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GIS ENABLED GEO-PORTAL ORIENTED TOURISM DEVELOPMENT AND VISITOR MANAGEMENT SYSTEM – A CONCEPTUAL FRAMEWORK FOR PUNJAB TOURISM

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ABSTRACT

Tourism is an expanding activity, and rapidly growing worldwide due to its own charm. Each and every Central and State Tourism bodies are critically examining the role of technology and implementing it for their own use and making tourist friendly website and managing visitors accordingly. This paper critically examines the role of Geographic Information System in visitor management, web development, and other aspects of tourism along with its benefits to the tourism industry. Through this paper, researchers also have explained different scopes of GIS in making scientific planning of tourism.

KEYWORDS: Tourism Development is a Priority for Rural and Regional Areas of Punjab Region

INTRODUCTION

Tourism industry is the fastest growing industry and the end user is human resources. Tourism development is a priority for rural and regional areas of Punjab Region. It is considered to be an economic bonanza for because industrial development is very limited among all the districts of Punjab (Gouda, M. H., & Binoy, T. A.,2018). Tourism is one of the largest employment generating and fastest growing industries of the world. Various forms of tourism have been developed in the world like leisure tourism, adventure tourism, pilgrim tourism, cultural tourism etc. Punjab is mainly an agrarian state (Kumar, N. Naresh Kumar/Rural Tourism in Amritsar: An Analysis). But managing tourism in remote areas, basically managing rural tourism is always a difficult task. The only option is to take help of modern technology, and built up a proper network. Geographic Information System is one of the modern tools which help the industry in doing scientific planning. In the early 1980s, geographical information system (GIs) software emerged commercially as a new information processing technology offering unique capabilities of automating, managing and analyzing a variety of spatial data. From the early beginnings, dating back to the development of the Canadian Geographic Information System (CGIS) in the 1960s (Tomlinson 1988), GIs has been depicted as a decision support technology (Jankowski. P,1995).), GIs has been depicted as a decision support technology. Many applications of GIs developed over the last decade provided information necessary for the decision-making in diverse areas including natural resources management, environmental pollution, and hazard control, regional planning, urban development planning, and utility management (Cowen,1988). Balanced perspective about the potential and utility of Web-based GIS in different geographical applications, and to provide a stimulus for future research directions in the field (Dragićević, S,2004). The planning is done by analyzing spatial data as large spatial

databases become increasingly available to researchers in the social and physical sciences, new tools are needed for the analysis of this information that matchthe sophistication in storage, retrieval, and display provided by the rapidly evolving technology (Anselin, L,1994). SDSS is a promising tool which can be very much used in tourism planning. It is a support tool of GIS technology to a decision-making environment which includes spatially referenced information concerned with how graphical representations of problem elements and spatial relationships of data is used in planning. Defined DSS as a computer-delivered decision aid system (Crossland, M. D., Wynne, B. E., & Perkins, W. C,1995). If an SDSS is to be of use in the task of problem analysis and decision support, it should incorporate tools knowledge and expertise to help the user in selecting and integrating appropriate models and data and in selecting suitable solution strategies to solve particular problems (Zhu, X., R. J. Aspinall, and R. G. Healey. 1996).In this paper, researchers have critically examined the scope of SDSS and have shown the potential use of it in the field of tourism.

SUMMARY

Expanding Tourism Based Livelihoods and Showcasing World-Class Heritage of Punjab

This report shares the glimpses of a few of the Developmental Regimes that tells us the growth of the tourism sector of Punjab. It shows how members of local communities improved their lives, how entrepreneurs increased their incomes, how aspiring youth found a path to prosperity, how rural tourism is developed, and how women broke societal barriers and charted new paths toward economic and personal success. This was possible through the Punjab Tourism Development Corporation, one of the largest dedicated tourism development project implemented by the Government of Punjab for Tourism Industry Development in front of the world. Successes of the developmental work have been reported on in media even across other continents and have provided models of best practice adopted in other countries via this authority's missions, academia, and industry experts.

