location for setting up any industry, warehouse, offices, airports etc. For airports, the closer an airport is to the city center, better benefits are derived because of shorter traveling times from the airport to centers of activity (Min 1994). The airport is able to handily service a metropolitan area. The commuting radius represents a tolerable commuting distance/time from the city center (CBD) (Figure 1), which is in the range of 1 hour. Beyond that threshold an airport does not serve its metropolitan area well as an undue amount of time must be spent to reach it.

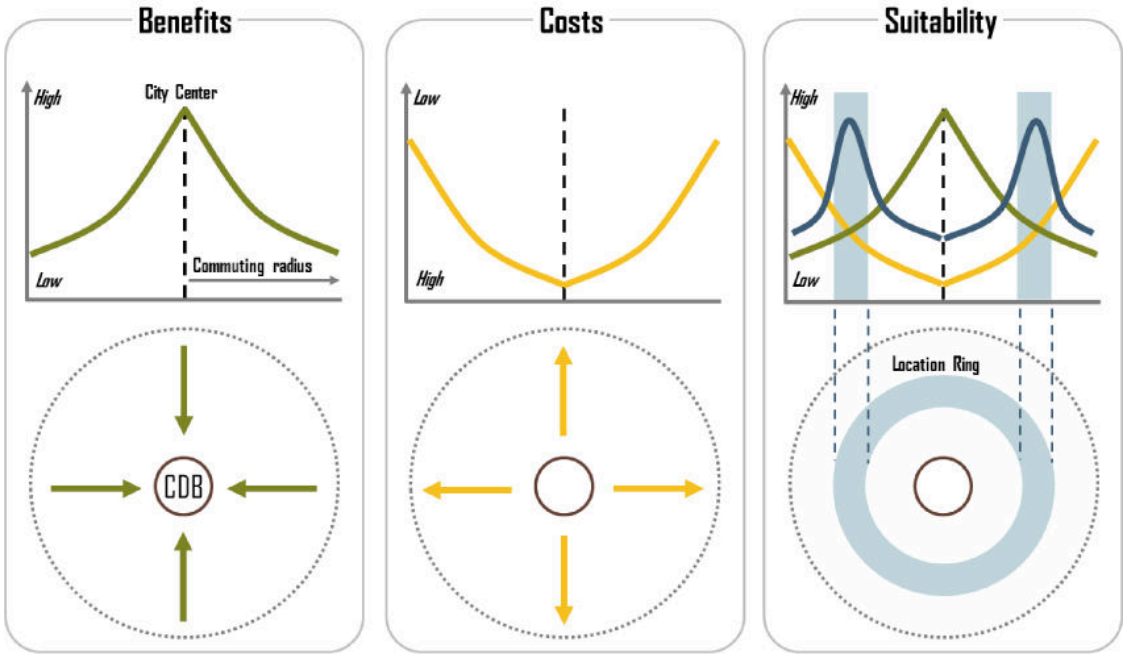

Figure 1: Airport Location Factor (Rodrigue n.d.)

As the location of an airport gets closer to the city center, more externalities are incurred. The opportunity cost for the land devoted to the airport, the number of people adversely affected by noise, and incompatibilities with local land uses increase. Externalities have been a strong factor pushing airports away from recent developments. Benefits and externalities functions tend to be inversely proportional. Consequently, a compromise is sought by choosing a site that is close enough to provide significant benefits and far enough to minimize externalities. A location ring of high suitability is derived from an overlay of the benefits and externalities curves (Rodrigue n.d.).

