

DISTRICT RAHIMYAR KHAN

PUNJAB - PAKISTAN

MULTI HAZARD VULNERABILITY & RISK ASSESSMENT (MHVRA)



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National Disaster Management Authority,
Prime Minister's Office, 2nd Floor, Sector G-5/1
Constitution Avenue, Islamabad - Pakistan
www.ndma.gov.pk



United Nations
**World Food
Programme**

The National Disaster Management Authority (NDMA) is the lead federal agency to deal with the whole spectrum of Disaster Management in Pakistan. It was established in 2007 through NDM Ordinance and was finally provided parliamentary cover by an act of Parliament in 2010. The NDMA is the executive arm of the National Disaster Management Commission (NDMC), which was established under the Chairmanship of the Prime Minister of Pakistan, as an apex policy making body in the field of Disaster Management. The NDMA aims to develop sustainable operational capacity and professional competence to coordinate the emergency response of Federal Government in the event of a national disaster.

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Questions and comments concerning this publication may be addressed to the Project Management Unit, National Disaster Management Authority, Pakistan vide contact details given below.

Contacts

Project Management Unit
National Disaster Management Authority
Prime Minister's Office, 2nd Floor, Sector G-5/1
Constitution Avenue, Post Code 44000, Islamabad, Pakistan
www.ndma.gov.pk
spm@ndma.gov.pk, dirimp@ndma.gov.pk

FOREWARD

One of the goals of the National Disaster Management Authority (NDMA) is to achieve sustainable social, economic and environmental development in Pakistan through reducing risks and vulnerabilities by effectively responding to and recovery from all types of disasters.

Pakistan is among the countries most vulnerable to natural and man-made disasters. The country's acute vulnerability to disasters is due to its geographical location, diverse topography, hydrological configuration and extended fault-lines. Recurrent disasters have taken a heavy toll on the long-term development goals of the country. The vulnerability to disasters is growing in both urban and rural areas, placing even more lives and livelihoods at risk.

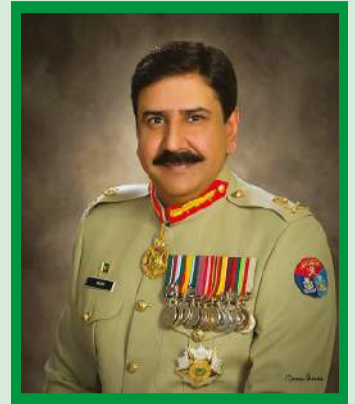
NDMA, being the country's apex body for implementing, coordinating and monitoring whole spectrum of disaster management activities in Pakistan, has always remained focused to achieve its vision of building disaster resilient Pakistan. Significant efforts have been made in this direction to reduce the country's vulnerability to several types of impending disasters. National DRR Policy and National Disaster Management Plan (NDMP) 2012-2022 reflect our priorities i.e. adopting a proactive approach towards disaster risk management. For implementation of NDMP's key interventions, NDMA conceived an implementation roadmap for NDMP (2016-2030) wherein particular emphasis has been laid on Multi Hazard Vulnerability & Risk Assessment (MHVRA) Intervention.

MHVRA study plays an instrumental role in integrated Disaster Risk Reduction (DRR) planning and mainstreaming DRR into development at local, provincial, and national level. It guides the relevant agencies/ line departments in requisite land-use planning and implementation of national level programs aligned to vulnerabilities at a community level. The knowledge gained from the study can also play a cardinal role in development of robust knowledge management framework for long-term socio-economic sustainable growth.

For MHVRA related activities, NDMA has successfully conducted the MHVRA study of five selected districts of Punjab by utilizing the in-house technical resources. It is important to mention that this Project demonstrates high degree of expertise for data processing and visualization. I am hopeful that this document will act as a constant source for informed decision making for all stakeholders and assist in development of NDMA in-house capacity to take similar endeavors in the future as well. I would like to extend my gratitude to the Members of National Disaster Management Plan (NDMP) Steering Committee for taking keen interest in providing strategic guidance throughout the course of this Study and endorsing its results.

I would like to place on record my sincere appreciation for the contributions of Development Partners, NGOs/INGOs and academia for their valuable inputs during the execution of this Study. A profound gratitude goes to the United Nation World Food Program, Pakistan for their support and cooperation for initiating and pioneering MHVRA initiatives in Pakistan and for their long-term support in establishing PMU in NDMA.

I believe that this is the first step of a long journey ahead which would require commitment, steadfast support of the partners to achieve the ultimate aim of a Resilient Pakistan.



Lieutenant General
Omar Mahmood Hayat, HI (M)
Chairman, National Disaster
Management Authority (NDMA)

ACKNOWLEDGEMENT

The National Disaster Management Authority (NDMA) is pleased to launch the Multi Hazards Vulnerability and Risk Assessment (MHVRA) Atlas of five selected districts of Punjab, prepared mainly as a dynamic planning tool for Disaster Risk Management (DRM) officials of Government, Humanitarian Agencies and Development Partners at provincial and district levels for improved and informed Disaster Risk Reduction (DRR), Preparedness and Contingency Planning.

An esteem of gratitude is owed to the Former Chairman NDMA, Major General (R) Asghar Nawaz HI(M) and the Current Chairman Lieutenant General Omar Mahmood Hayat HI(M), for their visionary approach, guidance and direction in constituting this Study. They remained a source of guidance at each stage of this project which ultimately had resulted in successful execution of this Project..

We profoundly acknowledge Senior DRM Officer, Mr. Sultan Mehmood of Disaster Risk Reduction (DRR) Unit and Program Officer Mr. Iftikhar Abbas of Vulnerability Analysis & Mapping (VAM) Unit of World Food Program (WFP) for their support and cooperation for all our initiatives and endeavors throughout the working of this project. We acknowledge and express our sincere and deep appreciation for their assistance in this regard.

Our sincere and passionate felicitations to Former Member Disaster Risk Reduction (DRR) NDMA, Mr. Ahmed Kamal, Current Member DRR, NDMA, Mr. Idrees Mehsud, Director Implementation Lieutenant Colonel (R) Raza Iqbal and Assistant Director Projects Mr. Shafi Agha for their continuous support, prized guidance and relevant inputs based on their vast experience and knowledge that contributed immensely in this endeavor.

We acknowledge significant contributions made by institutions and individuals at district, provincial, national by providing data and information required to smoothly carryout this project. In addition, the proficiencies provided by the consultant of different disciplines were crucial, as it helped to maintain precision throughout the assessment.

In the end, we would like to extend our heartiest gratitude to all our relevant stakeholders who rendered their full support, contribution and active participation during execution of this Study. Their contributions are sincerely appreciated and acknowledged.

PREFACE

Pakistan by virtue of its diverse topographic features is vulnerable to wide degree of natural and man-made disasters. Events exhibited under many forms in the past are the testimonies to the country's susceptibility to disasters. Until recently, a reactive emergency response approach remained chiefly applicable to deal with disasters in Pakistan. However, disasters continued to exact a heavy toll on country's economy, human lives and environment and, consequently, manifested the need for developing a different strategy towards Disaster Risk Reduction (DRR). Against this backdrop, a shift from hitherto response based approach to proactive disaster management was adopted through 2007 National Disaster Management Ordinance, now known as National Disaster Management (NDM) Act 2010.

National Disaster Management Authority (NDMA), with provision of NDMA Act 2010 and in-line with the DRR Policy, formulated a 10-year comprehensive National Disaster Management Plan (NDMP) 2012–2022 outlining ten priority areas and 118 specific interventions and projects for implementation over the span of ten years. The priority number 3 and 4 under NDMP 2012–2022 warrants execution of Multi Hazard Vulnerability and Risk Assessment (MHVRA) Intervention in the Country. In this regard, NDMP implementation roadmap 2016–2030 was chalked out for phase-wise execution of MHVRA Intervention at micro level, down to UC Level, for all districts of Pakistan and AJ&K.

In view of the Country's vulnerability to multiple disasters, the implementation of MHVRA Intervention is considered essential for achieving national and global commitments, some of which are outlined in Millennium Development Goals (MDGs) & Sustainable Development Goals (SDGs), Sendai Framework for Disaster Risk Reduction (SFDRR), Climate Change Policy 2012, National Disaster Risk Reduction (DRR) Policy 2013, NDMP 2012–2022 and Pakistan Vision 2025.

Cognizance of the importance of MHVRA component, NDMA, being an apex body to deal with the whole spectrum of disaster management, embarked upon establishing holistic and well-structured methodology for country-specific MHVRA activity. To this end, Project Management Unit (PMU) has been established in NDMA for execution and monitoring of the MHVRA Studies in the Country, with an aim to clearly estimate and map the risk of communities nationwide. PMU, as the first step, laid down "NDMA Policy & Execution Guidelines for the conduct of MHVRA" to maintain unanimity in risk assessment methodology across the Country and AJ&K. The Guidelines constitute an important part of NDMA's effort towards provision of unified standards and procedures for the hazard, exposure, vulnerability and risk assessments.

To test the various attributes of the MHVRA Guidelines, PMU with the support of World Food Programme (WFP), conducted a micro-level MHVRA intervention, down to Union Council level, for five selected districts of Punjab namely Bahawalpur, Jhang, Khushab, Multan and Rahim Yar Khan. This Project has a distinction of being the only study to be endorsed by Steering Committee formulated to oversee implementation of NDMP. The NDMP Steering Committee consists of members from all lead technical agencies of Pakistan including representatives from S/GB/F/PDMA, Pakistan Meteorological Department (PMD), Planning Commission, Planning Development & Reforms Division, Finance Division, Economic Affairs Division, Ministry of Water & Power, Ministry of Climate Change, Federal Flood Commission (FFC), Geological Survey of Pakistan (GSP), Space & Upper Atmosphere Research Commission (SUPARCO) and Survey of Pakistan (SOP) as well as representatives from academia.

METHODOLOGY

This Study involved identification and analysis of prevailing hazards in the study districts through field level consultation with local stakeholders and analysis of historical records. Three hazards namely drought, flood, earthquake have been considered for hazard analysis owing to their frequent recurrence in the study districts. The project covered various scientific and technical activities, including a review of past and ongoing studies related to hydrological, seismological and geological phenomenon. For hazard modelling and analysis, probabilistic and scenario based hazard assessment tools have been employed in the project. Technical parameters used for hazard estimation include information concerning soil moisture condition, climatic, biotic & edaphic factors of soil, temperature condition, vegetation health, water flow paths, flood catchment area, streamline data, land use data, river discharge information, flood extent, flood velocity, precipitation, seismic sources, plate tectonics, geomorphology, soil data, bore hole data, fault zones, ground motion prediction equations, seismic intensity (PGA), soil ground motion amplification factor and so on.

Exposure has been mapped in the dimensions of population, physical elements, life lines, essential facilities, transportation facilities, socio-economic aspects, economic activities, environmental elements, critical infrastructure, agriculture and livestock elements; being termed as elements at risk. Various statistical tools such as projection equations, dissimilarity index, have been employed in the Project to extrapolate information beyond the available frame.

Vulnerability analysis has been conducted considering three dimensions i.e. physical, social and agriculture (Food Insecurity). For physical vulnerability, fragility curves have been developed using available technical and statistical tools (Probabilistic or Empirical fragility models). For social vulnerability, several technical tools such as Principal Component Analysis (PCA) and Social Vulnerability Indicator (SoVI) have been utilized to obtain possible driving factors contributing to the social vulnerability in the study area. Vulnerability analysis in the context of agriculture and food security have also been undertaken to determine sets of contributing factors to food insecurity and agricultural vulnerability. The stressor covered epidemic, endemic, biotic and edaphic factors and sudden shocks such as earthquake, flood and drought.

Coping capacity has been anticipated by assessing existing capacities of organization to manage disasters. The coping capacity has further been divided into three main factors i.e. capacity to anticipate risk, capacity to respond and capacity recover. Adaptive capacity has been evaluated using fifteen indicators.

(Continued)

For Risk Assessment, Analytical Hierarchy Process (AHP) and Multi Criteria Decision Making approaches have been employed in the Study. The risk assessment has been carried out using qualitative, quantities or semi quantitative approach. On basis of these factor components, the cumulative risk profile of the study districts (risk indexing down to UC Level) have been developed. Various DRR intervention and mitigation measures have formulated and finally Cost Benefit Analysis (CBA) of proposed DRR interventions have been performed to estimate their economic feasibility.

Close linkages with the National, provincial and district organizations have been established through stakeholder consultation arrangements in order to facilitate secondary data collection, hazard specific information exchange, and sharing of any other relevant data. For this purpose, several data collection tools have been utilized in the Study such as focus group discussion, key informant interviews, participatory rural appraisal, semi structured interviews and one-to-one interviews with community level stakeholders and line departments.

ABOUT THIS ATLAS

An accurate, easy-to-interpret and up-to-date information is one of the most fundamental elements of decision-making process. Information, particularly in the realm of disaster management, plays an instrumental role in the risk-informed Disaster Risk Reduction (DRR) planning. It makes the relevant departments aware of the likely losses, relative vulnerabilities, exposure and impending disaster risks in the study area, enabling them to effectively undertake prevention, mitigation, preparedness and response based measures before or at the onset of any emergency situation. However, compilation and visualization of information concerning Multi Hazard Vulnerability & Risk Assessment (MHVRA) study is fairly a challenging task since it demands multi-dimensional analysis of different natural processes to understand their composite effects over the study area. Similarly, presentation of the outputs of MHVRA study to the end user, in an easy manner, is yet another challenging task, which requires development of data visualizing tools, graphic aids, catalog of charts and map composition with effective cartographic language. This Atlas in one major step to achieve the said objectives. Much effort has been put in to provide easy to comprehend and interactive information to the users.

This Atlas provides detailed baseline maps of the study district covering several dimensions to include geology, climatology, land use, land cover, elevation, population, settlements, buildings, transportation, telecommunication, health, education, irrigation infrastructure, industries, livestock, agriculture etc. Several graphical tools have been employed to produce easy to grasp charts, these include pie-charts, histograms, ring charts, matrix diagram, bar charts, line graphs, 3D charts and informative tables. The Atlas also provides brief hazard assessment methodologies for each selected hazards i.e. drought, earthquake and flood, along with maps for various return periods. Exposure Matrix Tables identifying the exposed elements at risk have also been developed along with the exposure maps. A brief risk assessment methodology is also provided in the atlas with the risk maps. All the study has been conducted at micro-level, down to the level of Union Council. This Study is first of its kind and demonstrates high level of expertise, arduous work and coordinated approach involving cross-sectorial stakeholder linkages.

The Product shall be useful for policymakers and practitioners for risk-informed land-use planning, mainstreaming DRR into development programs and implementation of national scale programs aligned to ground. The project would render substantial baseline information over which other micro level DRR plans could be devised and will serve as a state of the art planning tool enabling mapping of resources in the study district.

List of Officers/Officials involved in MHVRA Punjab Study

Technical Team

Name	Designation/Position
Mr. Ehtisham Khalid Khan	Project Director / Team Lead
Ms. Nimrah Khalid	MHVRA Expert
Mr. Asif Jan Turangzai	Senior MHVRA Expert (Till October, 2016)
Mr. Saad Shams Butt	GIS Expert (Till September, 2016)
Mr. Syed Muhammad Tayyab Shah	Project Officer
Mr. Aamir Qayyum	Project Officer
Ms. Mashal Riaz	MHVRA Officer
Ms. Sana Zahid Shah	GIS Officer
Ms. Zahra Hassan	GIS Officer
Mr. Ismail Khan	Project Officer (Till September, 2016)
Mr. Malik Zaheer-ud-Din	Project Officer (Till August, 2016)
Ms. Sarah Ovais	GIS Associate (Till September, 2016)
Ms. Saman Mushtaq	GIS Associate (Till September, 2016)
Mr. Muhammad Waqas	MHVRA Associate (Till February, 2017)
Mr. Sheikh Rafay Ehsan	MHVRA Intern

Consultants

Name	Consultancy Area
Dr. Naveed Ahmad	Seismic Hazard Analysis and Vulnerability Analysis
Dr. Bashir Ahmad	Drought Hazard Analysis
Dr. Athar Ashraf	Flood Hazard Analysis
Dr. Wajid Pirzada	Food Insecurity Study
Dr. Shahzad Ali Khan	Cost & Benefit Analysis
Mr. Amjad Ahmad	Risk Assessment

Support Team

Name	Designation/Position
Ms. Muqaddas Iqbal	Project Coordinator (Till September, 2016)
Mr. Ghulam Rasool	Admin and Account Officer
Mr. Shahid Malik	Field Surveyor
Mr. Ali Tassadaq	Account Intern (Till February, 2017)
Mr. Tilwat Khan	Office Assistant
Mr. Nasir Khan	Office Assistant

National Disaster Management Plan (NDMP)

Steering Committee - Participants List (19th Sep & 9th Dec 2016)

Name	Designation	Position	Department
Maj. Gen. Asghar Nawaz	Chairman	Chair	National Disaster Management Authority (NDMA), Pakistan
Mr. Ahmed Kamal	Member (Disaster Risk Reduction)	Member/ Secretary	
Brig. Ishtiaq Ahmed	Member (Operations)	Member	
Mr. Ehtisham Khalid Khan	Project Director/Team Lead	Member	
Mr. Chaudhry Muhammad Anwar	Chief (PPH)	Member	Planning and Development Division
Mr. Syed Zawad Haider Shah	Section Officer	Member	Economics Affairs Division
Mr. Syed Zakria Ali Shah	Deputy Secretary (UN)		
Mr. Muhammad Saleem Khatak	Deputy Secretary	Member	Ministry of Climate Change
Mr. Wasim Akhtar	Deputy Secretary (Development)		
Mr. Muhammad Afzal Shabzada	Deputy Director		
Mr. Arshad Ahmed	Senior Joint Secretary	Member	Finance Division
Mr. Malik Aman	DSA (NDMA)		
Mr. Khalid Sher Dil	Director General	Member	Provincial Disaster Management Authority, Punjab
Mr. Hameedullah Malik	Project Director		
Mr. Nisar Ahmed Sani	Documentation Officer		
Mr. Syed Ahmed Fawad	Director (Operations)	Member	Provincial Disaster Management Authority, Sindh
Mr. Amer Afaq	Director General	Member	Provincial Disaster Management Authority, Khyber Pakhtoonkha
Mr. Wajid Ali Khan	Deputy Director (Relief)		
Mr. Israr Muhammad	Director (R&R)		
Mr. Faisal Khan Baloch	Assistant Director	Member	Provincial Disaster Management Authority, Balochistan
Mr. Muhammad Khalid Sherdil	Director General	Member	FATA Disaster Management Authority
Mr. Main Adil Zahoor	Assistant Director (Operations & Relief)		
Mr. Zaheer-udin-Babar	Deputy Director	Member	Gilgit Baltistan Disaster Management Authority
Mr. Abdul Waheed Shah	Director General		
Mr. Zaheer-udin-Qureshi	Director General	Member	State Disaster Management Authority Azad Jammu & Kashmir
Dr. Muhammad Hanif	Director (NWFC)	Member	Pakistan Meteorological Department
Mr. Zafar Iqbal	Senior Engineer	Member	Federal Flood Commission, Ministry of Water and Power
Mr. Alamgir	Chief Engineer		
Mr. Muhammad Ishtiaq	Director	Member	Survey of Pakistan
Mr. Syed Zuhair Bukhari	Director	Member	Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)
Mr. Zafar Iqbal	Director		
Mr. Muhammad Farooq	General Manager		
Mr. Sardar Saeed Akhter	Director	Member	Geological Survey of Pakistan
Mr. Simon Sadiq	Deputy Director		
Brig Sajid Naeem (R)	Senior Capacity Building Expert	Member	National Institute of Disaster Management
Dr. Talat Iqbal	Deputy Chief Scientist / Director	Co-opted Member	Center for Earthquake Studies, PAEC
Dr. Muhammad Ali Shah	Manager (DM & R Division)	Co-opted Member	Micro Seismic Studies Program, Pakistan Atomic Energy Commission (MSSP,PAEC)
Ms. Thai Van Hoary	Head of Vulnerability Analysis & Mapping	Observer	World Food Program, Pakistan (UN- WFP)
Mr. Iftikhar Abbas	Program Officer (Spatial Analyst)		
Ms. Umber Khan	Program Officer	Observer	Department for International Development (DFID)
Mr. Sherwan Asif	Program Manager		
Mr. Shaukat Shafi	Senior Project Officer	Observer	Asian Development Bank (ADB)

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BASELINE
INFORMATION

Rahimyar Khan is one of the largest districts of Punjab, with its city capital as Rahim Yar Khan City. The river Indus flows on its North-West side. It shares its boundary with Rajanpur and Muzaffargarh districts. On its South-West lies the Province of Sindh. To the South-East lies the Cholistan desert. The population of the district is predominantly Muslims i.e. 96.7 percent. The inhabitants of the district speak several dialects that are variously described as belonging to Punjabi. The local economy and livelihood of this district are mainly agriculture resource base with a good yield of different cash crops along with production of fruits. Industrial sector is also functional and furnishing here.

History

Rahim Yar Khan was once known as "AROR or ALOR". It received multiple names such as City of Pattan, Phul Wada and Noshehra. The name "Rahim Yar Khan" came from one of the relatives of Nawab of Bahawalpur. Its earlier name was "Naushehra.

Mohammad Bin Qasim passed through this area in 93-94 A.H. 800 years ago, Shahab-u-Din Ghouri conquered Uch Sharif, which at that time was capital of Sindh & Multan, and later established Islamic Government in this area. In the reign of Shams-ud-Din Altamash, for a period of twenty years this area was under rebel. Rahim Yar Khan got much attention in 1751 A.D during the reign of Fazallahi Khan Halanion who built this region from the ruins of ancient PhulWadda during the Sumra Supremacy in Sindh. In the year 1880 Lahore, Karachi Railway Line was built in the area. At the time its name was "Naushera" which compelled the railway authorities to alter the name of the station, as Naushera was also the name of a station in Peshawar District. Consequently Nawab Muhammad Sadiq Khan named it Rahim Yar Khan after his first son Rahim Yar Khan, who was given as a hostage to Kalhoras in 1809. It was a fertile land, due to fertility raw material such as cotton, sugarcane and wheat etc. were available which gave an incentive to ginning factories, so with the passage of time ginning factories were cropping up. First of the Committee was established in the year 1905, which meant the recognition of the fact that Rahim Yar Khan grown into a small urban center by that time. The administration of the committee was run through the tesildar and centrally controlled by Bahawalpur Municipal Committee. At that time the District Head Quarter was Khanpur. Thereafter, in the year of 1930 Rahim Yar Khan was designated as a District Head Quarter. In 1930 an extension development scheme was made, according to this scheme Jadeed Bazar, Sadar Bazar, Qazi Bazar, and School Bazaar were developed. In the year 1933 the town committee attained that status of a Municipal Committee a whole time Secretary was appointed. The Ex-Officio Chairman of the Municipal Committee used to be the Session Judge of the District. The total yearly income in the year 1933 is reported to be Rs. 21,000.00 only. At the time of defunct Bahawalpur State, Rahim Yar Khan Municipal committee was of the status of first class. In 1942 was a fairly good industrial town and cotton center with a population of approximately 8,000 persons. Before independence Mr. Nehru and Mr. Patel tried to persuade Nawab Muhammad Sadiq Abbasi to join India but he refused all temptations.

Being an industrial center, it has got several mills and factories all over the town making it extremely unhealthy. Elected representative took the

responsibilities in the year 1949; Erection of factories in residential areas had caused unhygienic conditions. In the year 1950, Improvement trust was created face lifting of the town started. Under this organization many new schemes and two factories that are Abbasia Textile Mills and Sadiq Vegetable and Oil Mills (now Lever Brothers) where established which played a vital role in the urbanization of the city. Moreover Sadiq Bazar, Railway Bazaar, Shahi Bazaar and Grain Market were also established under this organization. A detailed layout plan of industrial estate was also made by improvement trust. In the year 1959 full time administrator was appointed for Municipal Committee, In 1960 Municipal Committee was run by elected members. In the year 1970 Improvement trust was amalgamated in the Municipal Committee.

Landscape

Rahim Yar Khan is situated between 27°40'-29°16' north latitudes and 60°45'-70°01' east longitudes and covers an area of 11,880 square kilometers. It lies in the South East of Punjab Province. The River Indus separates Rahimyar Khan from Muzafargarh, Rajanpur, Kashmore & Ghotki districts. The district borders with Muzaffargarh district on the north, with Jasimiri (India) and Ghotki district of Sindh province on the south, with Bahawalpur district on the east, and with Rajanpur district on the west. The district has a very hot and dry climate in summer. The maximum temperature touches 49.7C. The minimum temperature recorded is 6.8C. The average annual rainfall in the district is 165 mm. The district based on its physical features, the district can be divided into three parts i.e. canal-irrigated area, riverside area and the desert area. To the South West of this area lies the canal irrigated area. The Riverside area of the district lies close to the river Indus and Panjnad. The land in this area is higher than that of the riverside area. The approximate height of this area is 150 to 200 meters above sea level. The desert area lies in the South-East of the district. It is called as the Cholistan. It extends into Bahawalpur and Bahawalnagar districts, occupying the South-Eastern part of the two districts.

Culture

Rahim Yar Khan enjoys a diverse culture with inhabitants belonging from different ethnicities and race. The major tribes in the district include Arain Jat, Rajput and Gujjar. Kabaddi is liked and played almost in all urban and rural areas of the districts. The district many has famous bazaars such as Sadiq Bazar, Bano Bazar and Shahi Bazar.

In Cholistan area, women generally wear short shirts and ghagras and Dopattas and male prefer to wear long loose shirt hanging up to the knees, made of coarse cloth, a chadder and pagri. People use cheap and coarse cloth for dresses. For footwear, men in the rural areas wear locally made shoes prepared by the village cobbler (mochi). The women of this area are very fond of wearing ornaments, both golden and silver.

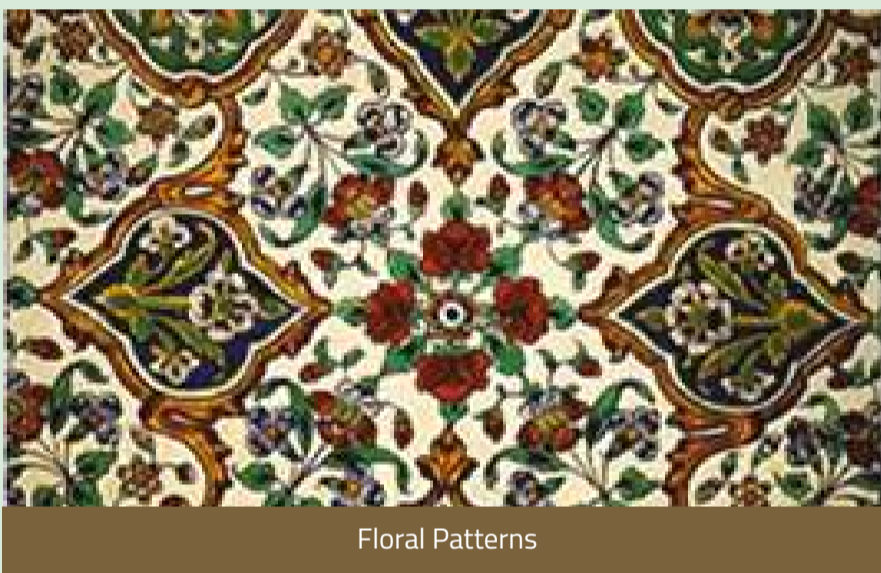
The population of the district is predominantly Muslims i.e. 96.7 percent. The next higher percentage is of Hindu (Jati) with 1.8 percent, followed by Scheduled Castes 0.6 percent. While other minorities like Christians, Ahmadi etc. are very small in number. The proportion of population of Muslims is higher in urban than rural areas

Language

Major languages spoken in the district are Saraiki and variety of Punjabi dialects including thaochi, jandali, shanpuri Riasti, Majhi, Malwi, Bagri/Choolistani and Haryanvi. Urdu is spoken and understood by majority of population whereas English is understood by people with higher education background.

Traditional Crafts

The traditional crafts of the district mainly include engraved metal utensils and light weight pottery with geometrical designs. The Bhong Mosque in Rahim Yar Khan boasts an extraordinary modern architecture and interior (winner of the Aga Khan Award for Architecture). It is built in traditional style with extravagant use of gold leaf, mirror work and onyx and is particularly famous for its stylized Arabic calligraphy. The utensils engraved with flowers are produced at Khanpur and are considered a fine specimen of workmanship. The light weight pottery making is concentrated at Khanpur and Garhi Ikhtiar Khan and generally comprises "Piyalas" and double walled "Surahis" ornamented with symmetrical holes and raised flower designs. Gun-making is another traditional craft practiced at Ghari Ikhtiar Khan, Collyrium boxes, cauldrons and other brass and copper articles like dishes are also being fabricated.



Floral Patterns

Food Habits

Wheat is the staple food grains of this area. Bajra or maize is also used in the villages in lieu of wheat. People in the rural area mostly consume vegetables, pulses, milk butter and ghee. The inhabitants ordinarily take meals thrice a day. The first in the morning before leaving for the work on the fields and consist of wheat bread with lassi (curd with water) milk and butter. The midday meal consists of wheat bread with lassi, onions, chilies, pickles, and seldom with cooked vegetables and meat. While evening meal is taken at home on return or in the field after the day's work and generally comprises wheat bread with vegetables, beef or mutton and in the summers with milk. Vegetables are consumed mostly in winter when turnips, radish and mustard are plentiful. Sag (pot herb) and dal are commonly used in super. Chopri roti (bread smeared with ghee or butter) is given to the working male members of the family and the women folk rarely enjoy this buttered bread.

Addition of Gur or Sugar makes it of surpassing richness. Tobacco is commonly smoked by the male cultivators. Dates and mangoes are the favorite fruits and the poor take them with chapati. Meat is rare commodity in villages available only at once a week and generally in the form of beef. In sadiqabad area, a favorite dish of rich is saji, a goat or lamb roasted in the oven or on fire.

Tourist Attractions

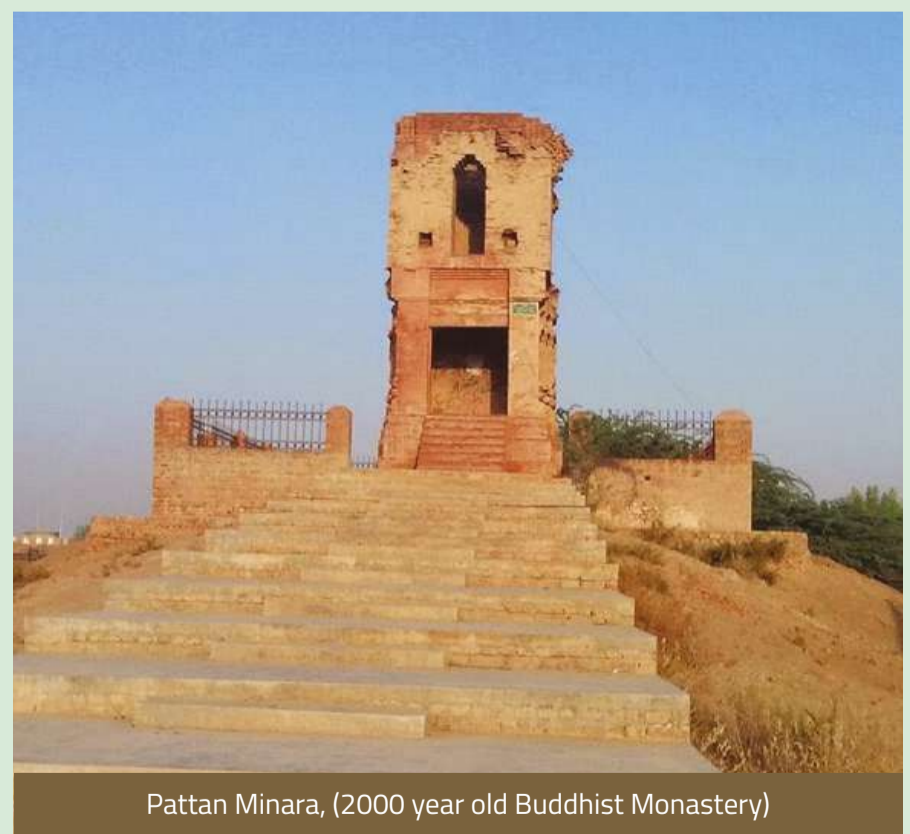
- ✓ Bhong Mosque: This mosque is located 40 km from city of Rahim Yar Khan. It stands among the most beautiful mosques in the world.
- ✓ Pattan Minara (Light House): An ancient tower (lighthouse) at the bank of river Hakra or Ghagra which lies almost 10 km from city. The remnants of the building are long gone but this tower is still existing.
- ✓ Mausoleums: Many saints are buried in the district and being visited for centuries by pilgrims. Their tombs have traditional architecture which make these important tourist attractions.
- ✓ Desert safari is another important activity of the district. Every year notables from the royal family of United Arab Emirates also come to explore the Cholistan desert.

Notable People

- ✓ Muniba Mazari- Artist, Motivational speaker
- ✓ Ahmed Raza- Cricketer
- ✓ Khawaja Ghulam Farid- Punjabi sufi poet



Bhong Mosque



Pattan Minara, (2000 year old Buddhist Monastery)



DISTRICT RAHIM YAR KHAN AT A GLANCE

Geography

Location



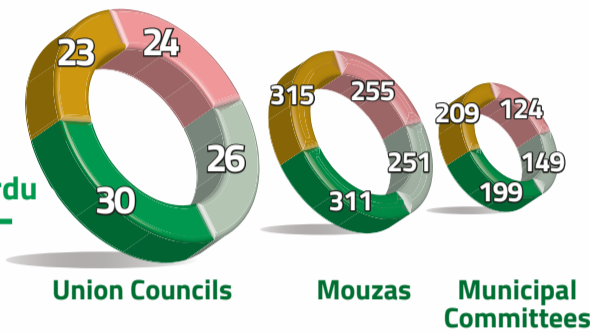
Lat: 27°40'-29°16' north
Long: 60°45'-70°01' east

Neighbouring Districts

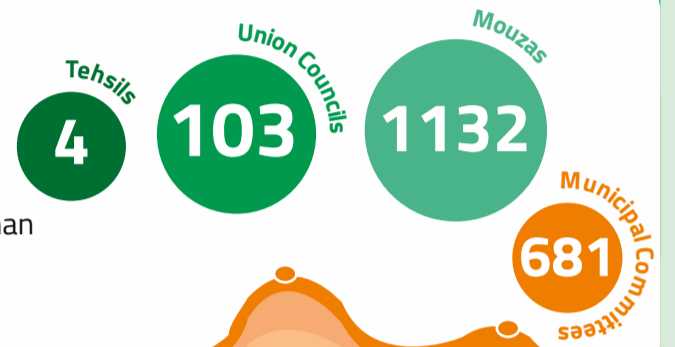
- North: Muzafargarh
- East: Bahawalpur
- West: Rajanpur
- South: Ghotki and India

Administrative Setup

Area	12935.6 sq.km
District Capital	Rahim Yar Khan
Language	Saraiki, Punjabi, Urdu
Elevation to District	1943

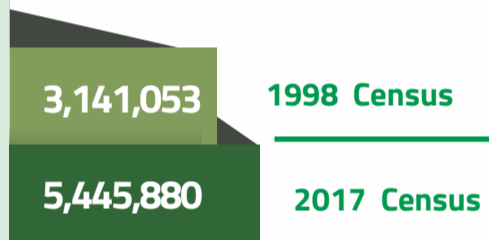


Tehsils
 Khanpur
 Liaqatpur
 Rahim Yar Khan
 Sadiqabad

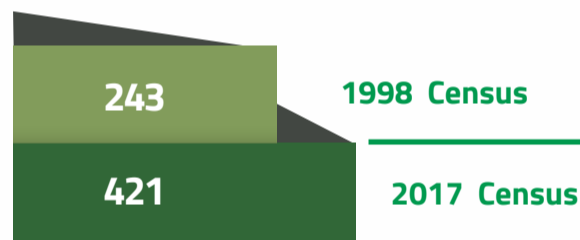


Population Distribution

Total Population in District



Population Density (Person per sq.km)



Growth Rate

2.27%
(2017 Census)



Educational Facilities



Govt. Schools: **3,236**

Colleges: **10**

Universities: **2**

Public Health Care Facilities (Numbers)



137

Tourist Attractions



Picnic Resort
Bhong Mosque, Town Hall



Historical Sites
Pattan Minara, Bijnot Fort

Agriculture

Major Crops
Wheat, Cotton, Sugarcane, Rice and Corn

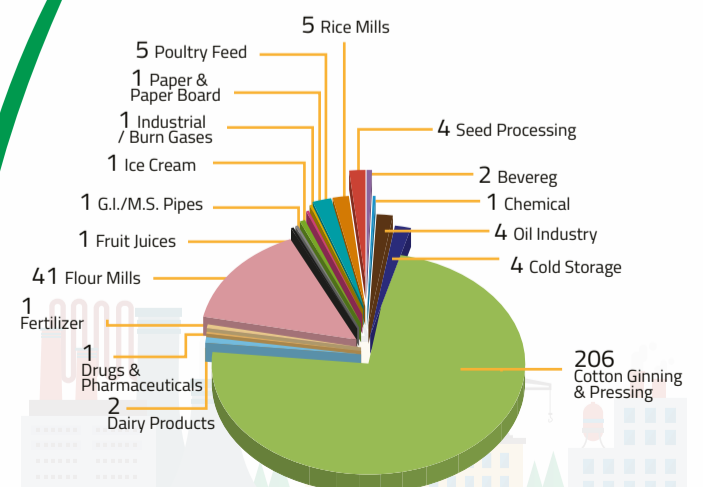
Major Fruits
Mangoes, Citrus, Dates and Guava

