET and can propose the quantity of solar panels, wind fans which can be executed at MUET for fulfilling the energy demand of MUET without burdening the government to pay high electricity buildings, and a researcher can also focus on the uncovered area of MUET, how much plantation will be required to covered its major parts, its daily water usage, & can propose the size & quantity of waste water treatment plant which will help to irrigate the planted portion of MUET without the issue of water shortage.

10. CONCLUSION

When Universities reinforce sustainability practices, showcase projects & apply their research, including energy reduction, efficient buildings, water usage reduction, alternative sources & recycling of energy, along with prompting the campus as a sustainable example, Our graduates would be the pioneer of business & Design world with deeper determination & appreciation for implementing these environment friendly practices.

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