2.4 Dholera International Airport

The Dholera Airport is planned to be located in the North of the DSIR. It is envisaged to cater to not only DSIR and its hinterland, but also to traffic overflow from Ahmadabad international airport. The proposed airport will propel an airport led economic growth in the entire region in line with other Aerotropolis worldwide. Total 1426 hectors of land have been selected at Village Navagam, taluka Dholera, District Ahmedabad for the Airport (DIACL n.d.). As per development plan, DSIR and Dholera city to be built, are planned to have 20, 00,000 population in 30 years and to then grow further in years to come as an industrial hub, the airport plan will have to provide for growth for about 100 years (SENES Consultants India Pvt. Ltd. 2013). The adequate land has been made available and plans been drawn to meet the expected demand of air traffic. The site can accommodate two runways of 2900 m and 4000 m. The

project will be developed in PPP Mode adhering to the guidelines of the Greenfield Airport Policy of Government of India (DFC Project Details n.d.).

Figure 2: Location of proposed Dholera International Airport.

2.4.1 Traffic Potential

In view of the prime growth drivers contributing to civil aviation, the proposed Greenfield International Airport has got the enormous potential to generate its air traffic on its own during the entire development period of the DSIR. The capacity of the Ahmedabad International Airport is 25 million passengers per annum, which is likely to saturate during the year 2024-25 according to the current traffic forecast. Since there is no space available for expansion of the terminal and construction of the second runway at Ahmadabad Airport, the spillover traffic is likely to be diverted to the proposed Dholera Airport after 2025 (MoEF 2014).

Passenger traffic forecasts show the expected traffic of passengers will increase from 0.79 million in 2018 to 115.62 million in 2045. Aircraft movement of proposed Dholera International Airport has been forecasted till 2045 and indicates that it will reach to 86621 annual international aircraft movement and 81419 domestic aircraft movement. It shows that Dholera International Airport will be more international flight oriented. Freight traffic forecast is indicating the growth in freight from 16 metric ton in 2018 to 1246.99 metric ton in 2045 (MoEF 2014).

3. METHODOLOGY

The research started with a background study of Greenfield airport as well as socio-economic infrastructure around airport including its pros and cons which led to the identification of the problem statement of the research. The research was aimed to develop strategies for augmentation of socio-economic infrastructure around proposed Greenfield airport "Dholera International Airport" and objectives has been set to reach the aim as well as the scope and the limitations of the study were defined. Once the objectives were decided, the literature study was conducted accordingly to identify the aspects as well as the factors for data collection to obtain the set objectives. All the data was collected from secondary sources. The first objective was to conduct a current situation analysis, for which the demographic and occupational data of adjacent districts as well as of the villages nearby proposed airport has been collected through the secondary source, i.e. Census of India 2011. The second objective was to detail and analyze

the socio-economic impacts of airport on hinterland for which the collected data has been analyzed by doing the quality of life assessment of study area as well as the socio-economic impact assessment of Dholera airport on the hinterland through which the basic & futuristic infrastructure gap has been identified and by providing them with a specific weightage the facilities have been located using Weber facility location problem in GIS.

As a final result of this research, strategies were framed and recommendations were given for augmentation of Socio-economic Infrastructure around proposed Dholera International Airport. Selection and location of the facilities and detailed layout are specific contributions of this research. Furthermore, economic analysis of the proposal, in terms of construction cost and employment generation was also conducted.

4. DATA COLLECTION AND ANALYSIS

4.1 Quality of life Assessment

Quality of life assessment was the initial step in understanding the current gap between the existing and required infrastructure and services in the vicinity of the proposed airport. For the study, a current situation analysis was conducted to assess the demographic, economic and social condition of the villages around the proposed airport in Ahmedabad district. Total 25 villages were taken into consideration and score of occupational pattern and worker participation was incorporated to identify the villages with employment potential.