Major Vegetables
Onion, Cauliflower, Tomato, Carrot, Turnip and Lady Finger

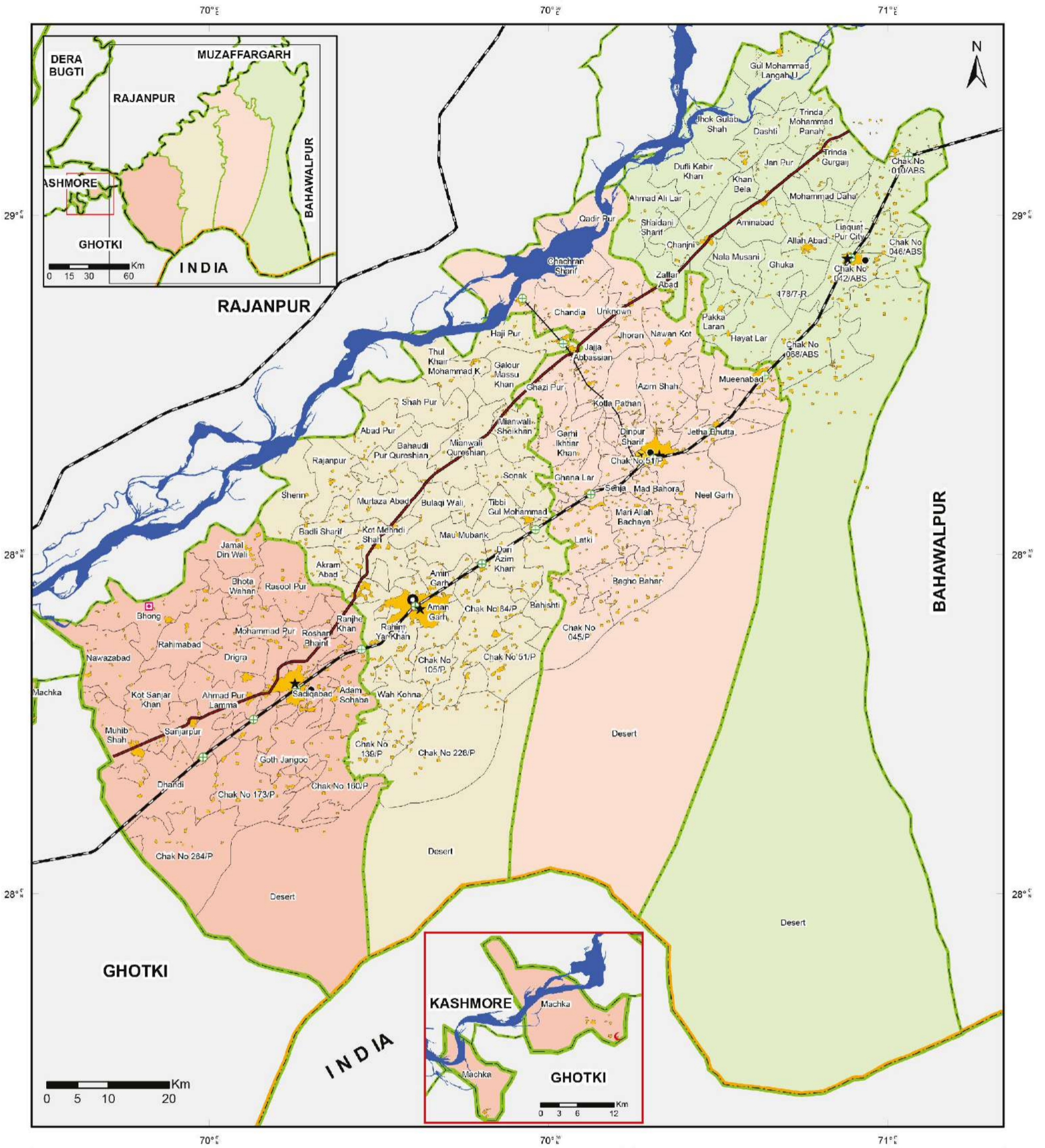
Major Livestock
Goats, Buffaloes, Cattles and Sheep



Major Industries



DISTRICT ADMINISTRATIVE MAP



Legend		Tehsil Boundary	
★ Rescue 1122	— Broad Gauge Railway Track	■ Khanpur	■ Liaquatpur
Police Station	— Other Gauge Railway Track	■ Rahim Yar Khan	■ Sadiqabad
✈ Air Field/Landing Strips	— Motorway	■ District Boundary	■ Provincial Boundary
✈ Airport	— Trunk/Highway	— Line of Control	— International Boundary
🚂 Railway Station	— Metalled Road	— Union Council Boundary	
🏛 Archaeological Sites	— Unmetalled		
🏙 District Headquarter	— River and Water Body		
● Tehsil Headquarter	■ Builtup Area		
🌉 Bridge	— Union Council Boundary		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION
Data Source(s):
 The Punjab Emergency Service - Rescue 1122
 Punjab Police
 Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-001
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

2 GEOLOGY



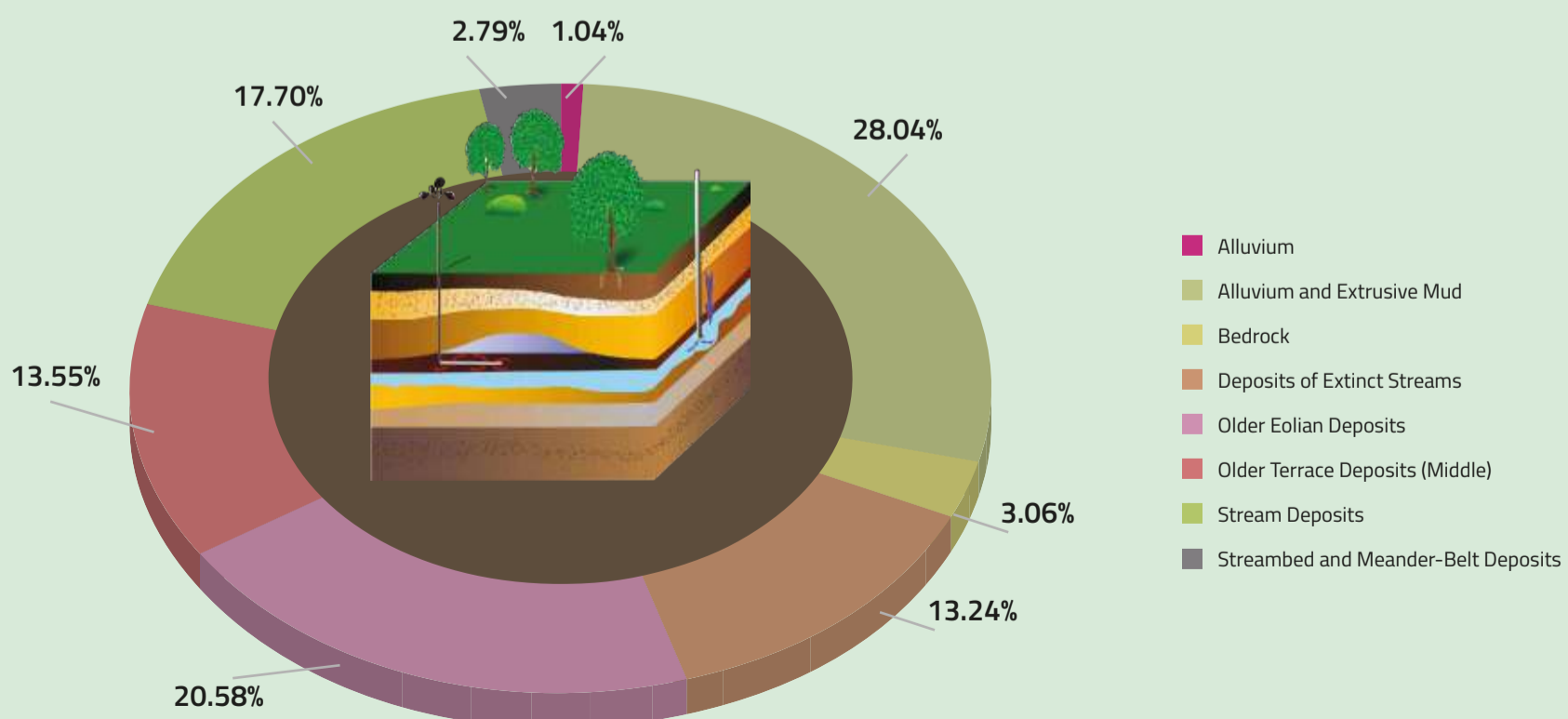
The surface geology of Rahim Yar Khan is mainly composed of Alluvium & Extrusive Mud (28.041%), Older Eolian Deposits (20.580%) and Stream Deposits (17.703%). The alluvial plain is located adjacent to the Indus River, whereas the rolling sand dunes cover the Eolian plain of the Cholistan desert. Within this part of the desert the dunes-increase towards the northwest. Other geological composition of the district includes Deposits of Extinct Streams (13.240%), Older Terrace Deposits (13.552%), Alluvium (1.040%), Bedrock (3.058%), Stream bed and Meander-Belt Deposits (2.786%).

Geologically, Rahim Yar Khan is underlain by a thick sequence of sediments consisting of sand, silt and clay deposits of fluvial and aeolian origin, ranging in age from Pleistocene to most Recent. The sediments, formed as channel infills, levees and overbank flood plain deposits, show both lateral and vertical lithologic variation. This is due to the cyclic shifting in the course of the Indus River and its tributaries which laid

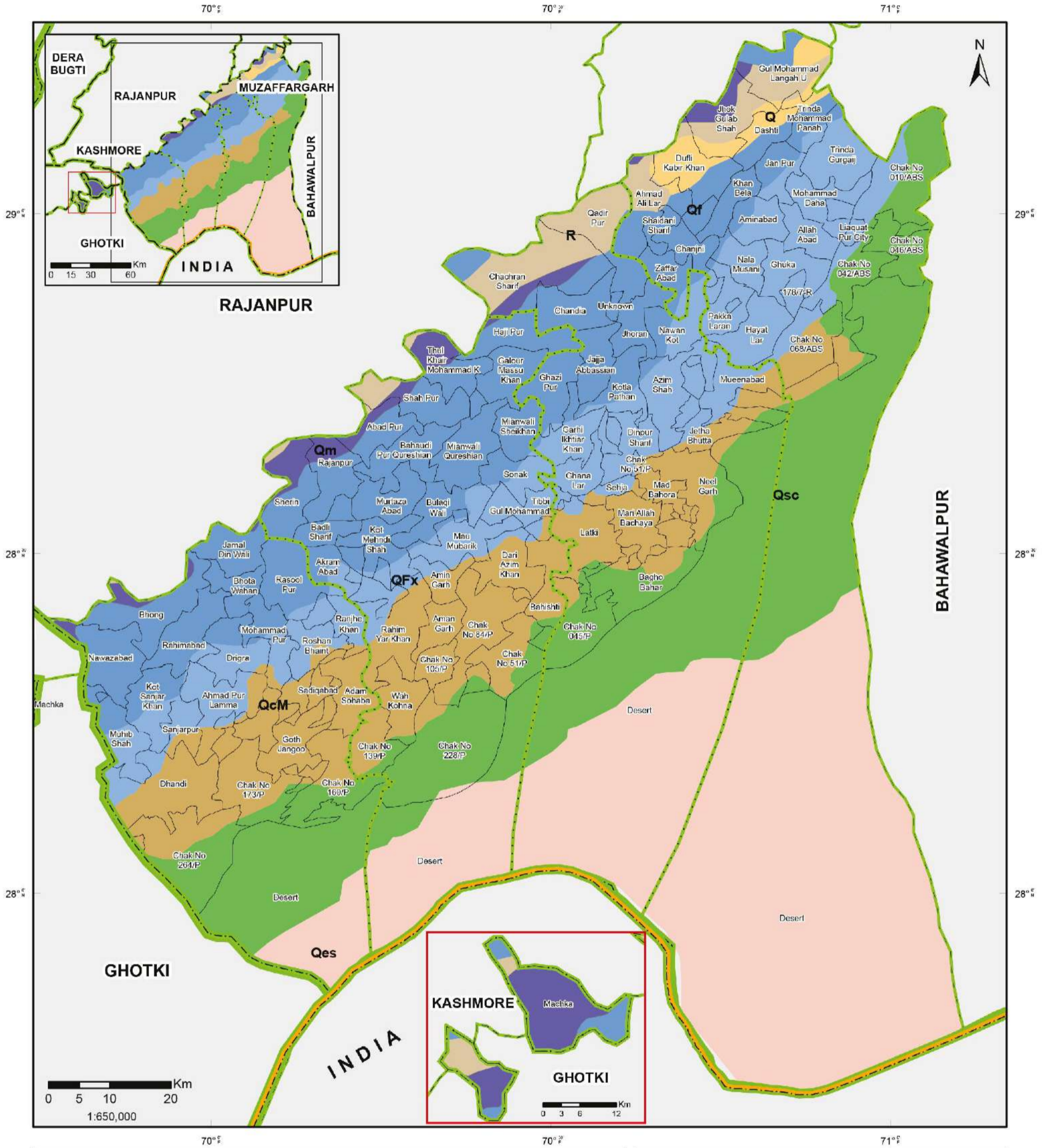
down these sediments. The grain size decreases laterally from northeast to southwest, which point to heterogenic conditions of deposition, and a cause for variation in the permeability values of the layers. The absence of continuous clay layers, in general, is indicative of the presence of unconfined aquifers in the fluvial sediments.

Geological Formation	Area (sq.km)	Composition
Alluvium	133.95	1.04%
Alluvium and Extrusive Mud	3611.83	28.04%
Bedrock	393.903	3.06%
Deposits of Extinct Streams	1705.352	13.24%
Older Eolian Deposits	2650.746	20.58%
Older Terrace Deposits (Middle)	1745.614	13.55%
Stream Deposits	2280.205	17.70%
Streambed and Meander-Belt Deposits	358.87	2.79%
	12880.47	

Geological Composition



GEOLOGY MAP



Legend

- | | |
|-------------------------------------|------------------------|
| Alluvium | Union Council Boundary |
| Alluvium and Extrusive Mud | Tehsil Boundary |
| Bedrock | District Boundary |
| Deposits of Extinct Streams | Provincial Boundary |
| Older Eolian Deposits | Line of Control |
| Older Terrace Deposits (Middle) | International Boundary |
| Stream Deposits | |
| Streambed and Meander-Belt Deposits | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
 Geological Survey of Pakistan
 Survey of Pakistan
 Pakistan Bureau of Statistics

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-004
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

Land Cover (LC) is defined as the observed (bio) physical cover on the earth's surface, whereas Land Use (LU) is characterized by the arrangements, activities and inputs that people undertake in a certain type of land in order to produce, change or maintain it. Knowledge of the LC/LU distribution helps Land Use Planners and Policy Makers to determine pragmatic land use policies.

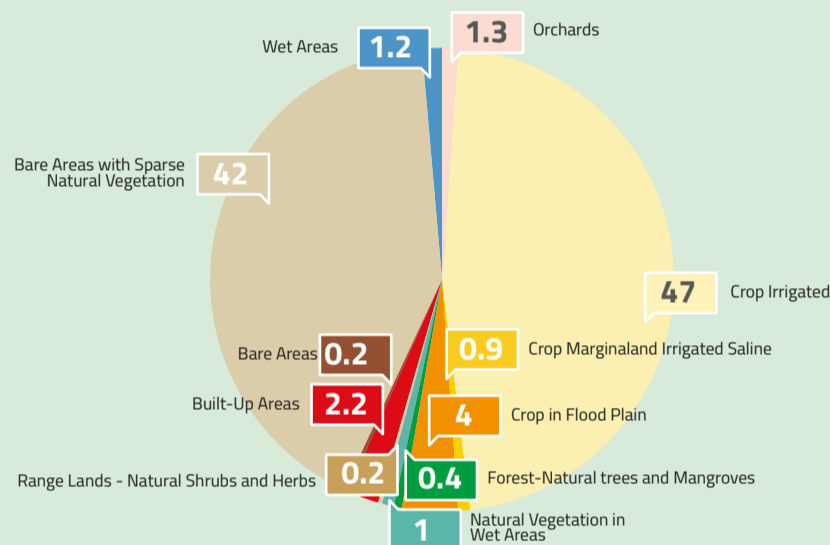
Land Cover/ Land Use (LC/LU) processes are important to be monitored since they are the direct drivers of Climate & Ecosystem Change. For this study, LC/LU demarcation carried out by Space & Upper Atmosphere Research Commission (SUPARCO) has been used which provides a comprehensive description of the biotic and abiotic resources of the study area and includes, inter alia, numerous categories of cultivated land; natural vegetation and non-vegetated areas including bare

and rocky areas, and areas of human settlements. In this study, Land Cover Classification System (LCCS) approach has been used with an aim to capture the physiographic characteristics down to a UC level.

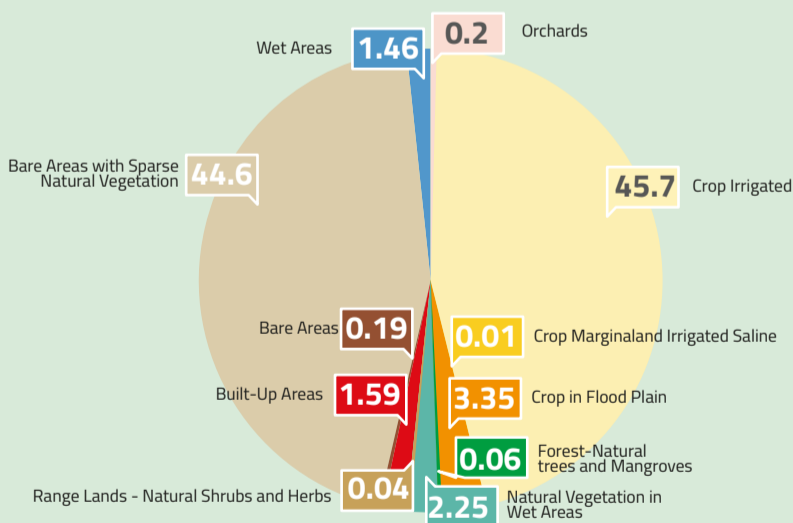
The geospatial database, prepared by SUPARCO, is used to provide basis for the development of an improved capacity for natural resources monitoring and management.

The legend consisting 13 main land cover classes have been used in this study which are being further subdivided into 36 classes, and have been mapped based on the analysis, interpretation and validation of SPOT-5 high resolution satellite imagery (5 meter). For this purpose, satellite images were segmented into homogeneous polygons and labeled using the LCCS classification system.

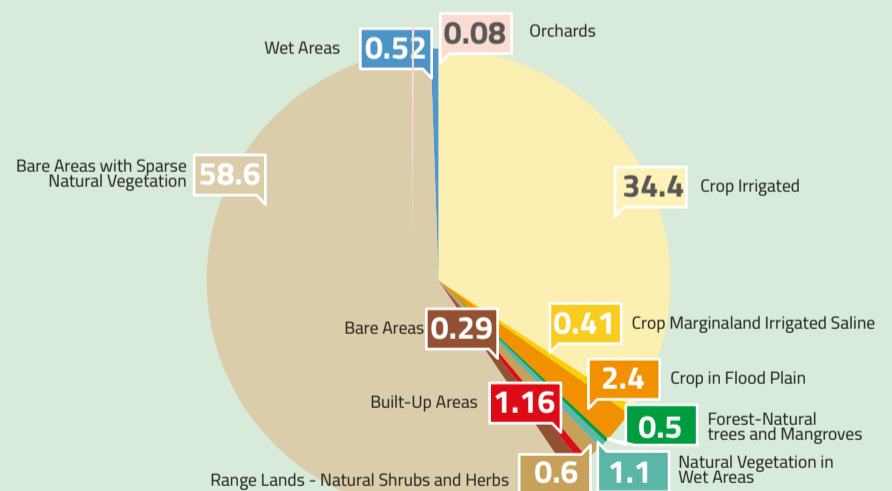
LAND COVER DISTRIBUTION (Percentage)



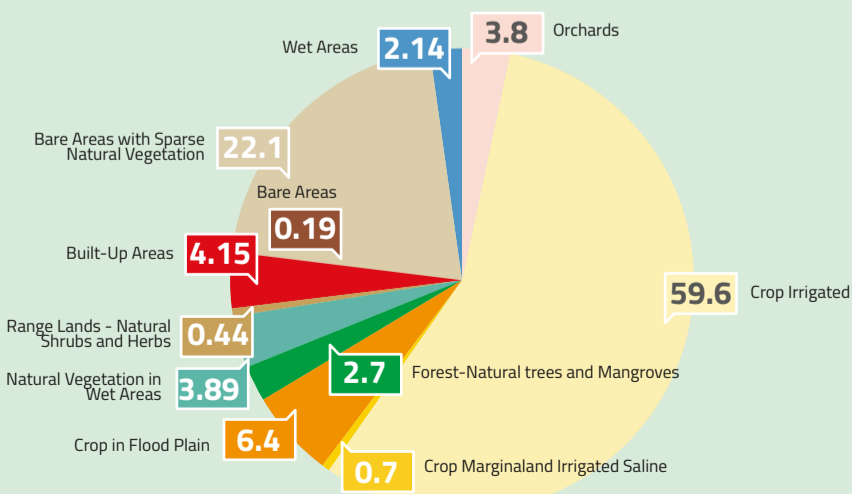
Tehsil Khanpur



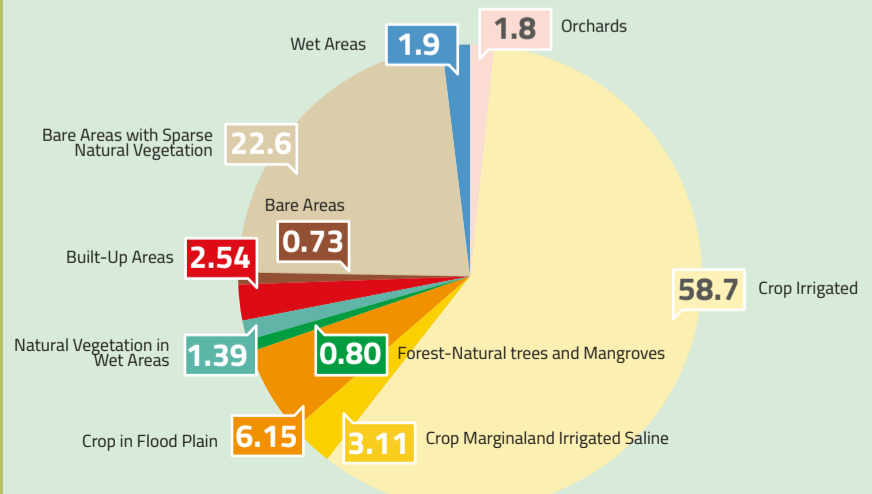
Tehsil Liaqatpur



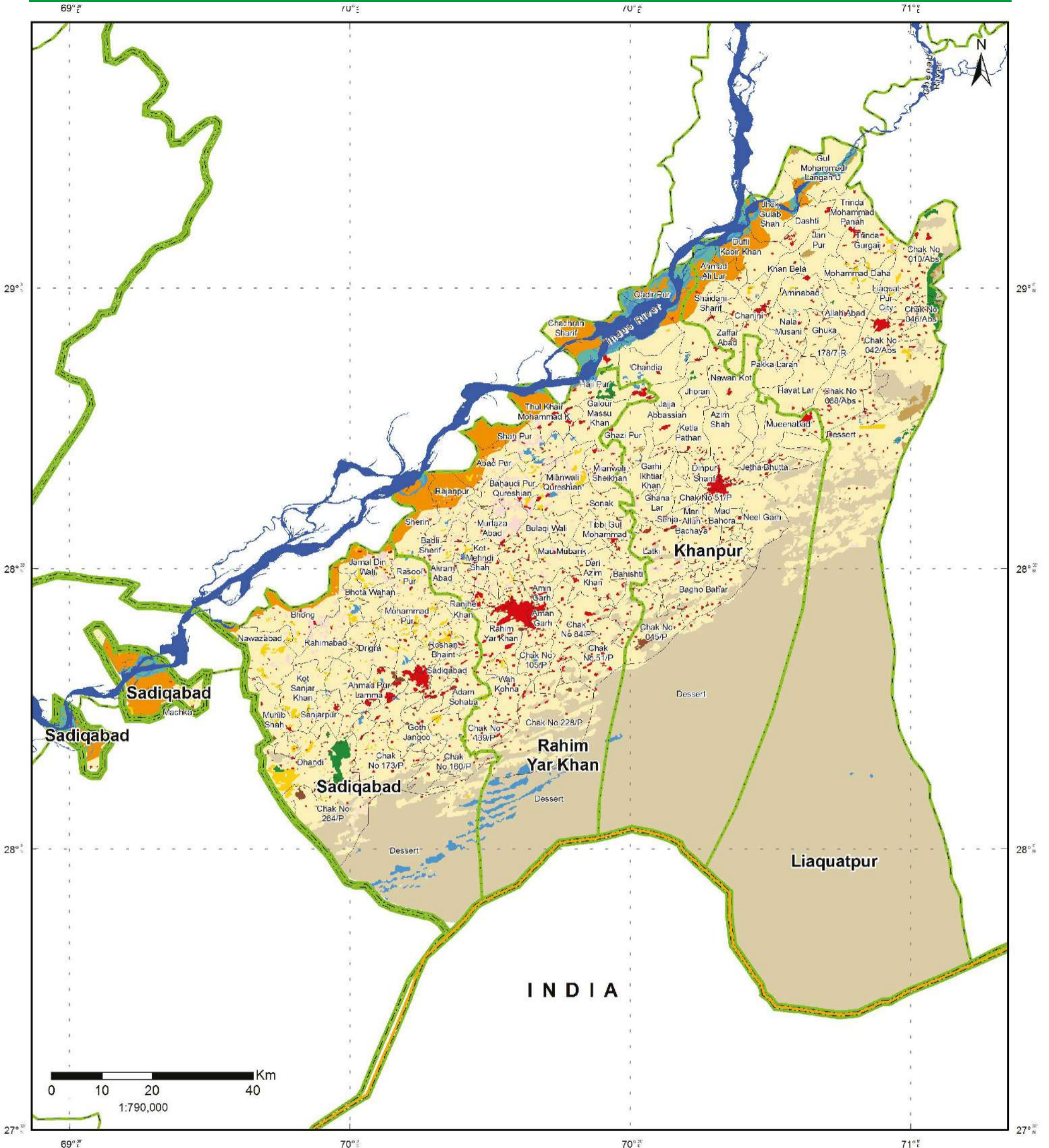
Rahim Yar Khan



Tehsil Sadiqabad



LAND USE & LAND COVER MAP



Legend

Bare Areas	River and Water Body
Bare Areas with Sparse Natural Vegetation	Union Council Boundary
Built-up	Tehsil Boundary
Crop in Flood Plain	District Boundary
Crop Marginal and Irrigated Saline	Provincial Boundary
Crop Rainfed	Line of Control
Crop Irrigated	International Boundary
Forest - Natural Trees and Mangroves	
Natural Vegetation in Wet Areas	
Orchards	
Range Lands - Natural Shrubs and Herbs	
Snow and Glaciers	
Wet Areas	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
 Units: Degree

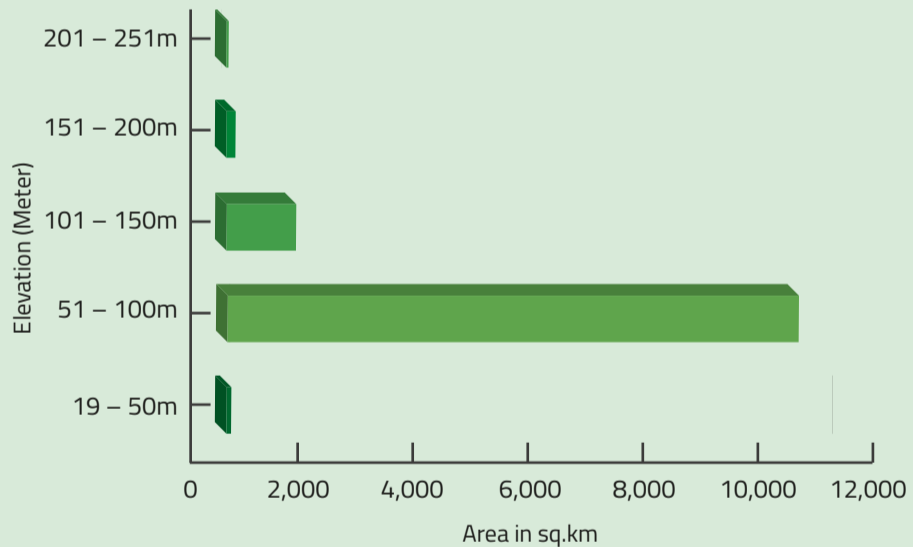
Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-002
 Prepared by: Project Management Unit, NDMA
 Last Updated: 10th May, 2017



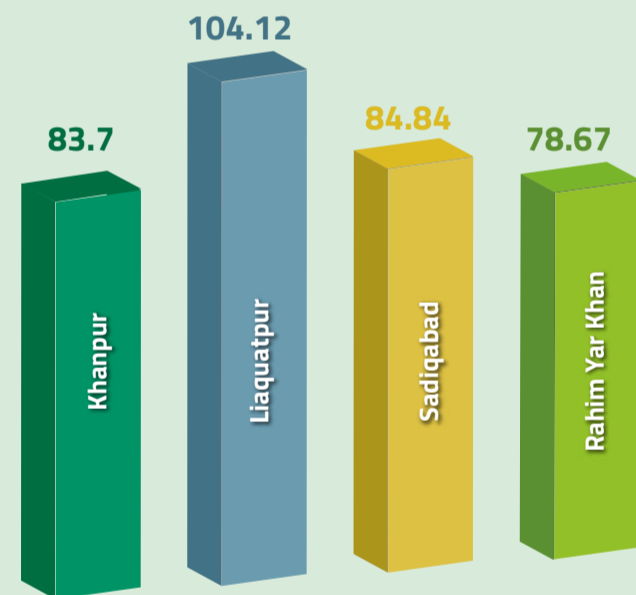
Elevation is the measurement of height of the land with respect to sea level or the sea floor. Elevation maps are used to identify how flat, elevated or hilly an area is, as well as to analyze other features of land using contour lines and symbols.

The elevation of the district is between 252m (High) to 15m (Low). It can be analyzed from the map that around 84% of the district lies within elevation range of 51 – 100m.

Elevation Distribution of District Rahim Yar Khan

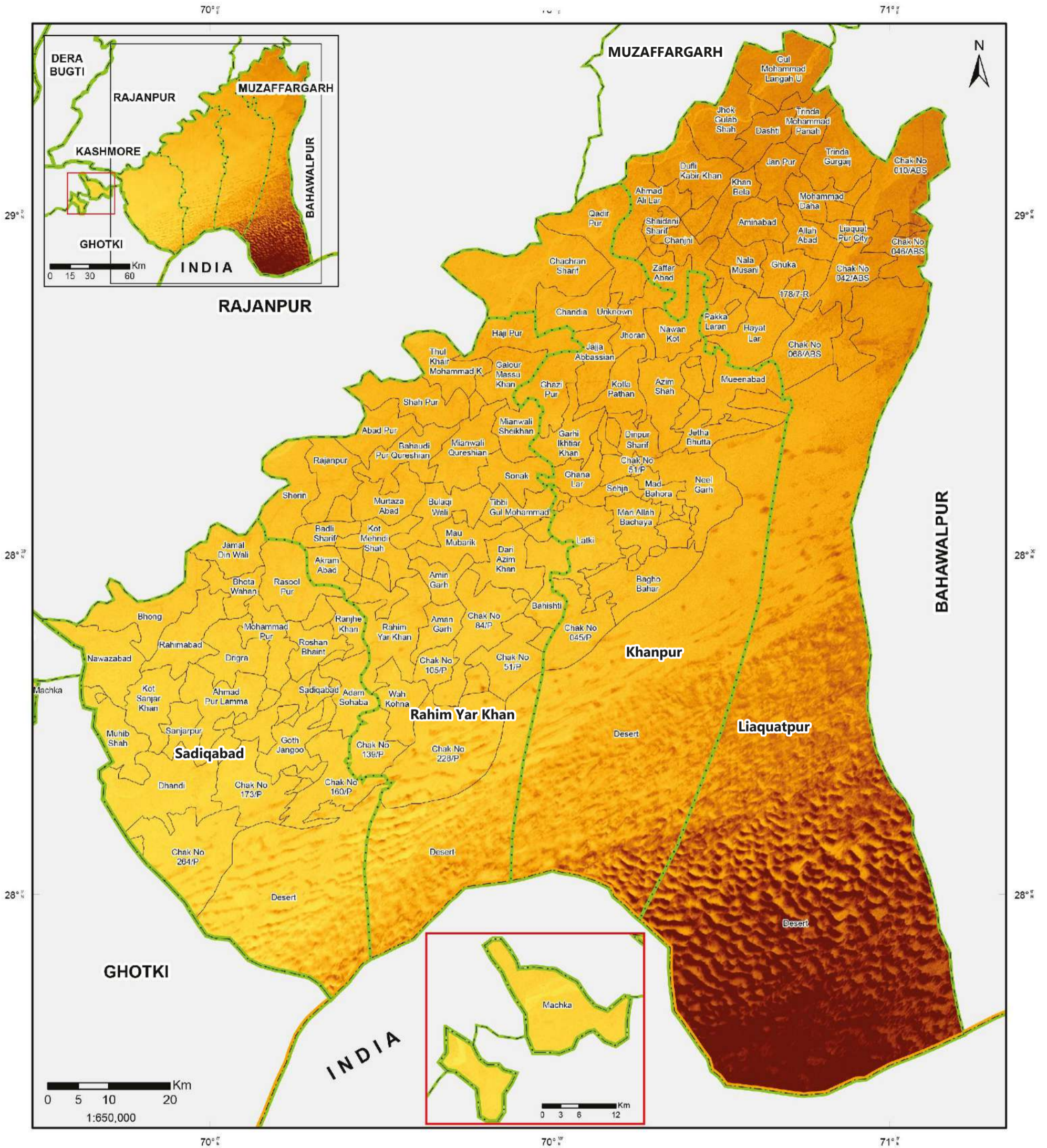


Tehsil Wise Mean Height (Meter)



Elevation Bands	Tehsil Wise Area Coverage (sq.km)				District Total (sq.km)
	Khanpur	Liaquatpur	Sadiqabad	Rahim Yar Khan	
19 – 50m	-	-	0.70	0.02	0.72
51 – 100m	2957.87	2795.41	2537.91	2614.28	10905.91
101 – 150m	118.57	1814.77	21.47	24.40	1979.34
151 – 200m	0.00	48.67	0.36	0.31	49.35
201 – 251m	-	-	0.10	0.01	0.12

ELEVATION MAP



Legend

Elevation (m)

High : 169

Low : 49

Union Council Boundary

Tehsil Boundary

District Boundary

Provincial Boundary

Line of Control

International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 NASA (SRTM 30m DEM)
 Survey of Pakistan
 Pakistan Bureau of Statistics

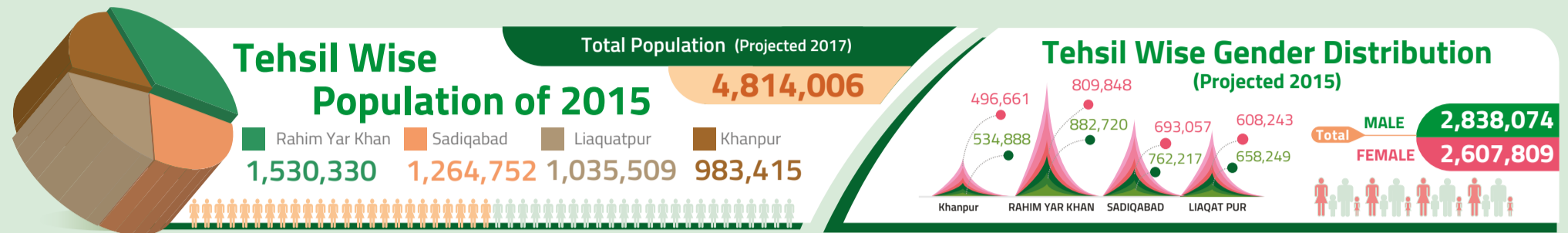
Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-003
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

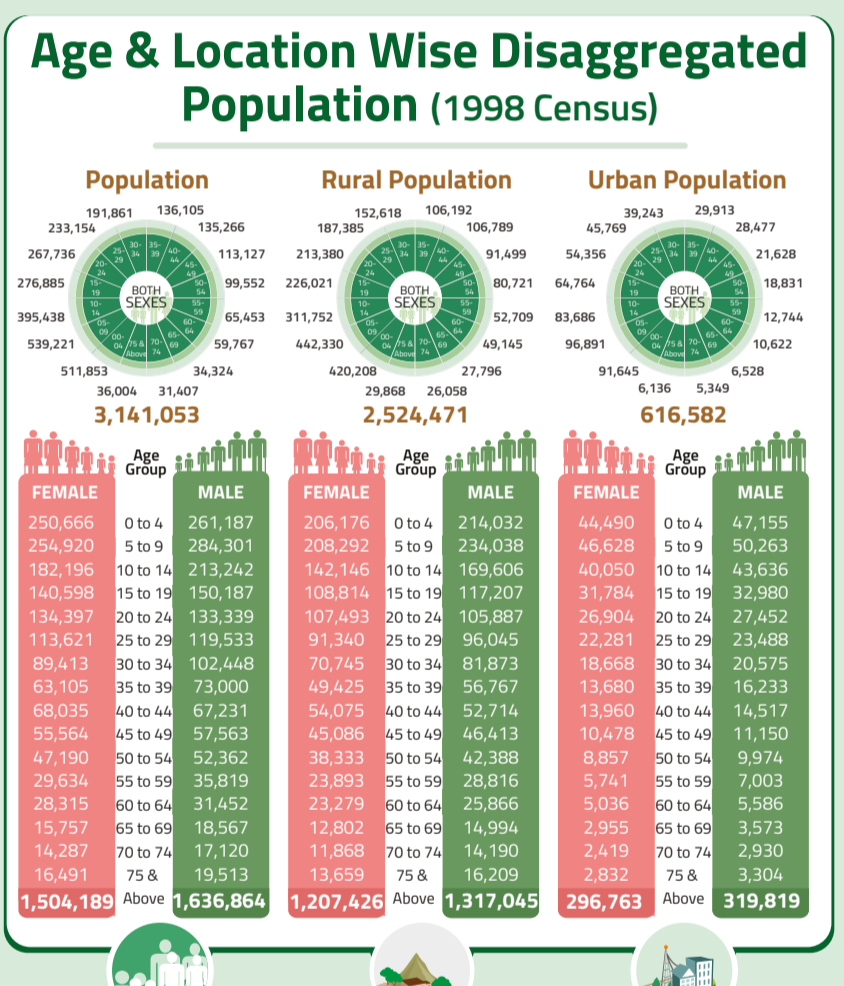
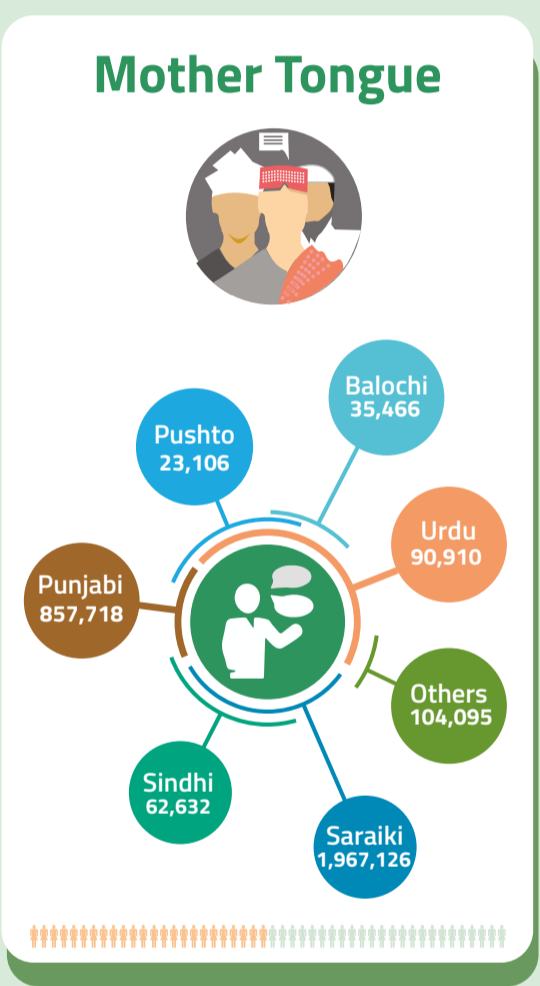
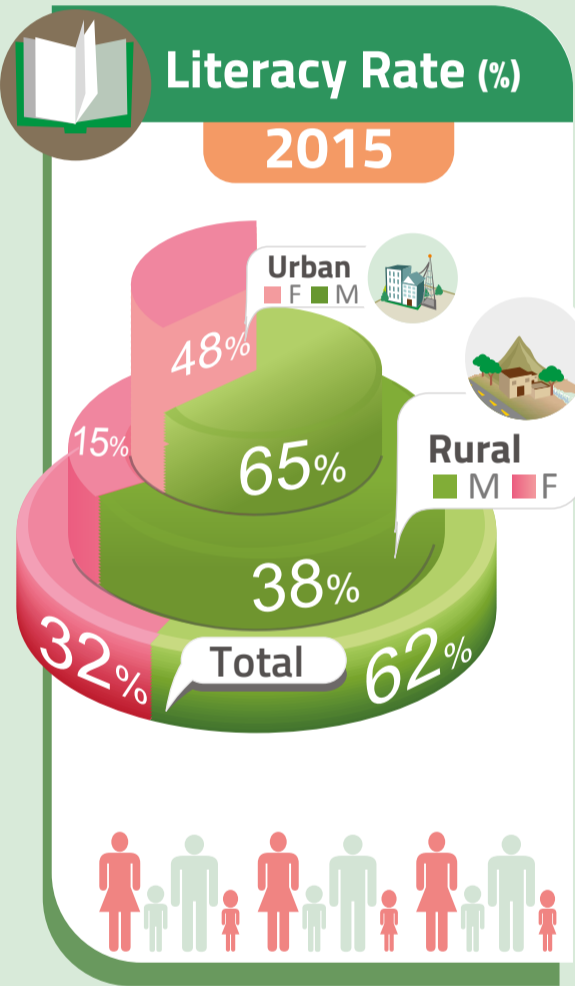
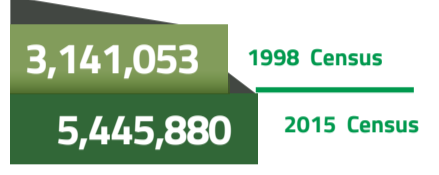
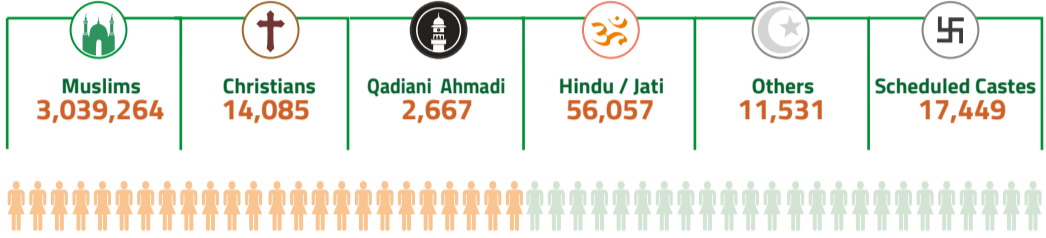
5 POPULATION DISTRIBUTION

According to the census report of 1998 Rahim Yar Khan was inhabited by a total of 3,141,053 people amongst which 1,636,864 are Male and 1,504,189 are Female. The projected population for the year 2015 is

5,445,880 persons. The annual growth rate is 3.19%. Average household size is 7.5 and number of housing units reported is 416,215 according to the census of 1998.



