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Site Selection for Greenfield Domestic Airport for Pandharpur City

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Abstract: India is a developing country in numerous sectors like Agriculture, Transportation, Education, and Infrastructure. Last one-decade excellent changes in the transportation field, now nation focus on airway transportation development. Airway plays a vital role in economic development of a country. The aim of research is to identify best location for setting up Greenfield Domestic Airport for Pandharpur City. Selection of the best location is primarily based on various parameters and that parameters mapping by using Delphi and Analytic hierarchy process strategies. From the complete analysis select the best location for airport.

Keywords: Transportation, Agriculture, Education, Infrastructure, Greenfield Domestic Airport, Delphi analysis, Analytic hierarchy process, Economic development, Airway.

I. INTRODUCTION

Now a day Transportation is a quickest growing region in India. India is a growing country but India's Prime Minister's vision to make India an evolved country. Because the expanding of metropolis and the increasing of roads and vehicles, the visitors gadget turn out to be more and more complex and hard to be controlled. That allows you to make better use of existing transport resources to achieve most efficient traffic scheduling also working on newly development road, rail and aviation network. In India, there are 24 International airports, 103 Domestic airports. All of this airport working with full of capacities. So there are few airports under construction and the Airports Authority of India also planning to develop new International and Domestic Airports across India. An airport is a gateway to a town. Due to this airport and airport environment become crucial. Because of these, its location is important. In this research, the airport site selection criteria, the effects of airport and site selection by planner or engineer are explained. Pandharpur is a famous pilgrimage spot within the state. [5] It attracts tourists who're on a religious quest from all around the country who come here to worship and pay respect to the Gods and Goddesses in this town. Stationary Population of Pandharpur Taluka is 4,42,368 out of this population urban area cover nearly 1,00,000 population (as per Census 2011). Normal day tourist population is more than 10000. In year nearly 2 million visitors come to Pandharpur with using various transport system. Pandharpur having four big pilgrims and total tourist population for those pilgrims is more than 4 million. Total tourist population is 6 million per year and increase by 2% per decade. [5] Nearest airport is Pune international airport, Pune is round 213 km from Pandharpur. So Pandharpur wants Domestic Airport for sophisticated tourist and regional transport. It should have positive vibes like increase standard of living, increase opportunity for locals and increase values of surrounding vicinity.

II. METHODOLOGY

Study of objectives and literature review discover major and critical problems related to site selection for airport. After objectives we collect essential data to fulfil further process. Data was analysed by various techniques like Delphi method and Analytic Hierarchy Process and achieve objectives of study.

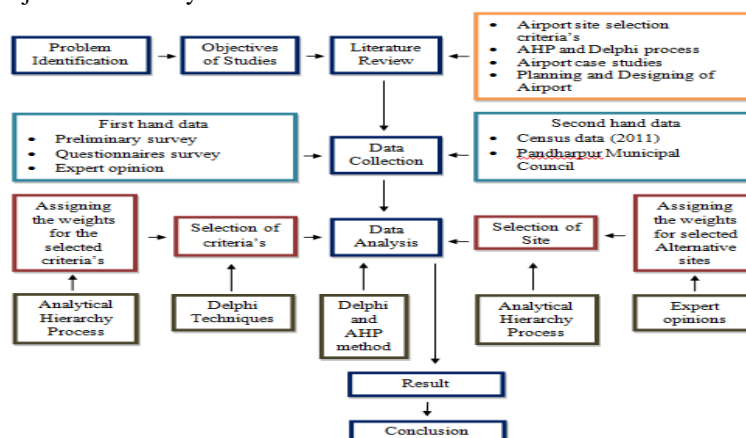


Fig. 1 Methodology

A. Study Area Profile and Location

Pandharpur is a holy place of Shri. Vitthal and Shri Rukmini. It’s also referred to as the Southern Kashi of India and Kuldaivat of Maharashtra state. It’s far placed at a distance of 72 km by using street from Solapur district headquarters. The historical temple of Shri. Vitthal and Rukmini become renovated in 1195 A.D. The Chandrabhaga River flows through the town. It is an important location from all aspects in Solapur district. Pandharpur is located on 17°11' north latitude and 75°11' east longitude. The entire area of Pandharpur taluka is 1,293 km² including a 1,268 km² rural area and a 25 km² urban area, and population is 442368 (as per Census 2011).