Table 2 : Parameters used for the computation of the quality of life (Mishra, Mishra and Tripathy 2008)

Parameters		Weightage
Social status	ST	0.5
	SC	0.5
	GEN	1
Gender	Male	1
	Female	0.5
Education	Literate	1
	Illiterate	0.25
Occupation	Cultivators	0.25
	Agricultural laborers	0.25
	others	1
Worker Participation	Main worker	0.75
	Marginal worker	0.5
	Non-worker	0.25

Population characteristics with the total number of households, population, density, sex ratio, literacy, and category wise population of each village were studied and scored accordingly as shown in the table (MoEF 2014). Golana, Vadgam, Mitli, and Dholera were found to be the most populated villages in the district, while Ratanapur, Samani, and Anandpur were the least populated. The number of Schedule tribe and Schedule caste in the area is also significantly lesser than general category in almost every village.

Further, the workforce pertaining to each village was divided into three groups, namely main worker, marginal worker and non-worker. Workers who had worked for the major part of the reference period (i.e. 6 months or more) are termed as Main Workers, while those who had not worked for the major part of the reference period (i.e. less than 6 months) are termed as Marginal Workers. Non-workers broadly constitute Students who did not participate in any economic

activity paid or unpaid, household duties that are not involved in any form of unpaid work in the family or cultivation or mulching, dependent such as infants or very elderly people, and also pensioners, who after retirement and are not engaged in any kind of economic activity. Subsequently, the workforce was again categorized according to their profession like; cultivators, agricultural labor, household industry and other worker categories i.e. services etc.

Table 3: Sample parameters wise weightage for villages

Villages	Occupational Pattern	Worker Participation	Gender	Social Status	Education	Total Score
Ambii	0.52	0.76	0.73	0.55	0.55	3.26
Anandpur	0.16	0.17	0.22	0.16	0.19	0.90
Bhadiyad	0.70	0.56	0.63	0.88	0.54	3.31
Bholad	0.44	0.72	0.63	0.58	0.56	2.95
Buranpur	0.15	0.30	0.26	0.19	0.17	1.07
Dholera	1.55	0.73	0.91	1.37	0.88	5.45
Dhanala	0.21	0.21	0.27	0.39	0.23	1.30

Table 4: Infrastructure and services identifiable with different quality of life scores

Average	Poor	Very Poor
Almost sufficiency of basic infrastructure. E.g. Primary and secondary school, college in vicinity, Electricity, Dispensaries, Employment.	Almost sufficiency of pre-basic infrastructure like primary school, medical stores. Lack of secondary schools, colleges, medical facilities.	Lack of primary and secondary school, medical facilities, employment etc.

Table 5: Total score with ranking, Quality of life

Villages	Total score	Quality of life
Vadgam	8.25	Average
Golana	8.02	
Mitli	7.29	
Dholera	5.45	
Piplii	5.04	
Mote boru	5.02	
Gamph	3.99	Poor
Pachchham	3.69	
Bhadiyad	3.31	
Ambii	3.26	
Bholad	2.95	
Shela	2.64	
Nani boru	2.58	
Kamatlav	2.11	
Valinda	1.92	
Kasindra	1.79	
Tarakpur	1.77	
Kamiyala	1.5	Very Poor
Dhanala	1.3	
Gogla	1.29	
Buranpur	1.07	
Navagam	0.93	
Anandpur	0.9	
Samani	0.84	
Ratnapur	0.59	

Table 6: Impact assessment rating matrix of Dholera International Airport (MoEF 2014)

Impact Rating	Employment during operation	Employment during construction	Land use Pattern	Resettlement issues	Tourism development	Influx of Construction workers
Nature of Impact	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Adverse
Duration of Impact	Long term	Short term	Long term	Long term	Long term	Short term
Impacted area	Regional	Local	Regional	Local	Local	Local
Likelihood of occurrence	High	High	High	Low	High	Low
Severity of Impact	Major	Medium	Major	High	Medium	Low
Significance of Impact	Major	Major	Major	Major	Moderate	Negligible

Table 3 shows a sample of parameter wise weightage for each village and explains the process used for calculating the total quality of life score. According to the obtained final score, the villages were then categorized as with average, poor and very poor, indicating the level of infrastructure and services available or being provided there.