Population on Basis of Religion (1998)



Liaquat Pur

Union Councils	Population
AZIM SHAH	55,936
BAGHO BAHAR	18,780
CHACHRAN SHARIF	20,482
CHAK NO 045/P	12,384
CHANDIA	23,164
DINPUR SHARIF	17,445
GARHI IKHTIAR KHAN	19,451
GHANA LAR	19,779
GHAZI PUR	19,152
JAJJA ABBASSIAN	20,803
JETHA BHUTTA	21,534
JHORAN	21,198
KOTLA PATHAN	17,755
LATKI	18,289
MAD BAHORA	18,064
MARI ALLAH BACHAYA	18,747
MUEENABAD	18,691
NAWAN KOT	20,221
NEEL GARH	75,910
QADIR PUR	22,505
SEHA	16,371

Khanpur

Union Councils	Population
17B/7-R	32,949
AHMAD ALI LAR	21,516
ALLAH ABAD	23,772
AMINABAD	24,473
CHAK NO 010/ABS	23,042
CHAK NO 042/ABS	27,220
CHAK NO 046/ABS	20,440
CHAK NO 068/ABS	22,384
CHANJINI	21,417
DASHTI	28,534
DASHTI	28,534
DUFU KABIR KHAN	25,401
GHUKA	23,417
GUL MOHAMMAD LANGAH	23,569
HAYAT LAR	23,816
JANI PUR	26,876
JHOK GULAB SHAH	21,516
KHAN BELA	23,105
Liaquatpur CITY	28,985
MOHAMMAD DAHA	26,905
NALA MUSANI	14,698
PAKKA LARAN	25,667
SHADANI SHARIF	24,749
TRINDA GURGAJI	27,949
TRINDA MOHAMMAD PANAH	26,059
ZAFFAR ABAD	19,784

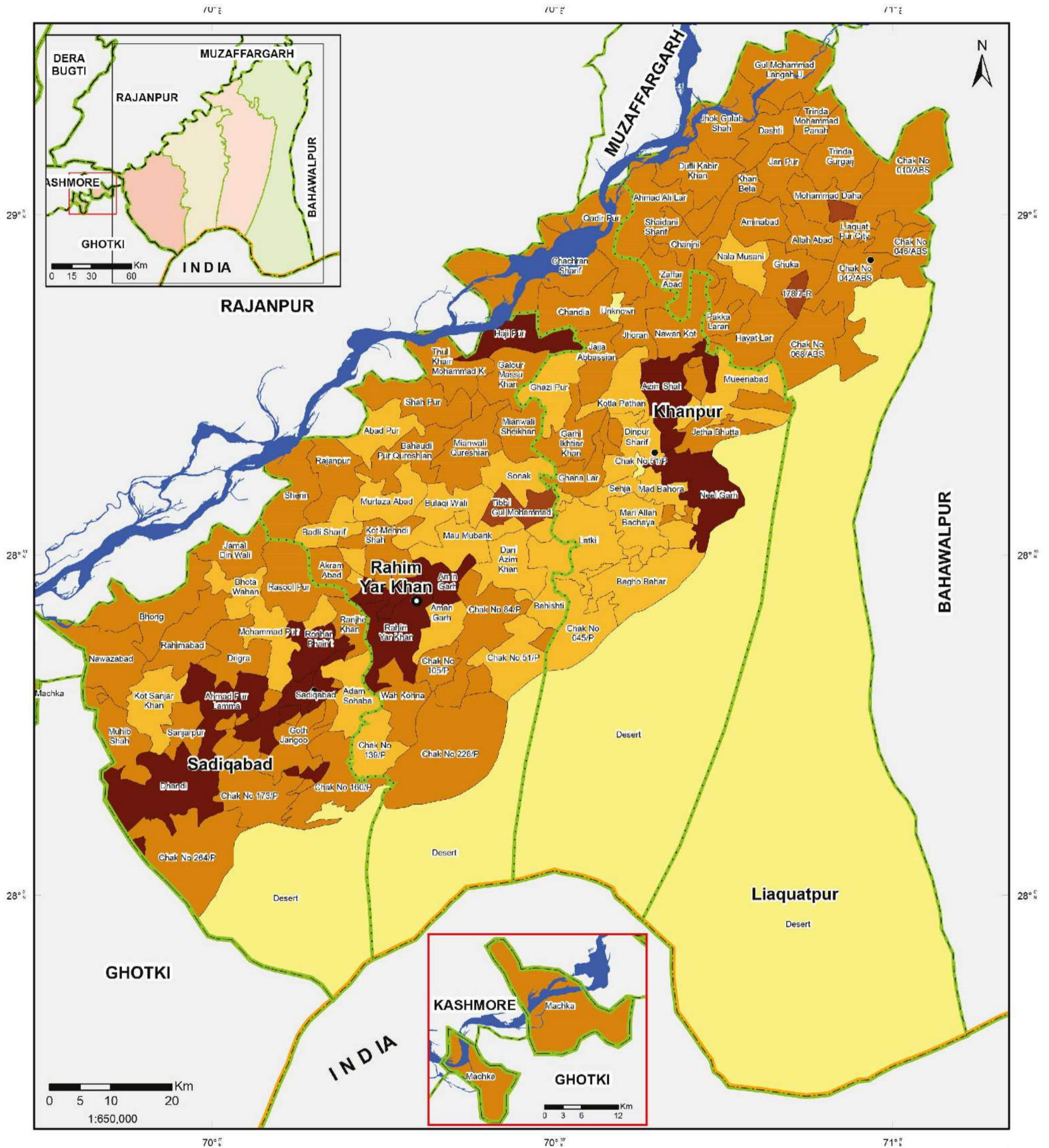
Sadiqabad

Union Councils	Population
ADAM SOHABA	17,553
AHMAD PUR LAMMA	49,865
BHONG	24,226
BHOTA WAHAN	18,376
CHAK NO 160/P	26,158
CHAK NO 173/P	22,408
CHAK NO 264/P	20,869
DHANDI	90,567
DRIGRA	23,601
GOTH JANGOO	25,446
JAMAL DIN WALI	24,868
KOT SANJAR KHAN	17,074
MACHKA	27,388
MOHAMMAD PUR	18,272
MUHIB SHAH	20,678
NAWAZABAD	22,015
RAHIMABAD	26,395
RANJHE KHAN	21,810
RASOOL PUR	21,778
ROSHAN BHAINI	68,466
SADIQABAD	82,064
SANJARPUR	23,180

Rahim Yar Khan

Union Councils	Population
ABAD PUR	18,098
AKRAM ABAD	24,019
AMAN GARH	18,536
AMIN GARH	56,254
BADLI SHARIF	16,922
BAHAUDI PUR QURESHIAN	24,456
BAHISHTI	18,238
BULAQI WALI	17,991
CHAK NO 105/P	20,638
CHAK NO 139/P	17,765
CHAK NO 228/P	21,066
CHAK NO 51/P	15,053
CHAK NO 84/P	26,064
DARI AZIM KHAN	15,364
GALOUR MASSU KHAN	21,908
HAJI PUR	53,358
KOT MEHNDI SHAH	22,517
MAU MUBARIK	14,149
MIANWALI QURESHIAN	22,491
MIANWALI SHEIKHAN	22,257
MURTAZA ABAD	15,259
RAHIM YAR KHAN	171,492
RAJANPUR	22,259
SHAH PUR	21,066
SHERIN	20,854
SONAK	19,157
THUL KHAIR MOHAMMAD K	20,083
TIBBI GUL MOHAMMAD	32,955
WAH KOHNA	19,579

POPULATION DISTRIBUTION MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Population Distribution
 - Abc < 10000
 - Abc 10001 - 20000
 - Abc 20001 - 40000
 - Abc 40001 - 60000
 - Abc 60001 - 80000
 - Abc > 80000
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

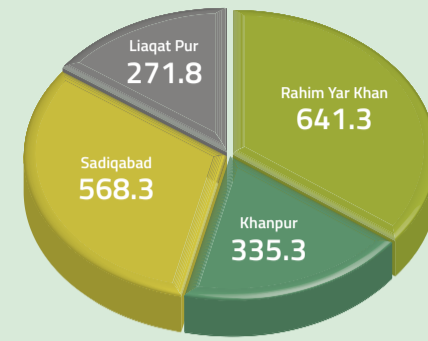
MAP INFORMATION

Data Source(s): Pakistan Bureau of Statistics, Survey of Pakistan

Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-005
 Prepared by: Project Management Unit, NDMA
 Last Updated: 2nd May, 2017

Tehsil Wise Population Density (Persons/sq.km)

The average population density of District Rahim Yar Khan is nearly 140 persons per sq.km in 1998 which in 2015 has grown to 421 persons per sq.km. The most densely populated Tehsil of the district is Rahim Yar Khan whereas Tehsil Liaquat Pur is the comparably sparsely populated.



Union Councils	Population	Male	Female	Area (sq km)	Density (Person / sq.km)
Tehsil Khanpur					
Azim Shah	115,349	59,413	55,936	91	1,269
Bagho Bahar	38,932	20,152	18,780	108	361
Chachran Sharif	42,266	21,784	20,482	194	217
Chak No 045/p	25,915	13,531	12,384	95	272
Chandia	48,798	25,634	23,164	73	670
Dinpur Sharif	35,786	18,341	17,445	68	530
Garhi Ikhtiar Khan	40,428	20,978	19,451	63	647
Ghana Lar	41,010	21,231	19,779	66	619
Ghazi Pur	39,789	20,637	19,152	68	581
Jajja Abbassian	42,648	21,845	20,803	56	766
Jetha Bhutta	44,922	23,388	21,534	77	584
Jhoran	44,314	23,116	21,198	54	828
Kotla Pathan	37,169	19,415	17,755	59	631
Latki	38,309	20,019	18,289	92	415
Mad Bahora	37,200	19,136	18,064	52	714
Mari Allah Bachaya	39,342	20,595	18,747	60	651
Mueenabad	38,887	20,196	18,691	83	469
Nawan Kot	41,930	21,709	20,221	79	528
Neel Garh	157,698	81,789	75,910	105	1,508
Qadir Pur	47,431	24,926	22,505	108	439
Sehja	33,424	17,053	16,371	28	1,201
Tehsil Total:	1,031,547	534,888	496,661	3076.45	335.30
Tehsil Liaquatpur					
178/7-r	70,635	37,686	32,949	28	2,511
Ahmad Ali Lar	44,236	22,719	21,516	88	503
Allah Abad	49,836	26,064	23,772	44	1,126
Aminabad	50,925	26,452	24,473	51	992
Chak No 010/abs	48,151	25,109	23,042	148	325
Chak No 042/abs	56,733	29,512	27,220	111	510
Chak No 046/abs	42,788	22,348	20,440	67	643
Chak No 068/abs	46,483	24,098	22,384	92	507
Chanjni	44,317	22,901	21,417	43	1,042
Dashti	57,378	28,844	28,534	48	1,201
Dufli Kabir Khan	52,411	27,010	25,401	87	600
Ghuka	49,536	26,119	23,417	59	834
Gul Mohammad Langah U	48,929	25,359	23,569	108	453
Hayat Lar	49,644	25,829	23,816	85	586
Jan Pur	56,039	29,163	26,876	47	1,200
Jhok Gulab Shah	45,185	23,669	21,516	92	490
Khan Bela	47,988	24,883	23,105	40	1,189
Liaquatpur City	59,536	30,551	28,985	9	6,480
Mohammad Daha	56,858	29,953	26,905	57	1,001
Nala Musani	30,491	15,793	14,698	46	667
Pakka Laran	53,515	27,847	25,667	52	1,027
Shaidani Sharif	51,299	26,550	24,749	37	1,382
Trinda Gurgajj	58,414	30,465	27,949	85	687
Trinda Mohammad Panah	54,076	28,017	26,059	48	1,126
Zaffar Abad	41,092	21,308	19,784	46	896
Tehsil Total:	1,266,495	658,249	608,243	4659.33	271.81

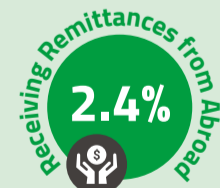
Tehsil Rahim Yar Khan

Abad Pur	37,534	19,437	18,098	59	637	637
Akram Abad	52,660	28,641	24,019	47	1,126	1126
Aman Garh	38,439	19,902	18,536	41	928	928
Amin Garh	116,487	60,233	56,254	63	1,862	1862
Badli Sharif	35,737	18,814	16,922	42	843	843
Bahaudi Pur Qureshian	52,026	27,570	24,456	76	688	688
Bahishti	38,059	19,821	18,238	66	573	573
Bulaqi Wali	37,432	19,440	17,991	76	496	496
Chak No 105/p	43,023	22,385	20,638	47	915	915
Chak No 139/p	36,652	18,887	17,765	60	607	607
Chak No 228/p	44,475	23,409	21,066	229	194	194
Chak No 51/p	31,604	16,551	15,053	95	334	334
Chak No 84/p	54,293	28,229	26,064	117	466	466
Dari Azim Khan	31,834	16,470	15,364	69	464	464
Galour Massu Khan	45,465	23,557	21,908	60	756	756
Haji Pur	111,189	57,831	53,358	71	1,558	1558
Kot Mehndi Shah	47,331	24,814	22,517	65	730	730
Mau Mubarik	29,273	15,124	14,149	70	420	420
Mianwali Qureshian	46,501	24,009	22,491	83	562	562
Mianwali Sheikhan	46,258	24,001	22,257	51	903	903
Murtaza Abad	32,142	16,883	15,259	65	494	494
Rahim Yar Khan	357,548	186,056	171,492	108	3,312	3312
Rajanpur	47,658	25,399	22,259	72	664	664
Shah Pur	44,205	23,139	21,066	85	517	517
Sherin	44,625	23,772	20,854	93	482	482
Sonak	39,078	19,921	19,157	69	568	568
Thul Khair Mohammad K	42,188	22,105	20,083	75	566	566
Tibbi Gul Mohammad	67,910	34,955	32,955	47	1,440	1440
Wah Kohna	40,943	21,365	19,579	62	662	662
Tehsil Total:	1,692,569	882,720	809,848	2,639.15	641.33	

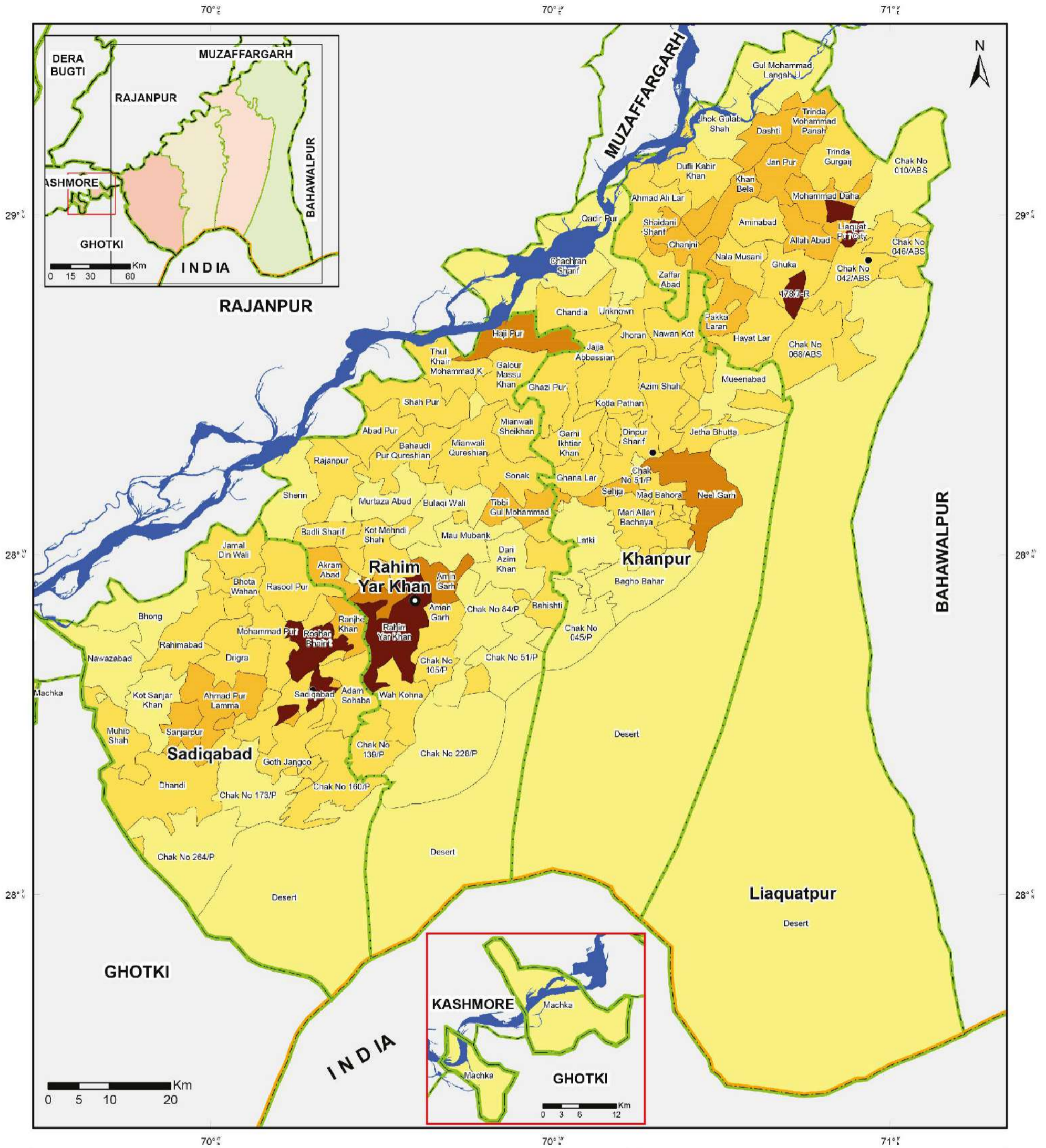
Tehsil Shujabad

Adam Sohaba	36,383	18,830	17,553	65	564	564
Ahmad Pur Lamma	103,528	53,664	49,865	93	1,115	1115
Bhong	50,462	26,236	24,226	110	459	459
Bhota Wahan	38,800	20,424	18,376	42	934	934
Chak No 160/p	54,503	28,345	26,158	109	500	500
Chak No 173/p	46,987	24,579	22,408	103	457	457
Chak No 264/p	44,498	23,629	20,869	165	269	269
Dhandi	189,772	99,205	90,567	220	863	863
Drigra	49,577	25,976	23,601	72	687	687
Goth Jango	53,420	27,974	25,446	90	594	594
Jamal Din Wali	52,341	27,473	24,868	62	850	850
Kot Sanjar Khan	36,338	19,265	17,074	73	497	497
Machka	58,714	31,327	27,388	240	245	245
Mohammad Pur	38,497	20,225	18,272	76	505	505
Muhib Shah	43,875	23,197	20,678	73	604	604
Nawazabad	46,627	24,612	22,015	103	453	453
Rahimabad	55,967	29,572	26,395	82	686	686
Ranjhe Khan	45,788	23,979	21,810	36	1,275	1275
Rasool Pur	45,589	23,812	21,778	90	507	507
Roshan Bhaint	144,059	75,593	68,466	51	2,835	2835
Sadiqabad	171,267	89,203	82,064	23	7,551	7551
Sanjarpur	48,277	25,097	23,180	46	1,044	1044
Tehsil Total:	1,455,269	762,217	693,057	2560.74	568.29	
District Total:	5,445,880	2,838,074	2,607,809	12.936	865	

Socio-Economics Statistics (2015)



POPULATION DENSITY (2015) MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Population Density (Person/Sq. Km.)
 - Abc ≤ 500
 - Abc 501 - 1000
 - Abc 1001 - 1500
 - Abc 1501 - 2000
 - Abc 2001 - 2500
 - Abc > 2500
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics, Survey of Pakistan

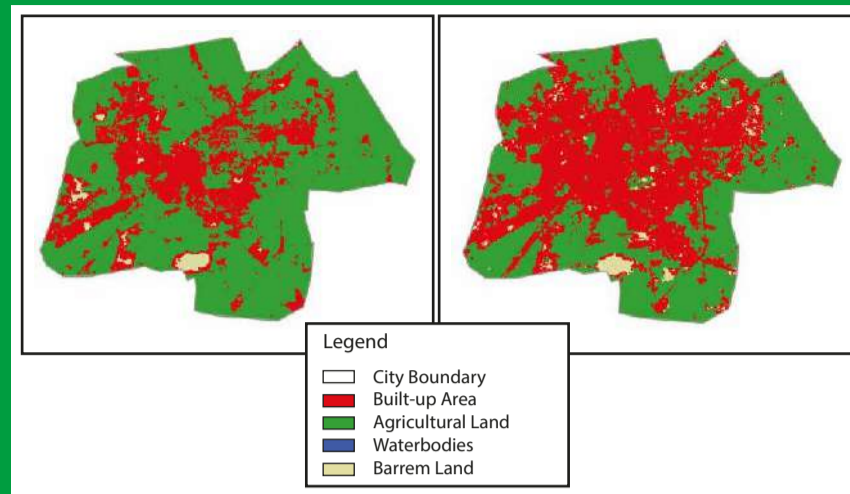
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Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-006
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

7 SETTLEMENTS

The settlements of the district include tehsils, union councils, cities and villages. We can broadly classify the settlement of Rahim Yar Khan District into two categories i.e. Urban and the Rural Settlement. The geographic distribution of settlements over the district is manifested in the Settlement Map.

Urban Sprawl of Rahim Yar Khan City in 1996 and 2013 is shown in the figures on the right. It can be seen that the most part of the city is occupied by the Agricultural land use i.e. 70.48 %, followed by the built-up land i.e. 28.04 % and barren land about 01.48%. In 2013 the Built-up area of the city increases with the decrease in agricultural and with a slight increase in barren land. The built-up land reaches up to 47.03% from 28.04% while there was a decrease of almost 20% in Agricultural land use and an increase of 01% in the barren land of the city in 2013.

Land Use Pattern (1996 & 2013)



Class	Area % 1996	Area % 2013	Change Detection %
Built-up Area	28.04	47.03	18.99
Agriculture	70.48	50.31	20.17
Water Bodies	0.00	0.00	0.00
Barren Area	1.48	2.65	1.17

Settlements Vulnerable to Riverine Flood on Basis of Inundation Frequency (2010 to 2017)

Tehsil Khanpur

Basti Arain
Gudpur
Samuka Minor
Mahran
Chenab
Ahmad Kudan
Basti Machhi
Samuka
Pir Shah
Gharu
Mad Adil
Bahar Gopang
Sadan
Nuran Channa
Darbari Khan
Basti Machhian
Minchan Bund
Goth Qadir Bakhsh
Chakar Darbari
Basti Sathar
Basti Goghe
Basti Bela Gopang
Basti Sadlan
Karim Bakhsh
Bakhshan Mahar
Chacharan
Sherwali
Bet Jhangani
Gullan Machhi
Baran Pahor

Tehsil Liaquatpur

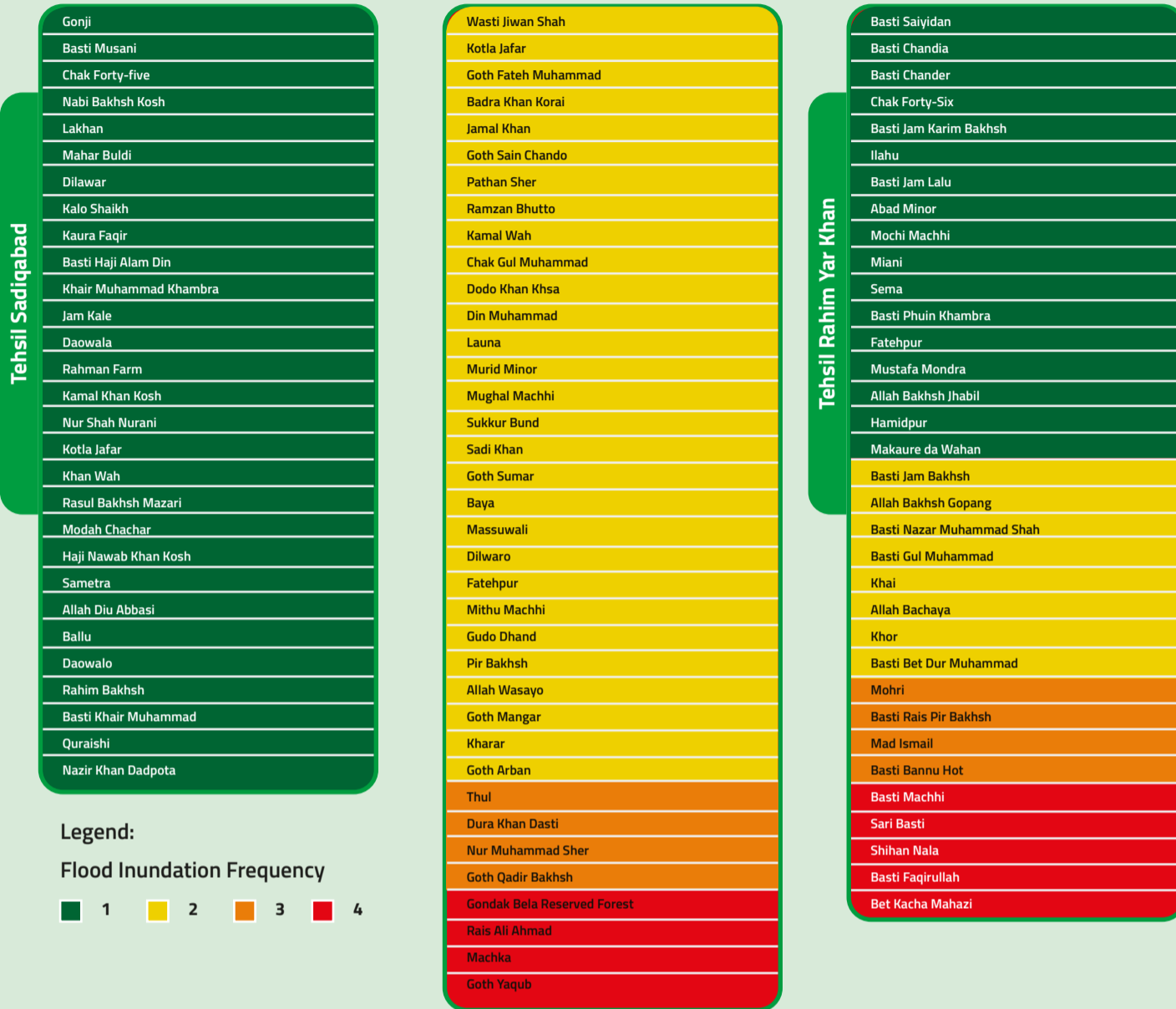
Basti Bhangar
Basti Gabol
Basti Abdullah
Basti Jalal Khan
Basti Beldar
Noorwala
Basti Malik Qasir Bakhsh
Bet Murad
Basti Danuna
Langah
Basti Gul Muhammad
Ahmadyar
Basti Makhdum
Tibbi Jhulan
Bana Roiah
Basti Lal Khan
Hotha Jarh
Sem
Basti Haji Din Muhammad Unar
Unran
Bet Nurwala

Hayat Machhi
Basti Miran Shah
Chhatte Khan di Basti
Gopanganwali
Basti Ghulam Hussain Mohana
Luhari Inspection Bungalow
Basti Moshori
Barnes Wah
Basti Qadar Bakhsh Mamai
Kotla Bakhsh
Basti Bandroe
Basti Baloch
Basti Dhammar
Basti Gopang Baloch
Basti Kandewali
Shahidabad
Basti Haji Allah Dad
Basti Ruk
Bet Diwan
Chohan
Basti Khokharan
Basti Mindh
Bet Banhar
Bet Baluch
Ghaghar
Qasaiwala
Shah Wasawa
Mad Ranjha Resthouse
Kundrala
Ahmad Bakhsh
Basti Dhukut Gopang
Basti Jam Siddiq
Basti Ahmad Ali
Basti Thume Parara
Basti Mohana
Basti Ilahi Bakhsh
Basti Paolian di
Bet Ahir
Minchin Bund
Bet Bhutto
Basti Bhutto
Bet Channan
Shah di Basti
Basti Ghulam Rasul
Basti Jhallar
Tibbi Burra
Machhiwala
Bakhshu Bhir
Basti Malik Budha Machhi
Jhullan
Basti Pattan
Mad Ranjha

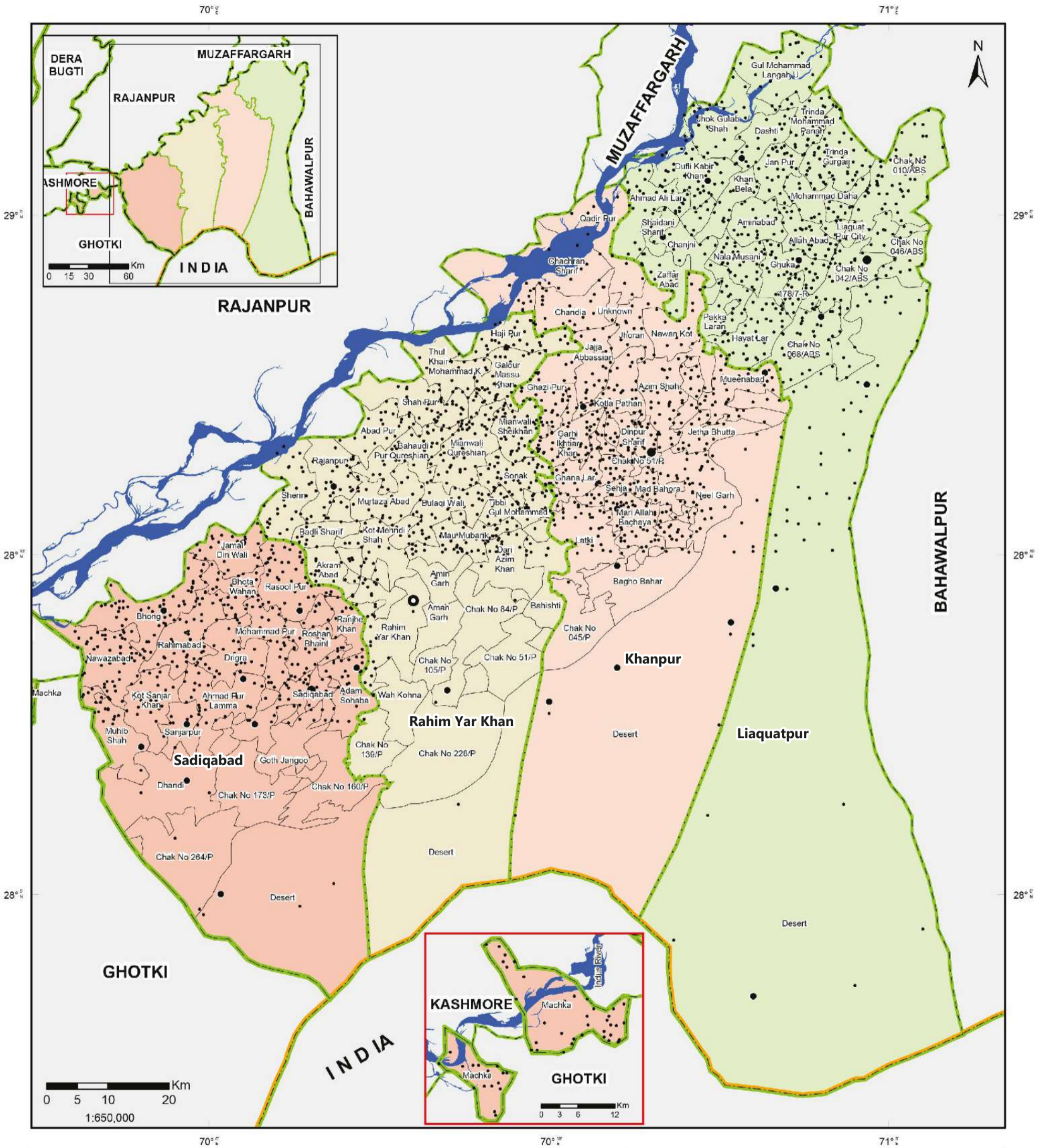
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Ahmad Ali Lar
Basti Haji Faqir Bakhsh Mahr
Basti Machhi
Basti Fazal Ahmad Khan Dahar
Basti Jam Siddiq Unar
Basti Doewala
Kotla Parara
Basti Manzur Ahmad Gopang
Basti Bijar Khan Gopang
Basti Makhdum Jahan Shah
Basti Fazal Khan Dahar
Basti Mohana
Basti Indrah
Basti Haslani
Khanpur Narakha
Fakhar Abad
Bet Machhi
Basti Chakar
Basti Jalal Lar
Basti Khuda Bakhsh Hir
Basti Muhammadani
Basti Dahe
Basti Jam Muhammad
Chakar Nurwala
Basti Sher
Basti Parhar
Sarki
Basti Dreshak
Basti Rahim Bakhsh Metla
Basti Beratha
Basti Khokharan
Mad Lai Khan
Basti Mamdani Dahar
Basti Shakri
Basti Sadiq Shah
Basti Jam Ahmad Chowhan
Khassar
Muhammduwala
Basti Muhammadi Gopang
Mad Daulat Shah
Jhullan
Qaim Sarki
Basti Pir Jafar Shah
Basti Faqir Bakhsh Naich
Bhangwala



Settlements Vulnerable to Riverine Flood on Basis of Inundation Frequency (2010 to 2017)




SETTLEMENTS MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Major Towns
- Settlements / Villages
- River and Water Body
- ▭ Union Council Boundary
- ▭ District Boundary
- ▭ Tehsil Boundary
 - ▭ Khanpur
 - ▭ Liaquatpur
 - ▭ Rahim Yar Khan
 - ▭ Sadiqabad
 - ▭ International Boundary
 - ▭ Provincial Boundary
 - ▭ Line of Control