Table I
Study Area Profile

| Pandharpur profile | | |
|--------------------|--------------------------------------|-----------------------------|
| Sr. No. | Parameters | Description |
| 1 | City | Pandharpur |
| 2 | Taluka | Pandharpur |
| 3 | District | Solapur |
| 4 | Distance from district to Pandharpur | 72 km |
| 5 | Area of Pandharpur Taluka | 1293 km ² |
| | Pandharpur urban | 25 km ² |
| | Pandharpur rural | 1268 km ² |
| 6 | Population | 442368 (as per Census 2011) |
| | Male | 230359 |
| | Female | 212009 |
| 7 | Tourist population | 6 million |
| | Normal days (yearly) | 2 million |
| | Pilgrims days | 4 million |
| 8 | Households | 88637 |
| 9 | Literacy rate | 77.68 % |
| 10 | Elevation | 465.12 m (1525 ft) |
| 11 | Average Temperature | 39 |
| 12 | Average Rainfall | 600 mm |
| | Maximum rainfall in year of 1974 | 1231 mm |
| | Minimum rainfall in year of 1972 | 157 mm |
| 13 | Average Wind speed | 10.8 mile per hours |
| 14 | Soil | Soft soil to hard murum |

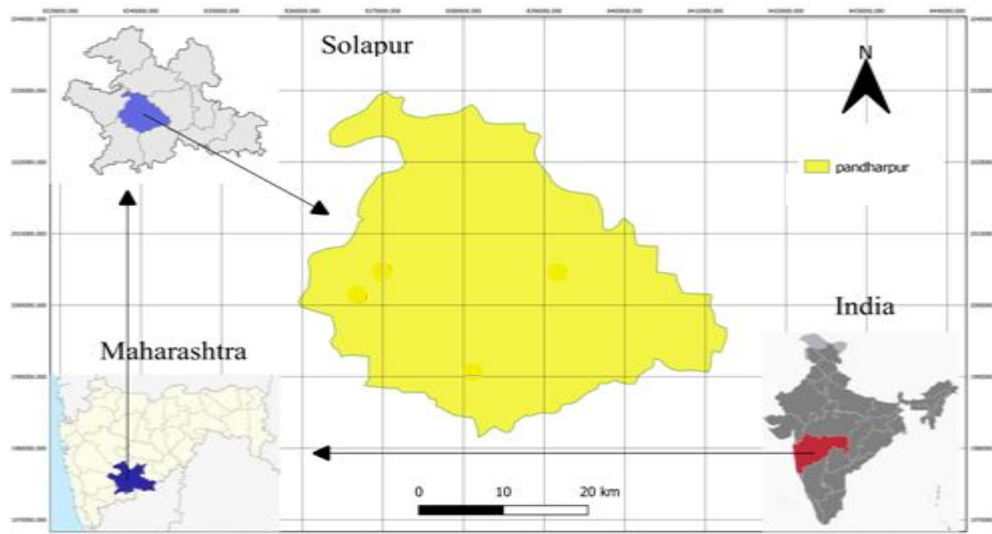


Fig. 2 Study area location

B. Site selection as Planner, Engineer, and Architect

Consist with the planner, engineer, and architect are more sensitive about site selection for airport. The planner should consider the financial, social, and physical aspects of an airport on a town. To choose the location of airport, the first step is to analyse the current situation of city. Present transportation network, wetland, agriculture region, forest area, soil features, and industrial and residential location. They put together future city plans in keeping with this analysis. After this evaluation procedure, the alternative step of use of engineers. They define standards, and compare the location, and ultimately choose the maximum suitable location according to this using software.

C. Site selection Criteria's

The choice of a site for a new Greenfield domestic Airport must be based on certain criteria which will serve as proper guidance for the select proper location and size. Humans prefer to travel via aircraft because of time-saving. Because of this, an airport is a gateway to the city for both national and global dimensions. in keeping with these facts, site selection is an important topic for the airport authority. Following factors listed for selection of an appropriate site for airport 1. Regional plan, 2. Airport use, 3. Ground facilitate, 4. Obstacle, 5. Visibility, 6. Wind, 7. Topography, 8. Noise, 9. Soil feature, 10. Environs impact, 11. Availability of Land, 12. Future planning, 13. Availability of utilities, 14. Economical study, 15. Revenues.

III. DATA ANALYSIS

A. Delphi Analysis

For the evaluation part of the observe all the required data had been accumulated and summarized inside the proceeding chapter. Within the selected fifteen factors, of being a Greenfield Domestic Airport. Fifteen factors, every selected as the influencing factor inside the Airport Planning for Pandharpur City using Delphi Techniques. [2] The weight for these selected factors and sub-factors is assigned using AHP.