The total quality of life score was thus very instrumental in identifying lag of services and infrastructures and their extent in the villages around the proposed international airport. Moreover, it provided important insights on the availability of skilled and unskilled labor in the vicinity, which can prove to be very beneficial for both in construction and operational phase of the airport.

4.2 Socio-economic Impact Assessment

The next step in the research was to identify the socio-economic impact the upcoming airport will have in its vicinity, in both short and long terms. Therefore, to recognize the effects that the proposed airport will have, it was essential to first assess and evaluate the current condition and availability of basic facilities in the vicinity. The surrounding villages have a low population density with significant seasonal migration due to low employment opportunities and inadequate social infrastructure available in the area. In the study area, total main workers account for 29.93% whereas non-workers account for 54.49% and marginal workers are 15.57% of the total population (MoEF 2014). The area has 18 Middle Schools, 8 Secondary Schools, and 6 Senior Secondary Schools and has only 8 Primary Health Centre, 12 Primary Health Sub Centre, 4 Allopathic Dispensary, 22 Registered Private Medical Practitioners, 12 Community Health Workers, etc. (MoEF 2014). Furthermore, there is no appropriate rail connectivity and bus connectivity is also not optimum to meet the current as well as the future demands. Being a Greenfield project, there are not ample expected future facilities available, and, thus all facilities have to be planned accordingly to fulfill the future demand.

Therefore, an Impact assessment matrix was essential for the purpose of understanding the impacts and their degrees that the airport will have in its constructional as well as the operational stage which was obtained from the EIA report for Dholera Greenfield International Airport.

The relatively short-lived economic impacts of the construction stage are likely to be experienced in the local area during the construction phase as workers make everyday purchases

from local traders in nearby areas. This is likely to give a short-lived stimulus to the shopkeepers/traders that will disappear as soon as the construction is complete. Noticeable; flow-on economic impacts will be experienced in other sectors of the economy as a result of the purchase of construction materials and the payment of wages and salaries to the personnel engaged in the construction of proposed airport (MoEF, 2014).

During the construction of the proposed airport, 200 to 250 skilled and semiskilled and unskilled workers will get direct employment opportunity for about 3 years, which will have a beneficial impact on the socio-economic conditions of the area. Therefore, overall positive impacts are anticipated on the socio-economic environment during the construction phase. Furthermore, local skilled, semi-skilled and unskilled laborers will get indirect employment also during the construction phase. This may also result in a steep rise in wages of workers in the surrounding villages. Several other opportunities for locals will be available in terms of supply of construction materials & machinery, vehicles and other essential commodities, petty contracts, etc. (MoEF, 2014)

Although the construction contractors are likely to use unskilled labor drawn from local communities, use of specialized road construction equipment will require trained personnel not likely to be found locally. Sudden and relatively short-lived influxes of construction skilled workers to communities near the airport project may have the potential to „skew" certain demographic variables and the traditional social coherence (MoEF, 2014).

The overall indirect impact on the land use is considered as positive as the nearby area may be developed for residential and commercial use. Local farmers may adopt advance methods of sowing of cash crops, as there is a likelihood of an increase in purchasing power of the local people, which could be attributed to the improvement in income due to direct and indirect employment and business opportunities in the area (MoEF, 2014).

The region is rich in cultural resources and tourist destinations. With the commissioning of the proposed Dholera International airport, tourism will get a boost due to the better connectivity of DSIR and region (MoEF, 2014).

4.3 Location Factor

The facilities that have been prioritized to be located nearer to the airport according to their impact and socio-economic benefits are Logistic Park, Business Park, Hospital, Resorts and Craft Village. The logistic park has been proposed as freight traffic on the proposed airport is adequate. Logistic and Business Park need a business environment for growth. Hence, the location of the business and logistic park should be nearest to their potential consumers. Another factor of their location is good connectivity to transport. So, as per requirement, the logistic and business park should be optimally nearer to Airport, highway and Dholera Special Investment Region (DSIR).