BACKGROUND OF THE STUDY

Tourism in Punjab

Deriving its name from five full-bodied rivers–Sutlej, Beas, Ravi, Jhelum, and Chenab which flow through its vast plains, Punjab is representative of abundant things. Located on the north-western edge of India, it is one of the smaller albeit prosperous states of the nation, and home to a lively, hospitable and dynamic people. The present study examines the impact of the tourism industry on regional economic in Punjab. The tourism industry is the largest contributor on the state economy and an important industry in Punjab. The growth and development in tourism have contributed to the socio-economic development in the state. Tourism is also resulting in the improvement in the health status of people in the region. The increase of inflow the tourists in Punjab resulted in the economic benefit in the regional level. The per capita Gross State Domestic Product is increasing along with the growth of the tourism sector. Tourism providing employment to the people and thereby making them economically sound, which results in improving the health status. Tourism is helping in reducing poverty and boosts the regional economy, which has indirectly led to the better standard of living of the people of Punjab.

Towards Modernization in Developing Tourism Sector of Punjab

We, after analyzing the present developmental status and the potentiality to grow further with great boost, propose technological assistance in the "Tourism Sector of Punjab". Once the Tourism Industry, backed up by the Govt. of Punjab, gets an appearance to assist the present tourism industry, it will be a pioneering effect to boost the benefit of tourism in

multifarious levels. We, therefore, propose A GIS Enabled Web Based Tourism Management Plan to make Spatial Decision Support System (SPSS) for the Government of Punjab. The architecture of the project will greatly portray our viewpoints:

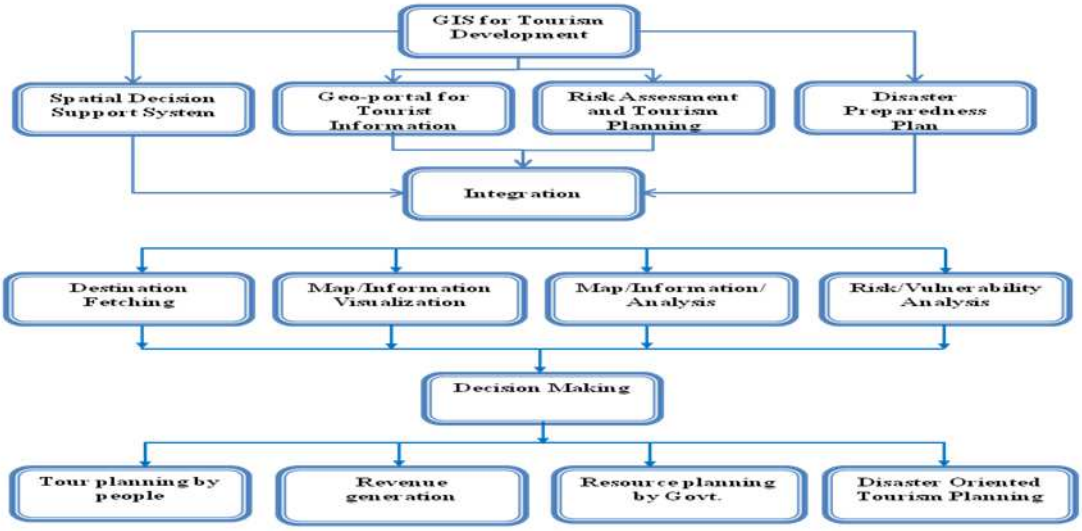

Figure 1

OBJECTIVES

- Identification of new destination (Destination Fetching) by using Geographic Information System.
- Development of Geoportal for sharing better information to the visitors.
- Risk assessment and tourism planning for the state of Punjab.
- Preparation of "disaster preparedness plan" by using Web GIS technology.

Proposed Scope of the Work:

The project was developed to improve the information and analysis system related to tourism for tourists and leveraging the employment and revenue for the general people of this state.