First, the group facilitator selects a group of specialists based on the topic being tested as soon as all participants are confirmed, every member of the organization is dispatched a questionnaire with instructions to comment on every subject matter primarily based on their private opinion, revel in, or studies. The quit of every comment consultation, all questionnaires are returned to the facilitator who decides if some other round is vital or if the outcomes are equipped for publishing. The questionnaire rounds may be repeated as many times as important to achieving a well-known feel of consensus.

TABLE II
DELPHI ANALYSIS 1

| Experts | E1 | E2 | E3 | E4 | E5 | E6 | E7 | E8 | GM | SD |
|---------------|----|----|----|----|----|----|----|----|-------|-------|
| Regional Plan | 4 | 4 | 5 | 5 | 1 | 5 | 4 | 6 | 3.760 | 1.268 |

TABLE III
DELPHI ANALYSIS 2

| Experts | x | Log x |
|---------|-------|------------------------------|
| E1 | 4 | 0.602 |
| E2 | 4 | 0.602 |
| E3 | 5 | 0.6989 |
| E4 | 5 | 0.6989 |
| E5 | 1 | 0 |
| E6 | 5 | 0.6989 |
| E7 | 4 | 0.692 |
| E8 | 5 | 0.6989 |
| | N = 8 | $\sum \text{Log } x = 4.601$ |

$$GM = A.L. (\sum \text{Log } x / N)$$

$$GM = A.L. (4.601 / 8)$$

$$GM = A.L. (0.575)$$

$$GM = 3.760$$

TABLE IV
DELPHI ANALYSIS 3

| Experts | x | x - \bar{x} = d | D ² |
|---------|-------|-------------------|-------------------------------|
| E1 | 4 | -0.125 | 0.015 |
| E2 | 4 | -0.125 | 0.015 |
| E3 | 5 | 0.875 | 0.765 |
| E4 | 5 | 0.875 | 0.765 |
| E5 | 1 | -3.125 | 9.765 |
| E6 | 5 | 0.875 | 0.765 |
| E7 | 4 | -0.125 | 0.015 |
| E8 | 5 | 0.875 | 0.765 |
| | N = 8 | | $\sum \text{Log } x = 12.874$ |

$$\bar{x} = (\sum x / N)$$

$$\bar{x} = (4+4+5+5+1+5+4+5 / 8)$$

$$\bar{x} = 4.125$$

$$SD = \sqrt{(\sum d^2 / N)}$$

$$SD = \sqrt{(12.874 / 8)}$$

$$SD = 1.286$$

1) Delphi Round 1

TABLE V
DELPHI ROUND 1

| Criteria | E1 | E2 | E3 | E4 | E5 | E6 | E7 | E8 | GM | SD |
|---------------------------|----|----|----|----|----|----|----|----|-------|-------|
| Regional plan | 4 | 4 | 5 | 5 | 1 | 5 | 4 | 5 | 3.760 | 1.268 |
| Airport use | 4 | 5 | 4 | 5 | 3 | 4 | 3 | 4 | 3.935 | 0.707 |
| Ground facilitate | 4 | 5 | 4 | 5 | 1 | 5 | 4 | 5 | 3.760 | 1.268 |
| Obstacle | 5 | 5 | 4 | 5 | 1 | 3 | 4 | 4 | 3.527 | 1.268 |
| Visibility | 5 | 5 | 4 | 5 | 2 | 3 | 4 | 4 | 3.847 | 1 |
| Wind | 5 | 5 | 4 | 5 | 1 | 3 | 5 | 4 | 3.627 | 1.322 |
| Topography | 4 | 2 | 4 | 5 | 2 | 4 | 5 | 5 | 3.657 | 1.165 |
| Noise | 4 | 2 | 4 | 5 | 3 | 3 | 4 | 4 | 3.510 | 0.856 |
| Soil feature | 5 | 3 | 2 | 5 | 2 | 4 | 5 | 4 | 3.527 | 1.198 |
| Environs impact | 5 | 4 | 4 | 5 | 1 | 4 | 5 | 4 | 3.657 | 1.224 |
| Availability of land | 5 | 5 | 5 | 5 | 2 | 4 | 4 | 4 | 4.100 | 0.968 |
| Future planning | 5 | 5 | 5 | 5 | 2 | 4 | 5 | 5 | 4.33 | 1 |
| Availability of utilities | 5 | 4 | 4 | 5 | 1 | 4 | 4 | 4 | 3.556 | 1.165 |
| Economical study | 5 | 4 | 4 | 5 | 1 | 4 | 4 | 5 | 3.657 | 1.224 |
| revenue | 5 | 4 | 4 | 5 | 2 | 4 | 4 | 3 | 3.988 | 0.927 |