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



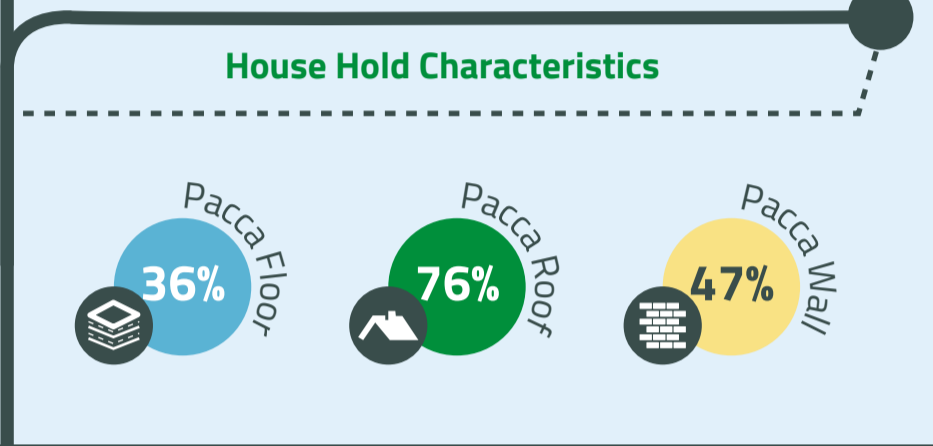
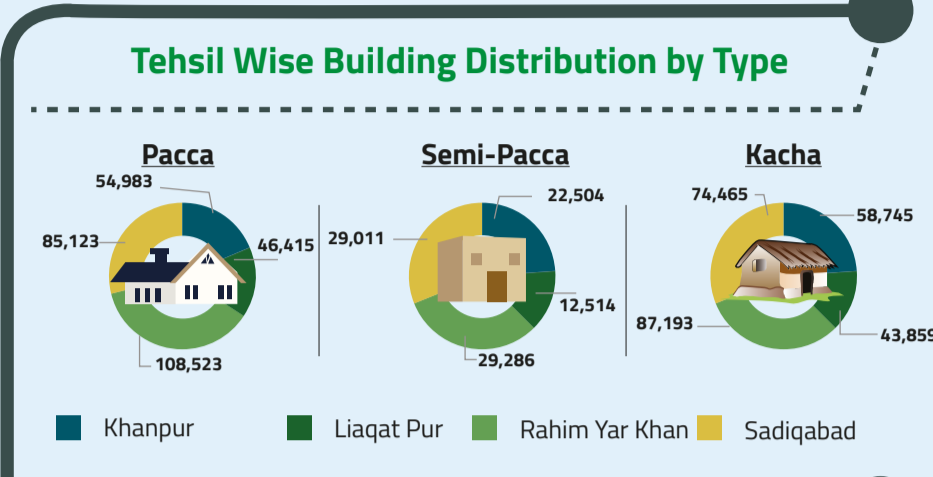
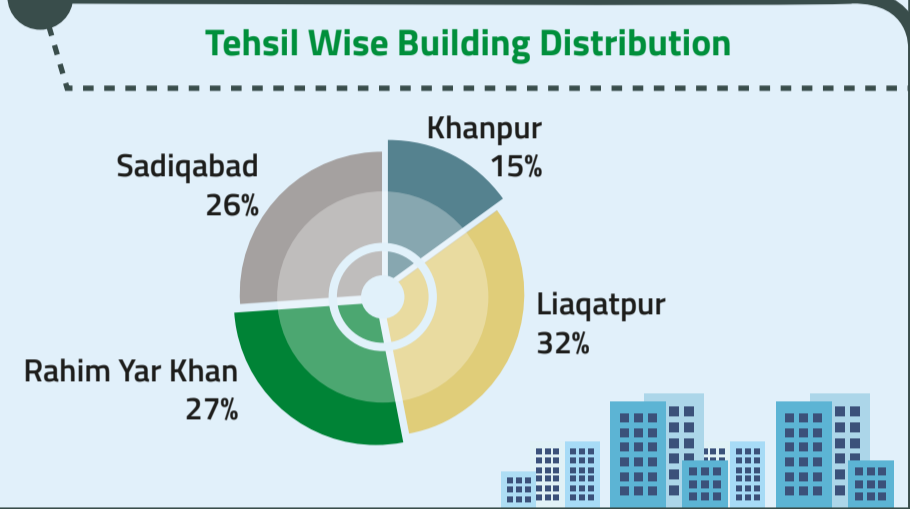
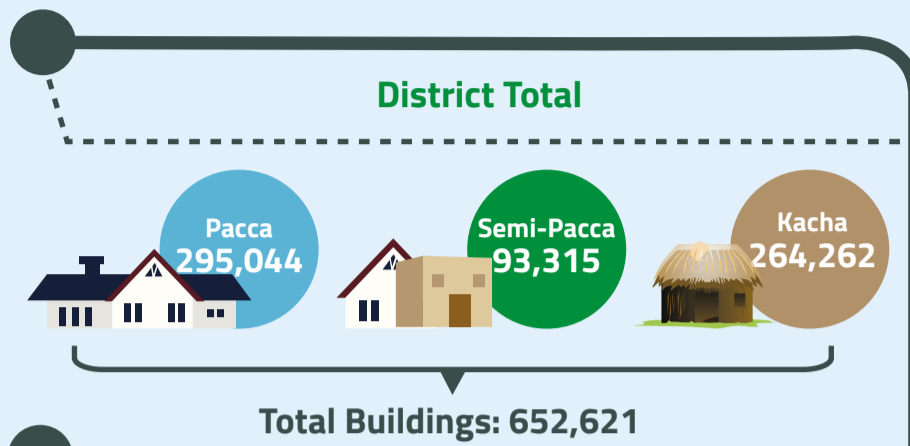
MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics (PBS)
Survey of Pakistan (SOP)

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-007
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

8 BUILDING DISTRIBUTION

The distribution of building over different parts of the district is shown in the Building Distribution Map. Based on nature of building material used, buildings can be categorized as Kacha, Semi Pacca and Pacca as per Pakistan Bureau Statistics:



UC Wise Building Distribution

Khanpur

UC	Pacca	Semi Pacca	Kacha
Azim Shah	8,553	2,864	3,817
Bagho Bahar	1,358	819	2,965
Chachran Sharif	1,676	842	3,064
Chak No 045/p	989	744	1,690
Chandia	2,378	460	3,607
Dinpur Sharif	2,087	672	1,967
Garhi Ikhtiar Khan	2,130	784	2,425
Ghana Lar	2,040	1,071	2,306
Ghazi Pur	2,076	746	2,432
Jajja Abbassian	1,405	1,467	2,760
Jetha Bhutta	1,917	1,031	2,984
Jhoran	3,263	521	2,069
Kotla Pathan	1,977	621	2,311
Latki	1,414	900	2,746
Mad Bahora	1,574	568	2,771
Mari Allah Bachaya	2,301	458	2,437
Mueenabad	1,815	1,184	2,136
Nawan Kot	2,804	783	1,950
Neel Garh	8,703	4,625	7,498
Qadir Pur	2,479	831	2,953
Sehja	2,044	513	1,857

Sadiqabad

UC	Pacca	Semi Pacca	Kacha
Adam Sohaba	2,232	389	2,062
Ahmad Pur Lamma	7,068	1,762	4,716
Bhong	1,724	844	3,927
Bhota Wahan	1,984	450	2,559
Chak No 160/p	2,922	966	3,127
Chak No 173/p	2,768	398	2,881
Chak No 264/p	2,427	592	2,708
Dhandi	13,792	3,838	7,200
Drigra	2,365	995	3,020
Goth Jangoo	3,352	635	2,888
Jamal Din Wali	1,797	533	4,407
Kot Sanjar Khan	1,862	746	2,069
Machka	824	1,468	5,265
Mohammad Pur	2,132	691	2,132
Muhib Shah	2,394	1,089	2,163
Nawazabad	2,567	615	2,819
Rahimabad	2,071	1,293	3,839
Ranjhe Khan	3,036	804	2,053
Rasool Pur	2,190	1,243	2,434
Roshan Bhaint	10,564	5,129	3,156
Sadiqabad	12,072	3,599	6,738
Sanjarpur	2,980	932	2,302

Liaquatpur

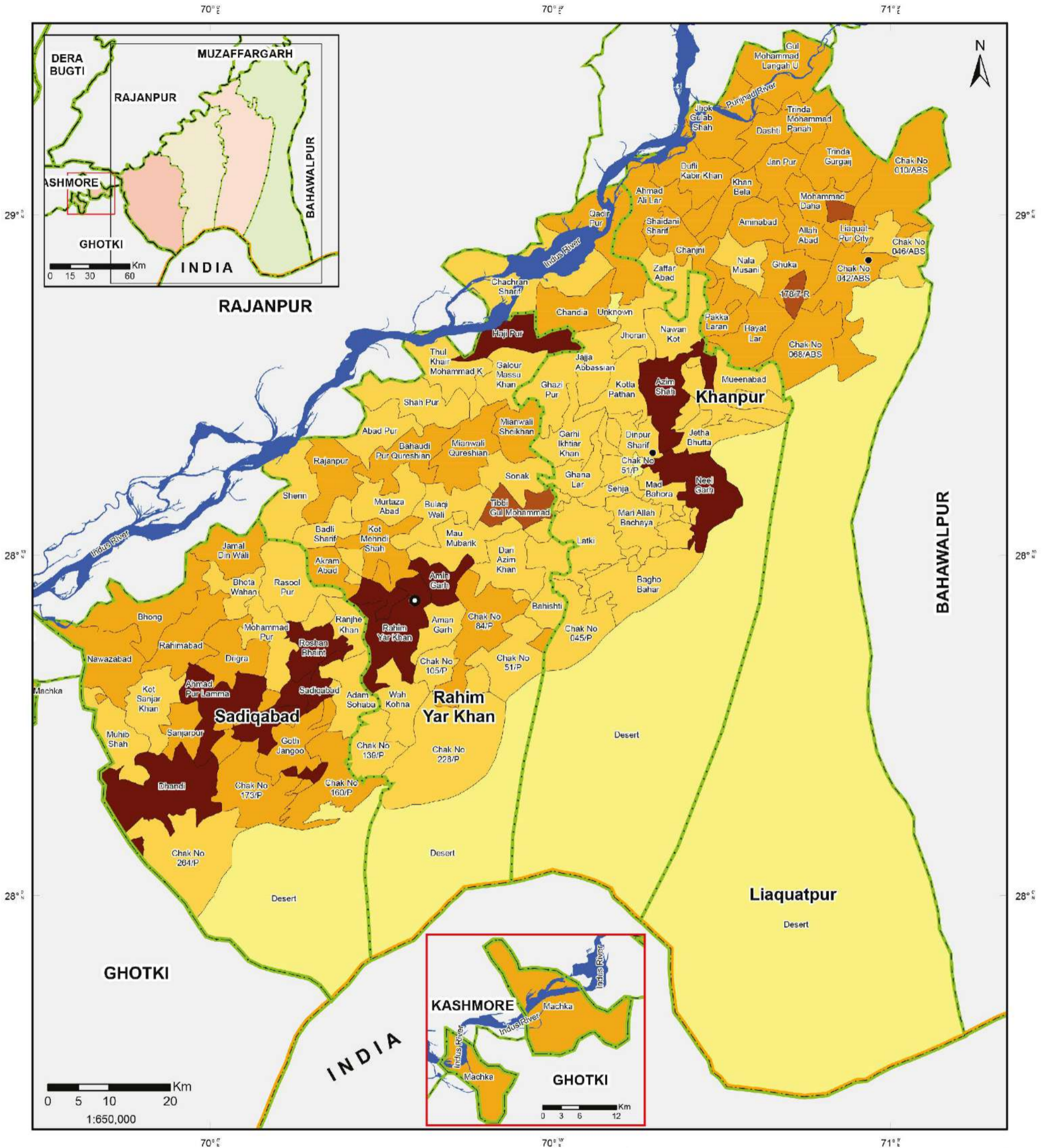
UC	Pacca	Semi Pacca	Kacha
178/7-r	1,707	1,415	6,549
Ahmad Ali Lar	1,744	1,066	3,247
Allah Abad	3,698	640	2,486
Aminabad	2,226	1,142	3,605
Chak No 010/abs	2,243	966	3,385
Chak No 042/abs	2,336	1,003	4,430
Chak No 046/abs	2,126	457	3,276
Chak No 068/abs	2,432	508	3,425
Chanjni	3,119	504	2,445
Dashti	3,171	1,021	3,665
Duffi Kabir Khan	1,649	1,115	4,413
Ghuka	2,749	1,339	2,694
Gul Mohammad Langah U	1,652	563	4,484
Hayat Lar	4,414	258	2,126
Jan Pur	4,029	782	2,861
Jhok Gulab Shah	1,105	804	4,279
Khan Bela	3,340	801	2,430
Liaquatpur City	5,479	1,259	821
Mohammad Daha	4,586	586	2,613
Nala Musani	1,303	767	2,105
Pakka Laran	3,381	1,087	2,860
Shaidani Sharif	2,737	975	3,312
Trinda Gurgaj	4,714	514	2,771
Trinda Mohammad Panah	2,761	961	3,683
Zaffar Abad	2,516	703	2,407

Rahim Yar Khan

UC	Pacca	Semi Pacca	Kacha
Abad Pur	1,253	851	2,844
Akram Abad	3,343	775	2,825
Aman Garh	3,254	329	1,485
Amin Garh	9,642	2,904	3,142
Badli Sharif	1,944	371	2,396
Bahaudi Pur Qureshian	2,428	872	3,559
Bahisht	1,915	318	2,786
Bulaqi Wali	1,079	1,542	2,314
Chak No 105/p	2,404	310	2,958
Chak No 139/p	2,391	244	2,197
Chak No 228/p	1,184	1,025	3,654
Chak No 51/p	1,771	348	2,048
Chak No 84/p	3,050	1,171	2,938
Dari Azim Khan	1,624	456	2,116
Galour Massu Khan	2,714	442	2,839
Haji Pur	6,806	1,211	6,957
Kot Mehndi Shah	3,071	756	2,414
Mau Mubarik	1,185	891	1,784
Mianwali Qureshian	3,496	465	2,169
Mianwali Sheikhan	3,483	285	2,331
Murtaza Abad	1,584	257	2,397
Rahim Yar Khan	29,871	8,672	9,609
Rajanpur	3,303	528	2,452
Shah Pur	2,137	486	3,205
Sherin	1,658	590	3,635
Sonak	3,007	339	1,806
Thul Khair Mohammad K	1,106	953	3,504
Tibbi Gul Mohammad	5,977	826	2,343
Wah Kohna	1,843	1,069	2,486

Legend: Pacca (Blue), Semi Pacca (Red), Kacha (Yellow)

BUILDING DISTRIBUTION (2015) MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Building Distribution**
- Abc < 3000
- Abc 3000 - 6000
- Abc 6000 - 9000
- Abc 9000 - 12000
- Abc > 12000
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



MAP INFORMATION

Data Source(s):

NDMA
Pakistan Bureau of Statistics

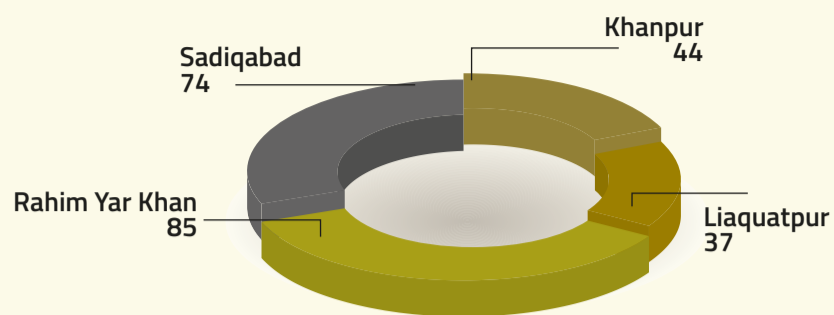
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Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-008
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

9 BUILDING DENSITY

There are a variety of building groups in District Rahim Yar Khan, covering residential, non-residential, office and administrative buildings, which are located in areas with relatively favourable geo-physical and socio-economic conditions.

Tehsil Wise Building Density (Buildings / sq.km)



	Building Types			Total Buildings	Area (sq.km)	Density (Buildings / sq.km)	
	Union Council	Pacca	Semi Pacca				
Tehsil Khanpur	Azim Shah	8,553	2,864	3,817	15,234	91	167
	Bagho Bahar	1,358	819	2,965	5,142	108	48
	Chachran Sharif	1,676	842	3,064	5,582	194	29
	Chak No 045/p	989	744	1,690	3,423	95	36
	Chandia	2,378	460	3,607	6,445	73	88
	Dinpur Sharif	2,087	672	1,967	4,726	67	71
	Garhi Ikhtiar Khan	2,130	784	2,425	5,339	63	85
	Ghana Lar	2,040	1,071	2,306	5,417	66	82
	Ghazi Pur	2,076	746	2,432	5,254	68	77
	Jajja Abbassian	1,405	1,467	2,760	5,632	56	101
	Jetha Bhutta	1,917	1,031	2,984	5,932	77	77
	Jhoran	3,263	521	2,069	5,853	54	108
	Kotla Pathan	1,977	621	2,311	4,909	59	83
	Latki	1,414	900	2,746	5,060	92	55
	Mad Bahora	1,574	568	2,771	4,913	52	94
	Mari Allah Bachaya	2,301	458	2,437	5,196	60	87
	Mueenabad	1,815	1,184	2,136	5,135	83	62
	Nawan Kot	2,804	783	1,950	5,537	79	70
	Neel Garh	8,703	4,625	7,498	20,826	105	198
	Qadir Pur	2,479	831	2,953	6,263	108	58
Sehja	2,044	513	1,857	4,414	28	158	
Tehsil Total:	54,983	22,504	58,745	136,232	3,075	1,834	

Tehsil Liaquat Pur	178/7-r	1,707	1,415	6,549	9,671	28	345
	Ahmad Ali Lar	1,744	1,066	3,247	6,057	88	69
	Allah Abad	3,698	640	2,486	6,824	44	155
	Aminabad	2,226	1,142	3,605	6,973	51	137
	Chak No 010/abs	2,243	966	3,385	6,594	148	45
	Chak No 042/abs	2,336	1,003	4,430	7,769	111	70
	Chak No 046/abs	2,126	457	3,276	5,859	67	87
	Chak No 068/abs	2,432	508	3,425	6,365	92	69
	Chanjni	3,119	504	2,445	6,068	43	141
	Dashti	3,171	1,021	3,665	7,857	48	164
	Duffli Kabir Khan	1,649	1,115	4,413	7,177	87	82
	Ghuka	2,749	1,339	2,694	6,782	59	115
	Gul Mohammad Langah U	1,652	563	4,484	6,699	108	62
	Hayat Lar	4,414	258	2,126	6,798	85	80
	Jan Pur	4,029	782	2,861	7,672	47	163
	Jhok Gulab Shah	1,105	804	4,279	6,188	92	67
	Khan Bela	3,340	801	2,430	6,571	40	164
	Liaquatpur City	5,479	1,259	821	7,559	9	840
	Mohammad Daha	4,586	586	2,613	7,785	57	137
	Nala Musani	1,303	767	2,105	4,175	46	91
Pakka Laran	3,381	1,087	2,860	7,328	52	141	
Shaidani Sharif	2,737	975	3,312	7,024	37	190	
Trinda Gurgajj	4,714	514	2,771	7,999	85	94	
Trinda Mohammad Panah	2,761	961	3,683	7,405	48	154	
Zaffar Abad	2,516	703	2,407	5,626	46	122	
Tehsil Total:	71,217	21,236	80,372	172,825	4,659	3,784	



Tehsil Sadiqabad

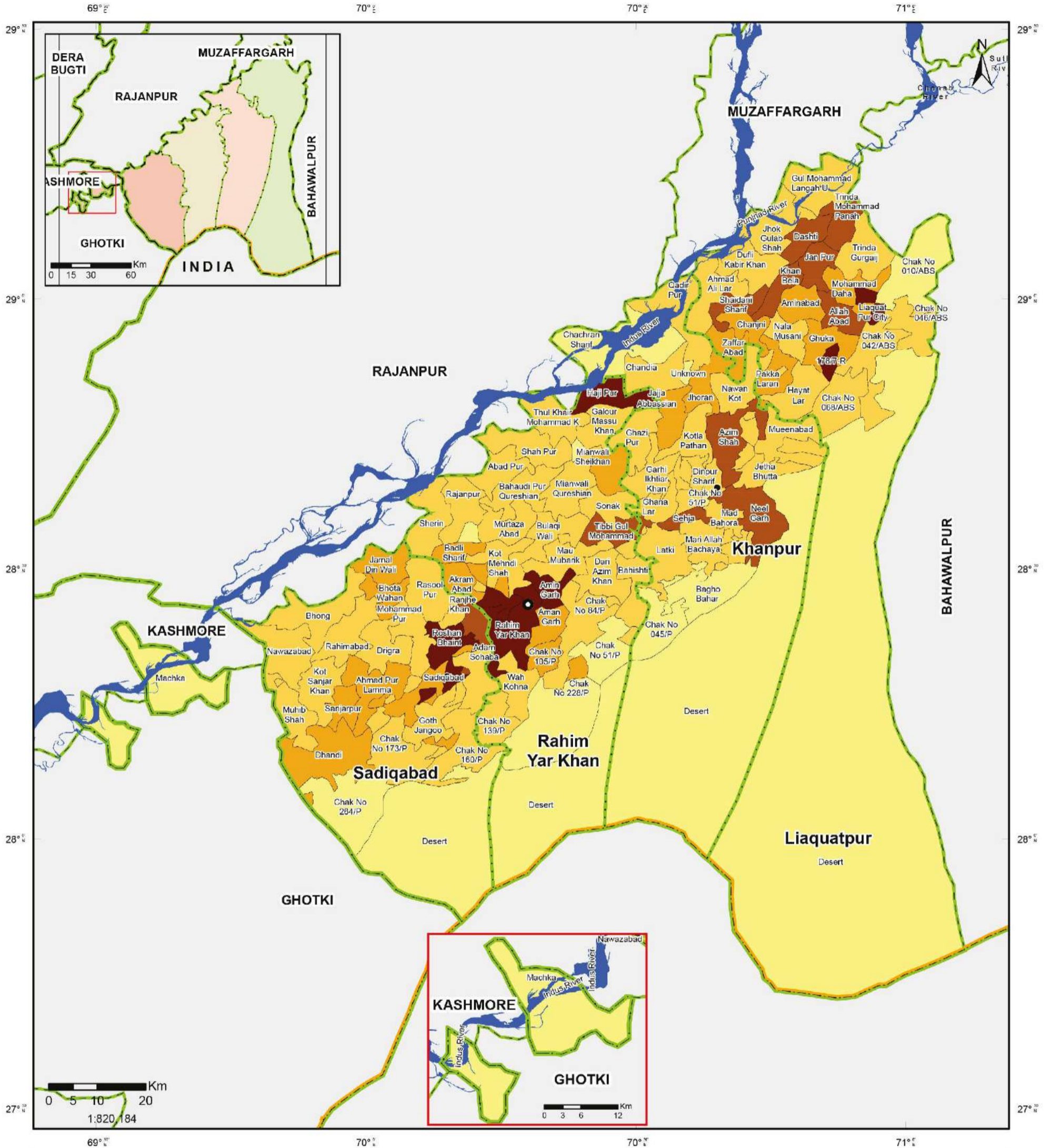
Adam Sohaba	2,232	389	2,062	4,683	65	72	72
Ahmad Pur Lamma	7,068	1,762	4,716	13,546	93	146	146
Bhong	1,724	844	3,927	6,495	110	59	59
Bhota Wahan	1,984	450	2,559	4,993	42	119	119
Chak No 160/p	2,922	966	3,127	7,015	109	64	64
Chak No 173/p	2,768	398	2,881	6,047	103	59	59
Chak No 264/p	2,427	592	2,708	5,727	165	35	35
Dhandi	13,792	3,838	7,200	24,830	220	113	113
Drigra	2,365	995	3,020	6,380	72	89	89
Goth Jangoo	3,352	635	2,888	6,875	90	76	76
Jamal Din Wali	1,797	533	4,407	6,737	62	109	109
Kot Sanjar Khan	1,862	746	2,069	4,677	73	64	64
Machka	824	1,468	5,265	7,557	239	32	32
Mohammad Pur	2,132	691	2,132	4,955	76	65	65
Muhib Shah	2,394	1,089	2,163	5,646	73	77	77
Nawazabad	2,567	615	2,819	6,001	103	58	58
Rahimabad	2,071	1,293	3,839	7,203	82	88	88
Ranjhe Khan	3,036	804	2,053	5,893	36	164	164
Rasool Pur	2,190	1,243	2,434	5,867	90	65	65
Roshan Bhaint	10,564	5,129	3,156	18,849	51	370	370
Sadiqabad	12,072	3,599	6,738	22,409	23	974	974
Sanjarpur	2,980	932	2,302	6,214	46	135	135
Tehsil Total:	85,123	29,011	74,465	188,599	2,563	3,033	

Tehsil Rahim Yar Khan

Abad Pur	1,253	851	2,844	4,948	59	84	84
Akram Abad	3,343	775	2,825	6,943	47	148	148
Aman Garh	3,254	329	1,485	5,068	41	124	124
Amin Garh	9,642	2,904	3,142	15,688	63	249	249
Badli Sharif	1,944	371	2,396	4,711	42	112	112
Bahaudi Pur Qureshian	2,428	872	3,559	6,859	76	90	90
Bahishti	1,915	318	2,786	5,019	66	76	76
Bulaqi Wali	1,079	1,542	2,314	4,935	75	66	66
Chak No 105/p	2,404	310	2,958	5,672	47	121	121
Chak No 139/p	2,391	244	2,197	4,832	60	81	81
Chak No 228/p	1,184	1,025	3,654	5,863	229	26	26
Chak No 51/p	1,771	348	2,048	4,167	95	44	44
Chak No 84/p	3,050	1,171	2,938	7,159	117	61	61
Dari Azim Khan	1,624	456	2,116	4,196	69	61	61
Galour Massu Khan	2,714	442	2,839	5,995	60	100	100
Haji Pur	6,806	1,211	6,957	14,974	71	211	211
Kot Mehndi Shah	3,071	756	2,414	6,241	65	96	96
Mau Mubarak	1,185	891	1,784	3,860	70	55	55
Mianwali Qureshian	3,496	465	2,169	6,130	83	74	74
Mianwali Sheikhan	3,483	285	2,331	6,099	51	120	120
Murtaza Abad	1,584	257	2,397	4,238	65	65	65
Rahim Yar Khan	29,871	8,672	9,609	48,152	108	446	446
Rajanpur	3,303	528	2,452	6,283	72	87	87
Shah Pur	2,137	486	3,205	5,828	85	69	69
Sherin	1,658	590	3,635	5,883	93	63	63
Sonak	3,007	339	1,806	5,152	69	75	75
Thul Khair Mohammad K	1,106	953	3,504	5,563	75	74	74
Tibbi Gul Mohammad	5,977	826	2,343	9,146	47	195	195
Wah Kohna	1,843	1,069	2,486	5,398	62	87	87
Tehsil Total:	108,523	29,286	87,193	225,002	2,640	3,160	
District Total:	319,846	102,037	300,775	722,658	12,937	115	



BUILDING DENSITY (2015) MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Building Density (Buildings/Sq.km)**
- Abc < 50
- Abc 51 - 100
- Abc 101 - 150
- Abc 151 - 200
- Abc > 200
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
NDMA
Pakistan Bureau of Statistics

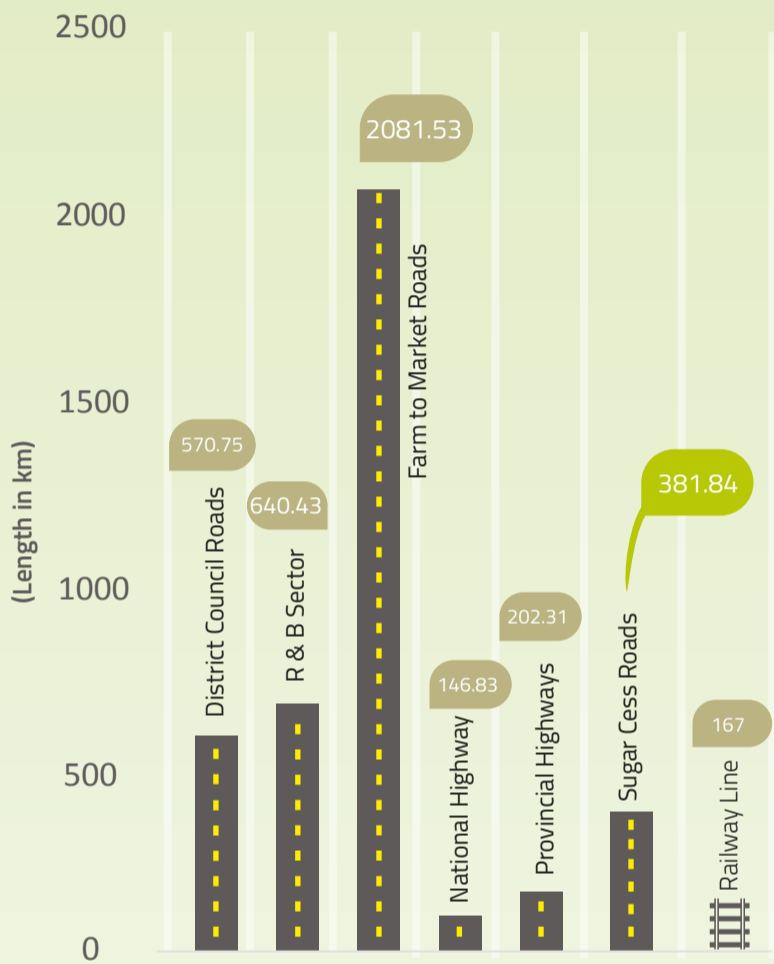
Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-009
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

Rahim Yar Khan District has a total metalled road-length of 4023.69 Kilometers. The district is linked with Bahawalpur, Sakkhar and Muzaffargarh districts through metalled road. The Transportation Network Map of the district identifies all the essential road links including trunk, primary, secondary, tertiary and residential roads.

Besides roads, the district has also a fully functioning railway network. The main Peshawar-Karachi railway line passes through the District. The district is linked with Bahawalpur and Sakkhar through railway network. The total length of railway network in the district is 167km. There is only one landing strip in the district located at Khanpur. The nearest international airport is Sheikh Zaid Intl Airport.

Road Length (km)

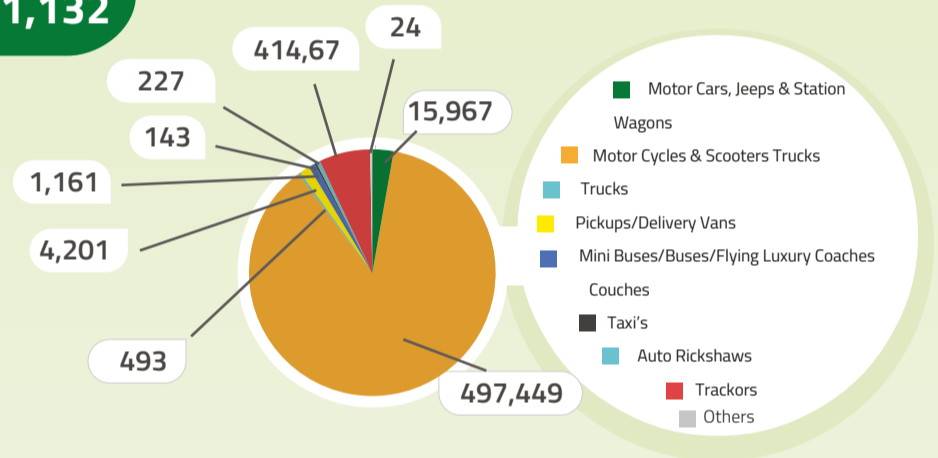


Motor Vehicles 'Registered'

by Type as on 30th June, 2014

Icon	Motor Cycles & Scooters	Trucks	Auto Rickshaws	Tractors	Taxi's	Others
Mini Buses / Buses / Flying Luxury Coaches Couches	1,161	4,201	493	227	41,467	143
Motor Cars, Jeeps & Station Wagons	15,967	497,449	24			
Pickups / Delivery Vans						

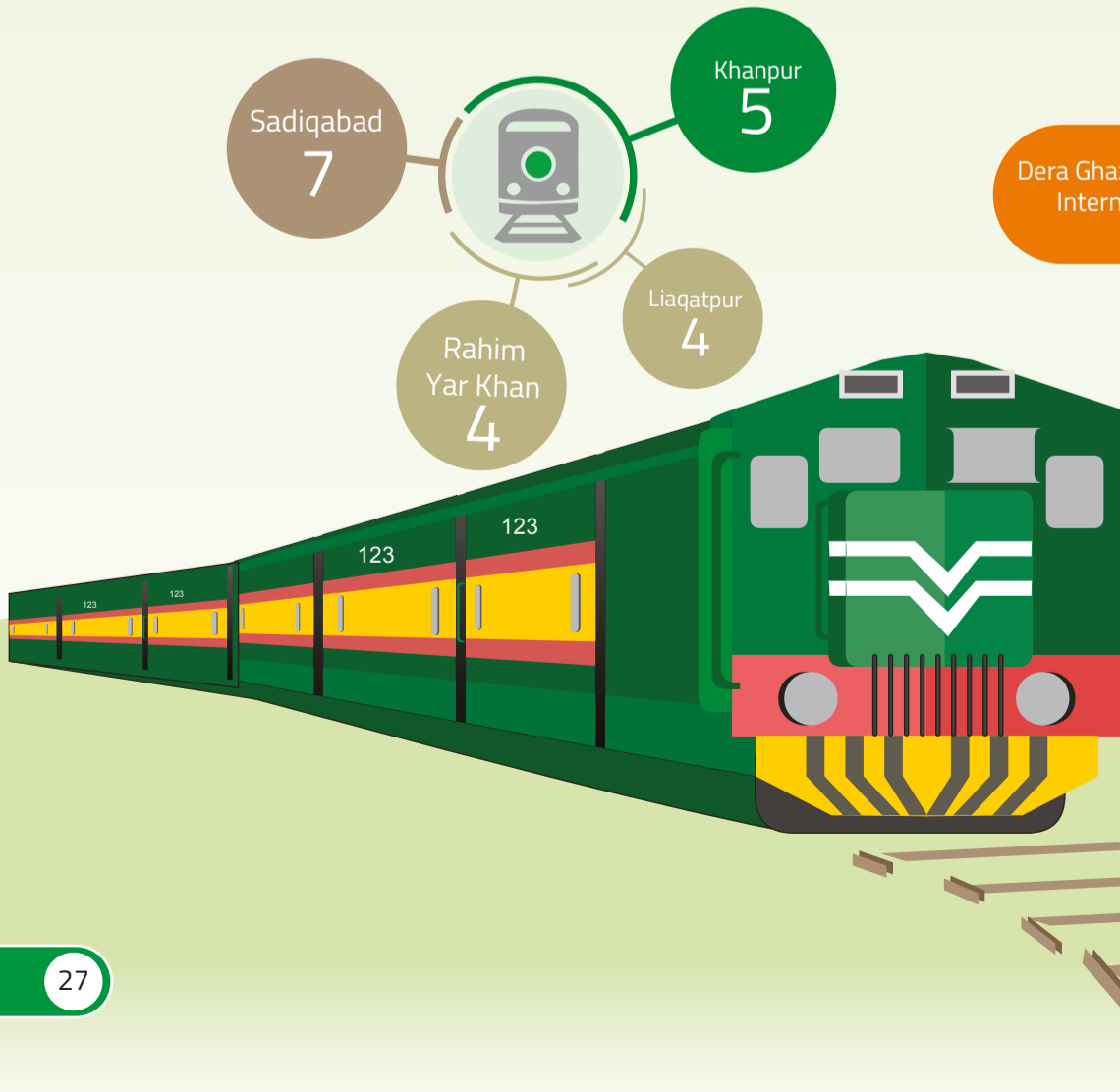
Total: 561,132



Nearest Major Airports from Rahimyar Khan City



Number of Railway Stations



253 km

Dera Ghazi Khan International Airport



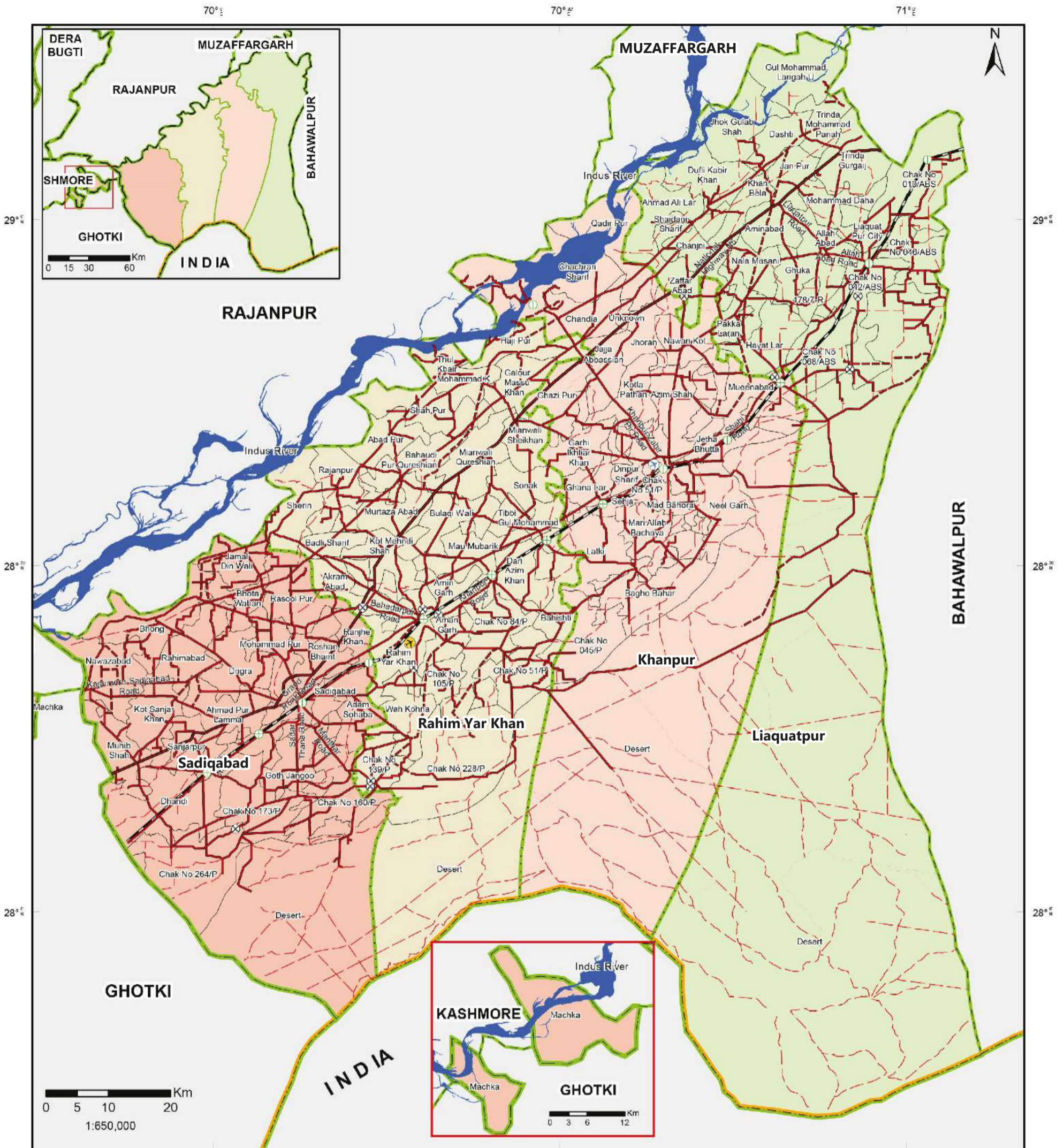
5 km

Sheikh Zaid Intl Airport



Rahim Yar Khan

TRANSPORTATION NETWORK MAP



Legend

Airport	Broad Gauge Railway Track	Provincial Boundary
Air Field/Landing Strips	Other Gauge Railway Track	Line of Control
Railway Station	River and Water Body	International Boundary
Bus Station	Union Council Boundary	
Bridge	Tehsil Boundary	
Motorway	Khanpur	
Trunk/Highway	Liaquatpur	
Metalled Roads	Rahim Yar Khan	
Unmetalled Road	Sadiqabad	
Cart track	District Boundary	
Pack track		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION
 Survey of Pakistan
 National Highway Authority

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-010
 Prepared by: Project Management Unit, NDMA
 Last Updated: 4th May, 2017

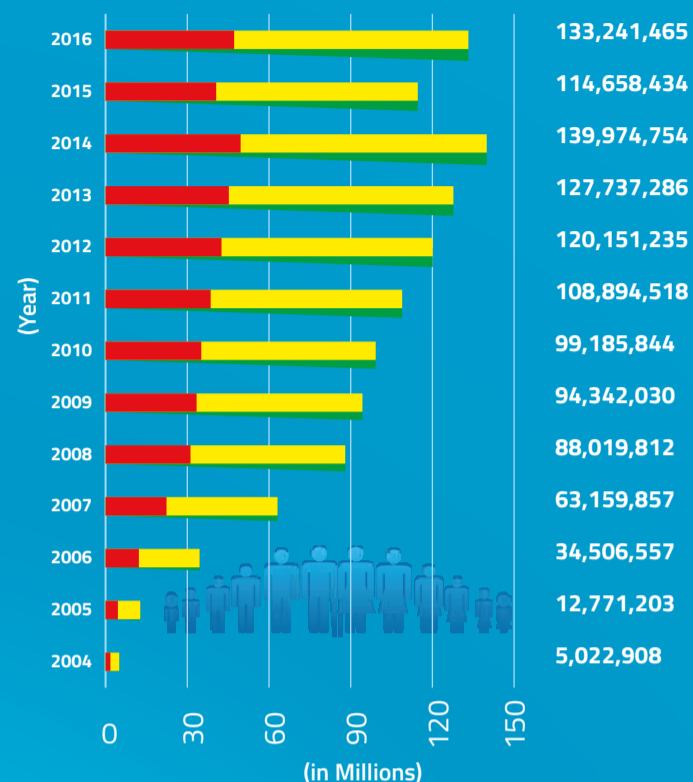
11 TELECOMMUNICATION

Communication System; particularly telecommunication services, plays a role of significant importance in connecting distant people either through wired or wireless voice services. These telecommunication technologies have been changed immensely in the last twenty years. Before the emergence of cellular systems, the communication system of District Multan was primarily based on telephone services, known as Public Service Telephone Systems (PSTNS). However, with worldwide expansion/growth and recognition of wireless communication systems, cellular systems have also been deployed in the district.