The Specific Objectives of the Paper Contribute to:

- Generating unconventional new source of income
- Developing tourism industries for the alleviation of poverty from the state
- Maintaining proper statistics of the tourist arrival in the state.
- Finding new tourist spots, especially rural tourism to create pro-poor tourism.
- To analyze the potential and carrying capacity of the identified tourist circuits/destinations for developing scientific tourism planning.
- Prepare and publish digital route approaching tourist destination

- Prepare the best possible and resourceful tourist circuits.
- Publish other space-based information over the route to the particular tourist circuit
- Prepare the Web-enabled SDSS system for the Department of Tourism, Govt. of Punjab.

Impact on Decision Making

It is clear that tourism and recreation management have a lot to benefit if GIS technology is applied in tourism planning. In this project, risk management, tourism planning and disaster preparedness plan for tourism will be implemented for the first time in India. The web-based tourist information system will enhance decision-making ability of the government, and help planning and management tourism system in a scientific way. Geo-portal and crowd sourcing facility will enhance the marketing mechanism and will attract more tourists to the state by giving an understanding and relative importance of the place.

Possible Users

There will be three types of possible users of this tourism development and management system:

Type I Users

- The Tourism Department
- Decision makers can use the information for planning;

Type II Users

- Common people and tourists can access the information related to tourism available in the portal.
- Travel agents, if permitted, can subscribe to the Website, and, tourism related information canusedwith a certain permissible limit.

Type III Users

- A researcher can access the database from the portal or from its Web server with certain access limit;
- Government officials can access data and information while working on risk and disaster management.

Summary of Deliverables

Four services-oriented applications such as destination fetching, a geo-portal based tourist information system, risk assessment in tourism planning and disaster preparedness plan will be provided. The tourist related database will be structured for decision making. Various digital layers related to tourism management will be provided. The deliverables are listed below which can be farther modified as per requirements.

Application

- Individual web interface for Tourism management system
- Web interface and domain creation for the interchange of data and publication

- Geo-portal and crowdsourcing interface
- Information management platform
- Identification and new tourist spot, helipad etc. location
- Disaster management program interface and preparedness plan

Data and GIS Layers

- Location of tourist centers and facilities related to tourism and digital layers
- Digital spatial data e.g. physical characteristics of plain and terrain
- Road network and spot connectivity
- Vulnerability assessment map
- Processed satellite imagery and Digital Elevation Model (DEM) if required
- Geo-visualization and any others graphical map

Technical Support

- Regional training of technical staff on the use of this system prepared for Web-based GIS for Tourism will be provided.

METHODOLOGY OF THE PROPOSED WORK:

Identification of New Destination (Destination Fetching) by using Geographic Information System

Tourists travel to the existing touristic sites. Identification of new tourist spots/destinations needs to be encouraged for the development of tourism. These spots could be suitable for summer tourism, winter tourism, Pilgrimage tourism or Adventure tourism. A multi-criteria based Spatial Decision Support System (SDSS) Modeling is required to find out the potential/new tourist site where development can be done as per above-mentioned category. The system required all kinds of satellite datasets (Satellite image, Digital Elevation Model, land use and land cover information, road network, drainage, vulnerability etc.) to model this in a GIS environment. Field verification, proximity analysis, and feasibility assessment needs to be carried out for making final decision and policy formulation

Development of Geoportal for Sharing better Information to the Visitors

The application of Geo-Portal is the most recent concept in Geographical Information Science. Though the web publishing is an old concept the new one is the interactive mapping with query and analysis techniques which not only extract the result but also show the visual theme on the map at a time that ultimately helps in Decision Support System.

A geo-portal need to be created which will provide spatially referenced (map based) information regarding a tourist spot. It will provide all kind of information (locations, maps, how to reach, accommodation, food, suitable time to visit, Govt. or private tourist package etc.) which will be spatially linked. It can work as a guiding system to all national and international tourists for spot selection and reaching any destination. A feedback system about the spot can be created

for further information to a new tourist based on the review of the visited persons. It can also depict (mark on the map) that all the interesting places along the road or in diversion so that tourist can see this. An option can be given on the visited sites by tourists in the geoportal. The complete system requires the creation of a geo-portal, detail mapping and ground information through field visit. This portal can be added with existing tourism website of Punjab Tourism.