2) Delphi Round 2

TABLE VI
DELPHI ROUND 2

| Criteria | E1 | E2 | E3 | E4 | E5 | E6 | E7 | E8 | GM | SD |
|---------------------------|----|----|----|----|----|----|----|----|-------|-------|
| Regional plan | 3 | 5 | 4 | 1 | 5 | 3 | 4 | 4 | 3.309 | 1.218 |
| Airport use | 4 | 3 | 4 | 5 | 2 | 4 | 5 | 4 | 3.741 | 0.927 |
| Ground facilitate | 1 | 5 | 3 | 5 | 2 | 5 | 4 | 5 | 3.326 | 1.479 |
| Obstacle | 4 | 5 | 4 | 5 | 2 | 3 | 3 | 4 | 3.609 | 0.968 |
| Visibility | 4 | 1 | 4 | 5 | 3 | 3 | 4 | 4 | 3.218 | 1.118 |
| Wind | 4 | 5 | 4 | 5 | 2 | 3 | 5 | 3 | 3.711 | 1.053 |
| Topography | 4 | 4 | 4 | 5 | 3 | 4 | 5 | 4 | 4.080 | 0.599 |
| Noise | 2 | 2 | 4 | 4 | 3 | 3 | 2 | 1 | 2.413 | 0.992 |
| Soil feature | 4 | 3 | 2 | 5 | 2 | 4 | 4 | 5 | 3.430 | 1.111 |
| Environs impact | 4 | 4 | 5 | 3 | 3 | 2 | 4 | 4 | 3.510 | 0.856 |
| Availability of land | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 4.195 | 0.661 |
| Future planning | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4.598 | 0.484 |
| Availability of utilities | 4 | 1 | 4 | 5 | 2 | 4 | 3 | 4 | 3.059 | 1.218 |
| Economical study | 1 | 4 | 3 | 5 | 4 | 4 | 5 | 5 | 3.527 | 1.268 |
| revenue | 3 | 4 | 4 | 5 | 3 | 4 | 4 | 5 | 3.935 | 0.707 |

3) *Delphi Analysis Result:* The result based on experts responses. Use Geometric Mean column for calculate difference between round 1 and round 2. After this process we are ranking criteria's.

TABLE VII
Delphi analysis result

| Criteria | Rank |
|----------------------|------|
| Revenue | 1 |
| Obstacle | 2 |
| Wind | 3 |
| Availability of land | 4 |
| Soil feature | 5 |
| Economical study | 6 |
| Environs impact | 7 |
| Airport use | 8 |
| Future planning | 9 |

B. Analytic Hierarchy Process AHP

The factors that are recognized as capacity aspects for the inexperienced metropolis element by using the use of the Delphi method are analysed to determine the weights of those selected factors using statistics amassed from AHP. The Analytic Hierarchy method (AHP) [4] is a technique for organizing and reading complicated decisions, the usage of math and psychology. The following desk suggests the enter with the aid of an expert's opinion for the pair-wise evaluation of the elements and their categorical elements. The following tables constitute the effects and their consistency. The professionals have been asked to provide their inputs according to the well-based AHP questionnaire. 5 point likert scale is use for AHP analysis.

TABLE VIII
ANALYTIC HIERARCHY PROCESS 1

| Criteria's | Revenue | Obstacle | Wind | Availability of land | Soil feature | Economic al study | Environs impact | Airport use | Future planning |
|-----------------------|---------|----------|------|----------------------|--------------|-------------------|-----------------|-------------|-----------------|
| Revenue | 1 | 4 | 9 | 2 | 4 | 3 | 3 | 2 | 2 |
| Obstacle | 1/4 | 1 | 2 | 1/3 | 1 | 1/2 | 1/2 | 1/2 | 1/2 |
| Wind | 1/9 | 1/2 | 3 | 1/3 | 1/2 | 1/2 | 1/3 | 1/3 | 1/3 |
| Availabilit y of land | 1/2 | 3 | 2 | 1 | 2 | 2 | 1 | 1/2 | 2 |
| Soil feature | 1/4 | 1 | 2 | 1/2 | 1 | 1/2 | 1/2 | 1/2 | 1/3 |
| Economica l study | 1/3 | 2 | 2 | 1/2 | 2 | 1 | 2 | 1/2 | 1/2 |
| Environs impact | 1/3 | 2 | 3 | 1 | 2 | 1/2 | 1 | 1/2 | 1 |
| Airport use | 1/2 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 2 |
| Future planning | 1/2 | 2 | 3 | 1/2 | 3 | 2 | 1 | 1/2 | 1 |