Further, the historic site of Lothal, an ancient city since Indus valley civilization, is located just at a distance of 15 km from the airport, and also being an archeologically significant find, the site has the potential to attract more tourists. So, for the convenience of tourist one resort should be located at an optimal distance from airport, highway and Indus valley civilization site.

To fulfill the basic infrastructure gap according to current need and future demand, there arises a need of one hospital, located at an optimum distance from all villages and with better transport connectivity. Craft villages are proposed to provide an opportunity for rural areas to show their tradition as well as creativity for sustainable employment which will result in the enhancement of the economic benefits through tourism for the local community. As a resort is

proposed near Lothal, so the craft village has also been planned to be located nearer to resort so that both can complement each other and can help in mutual growth.

Facility location problem has been solved according to the solution of Weber location problem in ArcGIS software. Facility location has been located according to suitable weightage given to each location factor (Govers 1996).

Table 7: Location factor weightage

	Logistic Park	Business Park	Hospital	Resort	Craft Village
Proximity to village (employment source)	2	2	2	3	3
Proximity to transport hub	5	5	2	3	1
Proximity to natural sites	1	1	1	5	4
Proximity to water source	2	1	1	4	1
Proximity to DSIR	3	3	0	1	1

Weightage (w) = f*p/1000
Where, f = location factor, W = Weightage, P = Population of village
Weighting Factors
1 = not very important; 2 = somewhat important; 3 = important; 4 = very important; 5 = essential.

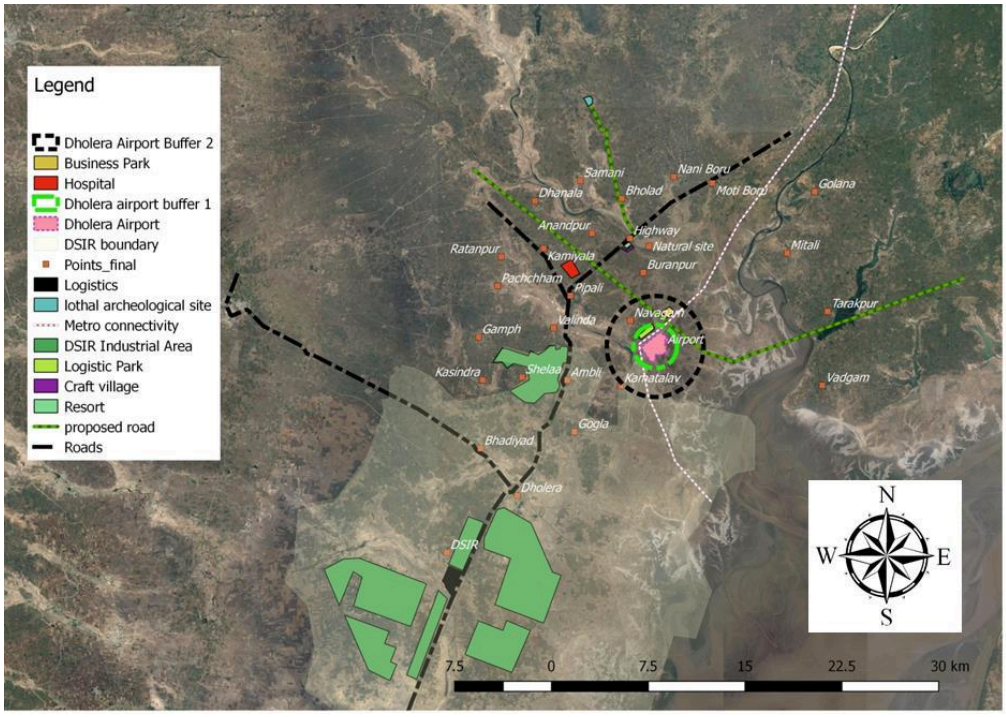

Figure 3: Final proposed facility location

5 CONCLUSION

Airports present an enormous economic opportunity, be it in terms of direct employment potential for locals, or in terms of tourism as a consequence of added footfall. To ensure the success of airport led urban development, it is important for infrastructure planners to provide a solid foundation in the form of basic infrastructure and a well laid out future growth plan. For all these purposes, a proper understanding of existing socio-economic setting of the area is vital.