Geo-Portal and Web Services

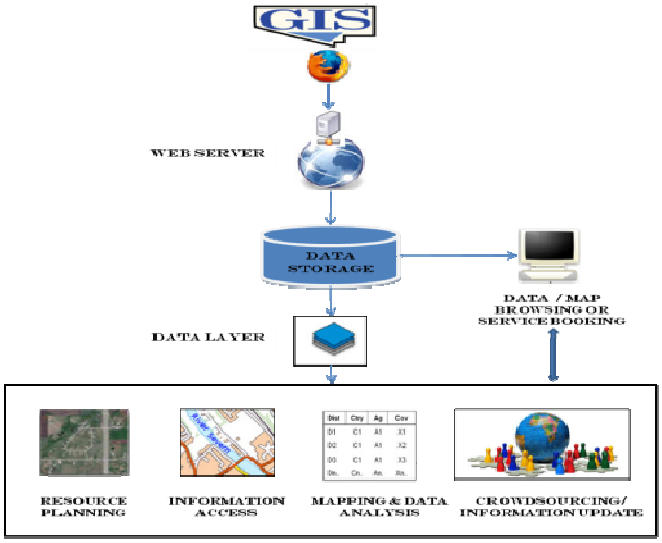

Figure 2

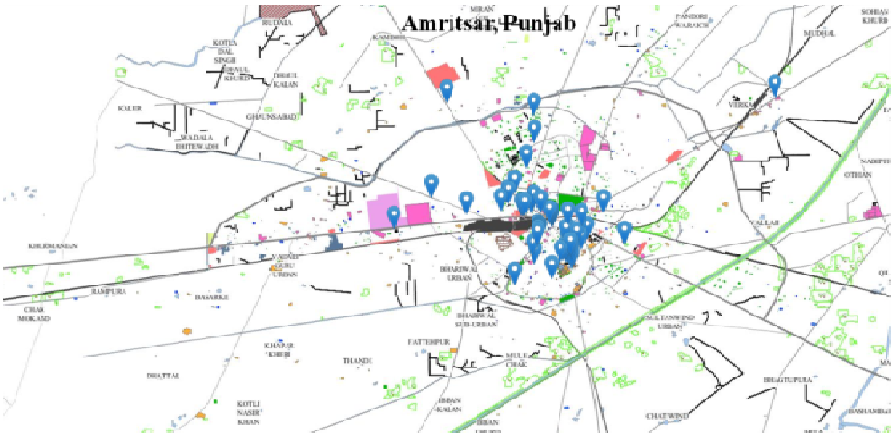

Figure 3

Risk Assessment and Tourism Planning for the State of Punjab

A risk management plan for tourism is much needed. Punjabis an amalgamation of plain land terrain and suffers from various hazards and disaster throughout the year. A complete risk and vulnerability assessment of all tourist spots need to be carried out. The information system should be created to suggest tourists about the best tourist spot during various seasons of the year. This information has immense importance to national and international tourists to find the beautiful places suitable for a particular time and will reduce misconceptions regarding traveling a place during monsoon or deep winter (offseason).

Preparation of "Disaster Preparedness Plan" by using Web GIS Technology

Implementation of Web GIS Technology in Punjab for Disaster Preparedness

Tourist Information Service will be established by using web GIS. Each tourist will have a log in a facility in the portal by disclosing their identity and giving the number of accompanying persons. Real-time information will be provided to thetourists, and relief & evacuation facilities will be provided if any disaster takes place. Total Road network system, Parallel secondary route network and facilities like Medication center, Hotels, and Relief center will be available online to take immediate action in time of natural disaster. Decision support system for building up Relief center, Helipad etc. This project will try to find out various safe places, helipad locations near the important tourist spots, for available emergency service. A special emphasis will be given on Amritsar and Chandigarh and its surrounding areas for tourism development.