There are 61 telephone exchanges operating in the district, ranging in capacities from 200 lines to 20150 lines. Cellular phone services are available in the district.

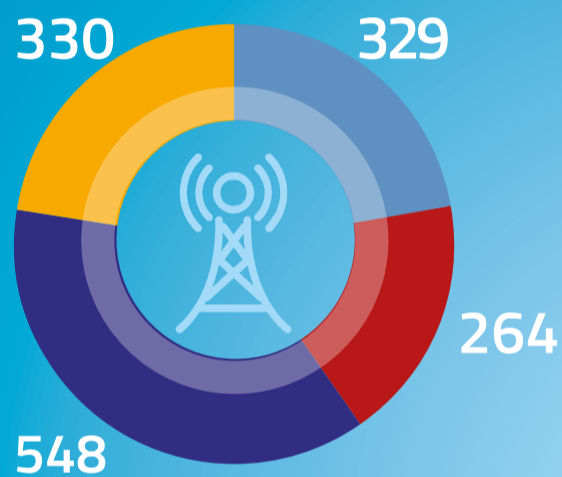
The Cellular Service Providers in the districts include Mobilink, Telenor, Ufone, Warid and Zong. The map on right, identifies total number of telecommunication towers distributed over the different parts of the district.

Cellular Subscribers in Pakistan



Tehsil Wise Distribution of Cellular Communication Towers

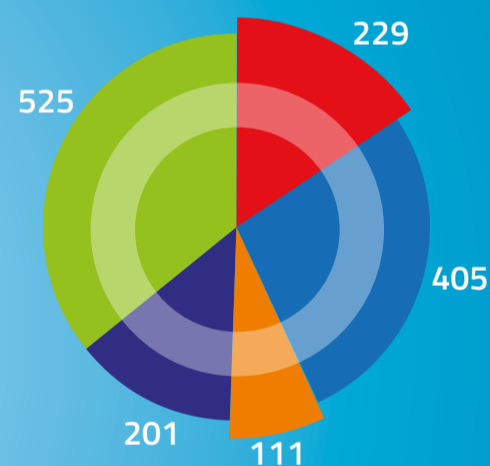
■ Khanpur ■ Liaquatpur ■ Rahim Yar Khan ■ Sadiqabad



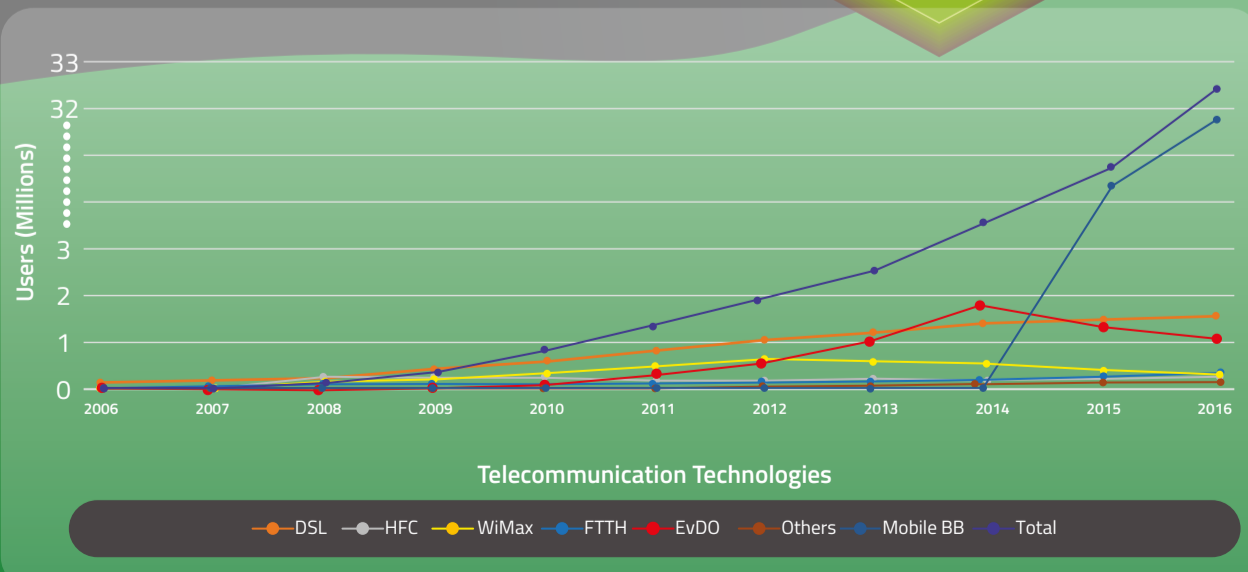
Total: 1,471

Network Wise Distribution of Cellular Towers (in Rahimyar Khan District)

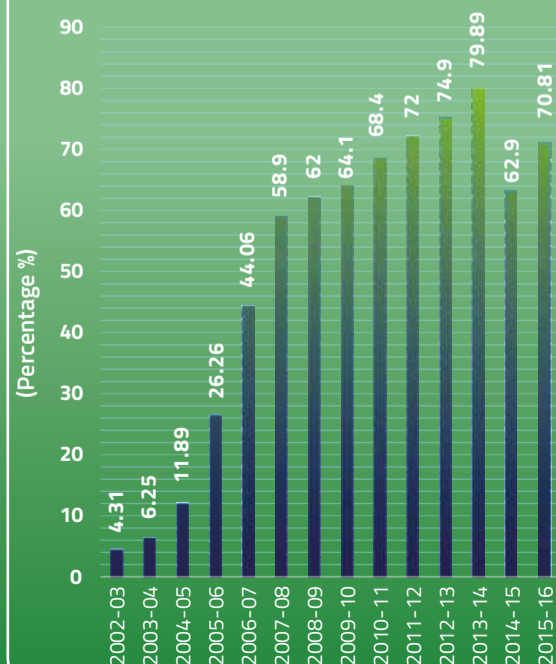
■ Mobilink ■ Telenor ■ Ufone ■ Warid ■ Zong



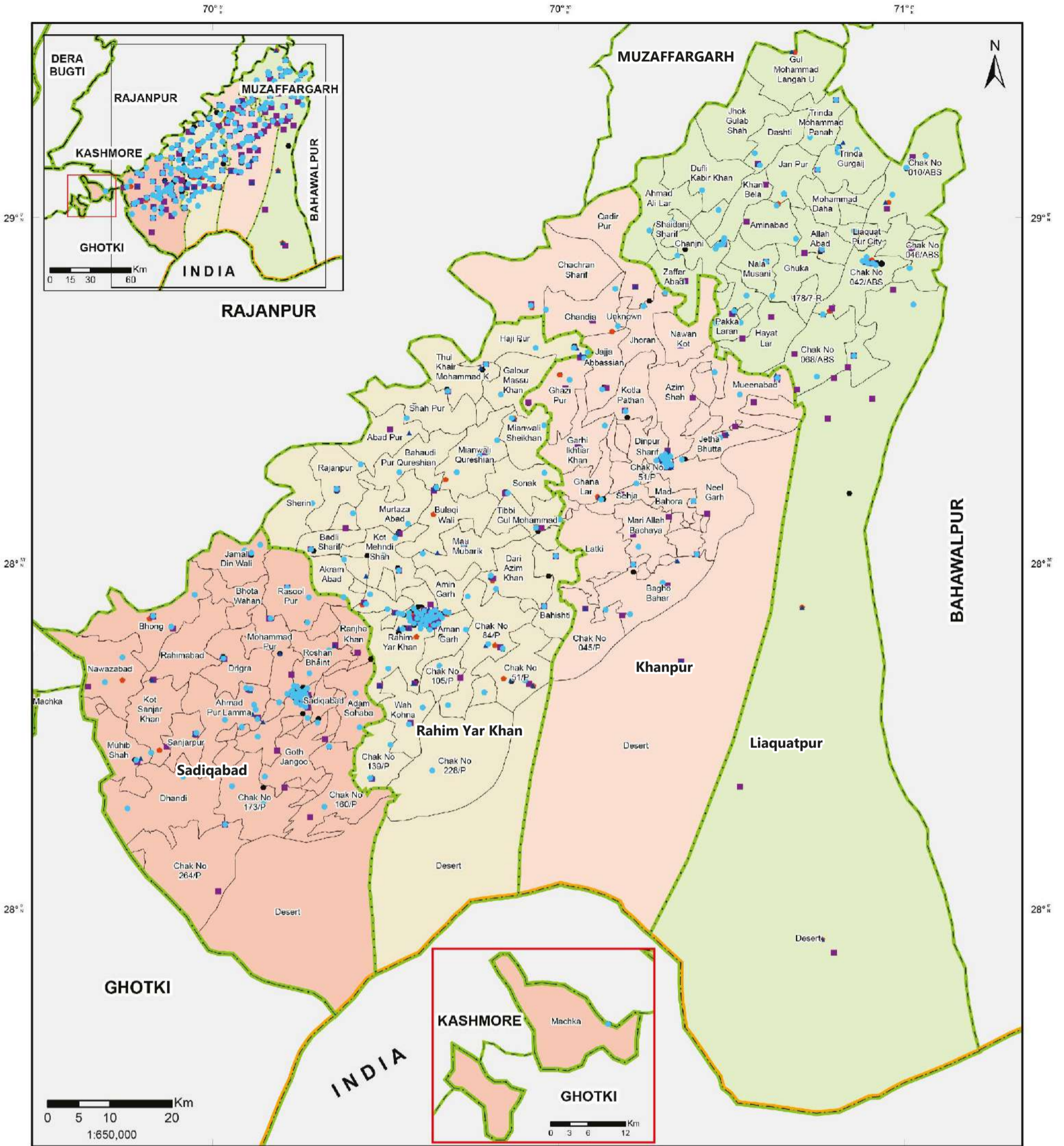
Internet Subscribers in Pakistan



Teledensity in Pakistan



COMMUNICATION TOWER MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Network**
- Mobilink
- Telenor
- ▲ Ufone
- Warid
- Zong
- Abc Union Council Boundary
- Tehsil Boundary**
- Khanpur
- Liaquatpur
- Rahim Yar Khan
- Sadiqabad
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

United Nations
World Food Programme

MAP INFORMATION

Data Source(s):
Pakistan Telecommunication Authority
Survey of Pakistan
Pakistan Bureau of Statistics

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-011
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

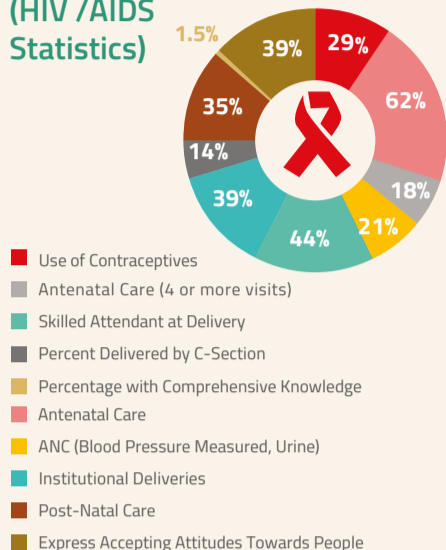
The provision of easily accessible, affordable and quality Health care facilities is among the basic amenities of life that must be provided to the people for their wellbeing and health safety. Health facilities include

hospitals, clinics, maternal & birth centers, dispensaries and other forms of health care centres. In district Rahimyar Khan, for 8,443 population there is one certified doctor available in public healthcare facilities.

Health Facilities by Type



Reproductive Health (HIV /AIDS Statistics)



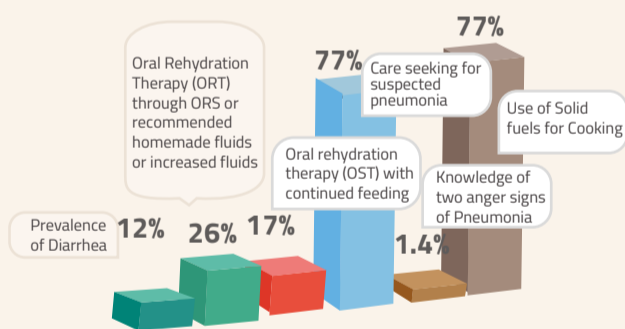
Primary Healthcare Sanctioned Staff

Health Facility Type	Medical Officers & Surgeons	Nurse (Head/Staff/Charge)	Assistants (Medical/X-ray/Lab/Dental)	LHVs / LHWs / Midwives / Vaccinators	Medical Tech/Dispenser	Others
Basic Health Unit (BHU)	105	0	6	1,614	197	193
Rural Health Centre (RHC)	76	108	52	487	98	210
Maternal & Child Health (MCH)	0	0	0	6	0	12
TBC	2	0	4	3	2	4

Secondary Healthcare Sanctioned Staff

Health Facility Type	MS/AMS/Deputy MS	PMO/AP MO/CMO/SMO/MO	PWMO/A PWMO/S WMO/W MO	Specialists (Eye/ENT/Chest/Child/Surgical/Medical)	Surgeons (Cardio/Neuro/Ortho/Gyne/Dental)	Non Surgical Staff (Anesthetist/Pathologist/Radiologist/Physiotherapists)	Assistants (Lab/Medical/X-Ray/Dental/ECG Techs)	Nurse (Head/Staff Nurse/Matron)	LHVS/LHWS/Midwives/EPI Vaccinators/LHWs	Health/Medical Tech/Dispensers	Other
Tehsil Headquarters (THQs)	4	53	29	14	12	13	15	65	7	25	0
HOSP	1	3	2	0	0	0	0	11	32	4	28
THOS	5	267	20	18	9	12	88	341	41	47	44

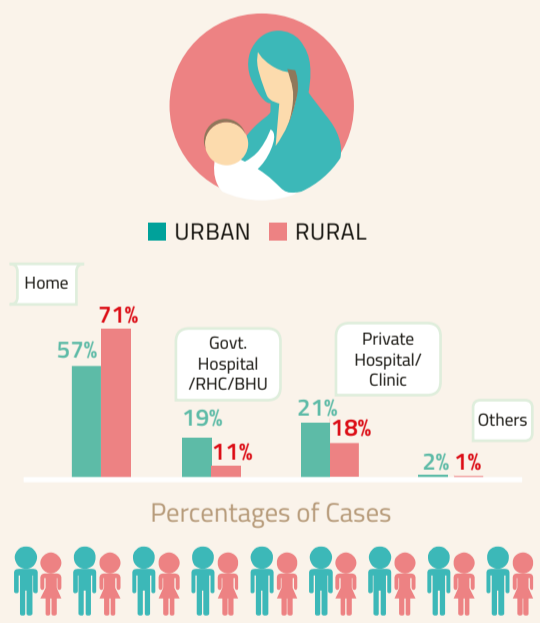
Statistics of Disease in Children



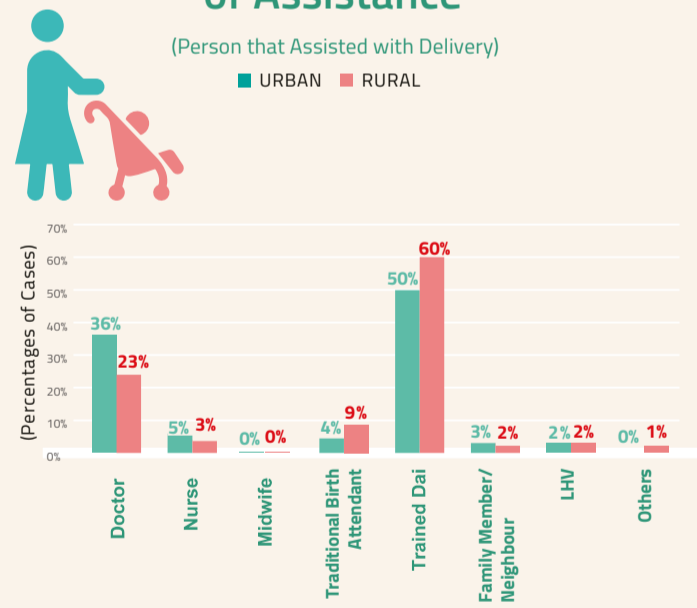
Child Mortality Statistics



Child Delivery by Location

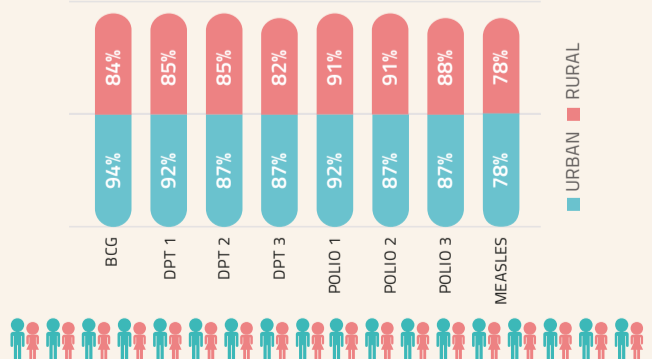


Child Delivery by Type of Assistance

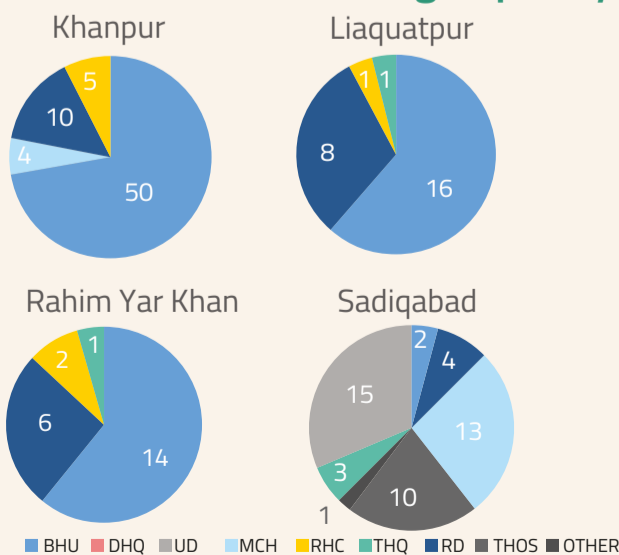


Children 12-23 Months

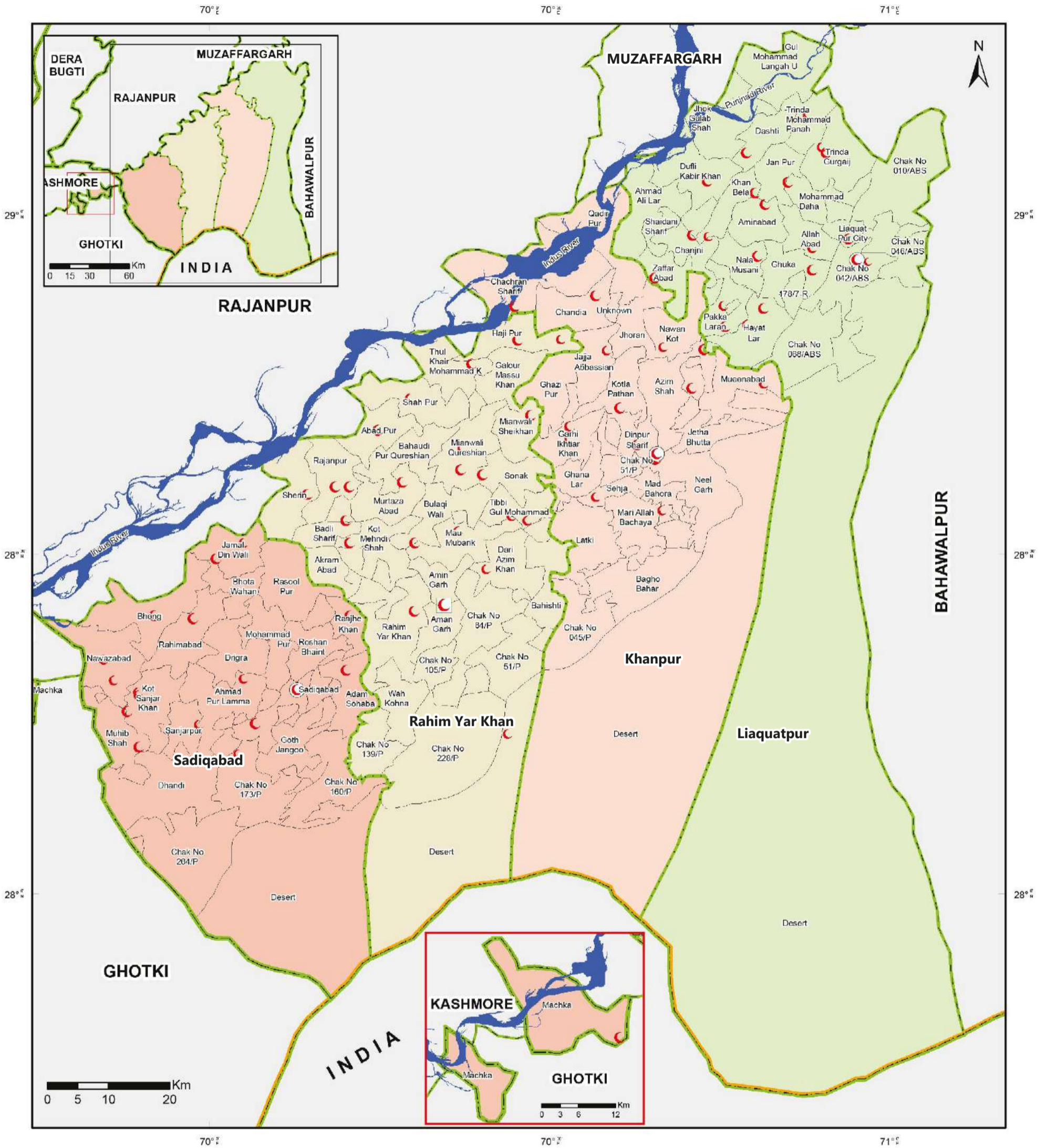
That have been immunized by type of antigen- based on record and recall



Tehsil Wise Bedding Capacity in Healthcare Facilities



HEALTH FACILITIES



Legend

District Headquarter Hospital	Provincial Boundary
Tehsil Headquarter Hospital	Line of Control
Civil Hospital & Tuberculosis Clinic	International Boundary
Basic Health Unit	Tehsil Boundary
Rural Health Centre	Khanpur
Maternal/Child Health Centre	Liaquatpur
River and Water Body	Rahim Yar Khan
Union Council Boundary	Sadiqabad
District Boundary	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

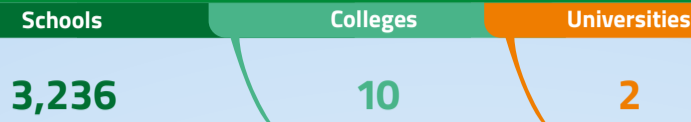
MAP INFORMATION
 Data Source(s):
 World Health Organization
 Health Department Punjab

Datum: WGS 1984
 Units: Degree

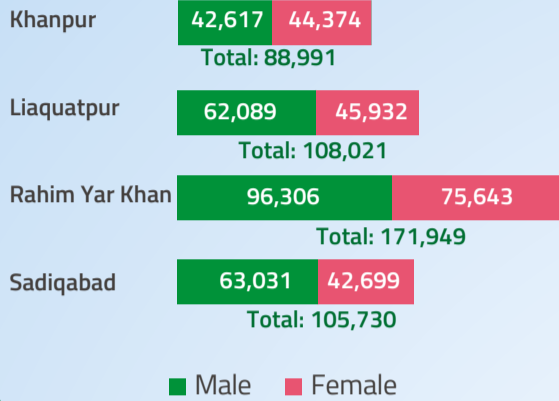
Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-013
 Prepared by: Project Management Unit, NDMA
 Last Updated: 2nd May, 2017



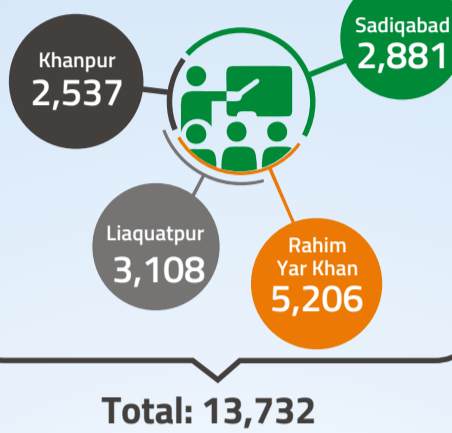
Education Facilities



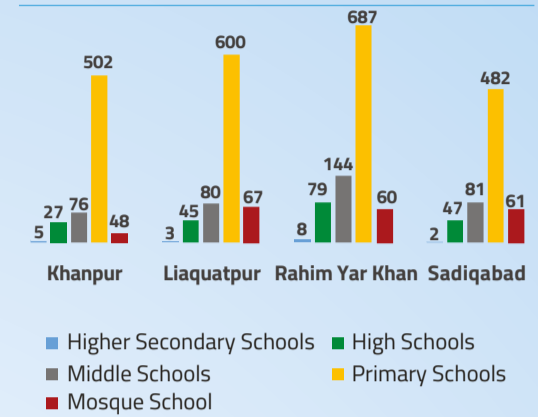
Total Enrollment by Gender



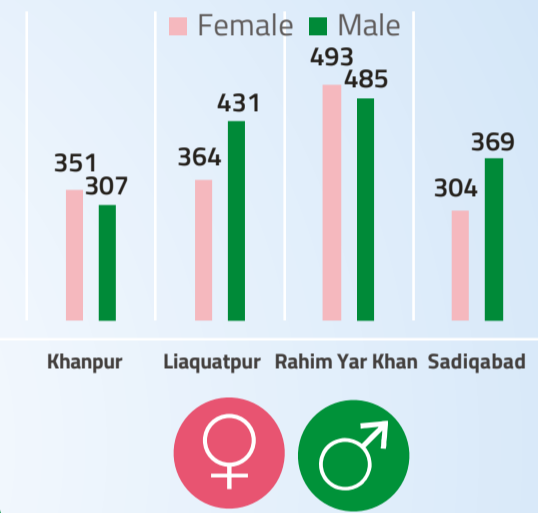
Number of Teachers



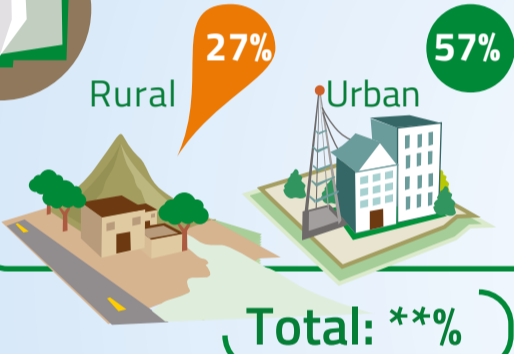
Tehsil Wise Govt. School by Type



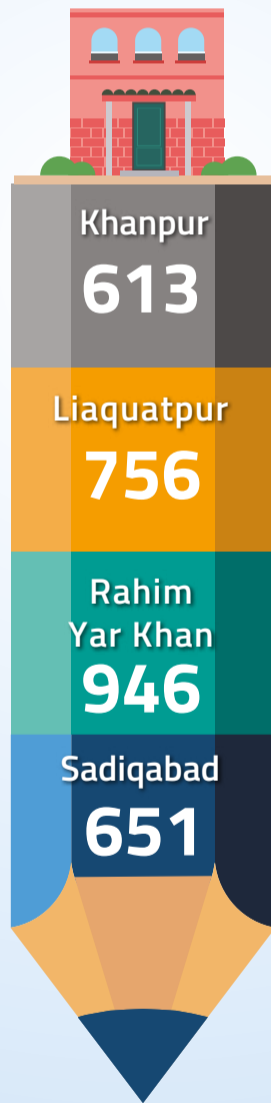
Tehsil Wise Govt. School by Gender



Literacy Ratio 2015-2016



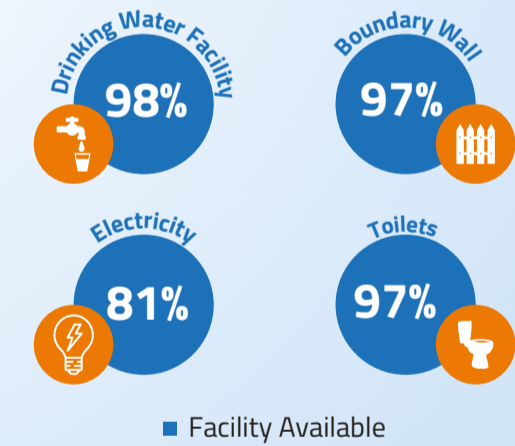
Total School Buildings



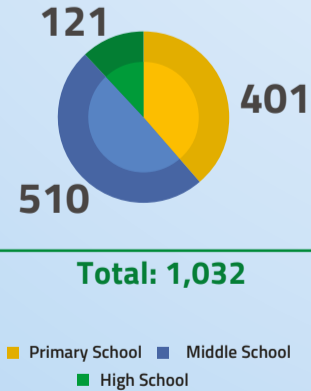
Tehsil Wise Govt. School by Building Type

Tehsils	Kacha	Semi Pacca	Pacca	Total
Khanpur	20	1	592	613
Liaquatpur	25	7	724	756
Rahim Yar Khan	27	6	913	946
Sadiqabad	19	6	626	651
Total:	91	20	2,855	2,966

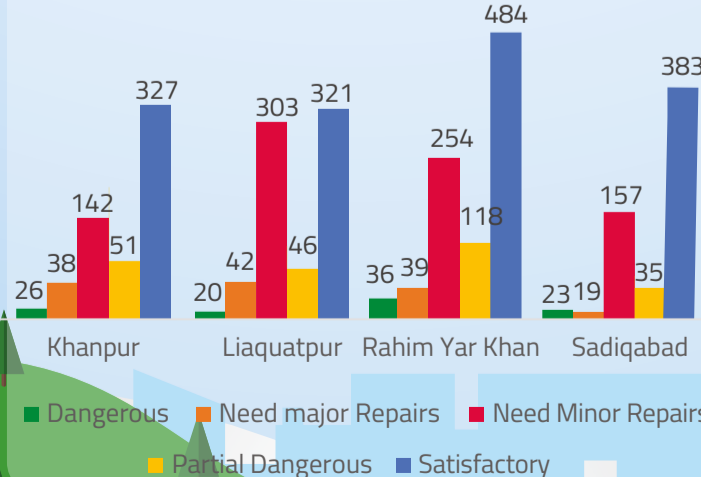
Tehsil Wise Facilities in Schools



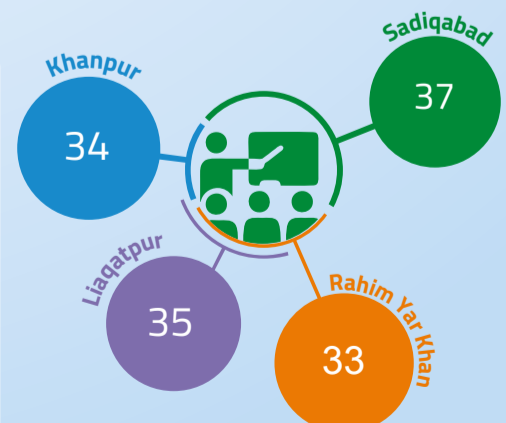
Private Education Facilities



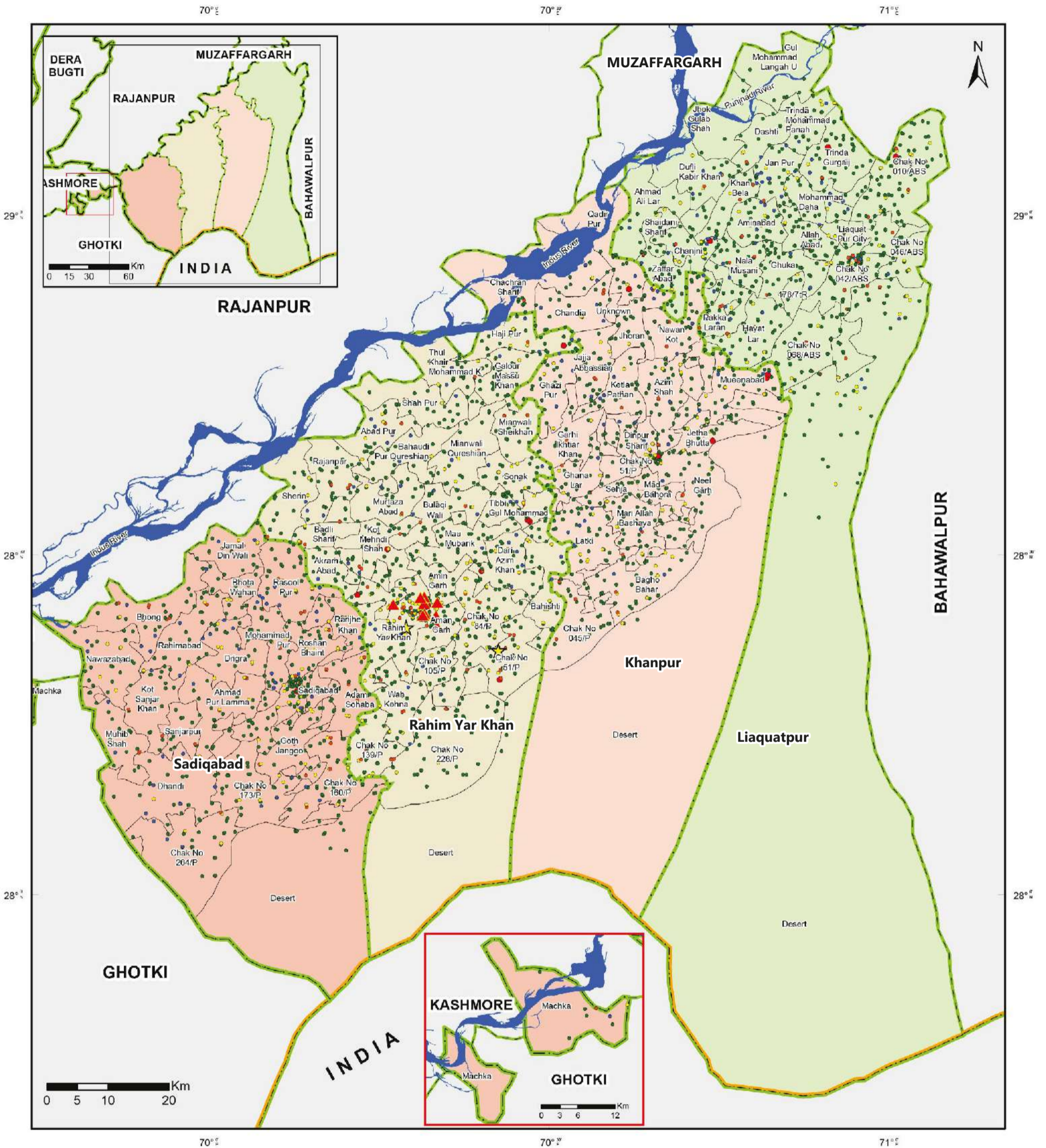
Tehsil Wise Building Conditions of Schools



Student to Teacher Ratio



EDUCATION FACILITIES MAP



Legend

★ University	ABC District Boundary
▲ College	Provincial Boundary
● Higher Secondary School	Line of Control
● High School	International Boundary
● Middle School	Tehsil Boundary
● Primary School	Khanpur
● Masjib/Maktab School	Liaquatpur
■ River and Water Body	Rahim Yar Khan
Abc Union Council Boundary	Sadiqabad

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



MAP INFORMATION
 Data Source(s):
 School Education Department,
 Government of the Punjab

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-014
 Prepared by: Project Management Unit, NDMA
 Last Updated: 2nd May, 2017

Irrigation System plays a role of great importance in the increase of crop yield. The fact remains that the processes involved in irrigation control moisture in the soil for the growth of seeds and better crop production. Rahim Yar Khan District can be divided into three main parts. These are the riverain area, the canal irrigated area and the Cholistan area. The riverain area of the district lies close to the river Indus and Panjnad. To the South West of this area lies the canal irrigated area. The land in this area

is higher than that of the riverain area. The approximate height of this area is 150 to 200 meters above sea level. The desert area lies in the South-East of the district. It is called as the Cholistan. It extends into Bahawalpur and Bahawalnagar districts, occupying the South-Eastern part of the two districts. The surface of the desert consists of a succession of sand dunes rising in places to a height of about 150 meters and covered with the vegetation peculiar to sandy tracts.