TABLE IIX
ANALYTIC HIERARCHY PROCESS 2

| Criteria's | Revenue | Obstacle | Wind | Availability of land | Soil feature | Economical study | Environs impact | Airport use | Future planning | Criteria weight |
|----------------------|---------|----------|-------|----------------------|--------------|------------------|-----------------|-------------|-----------------|-----------------|
| Revenue | 1.00 | 4.00 | 9.00 | 2.00 | 4.00 | 3.00 | 3.00 | 2.00 | 2.00 | 0.258 |
| Obstacle | 0.25 | 1.00 | 2.00 | 0.33 | 1.00 | 0.50 | 0.50 | 0.50 | 0.50 | 0.057 |
| Wind | 0.11 | 0.50 | 3.00 | 0.33 | 0.50 | 0.50 | 0.33 | 0.33 | 0.33 | 0.036 |
| Availability of land | 0.50 | 3.00 | 2.00 | 1.00 | 2.00 | 2.00 | 1.00 | 0.50 | 2.00 | 0.132 |
| Soil feature | 0.25 | 1.00 | 2.00 | 0.50 | 1.00 | 0.50 | 0.50 | 0.50 | 0.33 | 0.057 |
| Economical study | 0.33 | 2.00 | 2.00 | 0.50 | 2.00 | 1.00 | 2.00 | 0.50 | 0.50 | 0.093 |
| Environs impact | 0.33 | 2.00 | 3.00 | 1.00 | 2.00 | 0.50 | 1.00 | 0.50 | 1.00 | 0.095 |
| Airport use | 0.50 | 2.00 | 3.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1 | 2.00 | 0.158 |
| Future planning | 0.50 | 2.00 | 3.00 | 0.50 | 3.00 | 2.00 | 1.00 | 0.50 | 1.00 | 0.114 |
| Sum | 3.78 | 17.50 | 28.00 | 8.17 | 17.50 | 12.00 | 11.33 | 6.33 | 9.67 | |

TABLE X
ANALYTIC HIERARCHY PROCESS 3

| Criteria weight | 0.258 | 0.057 | 0.036 | 0.132 | 0.057 | 0.093 | 0.095 | 0.158 | 0.114 | Weights sum values |
|----------------------|---------|----------|-------|----------------------|--------------|------------------|-----------------|-------------|-----------------|--------------------|
| Criteria's | Revenue | Obstacle | Wind | Availability of land | Soil feature | Economical study | Environs impact | Airport use | Future planning | |
| Revenue | 1.00 | 4.00 | 9.00 | 2.00 | 4.00 | 3.00 | 3.00 | 2.00 | 2.00 | 2.407 |
| Obstacle | 0.25 | 1.00 | 2.00 | 0.33 | 1.00 | 0.50 | 0.50 | 0.50 | 0.50 | 0.524 |
| Wind | 0.11 | 0.50 | 3.00 | 0.33 | 0.50 | 0.50 | 0.33 | 0.33 | 0.33 | 0.334 |
| Availability of land | 0.50 | 3.00 | 2.00 | 1.00 | 2.00 | 2.00 | 1.00 | 0.50 | 2.00 | 1.240 |
| Soil feature | 0.25 | 1.00 | 2.00 | 0.50 | 1.00 | 0.50 | 0.50 | 0.50 | 0.33 | 0.527 |
| Economical study | 0.33 | 2.00 | 2.00 | 0.50 | 2.00 | 1.00 | 2.00 | 0.50 | 0.50 | 0.871 |
| Environs impact | 0.33 | 2.00 | 3.00 | 1.00 | 2.00 | 0.50 | 1.00 | 0.50 | 1.00 | 0.887 |
| Airport use | 0.50 | 2.00 | 3.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1 | 2.00 | 1.490 |
| Future planning | 0.50 | 2.00 | 3.00 | 0.50 | 3.00 | 2.00 | 1.00 | 0.50 | 1.00 | 1.061 |