Project Justification:

Benefits of Proposed Project:

The success of the tourism industry in any country depends on the ability of that country to develop, manage and market the tourism facilities and activities in that country. Applications of GIS in tourism and recreation planning illustrate that GIS is a strong and effective tool that can help in tourism planning and decision-making, ultimately benefitting both the Government and the people of this region.

Benefits in General:

Table 1

Benefits for Tourists and Residents	Benefits of Government
1. Where is the city, state or country located?	1. Recognizing the tourism demand for attractive places, tourist equipment, and services?
1) How is the climate? Does it have warm or cold weather? What is the best time of year to visit?	1) Classifying and categorizing tourist weather regime and that regime may be focused for tourism?
2) What attractive places are near my hotel? What kind of public transportation is available? Where are rental car agencies located?	2) Conveyance facilities with stops/station of public transport facilities may be increased?
3) Where are the accommodations in the city located? What is their classification? What are their rates?	3) Better accommodation may be created with a cheap rate in focused places.
4) Where are the banks? Where is the police station? Where is the hospital?	4) Government activities may be reinforced in the focused areas to manage the commuter's comfortable travel as well as to reduce the crime rate.
5) Which public and private institutions are available that is competent enough in taking part in tourism planning?	5) Increasing the interaction with the general tourism agencies through the Government with a techno-commercial benefit for both

The project is developed to improve the information system related to tourism and leveraging the employment and revenue for the residents of this state. The project will provide following advantage

Development of Tourism Industry:

The project will help in the flourishing tourism industry by improving web advertising and well management process. The advertising will enable stakeholders to attract foreign tourist as well as the domestic tourist in a better way. This process will help the State Government's revenue generation process.

Escalation of Tax Collection of Government:

The better and documented management process of tourism industries will help the government for collection of tax. In another way if the tourism industries grow, the tax collection will also increase simultaneously.

Rising of Industries Depending on Tourism:

The new tourism (tourist spot) destination will help in rising of small industries or business centers which depends on tourism. This will directly or indirectly affect the occupation of local people.

Increase of Income of Local People

The development of overall tourism industries and the new tourist spot will increase the income of local people. It will help to solve the unemployment problem of the common people, improve their livelihood and generate an unconventional new source of income.

Establishment of the Disaster Management Plan for Real-Time Hazards Related to Tourism

Punjab is a mixture of plain land and terrain, and natural hazards and disaster sometimes affect tourism. Hence, it is necessary to prepare a real-time disaster management plan related to tourism. This plan will help is tourism planning for the government, private tourism stakeholders and the tourist for site selection in the different season. This model will also help the decision makers to understand the risk associated with various tourist spot and help the disaster management process.

Real-Time Information Database Management:

The tourist information database management system will help the decision makers in a different way to improve tourism. The relative preference of various tourist spot and where from the tourist are coming can be very easily identified which will help the development process of the tourism industry. During the hazards and disaster, it can be identified that where the people are stack and their details which will intensify the process of the rescue operation and convey information to their family.

Real-Time Evacuation, Relief and Rehabilitation Plan for the Tourists and Tourism People:

The real-time disaster support plan will help in evacuating tourist to the safe place during the hazards and disaster. It will also intensify the execution of relief and rehabilitation plan for the tourist. National and international tourist will feel safe secure to visit Punjab so tourism will increase.

Intensification of Ecotourism and Establishment Environment Tourism Co-Existence Concept

The project will, directly and indirectly, help in developing ecotourism and rural tourism co-existence concept which is basically required in Punjab due to its location and landscape. The state government can understand the risk of various hazards and their spatial variability, which will help the development of new ecotourism spot in those regions to support the employment of local people and safe the environment.

Infrastructural Growth, i.e. Roads, Hospitals, Markets, Schools etc.

The development of new tourist spot will directly or indirectly contribute to the infrastructural growth like road, hospital, market, school, business centers etc.

Poverty Alleviation and the Proliferation of Health and Educational Support:

This project will help in poverty alleviation and the proliferation of health and educational support for local people of Punjab. Development of tourism industry with regional development will support for alleviation of poverty.

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