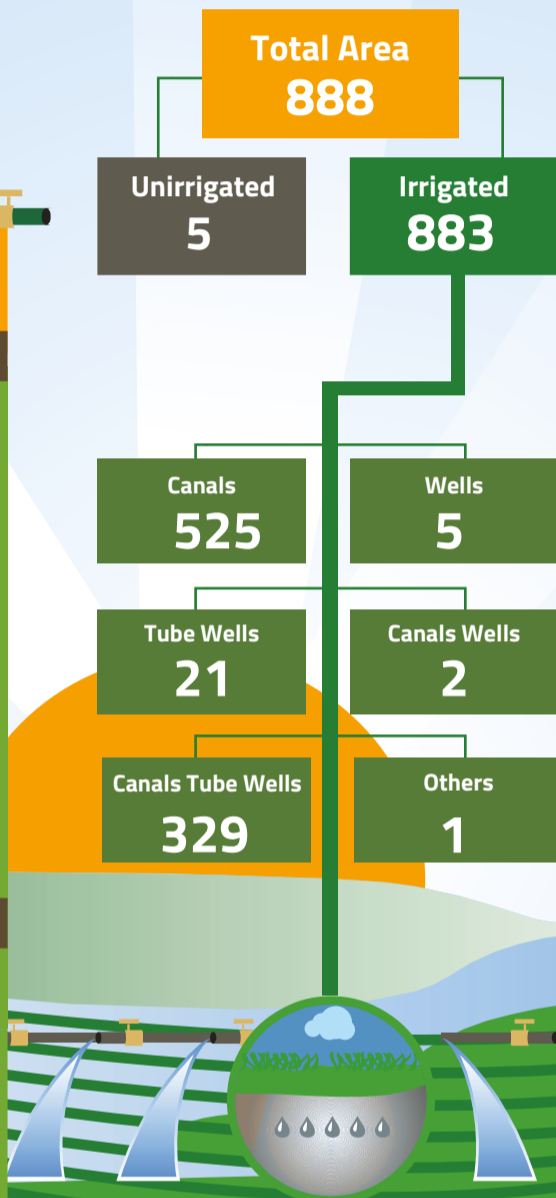
Canal System

Name	Length (km)
Major Canals	
Dera Gabolan	6.6
Dallas Wah	13.5
Rahimyar Khan Branch	29.8
Sem Nullah	44.8
Abbasia Canal	90.5
Sadiq Branch Panjnad	65.5
Minchin Branch	30.8
Panjnad Main Canal	39.7
Dallas Branch	6.9
Unknown	9.1
Mubarak Wah	8.4
Fazil Wah	6.6
Tarkari Wah	4.6
Minor Canals	
Ther Sub Minor	5.0
1L Minor	19.4
Mahran Minor	9.4
Risar Minor	13.7
Farid Minor	16.0
Zarin Minor	0.8
Pattan Munara Minor	17.5
Naushahra Minor	8.3
Lakhi Minor	5.0
Chanorami Minor	9.4
Sinawar Minor	14.9
Malu Minor	10.3
Bindor 2 R Minor	13.8
Kandera Minor	22.4
Khammari Minor	9.1
Lundi Minor	4.8
Shah pur Minor	4.2
Londa M Jinor	4.8
Shabral Minor	11.3
Darggahi Minor	5.1
Laghari Minor	7.7
Nurpur Minor	14.1
Mubarak Minor	11.8
Ghazi Minor	5.0
Makharria Minor	8.0
Nazir Minor	3.9
Khan Minor	15.6
Muhammad Minor	15.1
Daulat Minor	9.1
Garhi Minor	5.7
Sina wah Minor	8.1

Area Sown

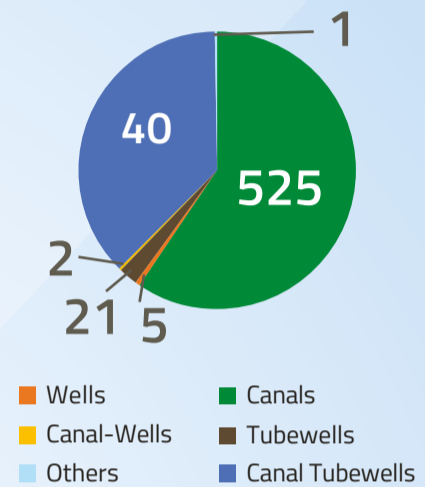
(Thousand Hectares)

Note: Excludes 485,000 hectares under orchards & 17,000 hectares under Tobacco, sown under "Zaid Rabi" Crop.

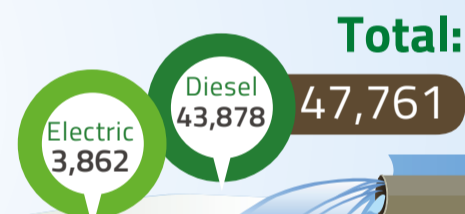


Area Sown by Different Irrigation Techniques

(Thousand Hectares)



Tube Wells Installed by Energy Source (2013-14)

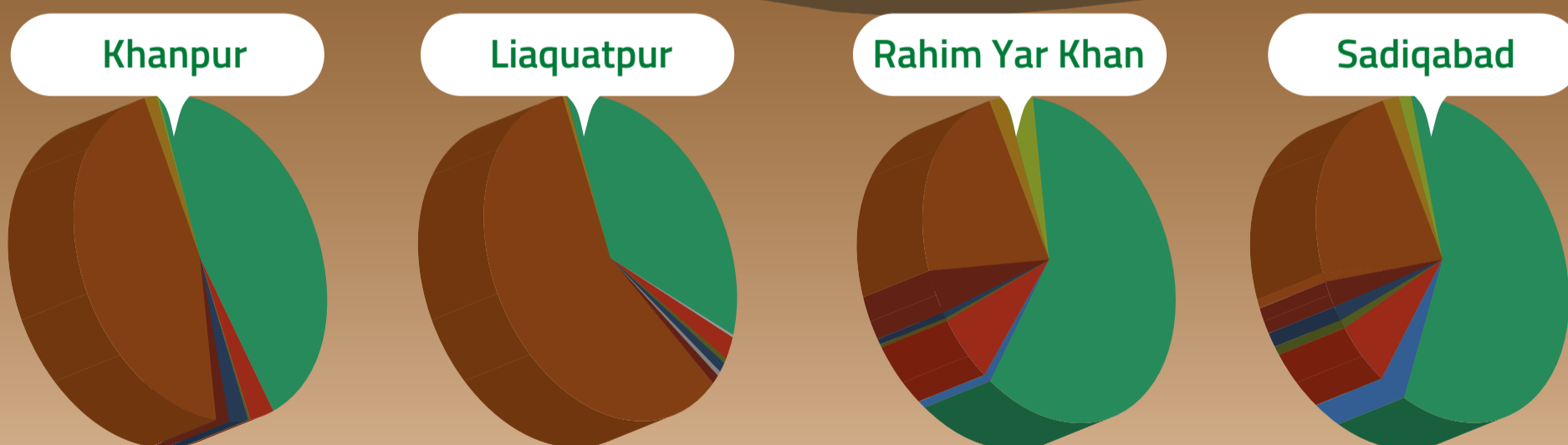


Name	Length (km)
Minor Canals	
Mahar Minor	3.7
Lamma Minor	6.0
Walana Minor	8.7
Abad Minor	6.6
Adam Wali Minor	8.0
Rahmat Minor	7.5
Makhun Wah Minor	8.6
Duphli Minor	10.4
Samulla Minor	2.7
Mithu Minor	5.0
Gana Kala Minor	6.1
Kawanal Minor	8.9
Thal Posti	12.4
Pakka Laian Minor	5.6
Gabbar Minor	4.1
Shuf Minor	7.7
Shatast Minor	5.4
Shergarh Minor	12.3
Tarukari Minor	9.4
Shams Minor	7.9
Mitla Minor	16.4

Name	Length (km)
Minor Canals	
Sharit Minor	20.9
Gulzar Minor	6.7
Rinda Minor	4.5
Rahat Minor	6.9
Degi Minor	17.9
Forest Minor	4.6
Kasmani Minor	25.4
Ranino Sub Minor	11.9
Kikari Minor	9.4
Manthar Main Drain	4.2
R Drain	7.6
Kabira Minor	0.1
Mincnin Branch	6.0
Walhar Branch	19.0
Gurges Sub Minor	4.9
IL Minor (Disused)	9.8
Unran Minor	8.5
Maluk Minor	14.5
Bhutta Minor	9.4

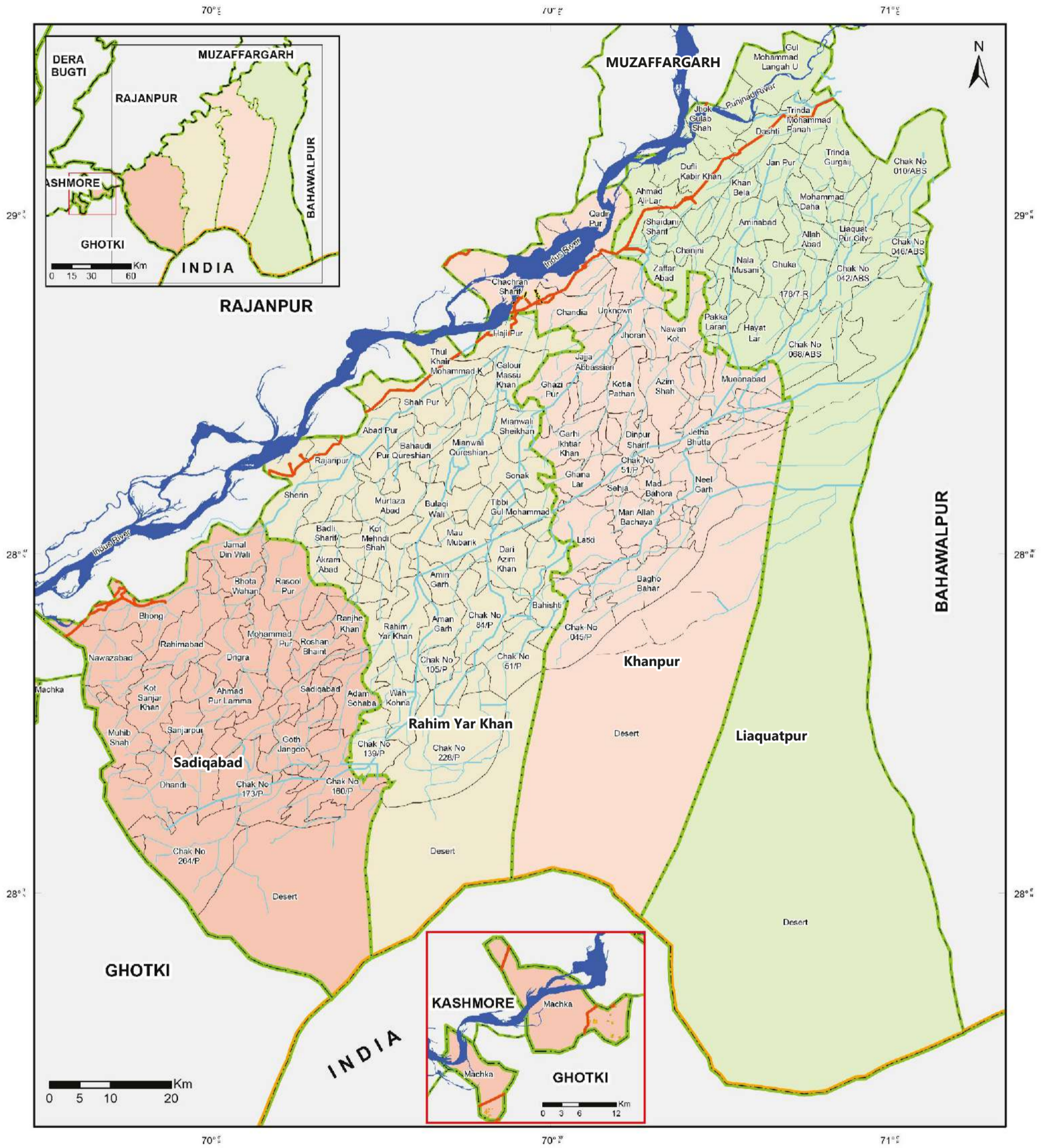
Name	Length (km)	Name	Length (km)	Name	Length (m)
Distributaries		Distributaries		Embankments	
Adam Sahaba Disty	14.4	IR Khabbanwala Disty	16.4	Minchin Flood Bund Dallas	2,481.2
4R Ghulam Distributary	39.9	2R (Khabbarwali)	18.3	III Defence Bund Dallas	1,646.9
Ab-i-Hayat Distributary	54.3	2 L (Thakowali) Disty	19.8	Ranwati Bund	4,136.7
Sultanpur Distributary	4.1	1L Saluwah Disty	7.9	II Defence Bund RYK	1,530.9
Aminghar Disty	7.1	Farhat Disty	11.3	Chachran Link Bund RYK	4,985.4
Rahim Distributary	14.6	Grey Distributary	35.7	II Defence Bund (Mud Adil)	3,590.1
Hamid Distributary	12.9	Lamma Disty	45.8	U / S Marginal Bund	16,896.6
Haji Distributary	16.0	Talla Disty	10.8	Machka Bund	4,092.4
Chamarr Disty	16.4	Bhong Disty	48.5	K K Bund	7,849.1
Chachaian Distributary	16.3	1L Disty	10.2	Dilwaro Bund	1,024.4
Raj Disty	12.4	Rakn Distributary	20.1	Fakher Flood Bund	2,174.5
5 L Dina Disty	10.7	L Disty	3.7	Minchin Flood Bund Khanpur	71,632.0
4 L Ikhtiar Disty	21.1	3 R Disty	9.6	IV Defence Bund Dallas	4,954.2
Upper Nawankot Disty	40.8	7 R Bakharlit Disty	27.7	L M New Bund	430.2
Srasan Distributary	14.0	5 R Disty	7.9		
Link	12.5			Spurs	
Upper Amir Din Disty	52.3	Others		Guide Bank Spur III at RD	542.9
IL Disty	36.8	Indus River	16.4	Mole Head Spur AT JSpur 1	528.6
Sangla Distributary	12.6	Minchin Nala	5.4	JHead Spur III A at RD 12	638.9
Bihari Distributary	14.7	Bauli Nala	10.1	Prong at JHead Spur II	101.0
Sardar Wah	33.2	Sem Nala	85.0	JHead Spur1 at RD 8000	2,470.9
Mughla Disty	9.9	Unknown	55.4	Left J Spur	167.4
Thul Hamza Distributary	5.0			JHead Spur II at RD 5000	819.1
Khan Belan Disty	9.9				
2 R Distributary	16.9				
6R Distributary	25.3				

Tehsil Wise Land Use Classification



- Orchards
- Forest - Natural Trees and Mangroves
- Bare Areas with Sparse Natural Vegetation
- Crop Irrigated
- Natural Vegetation in Wet Areas
- Wet Areas
- Crop Marginal and Irrigated Saline
- Range Lands - Natural Shrubs and Herbs
- Snow and Glaciers
- Crop in Flood Plain
- Built-Up
- Bare Areas
- Crop Rainfed





IRRIGATION MAP



Legend

Main Canal	Union Council Boundary
Minor Canal	District Boundary
Distributary	Provincial Boundary
Others	Line of Control
Embankments	International Boundary
Spur	Tehsil Boundary
Dikes/Studs	Khanpur
Dams & Reservoirs	Liaquatpur
Headworks	Rahim Yar Khan
Pondage/Ditch	Sadiqabad
River and Water Body	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION
 Data Source(s):
 Irrigation Department, Punjab
 Survey of Pakistan
 SUPARCO

Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-015
 Prepared by: Project Management Unit, NDMA
 Last Updated: 2nd May, 2017

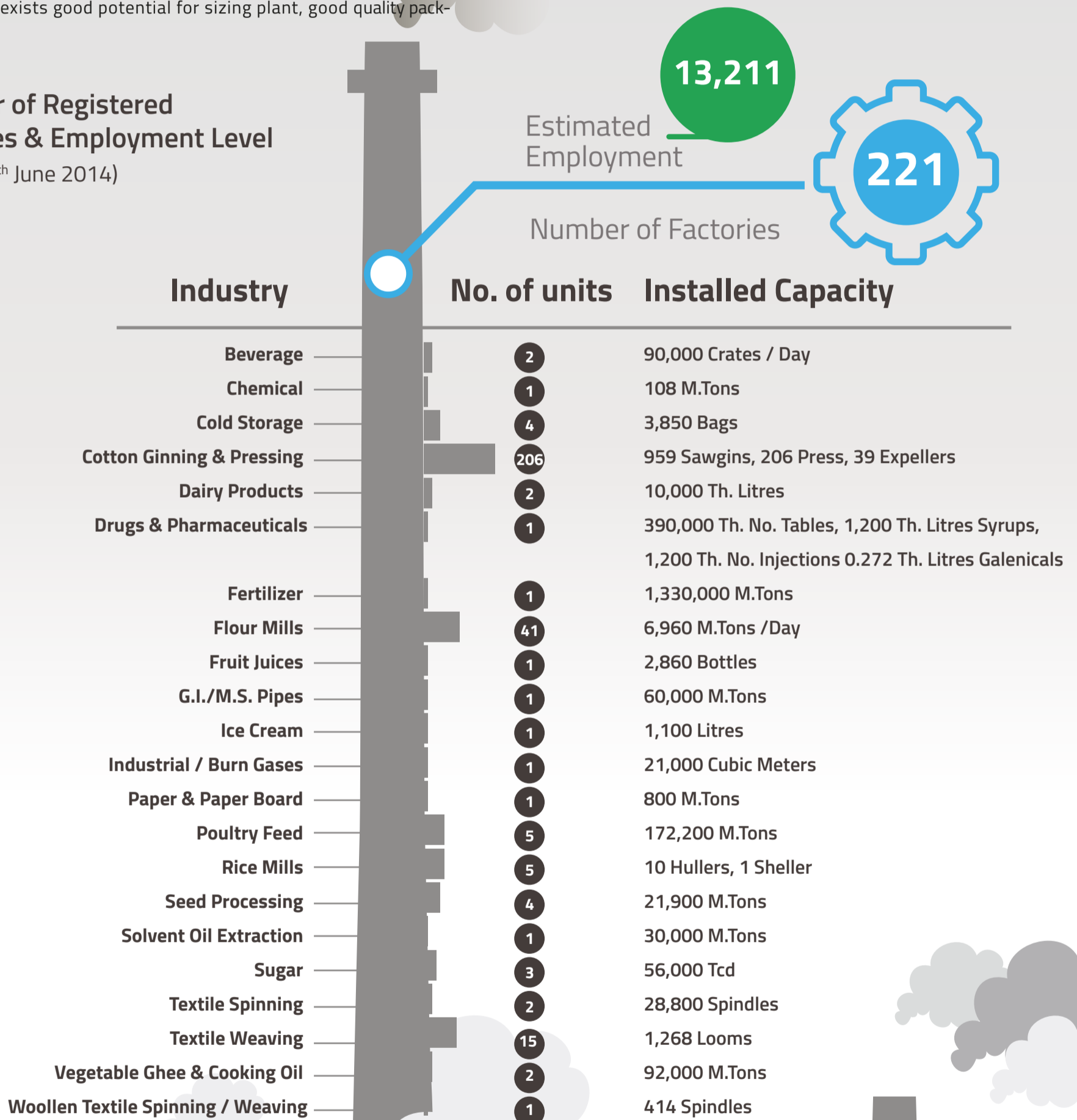
The main industries of the district are textile, cotton ginning and pressing, sugar, cottonseed oil, edible oil, soap, beverage making, agricultural implements manufacturing and fertilizer, manufacturing. Cottage industry includes ginning, pottery/clay products, electric desert cooler, agricultural machinery, handicrafts, food industry, and embroidery. Unilever, the international manufacturers of some famous brands of the world like Sunsilk shampoos, Walls ice cream, Lux, soaps etc. has one of their major factories of Pakistan in Rahim Yar Khan. In view of the existing industries, there exists good potential for sizing plant, good quality pack-

ing boxes, paper and paper board, high density polypropylene woven bags, paper cones and bobbins, tins for vegetable ghee / cooking oil packing, hosiery, towels, etc.

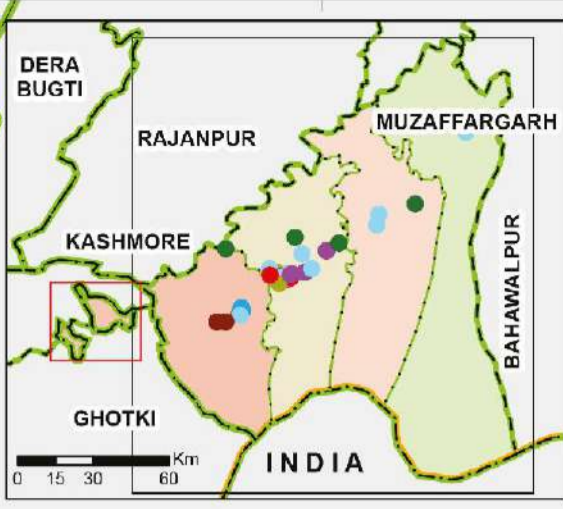
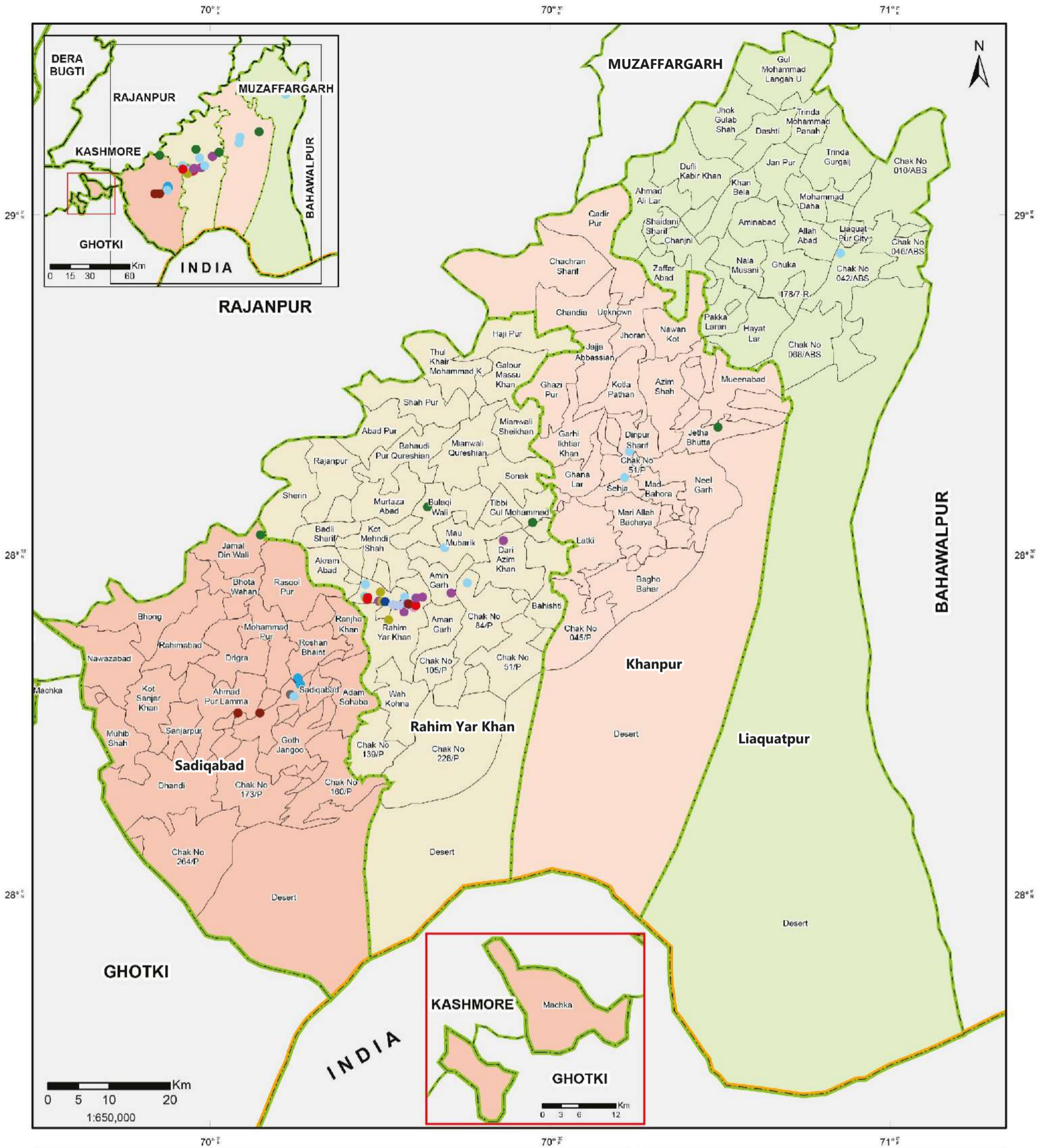
There are no major minerals being mined in Rahim Yar Khan. Only lake salt is being recovered under the process of solar evaporation from various salt lakes in District Rahim Yar Khan and this is mainly used in tanneries and for refrigeration purposes

Number of Registered Factories & Employment Level

(As on 30th June 2014)



INDUSTRIES MAP



Legend

- Sugar Mill
- Cotton Industry
- Oil Mill
- Textile Industry
- Flour Mill
- Agriculture based Industry
- Chemical and Fertilizer Industry
- Cosmetics Industry
- Phramaceutical Industry
- Ice Factory
- LPG Industry
- Plastic Manufacturing Industry
- Ceramic Industry

abc Union Council Boundary
Tehsil Boundary
Khanpur
Liaquatpur
Rahim Yar Khan
Sadiqabad
ABC District Boundary
Provincial Boundary
Line of Control
International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

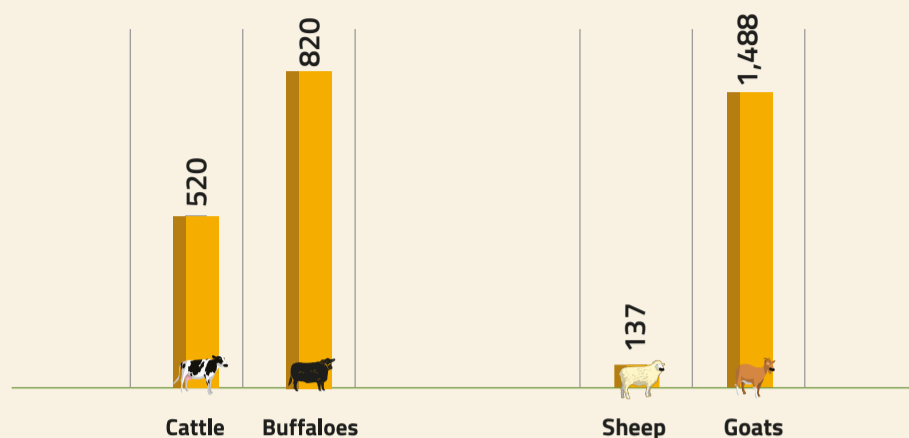
MAP INFORMATION
 Data Source(s): Punjab Agricultural Board, Government of Punjab
 Survey of Pakistan
 Pakistan Bureau of Statistics

Datum: WGS 1984
 Units: Degree

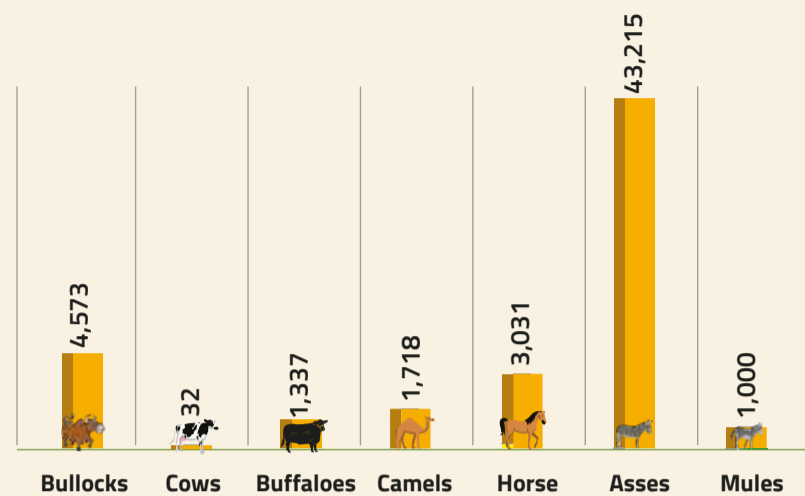
Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-016
 Prepared by: Project Management Unit, NDMA
 Last Updated: 2nd May, 2017

16 LIVESTOCK

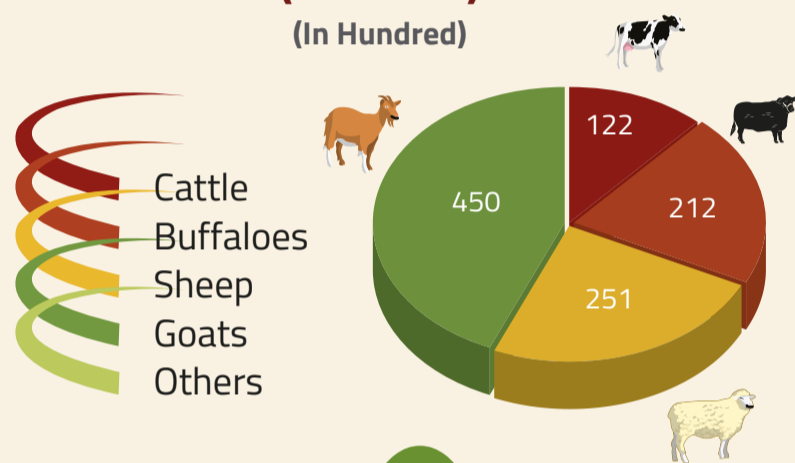
Number of Domestic Animals (2006)
(Thousand)



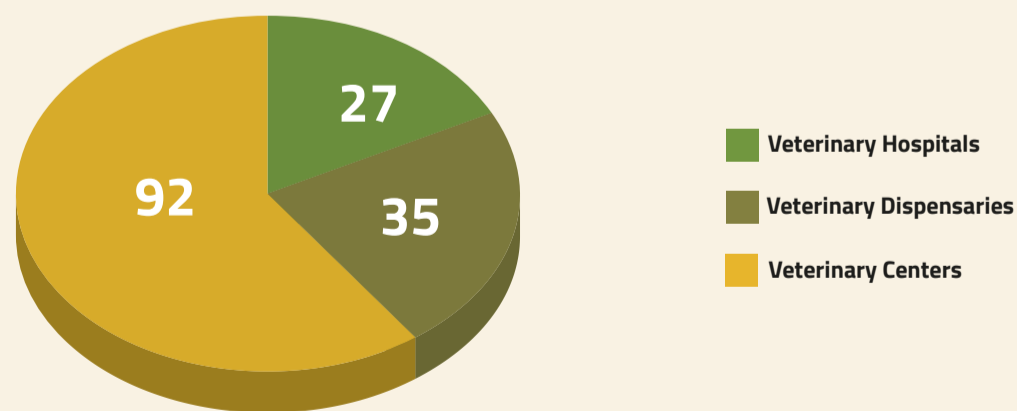
Number of Work Animals by Type (2006)
(Number)



Animals Slaughtered in Recognized & Unrecognized Slaughter Houses by Type (2013-14)
(In Hundred)

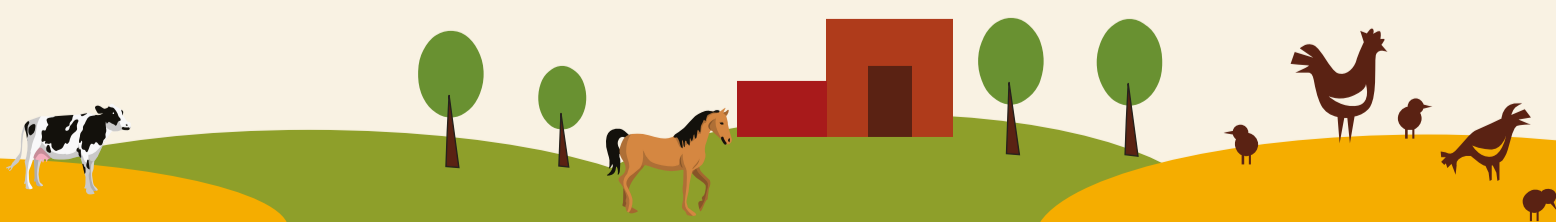


Veterinary Healthcare Facilities (2013-14)



Established Private Poultry Farms (2013-14)

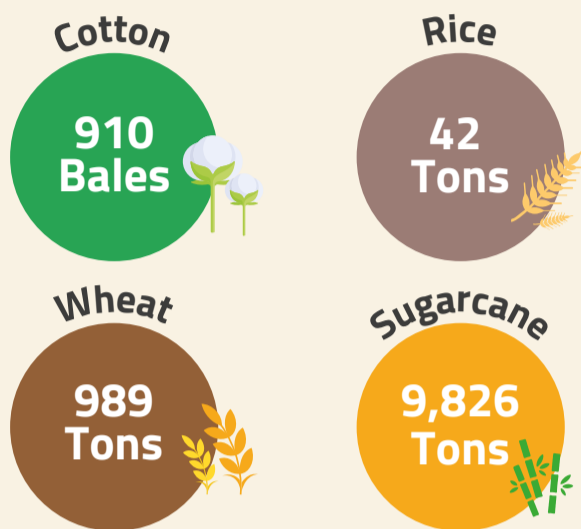
	Broiler Farms	Layer Farms	Breeding Farms
Number	583	27	10
Capacity to Rear Birds per Annum (Thousand)	17,250	350	110



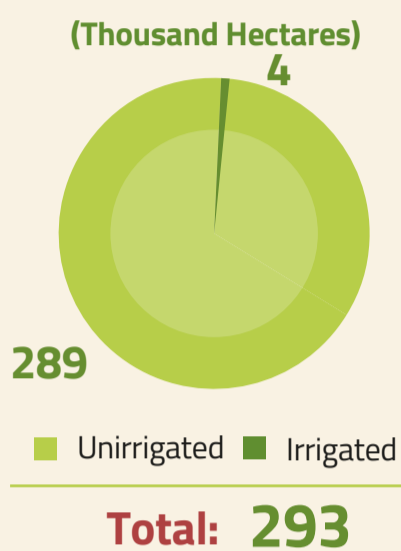
The local economy the district Rahim Yar Khan is mainly driven by agriculture sector with a good yield of different cash crops along with production of fruits. The main crops grown in district Rahim Yar Khan are wheat,

cotton and sugarcane whereas mangoes and citrus are main fruits produced in this region.