TABLE XI
ANALYTIC HIERARCHY PROCESS 4

| Criteria's | Weights sum values | Criteria weight | CA |
|----------------------|--------------------|-----------------|-------|
| Revenue | 2.407 | 0.258 | 9.316 |
| Obstacle | 0.524 | 0.057 | 9.257 |
| Wind | 0.334 | 0.036 | 9.361 |
| Availability of land | 1.240 | 0.132 | 9.394 |
| Soil feature | 0.527 | 0.057 | 9.253 |
| Economical study | 0.871 | 0.093 | 9.328 |
| Environs impact | 0.887 | 0.095 | 9.297 |
| Airport use | 1.490 | 0.158 | 9.439 |
| Future planning | 1.061 | 0.114 | 9.328 |
| λ_{max} | | | 9.330 |

$$\lambda_{max} = 9.330$$

$$n = 9$$

$$CI = (\lambda_{max} - n) / (n - 1)$$

$$CI = (9.330 - 9) / (9 - 1)$$

$$CI = (0.330) / (8)$$

$$CI = 0.041$$

TABLE XII

RANDOM CONSISTENCY INDEX

| n | RI |
|----|------|
| 1 | 0 |
| 2 | 0 |
| 3 | 0.58 |
| 4 | 0.9 |
| 5 | 1.12 |
| 6 | 1.24 |
| 7 | 1.32 |
| 8 | 1.41 |
| 9 | 1.45 |
| 10 | 1.49 |

n = 9

RI = 1.45

CI = 0.4125

CR = CI / RI

CR = 0.04125 / 1.45

CR = 0.0284 = 2.84 %

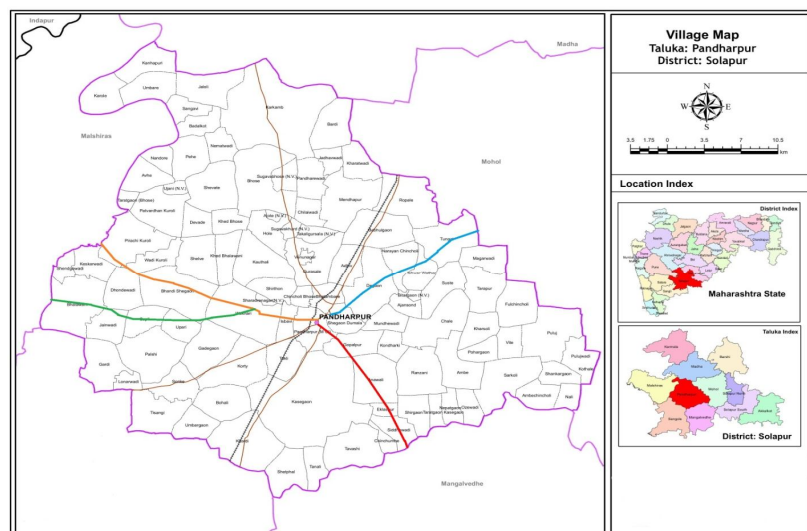
2.84 ≤ 10 %

TABLE XIII

FINAL WEIGHTS OF CRITERIA

| Criteria's | Criteria weight | % Weights |
|----------------------|-----------------|-----------|
| Revenue | 0.258 | 26 |
| Obstacle | 0.057 | 6 |
| Wind | 0.036 | 4 |
| Availability of land | 0.132 | 13 |
| Soil feature | 0.057 | 6 |
| Economical study | 0.093 | 9 |
| Environs impact | 0.095 | 9 |
| Airport use | 0.158 | 16 |
| Future planning | 0.114 | 11 |
| Total | 1 | 100 % |

4) The Analytic Hierarchy Process AHP [1] [4] is useful as multi-criteria decision making based on pair wise comparisons. AHP is also useful for selection of best facility location for planning and developing Greenfield Domestic Airport.



Pandharpur city is well connected by roadways. There are various road networks like state highway, district road, and village road. From this entire road network there are four road networks connect to district headquarters and four road networks connect taluka places.

We are select four major road networks as site selection alternatives.