This research revolves around augmenting socio-economic infrastructure around the newly proposed Dholera International Airport. The data has been analyzed by doing the quality of life assessment by giving weightage to different factors as well as by conducting socio-economic impact assessment which resulted in defining the gap between the existing and the expected future facilities as well as the duration of the impact of airport on the socio-economic condition of the surrounding and the population.

The outcome of the research is a proposal of a detailed facility augmentation plan for Social infrastructure elements (e.g. hospitals) and Economic Infrastructure elements (e.g. Business Park, Logistic Park, Resort, and Craft Village), however, other elements (e.g. offices, Technology Park, Conference Centre, shopping malls etc.) still need more diligence and the research outlines an approach for how this can be tackled.

It also lays down a framework for future infrastructure augmentation attempts, especially in the context of developing nations where rural landscapes still house more than 64% of the population.

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Study of Redevelopment Opportunities in Delhi

Amrita Kaur Gulati[1]

[1]Associate Professor, MBS School of Planning and Architecture, Sector-9, PSP Area, Dwarka, New Delhi. E-mail: amrita.arch@gmail.com

ABSTRACT

The main objective of DDA's Master Plan 2021 is to make space for the projected population of 22–23 million by 2021—in the capitals. The estimates show that we need 24 lacs dwelling units by the year 2021 i.e. 3 lacs per year. To cater this requirement as per the MPD-2021, 40 percent will be through re-densification of existing areas and the remaining 60 percent of the requirement would have to be met through creation of new housing in urban extension. This paper is an attempt to study the redevelopment norms proposed in MPD 2021 including related notifications and discusses existing redevelopment activity in Delhi. The paper analyses the scope and options of redevelopment activity in various planned and unplanned residential areas of Delhi. Further, the redevelopment process is explored and study recommends the modifications in existing set of framework to enlarge or limit the scope of redevelopment depending upon the holding capacity of the area at settlement level.

INTRODUCTION

The need for re-densification of existing urban areas has been felt by most planners who came face to face with the present day realities like excessive urbanization, unprecedented growth of the cities and obsolescence/dilapidation of existing built up areas.

With the increase in population in urban areas, the demand for land as well as for other infrastructure is also increasing. As a result, land prices in cities are soaring. Redevelopment one of the workable option of re-densification suggest themselves as a viable means of optimizing use of land as well as introduce resource efficient, high quality buildings and remove blight. Redevelopment also reduce the pressure to develop green field sites.

Therefore expansion planning has to be replaced by urban integration or inner growth „consolidation' instead of „dispersion'. The argument for recycling/underutilized parts of the city for more efficient utilization especially for residential use assumes more compelling implications when faced with the fact that a major share of the land consumed by the expansion of the city is taken up by residential use. Therefore, it is important that the holes in existing housing areas must be filled and linked into the overall housing environment.

REDEVELOPMENT PROCESS IN DELHI

Redevelopment as clearance and rebuilding, is the process of demolition of old building and the creation of new building on the same plot by appointing a developer / builder. The basic reason is to utilize balance plot potential in terms of permissible FAR by constructing additional flats in new planned building.

The process of redevelopment is a dynamic process. In Delhi, both planned and unplanned areas are undergoing legal and illegal intensification respectively, beyond the carrying capacities of the area without augmentation of infrastructure which cause numerous problems. The increasing population density, dwelling unit density, plot density, FAR and area under plots, taken as the indicators of intensification, create stress on infrastructure generating poor