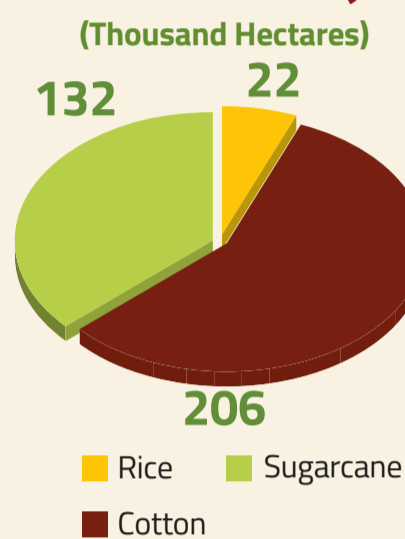
Major Crop Production (2013-14)



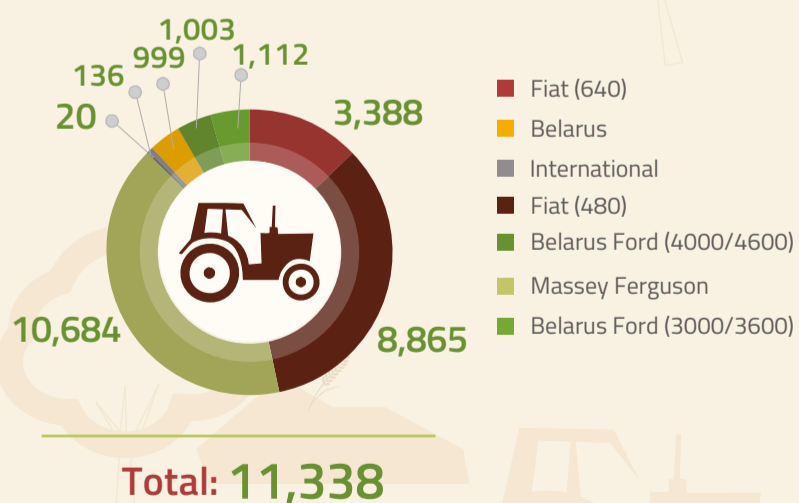
Total Area Sown (Thousand Hectares)



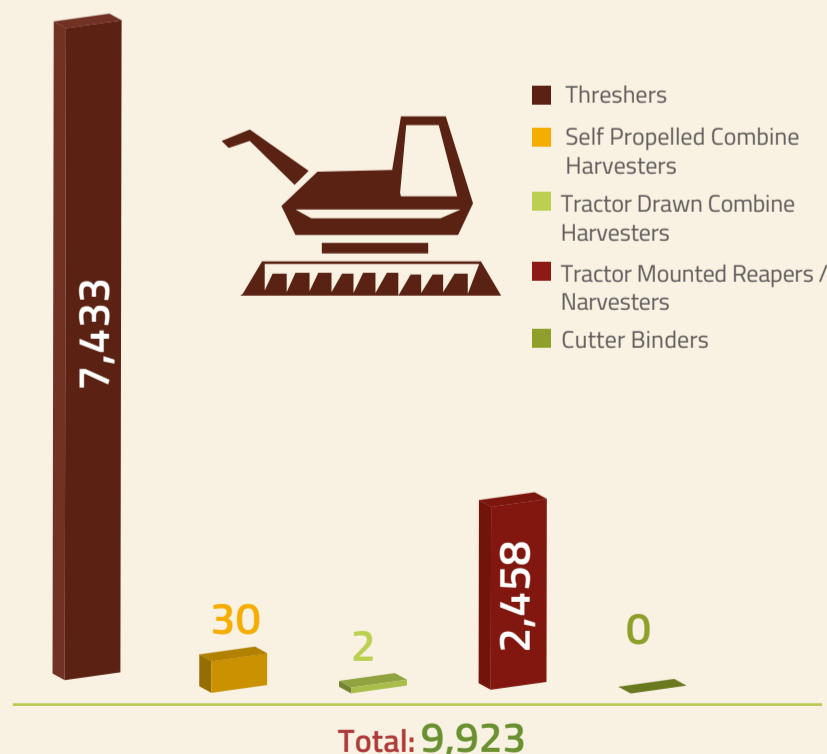
Area Sown Under Major Crops (Thousand Hectares)



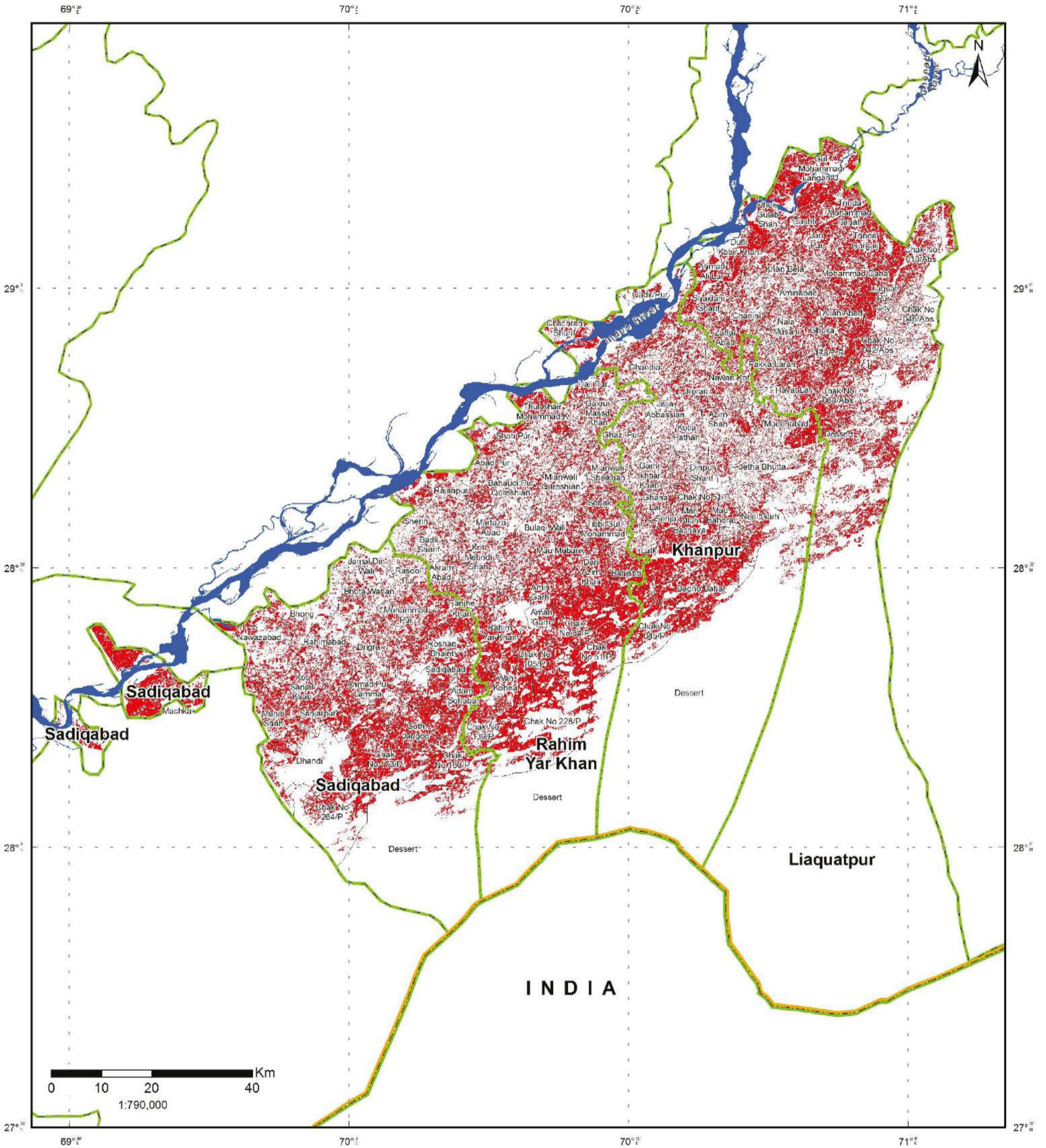
Tractors by Make (2012-13)



Threshers & Harvesters (2012-13)



RABI CROP MAP (JUNE TO FEB)



Legend

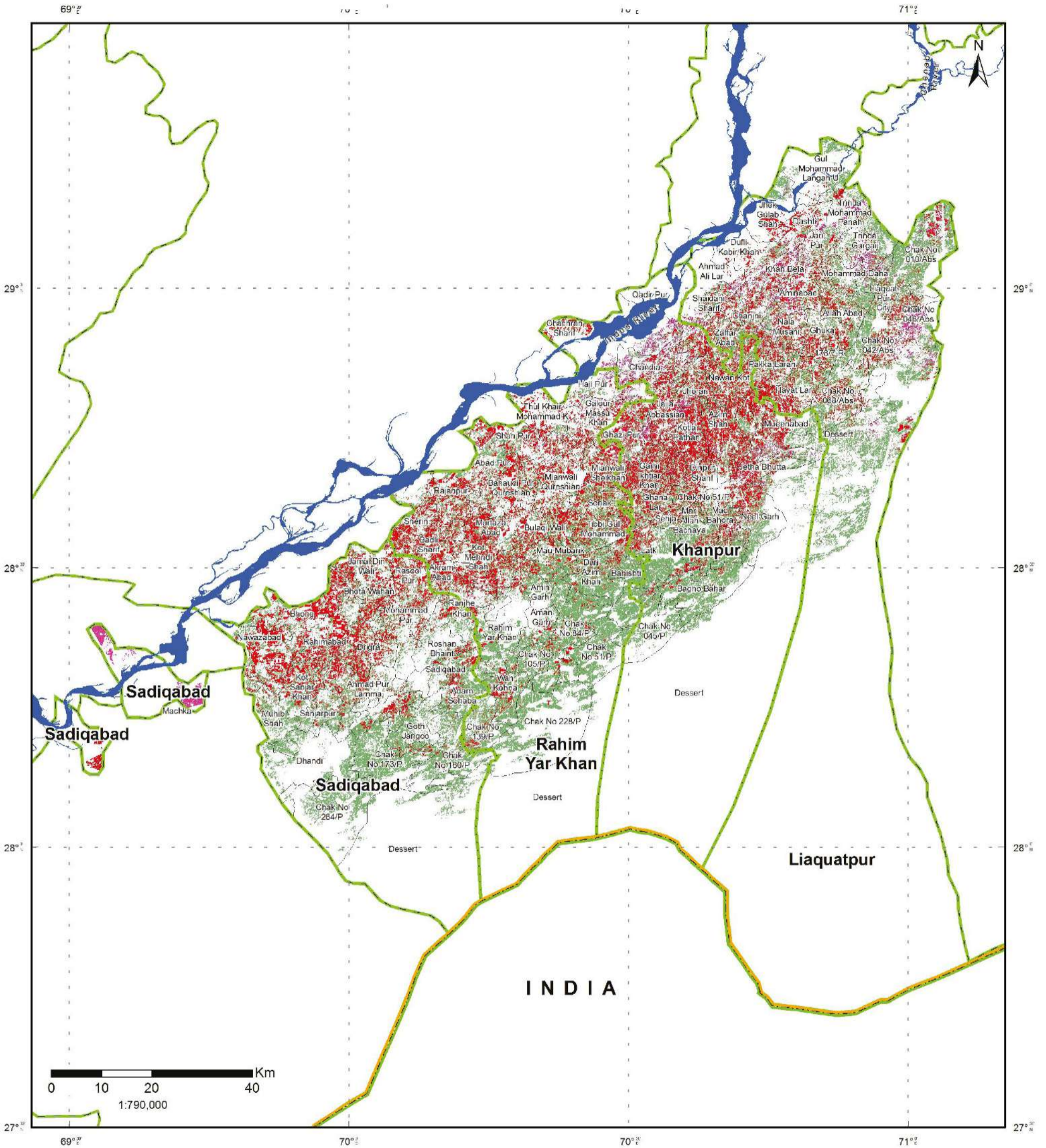
- Wheat
- River and Water Body
- Union Council Boundary
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-RB-012
 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017

KHARIF CROP MAP (AUG TO SEP)



Legend	
 Cotton	 River and Water Body
 Rice	 Union Council Boundary
 Sugarcane	 Tehsil Boundary
	 District Boundary
	 Provincial Boundary
	 Line of Control
	 International Boundary

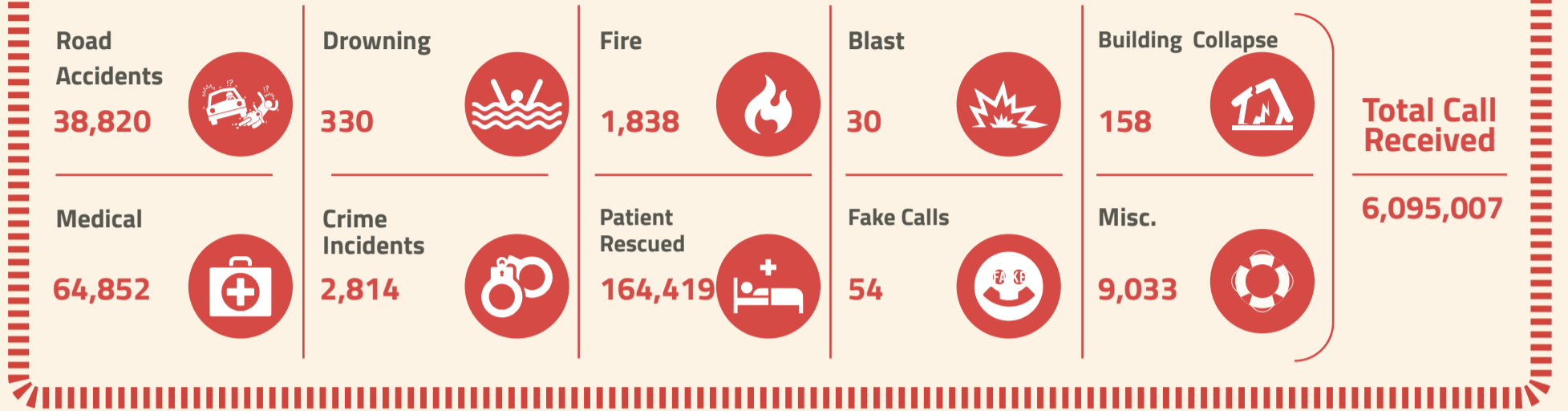
Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-FEB-2016-GEN-NDMA-KH-012
 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017



Emergency Calls (by Type)



Rescue Equipment

Fire Vehicle	2	Water Bowser	1	Ambulance	13	Truck 05 Ton	0
Rescue Vehicle	4	Recovery Vehicle	1	Ground Duty Vehicles (GDV)	1	Foam Vehicle	0
Water R.Van	0	Aerial Platform	0	Ladder	0	Boat Carrier Truck	1

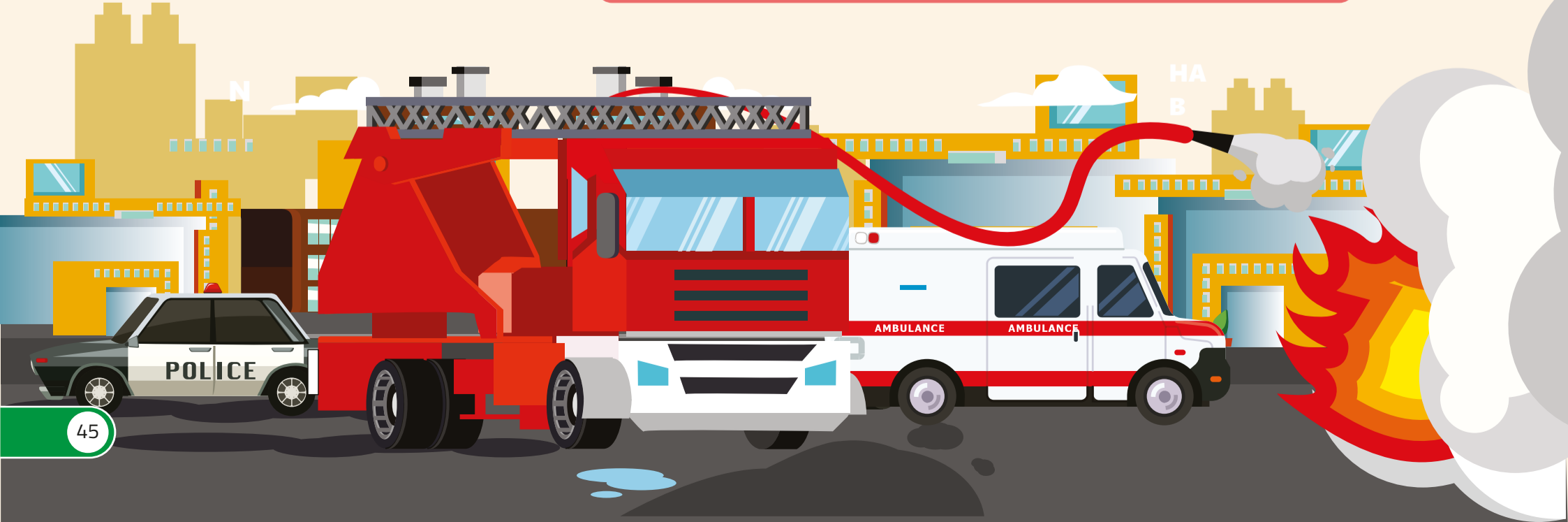
Flood Resources

Boat	17	Scuba	0	Life Ring	15	Oars	60
On Board Motors (Obm)	12	Torch	0	Tents	1	Mosquito Net	0
Life Jacket	66	Life Guard	22	Plastic Mat	0	Dry Suit	3
		Nylon Rope	12	Carpet	0		

Human Resource
128
 Persons

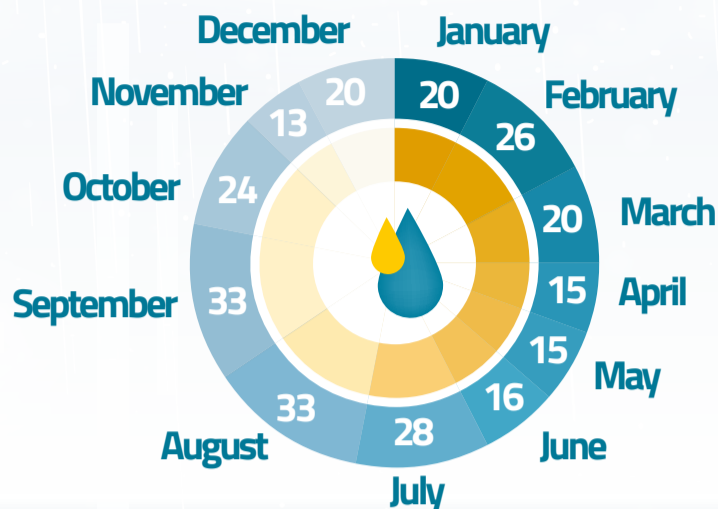
Address

Central Station, Near Allama Iqbal Library, WAPDA Colony Road, R.Y. Khan
Longitude : 70.31 **Latitude :** 28.42

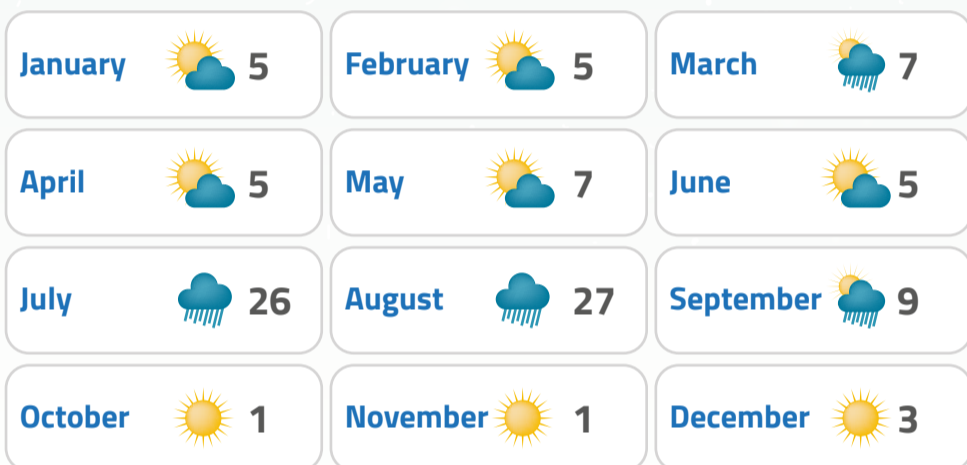


Rahim Yar Khan (RYK) district has an arid climate characterized by high temperature (up to 48°C), low rainfall, irregular humidity and, generally high evaporation rates. The maximum temperature touches 48°C. The minimum temperature recorded is 4.9°C. June is generally the hottest month while coldest month is January. The average annual rainfall in the district is 165 mm of which 60% occurs in the monsoon period of July and August.

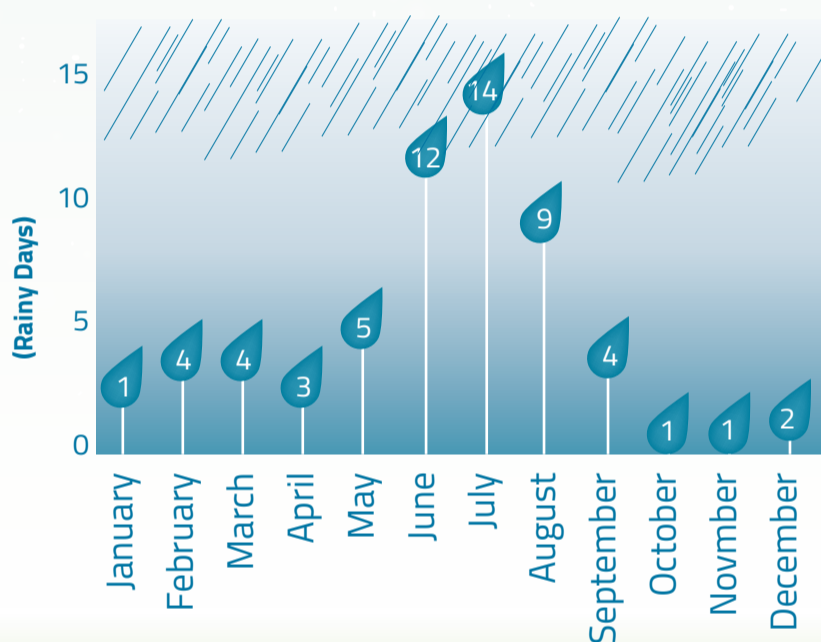
Relative Humidity (%)



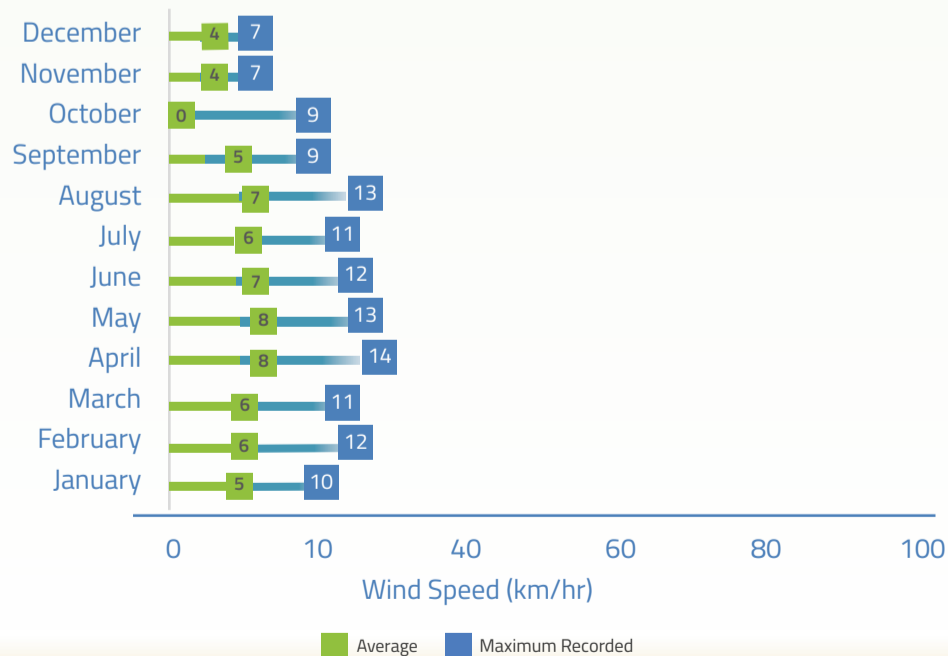
Average Precipitation (mm)



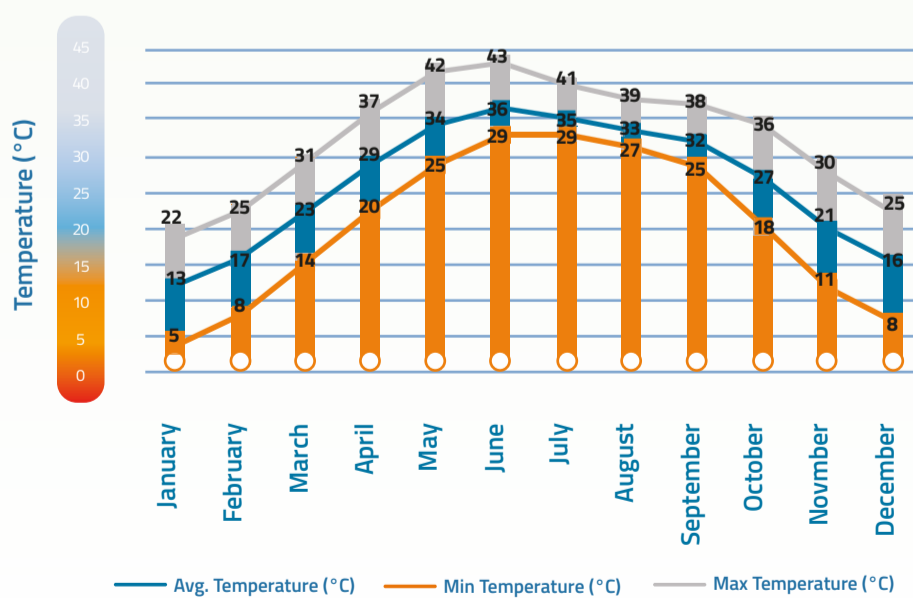
Average Rain Day (per month)



Average Wind Speed (km/hr)



Monthly Average Temperature (°C)





B

HAZARD ASSESSMENT

- DROUGHT
- EARTHQUAKE
- FLOOD



20 DROUGHT HAZARD ASSESSMENT

A large part of Pakistan faces severe effects of drought for most part of the year. Long-drawn-out presence of drought is a significant challenge to agriculture, human lives, livestock, forests, water resource management, urban planning and food security. Due to changing climatic patterns, the drought phenomenon is likely to increase in terms of recurrence, extent, and intensity, for which drought hazard assessment can provide scientific basis for planning interventions for DRR and land use planning. In this study following indices are used for assessment of drought hazard for District Multan to a Union Council level.

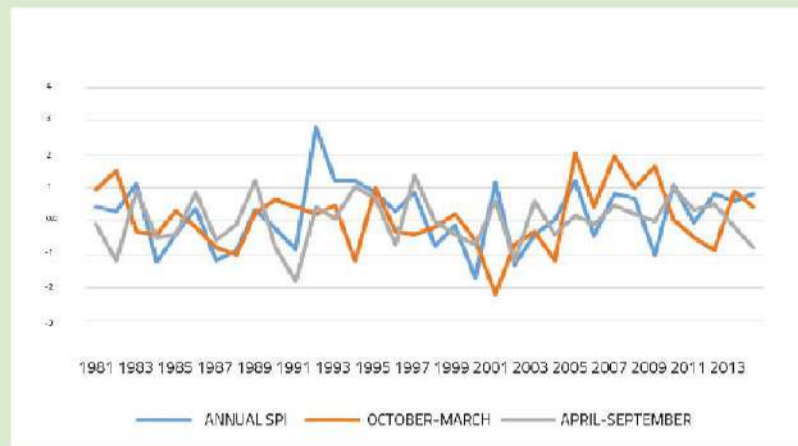
- a. Standard Precipitation Index (SPI)
- b. Normalized Difference Vegetation Index (NDVI)
- c. Drought Severity Index (DSI)
- d. Temperature Condition Index (TCI)
- e. Vegetation Condition Index (VCI)
- f. Vegetation Health Index (VHI)

Drought return period

A return period is the recurrence interval of a drought. It is statistical measurements, particularly based on previous data. Strategic planning and management of water resources under climate change and drought conditions often require the assessment of return periods of drought events categorized by high severities. Based on above mentioned 12-SPI, drought return period of 1951-2015 for district Multan is mentioned below.

Drought Occurrence (Years)	Most Severe Drought
1984, 1985, 1987, 1988, 1991, 1998, 2000, 2002, 2003, 2009	2000

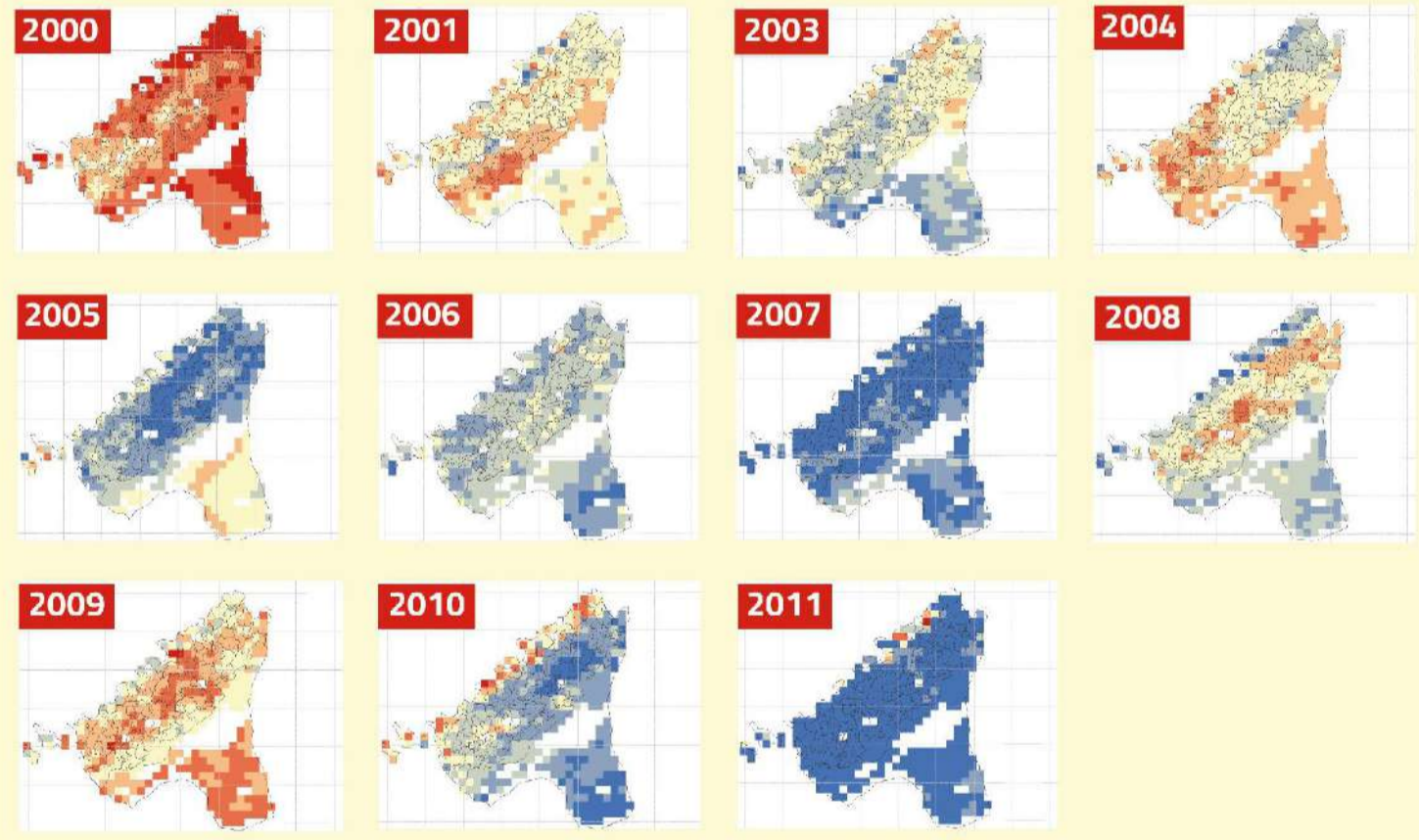
Standard Precipitation Index (SPI) 1981-2014



SPI Value	Conditions
2.0+	Extremely Wet
1.5 to 1.99	Very Wet
1.0 to 1.49	Moderately Wet
-0.99 to 0.99	Near Normal
-1.0 to -1.49	Moderately Dry
-1.5 to -1.99	Severely Dry
-2.0 and less	Extremely Dry

Description: SPI is a tool to determine the severity of a drought at a given time scale (temporal resolution) of interest for any rainfall station with historic data (record of at least 30 years). Mathematically, the SPI is based on the cumulative probability of a given rainfall event occurring at a station.

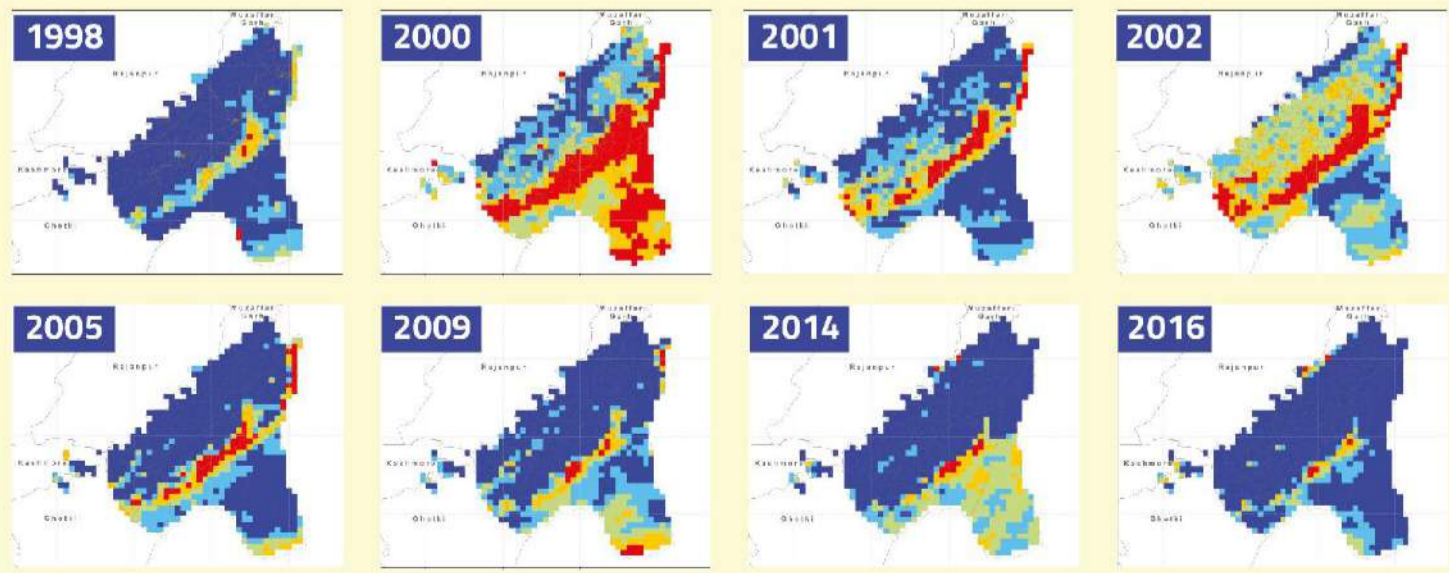
Drought Severity Index (DSI) 2000-2011



- Legend:**
- -1.5
 - -0.5
 - 0.5
 - 1.5
 - -1
 - 0
 - 1

Description: DSI is an effective tool to estimate relative dryness of the land through using available temperature and precipitation data. It spans between the scales of -10 (dry) to +10 (wet).

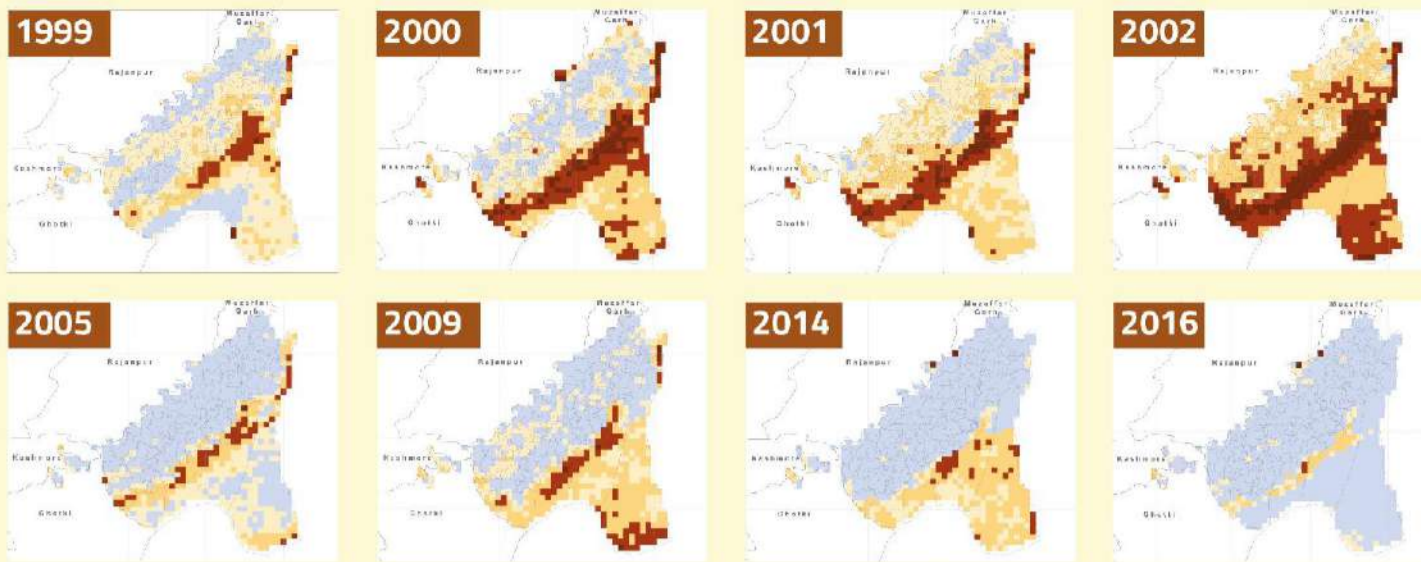
Vegetation Condition Index (VCI) 1998-2016



- Legend:**
- <10 (Extreme Drought)
 - <20 (Severe Drought)
 - <30 (Moderate Drought)
 - <10 (Mild Drought)
 - <10 (No Drought)

Description: VCI is used to identify drought situations and determine the onset, especially in areas where drought episodes are localized and ill defined.

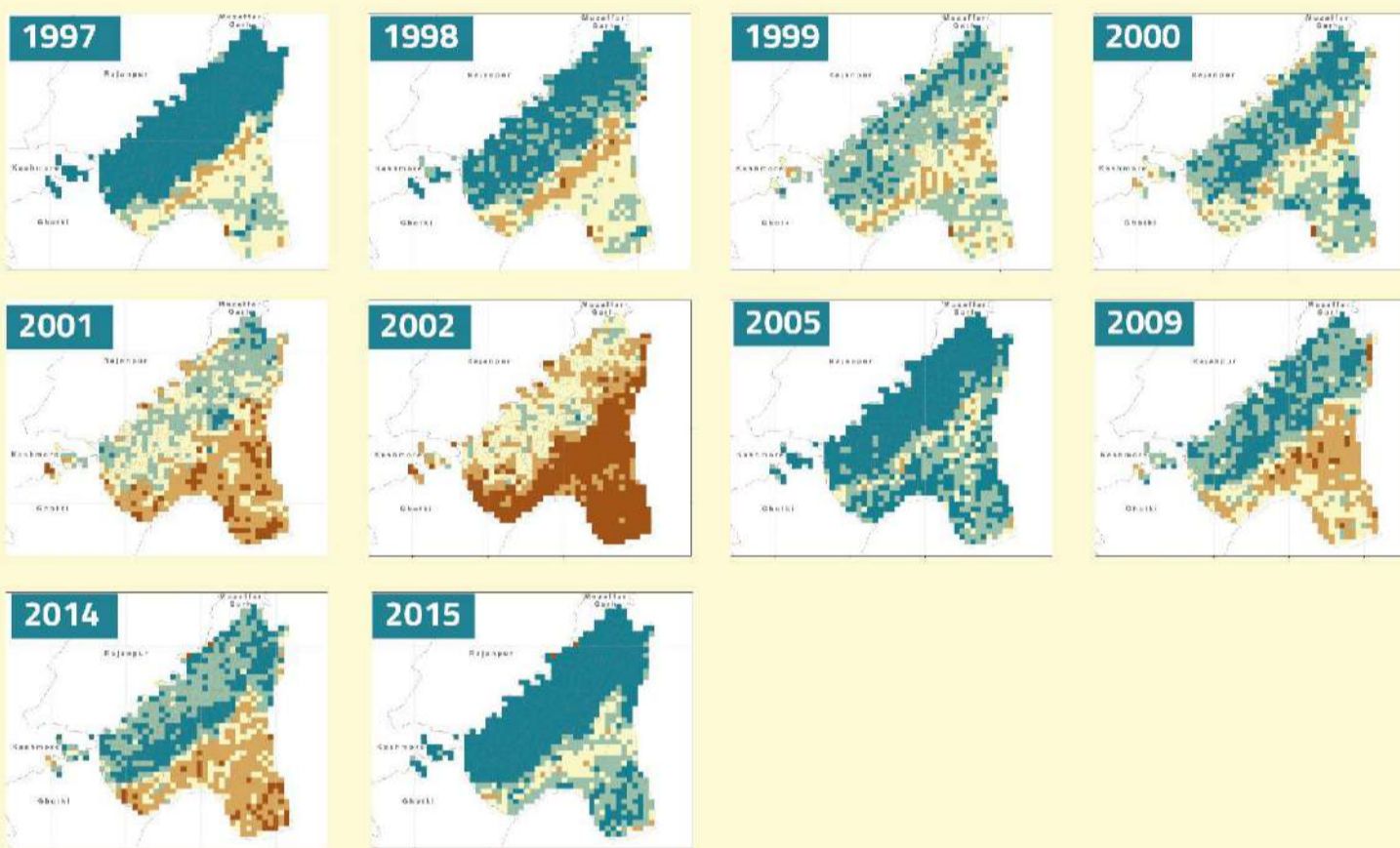
Vegetation Health Index (VHI) 1999-2016



- Legend:**
- <10 (Extreme Drought)
 - <20 (Severe Drought)
 - <30 (Moderate Drought)
 - <10 (Mild Drought)
 - <10 (No Drought)

Description:
VHI is used to identify and classify stress to vegetation due to drought.

Temperature Condition Index (TCI) 1997-2016



- Legend:**
- <10 (Extreme Drought)
 - <20 (Severe Drought)
 - <30 (Moderate Drought)
 - <10 (Mild Drought)
 - <10 (No Drought)

Description:
TCI is used to determine stress on vegetation caused by high temperatures and dryness.