- 1 Alternative Pandharpur to Solapur - —
- 2 Alternative Pandharpur to Sangali - —
- 3 Alternative Pandharpur to Satara - —
- 4 Alternative Pandharpur to Pune - —

Fig. 3 Alternative road locations

A. Pair-wise comparison based on Alternatives

TABLE XIV
Pair-wise comparison based on Revenue

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 |
|----------------|---------------|---------------|---------------|----------------|
| Alternatives 1 | 1 | 2 | 1/4 | 1/3 |
| Alternatives 2 | 1/2 | 1 | 1/3 | 3 |
| Alternatives 3 | 4 | 3 | 1 | 1/2 |
| Alternatives 4 | 3 | 1/3 | 2 | 1 |

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 |
|----------------|---------------|---------------|---------------|----------------|
| Alternatives 1 | 1.00 | 2.00 | 0.25 | 0.33 |
| Alternatives 2 | 0.50 | 1.00 | 0.33 | 3.00 |
| Alternatives 3 | 4.00 | 3.00 | 1.00 | 0.50 |
| Alternatives 4 | 3.00 | 0.33 | 2.00 | 1.00 |

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XV
Pair-wise comparison based on Obstacles

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XVI
Pair-wise comparison based on Wind

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XVII
Pair-wise comparison based on Availability of land

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XVIII

Pair-wise comparison based on Soil feature

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XIX

Pair-wise comparison based on Economical study

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XX

Pair-wise comparison based on Environs impact

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XXI

Pair-wise comparison based on Airport use

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XXII

Pair-wise comparison based on Future planning

| Alternatives | Alternatives1 | Alternatives2 | Alternatives3 | Alternatives 4 | average |
|----------------|---------------|---------------|---------------|----------------|---------|
| Alternatives 1 | 0.12 | 0.32 | 0.07 | 0.07 | 0.14 |
| Alternatives 2 | 0.06 | 0.16 | 0.09 | 0.62 | 0.23 |
| Alternatives 3 | 0.47 | 0.47 | 0.28 | 0.10 | 0.33 |
| Alternatives 4 | 0.35 | 0.05 | 0.56 | 0.21 | 0.29 |

TABLE XXIII

AHP FINAL WEIGHTS OF CRITERIA

| Criteria's | Revenue | Obstacle | Wind | Availability of land | Soil feature | Economical study | Environments impact | Airport use | Future planning |
|------------|---------|----------|------|----------------------|--------------|------------------|---------------------|-------------|-----------------|
| Weights | 0.26 | 0.06 | 0.04 | 0.13 | 0.06 | 0.09 | 0.10 | 0.16 | 0.11 |

TABLE XXIII
PAIR-WISE COMPARISON FINAL SCORE

| Criteria's | Revenue | Obstacle | Wind | Availability of land | Soil feature | Economical study | Environment impact | Airport use | Future planning | Final score |
|----------------|---------|----------|------|----------------------|--------------|------------------|--------------------|-------------|-----------------|-------------|
| Alternatives 1 | 0.57 | 0.47 | 0.35 | 0.4 | 0.1 | 0.3 | 0.14 | 0.51 | 0.39 | 0.413 |
| Alternatives 2 | 0.13 | 0.16 | 0.09 | 0.13 | 0.41 | 0.24 | 0.23 | 0.12 | 0.14 | 0.167 |
| Alternatives 3 | 0.07 | 0.08 | 0.39 | 0.1 | 0.31 | 0.22 | 0.33 | 0.06 | 0.08 | 0.141 |
| Alternatives 4 | 0.24 | 0.29 | 0.16 | 0.37 | 0.18 | 0.24 | 0.29 | 0.32 | 0.39 | 0.289 |

For Greenfield Domestic Airport a Pandharpur - Solapur Highway location is best location based on final score

IV. RESULT

The Pandharpur – Solapur State highway is best location for Airport development for Pandharpur city. This highway covers a 72 KM distance from Pandharpur to Solapur. There are many villages located on highway like Bhatumbre, Degaon, Narayan Chincholi, Penur, Tungat and boundary of Mohol - pandharpur Taluka. From all of these villages, Degaon is the nearest place from Pandharpur. It is less than 10 km from pandharpur. Chandrabhaga river is also close to Degaon. We checked the selected location to the selected parameters. And values of all parameters are shown Degaon is best suitable location from all aspects.

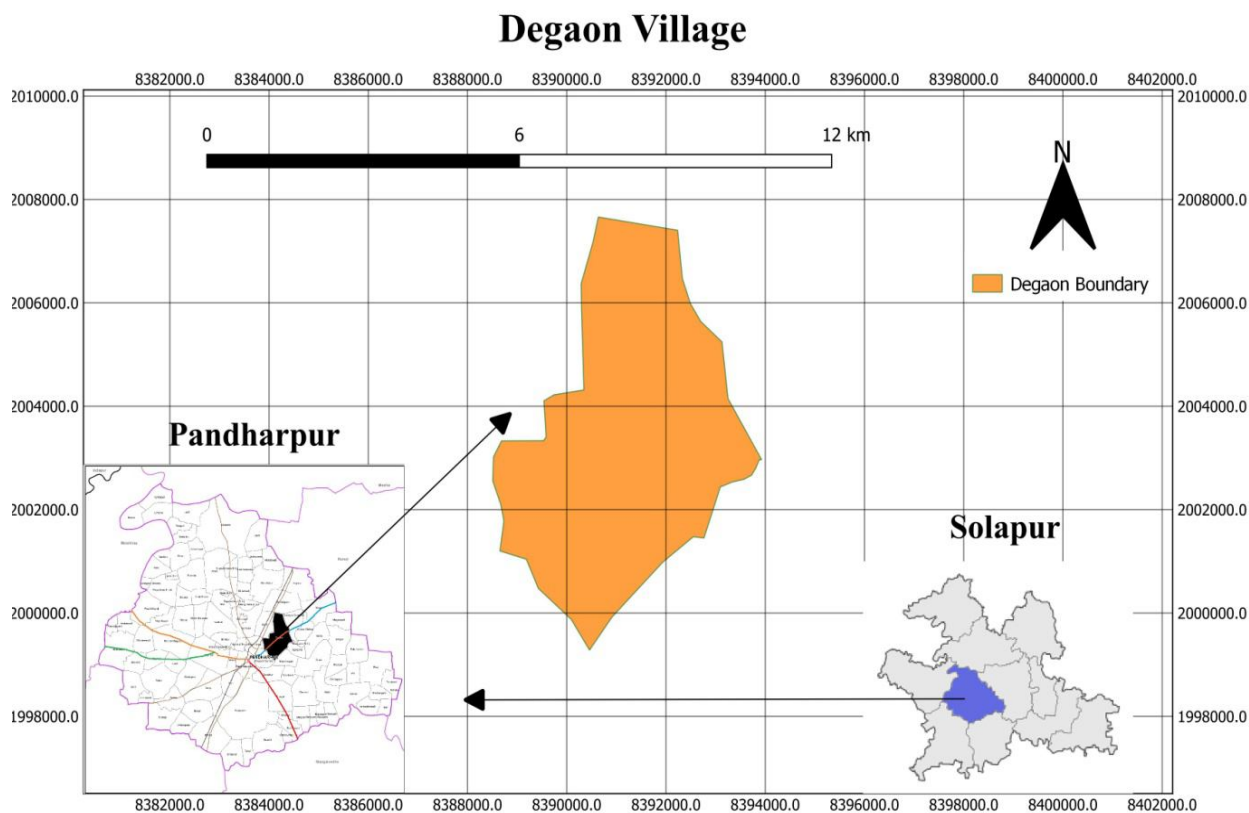


Fig. 4 Selected location (Degaon)

V. CONCLUSION

The information was received from 300 + Public responses from tourists and local residents of pandharpur city. To analyzed to provide a rating for each site selection parameter. The analysis of the study leads us to the end result chapter. This chapter covers a brief summary of the complete study.

Pandharpur is a famous spiritual city of west Maharashtra and a destination for devotees and tourists. Pandharpur is well connected by railway and road network but now airway is also important to connect Pandharpur city with nearby states. Airports are a major part of a country's infrastructure and foster economic activities by Encouraging tourism and generating employment. Planning of an Airport in Pandharpur city will result in greater connectivity and tourist inflow.

Summarized widespread ideas and tips for a comprehensive site analysis framework, and states the contributions of these studies. It also suggests destiny studies may amplify the idea and implementation of the site evaluation framework. This research views site analysis as a process of site selection and the major factors in the planning process also form the essence of site analysis and selection. The aim of the studies is to find the best location for setting up Greenfield Domestic Airport. This research has completed the following tasks:

- A. Study of site analysis for site selection on the basis of a comprehensive study of various parameters.
- B. Implementation of the parameters through the use of a computer simulation program, using various techniques like a Delphi analysis and Analytical hierarchy process is used.
- C. Worked on-site selection process via data collection, and analysis. Interviews and questionnaires survey with different professionals to demonstrate site selection processes and discussion of results generated by the computer analysis.
- D. All of the above points consider and choose the best location for the development of Greenfield Domestic Airport. Name of the selected location is Degaon village which is situated on Pandharpur – Solapur Highway and optimum distance from Pandharpur city.

VI. ACKNOWLEDGMENT

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