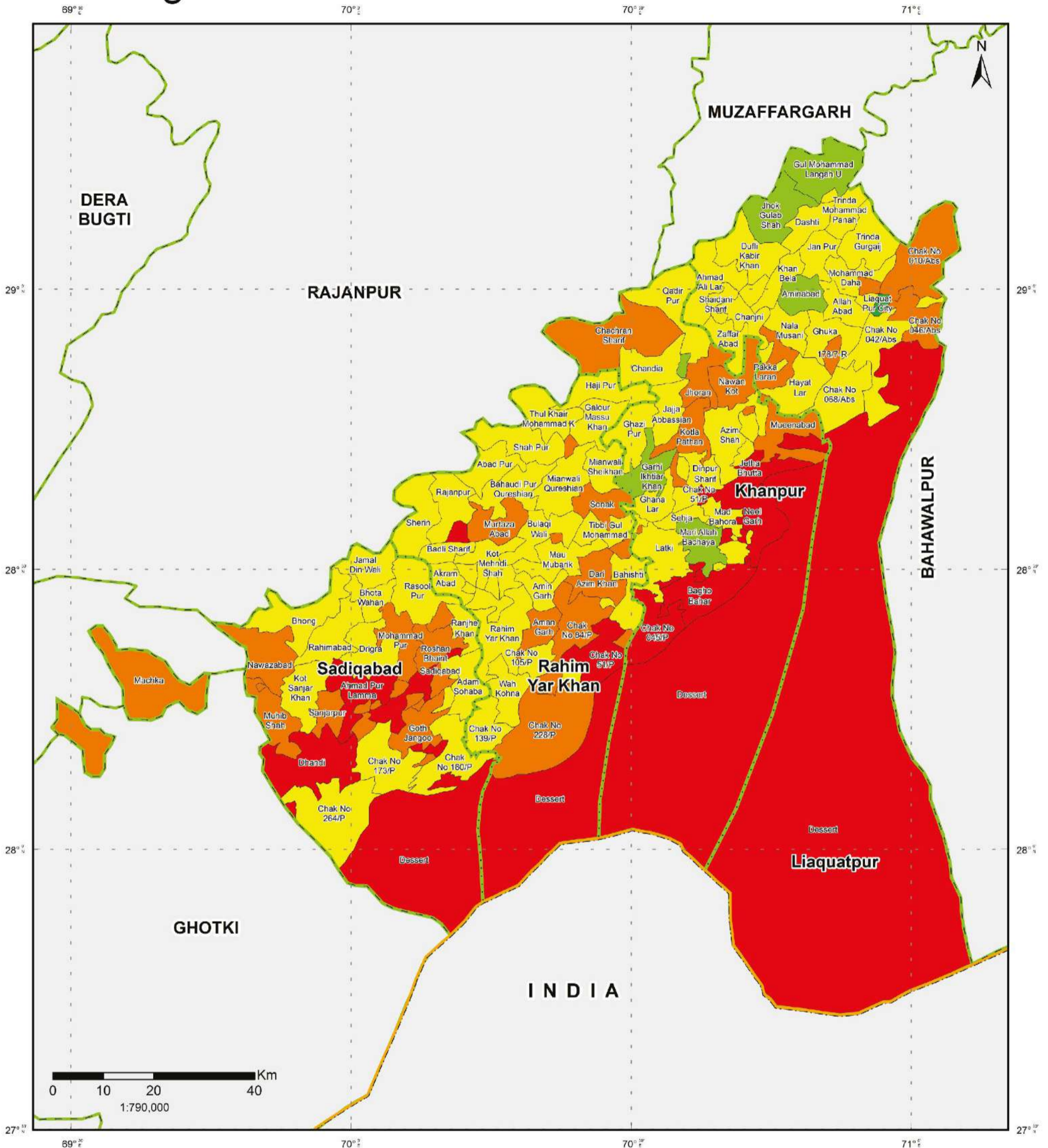
Normalized Difference Vegetation Index (NDVI)



- Legend:**
- -0.3-0
 - 0.01-0.1
 - 0.11-0.3
 - 0.31-0.6
 - 0.61-0.9

Description:
The NDVI utilizes satellite imagery to evaluate variations in the normalized difference between the reflectance in near infrared (NIR) and visible red bands, which are responsive to changes in vegetation. Higher NDVI values reflect healthy vegetation, whereas lower NDVI values depict stress condition.

DROUGHT PRONE UNION COUNCILS



Legend

Drought Severity Index (DP)

- No Drought
- Mild Drought
- Moderate Drought
- Severe Drought
- Extreme Drought

Abc Union Council Boundary

- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

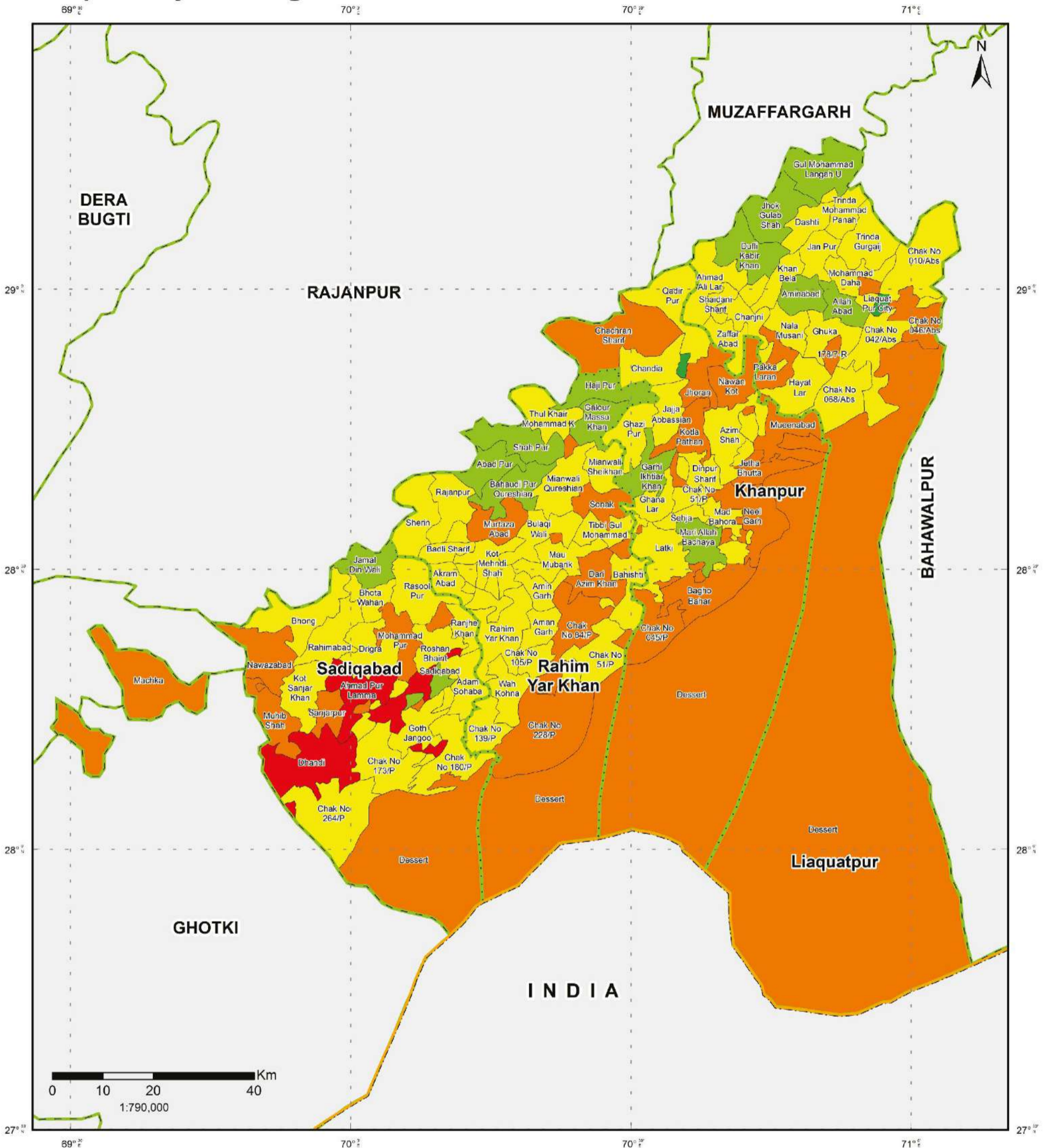
MAP INFORMATION

Data Source(s):
Pakistan Council of Research In Water Resources
SCARPs Monitoring Organization, WAPDA.

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-612-MAR-2016-HAZ-02-NDMA-001
Prepared by: Project Management Unit, NDMA
Last Updated: 7th March, 2017

FREQUENTLY DROUGHT PRONE UNION COUNCILS



Legend

Drought Severity Index (FDP)

- No Drought
- Mild Drought
- Moderate Drought
- Severe Drought
- Extreme Drought

Abc Union Council Boundary

- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

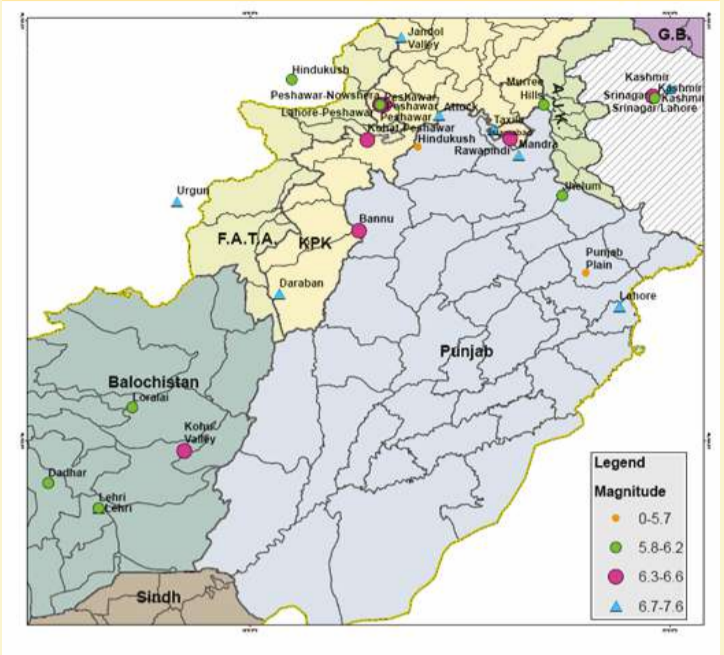
Data Source(s):
Pakistan Council of Research In Water Resources
SCARPs Monitoring Organization, WAPDA.

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-612-MAR-2016-HAZ-02-NDMA-002
Prepared by: Project Management Unit, NDMA
Last Updated: 7th March, 2017

Earthquake is defined as shaking and vibration at the surface of the earth resulting from underground movement along a fault plan from volcanic activity, cryoseismic activity, the sudden cracking of frozen soil or rock or due to movement of plate boundaries of the Earth. Earthquakes hazard at a site is characterized by either probabilistic or deterministic seismic hazard analysis. Probabilistic seismic hazard analysis involves the quantification of rate of probability of exceedance taking into consideration all possible earthquakes. Deterministic analysis evaluates the site specific seismic hazard that is influenced by maximum hazard from controlling sources. The general Probabilistic seismic hazard analysis procedure involves quantifying the annualized rate of exceedance of specified ground motions of various intensities, which is transformed to obtain the probability of exceedance of ground motions within the lifetime of the structure and infrastructure of interests. District Rahim Yar Khan has a fault line, the Rahim Yar Khan Fault passing through the Sadiqabad tehsil. According to the historical catalogues used in this assessment, this district has experienced earthquakes in the range of magnitude 4-6. The main findings of the probabilistic seismic hazard assessment were that the ground motions in District Rahim Yar Khan show no significant spatial variability throughout the district when ground motions are mapped for tehsil and UC levels. The following table shows the PGA based values against each settlement type in District Rahim Yar Khan. Some of the most important historical seismic events in the region are shown below.

Historical Seismic Events



For the purpose of seismic designs of buildings, Pakistan has been divided into 5 Zones. These Zones are based on Peak Ground Acceleration (PGA). Ranges are shown in Table below:

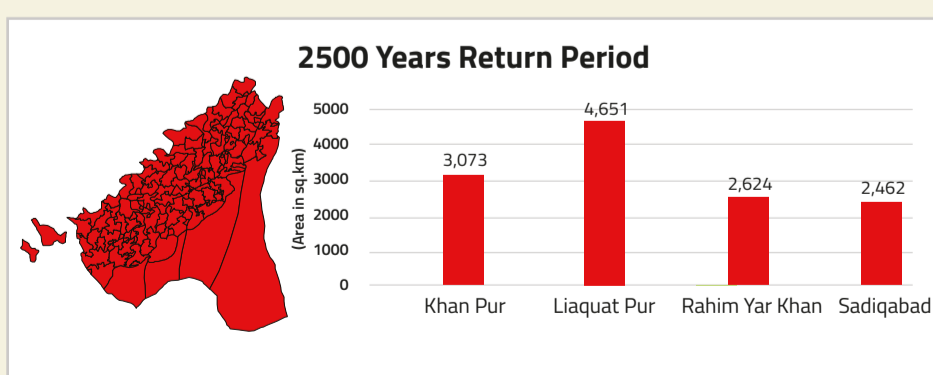
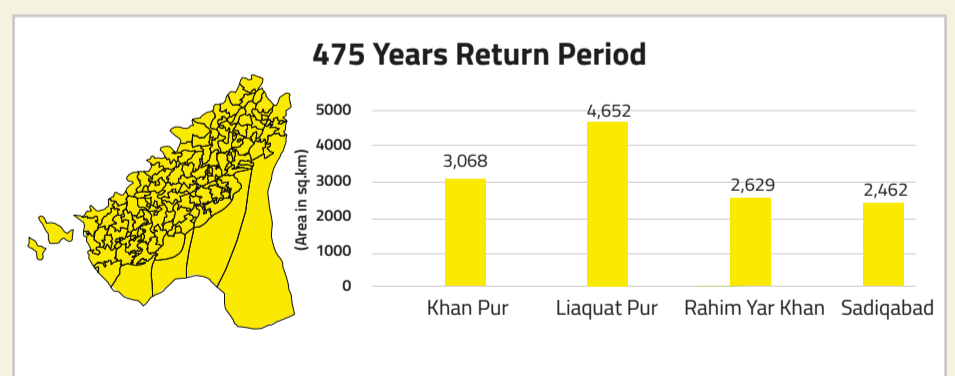
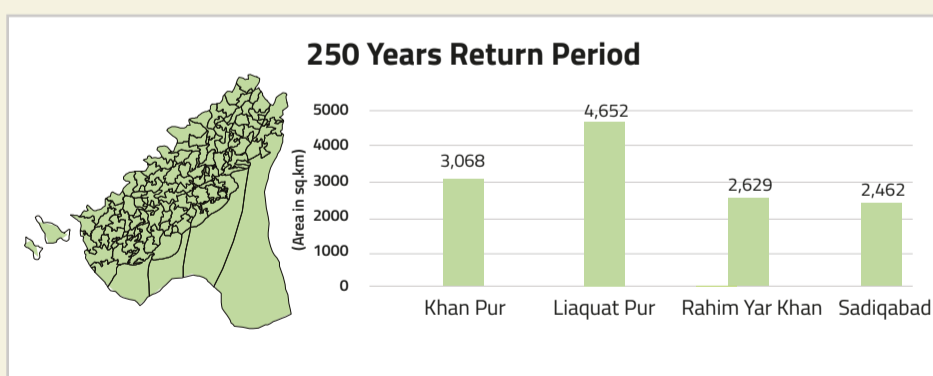
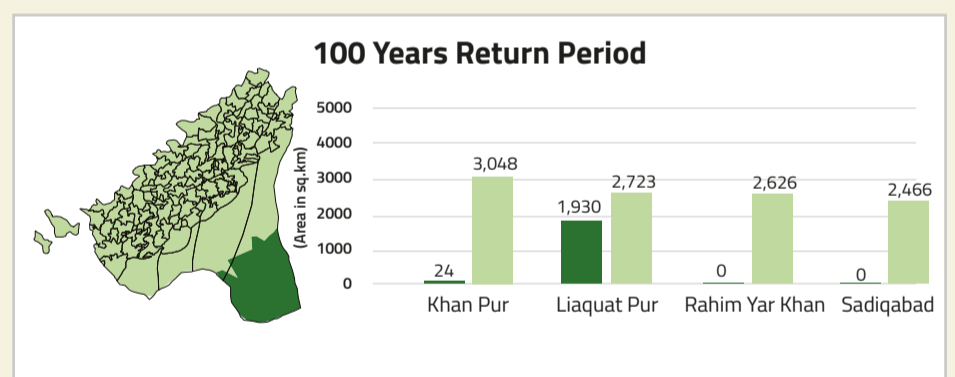
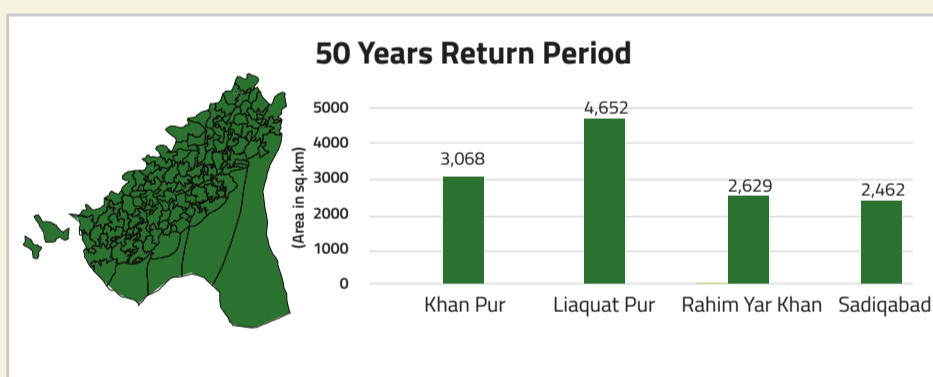
Zone	Intensity	Ground Motion (g)	PGA (g*)
1	Very Low	0.01 – 0.08	0.08
2A	Low	0.08 – 0.16	0.15
2B	Medium	0.16 – 0.24	0.20
3	High	0.24 – 0.32	0.30
4	Very High	> 0.32	0.40

*Where g is acceleration due to gravity

Methodology of Assessment

The first step was the definition of area of interest followed by the compilation of Earthquake Catalogue from different national and international sources. The catalogues were homogenized, declustered and checked for completeness. Ground Motion Prediction Equations (GMPEs) were selected and the data was processed in a hazard computation software (CRISIS). The output of the exercise was the probabilistic seismic hazard mapping on 50, 100, 250, 475 and 2500 years return periods. The next stage was Sensitivity Analysis of tools used in the study. The last step was Seismic Response Analysis of site soil using strong ground motions records using Deepsoil software. The final phase of assessment was the incorporation of site soil conditions for seismic microzonation to map site specific ground motions.

Seismic Hazard Maps Based on Return Periods (50,100,250,475 and 2500 Years)



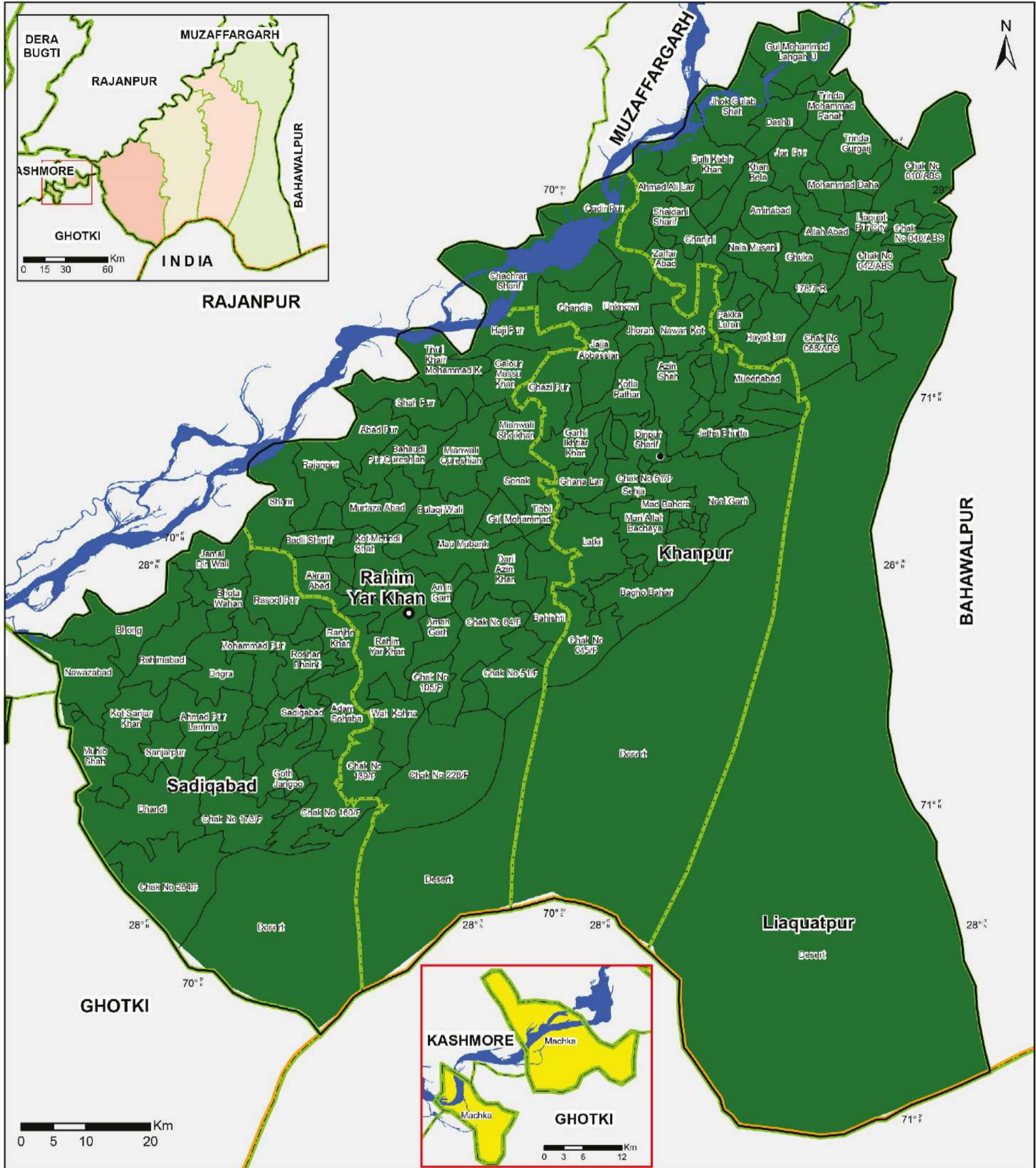
Hazard Zones (g)*

- Zone 1 (Very Low)
- Zone 2A (Low)
- Zone 2B (Medium)
- Zone 3 (High)
- Zone 4 (Very High)

Description:

Where return period is the recurrence interval of a flood. It is a statistical measurement particularly based on previous data.

EARTHQUAKE HAZARD 50 YEAR RETURN PERIOD



Legend

- District Headquarter
- Tehsil Headquarter
- River and Water Body
- ABC Union Council Boundary
- Abc Tehsil Boundary
- ABC District Boundary
- International Boundary
- Provincial Boundary
- Line of Control

Hazard Zone*

1	(0.05-0.08g)	Very Low
2A	(0.08-0.16g)	Low
2B	(0.16-0.24g)	Medium
3	(0.24-0.32g)	High
4	(>0.32g)	Very High

*Zones are categories as per classification of Pakistan Engineering Council. Symbol "(g)" represent Gravitational Acceleration

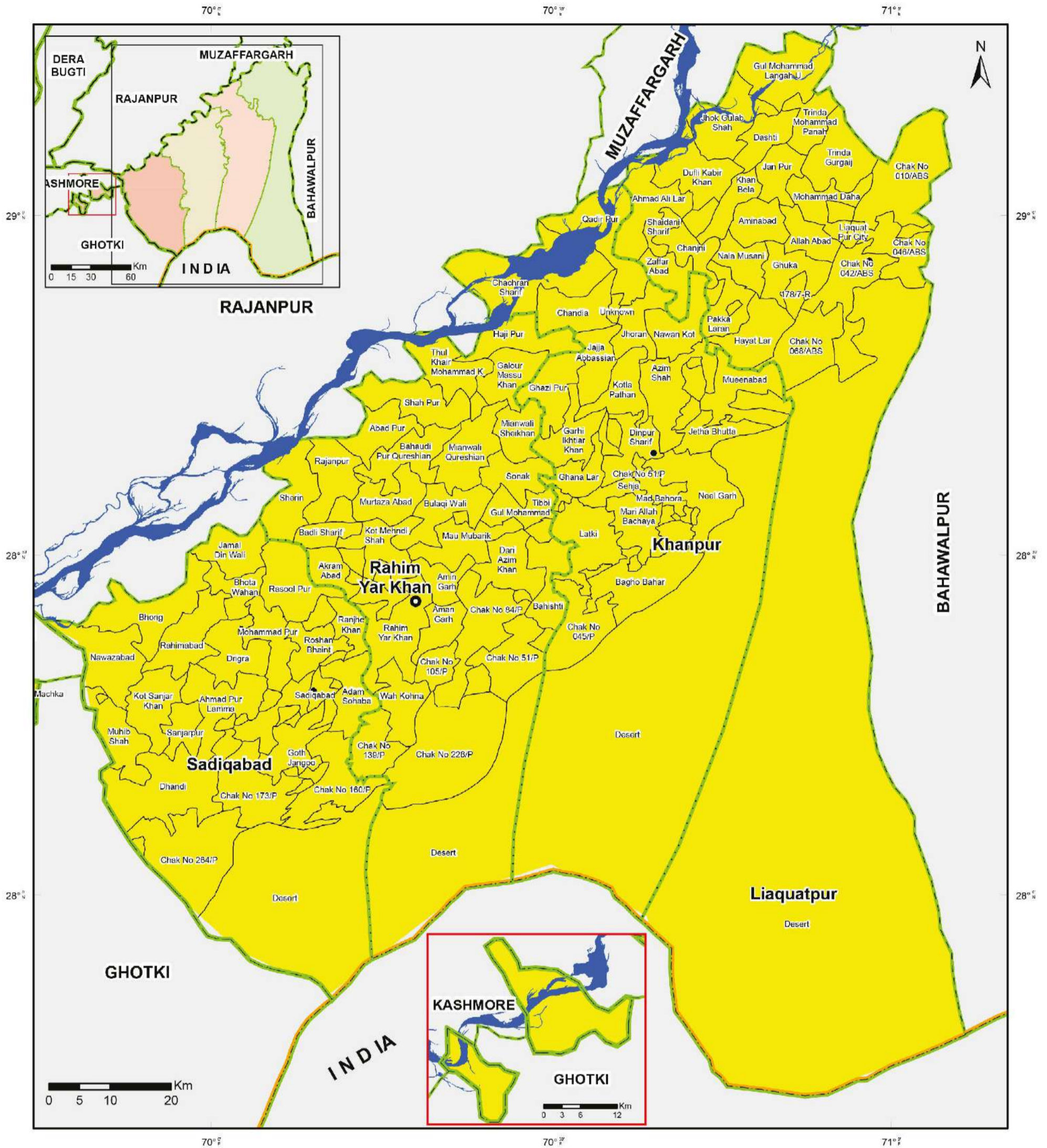
Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 The Punjab Emergency Service - Rescue 1122
 Punjab Police
 Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-MAR-2016-HAZ-03-NDMA-475
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

EARTHQUAKE HAZARD 475 YEAR RETURN PERIOD



Legend

- District Headquarter
 - Tehsil Headquarter
 - | | |
|------------------------|--|
| River and Water Body | |
| Union Council Boundary | |
| Tehsil Boundary | |
| District Boundary | |
| Provincial Boundary | |
| Line of Control | |
| International Boundary | |
- Hazard Zone***
- 1 (0.05-0.08g) Very Low
 - 2A (0.08-0.16g) Low
 - 2B (0.16-0.24g) Medium
 - 3 (0.24-0.32g) High
 - 4 (>0.32g) Very High

*Zones are categories as per classification of Pakistan Engineering Council. Symbol "(g)" represent Gravitational Acceleration

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
The Punjab Emergency Service - Rescue 1122
Punjab Police
Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-MAR-2016-HAZ-03-NDMA-475
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

District Rahim Yar Khan shares boundaries with district Muzaffargarh to its north, district Bahawalpur to its east, district Ghotki (Sindh) and Jaisalmer (India) to its south and district Rajanpur to its west. River Indus flows at the western borders of the district downstream towards province Sindh. The

area close to the river is the riverine area while rest of the district is divided into canal irrigated area and the Cholistan desert. As part of flood mitigation, following flood protection structures have been put in place:

Flood Protection Structures

Bunds
<ul style="list-style-type: none"> Shikrani flood bund Minchin flood bund Extension Minchin Bund Machka Dilawara flood Bund Retired Minchin Bund 4th Defence Bund

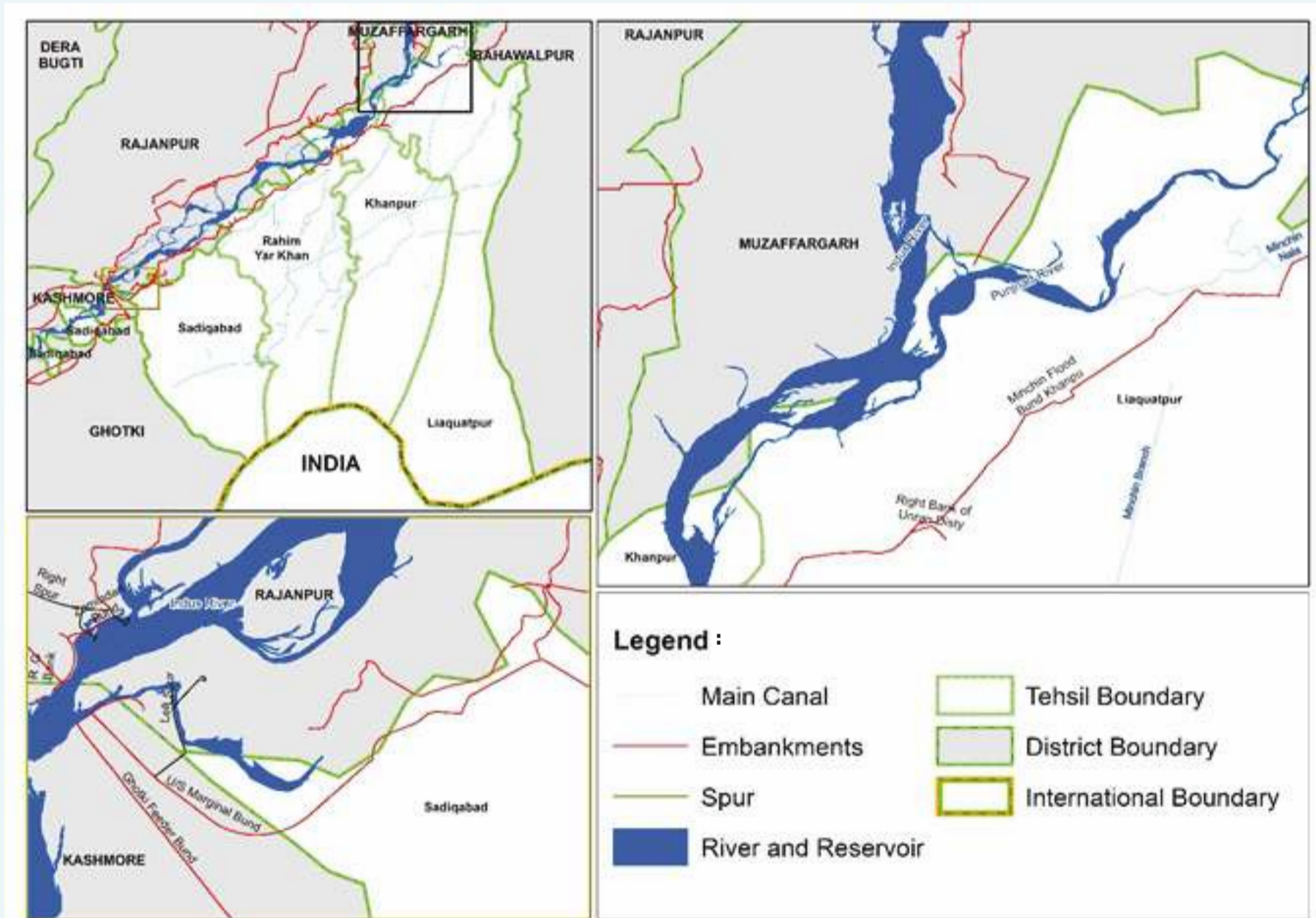
- Right Bank of Unran Disty
- Malkani Escape Both Side
- Retired Minchin Flood Bund along Chachran Disty
- 2nd Defence Bund
- Chachran Link Bund
- Loop Bund

Early Warning & Response Time for Riverine Floods (in Hours)

Flood Intensity	Reach From	Reach To	Total Response time
Sutlej	Suleimanki H/W	Islam H/W	72
Sutlej	Islam H/W	Panjnad H/W	84
Indus	Taunsa	Chachran	48
Indus	Chachran	Guddu	36

River Training Works				
<ul style="list-style-type: none"> J-Head Spur No.1 J-Head Spur No.3 J-Head Spur No.2 	<ul style="list-style-type: none"> J-Head Spur No.4 J-Head Spur Inverted Hockey Spur 	<ul style="list-style-type: none"> Guide Wall Spur No.5 J-Head Spur No.1-A Stone Stud 	<ul style="list-style-type: none"> Guide Head Spur Stone Stud 1-9 Concave Convex Guide Wall 	<ul style="list-style-type: none"> Solid Stone Studs 14 No. Guide Wall Spur

Flood Protection Structures Maps



Assessment Methodology

The HEC-RAS hydraulic model has been used for hydraulic modelling of the area, with an average discharge value observed at head Punjnad for consecutive 10, 50 and 100 years. For model inputs, geometric data (stream centerline, flow paths, channel banks, cut lines and cross-sections) has been developed in HEC-GeoRAS. Aster-SRTM DEM has been preprocessed and used for conversion into TIN, to be used as the elevation input in modelling for generation of flood hazard maps.

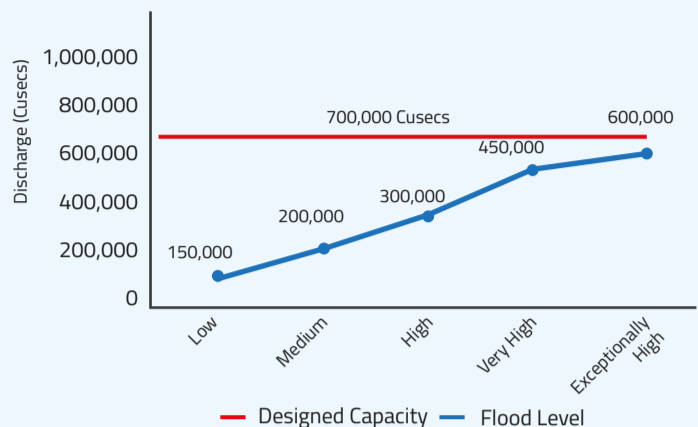
Modelling results are then processed in ArcGIS for floodplain delineation. Flood hazard maps are then generated as the final result using inundation depth grid and satellite imagery. These maps show the severity of flood hazard at any given point in the area.

Return Period

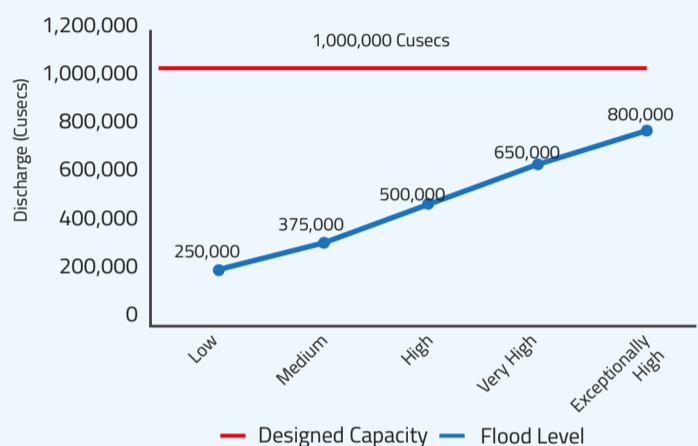
Return Periods	Discharge (in Cusecs)
10 Years	15,977
50 Years	737,406
100 Years	1,474,846

Flood Limits for River Chenab (Punjab Head) and River Indus (Taunsa & Guddu Barrage)

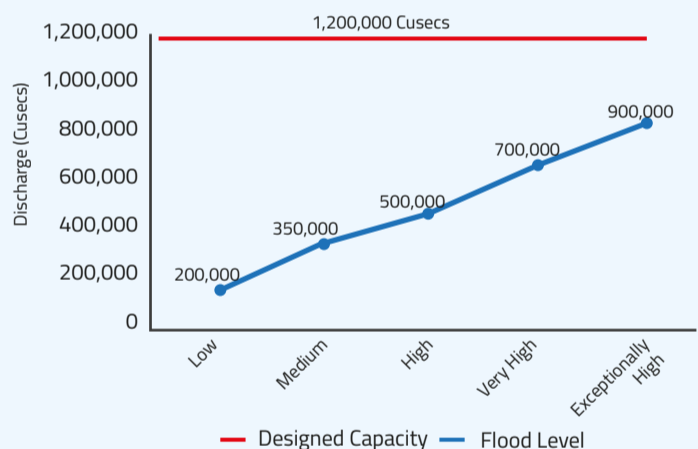
Flood Limits Punjab Headwork (Chenab)



Flood Limits Taunsa Headwork (Chenab)

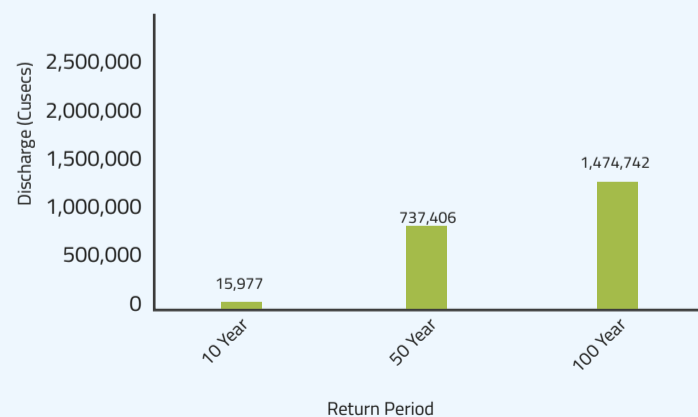


Flood Limits Guddu Headwork (Jhelum)



In this study for flood hazard assessment, return periods of 10, 50 and 100 years have been taken in account based on probability of occurrence for the flood modelling. Discharge values for the respective return periods have been considered at Punjab headworks.

Discharge Values for Return Period 10,50,100 Years



Historical Floods

Peak Discharge River Indus

Taunsa Barrage		Taunsa Barrage	
Year	Discharge (Cs)	Year	Discharge (Cs)
1958	788,650	1986	1,173,292
1976	675,233	1988	1,162,653
1992	654,579	1989	944,888
1995	617,096	1992	1,086,919
2010	959,991	2010	1,148,738
2013	425,210	2013	-

Peak Discharge River Chenab

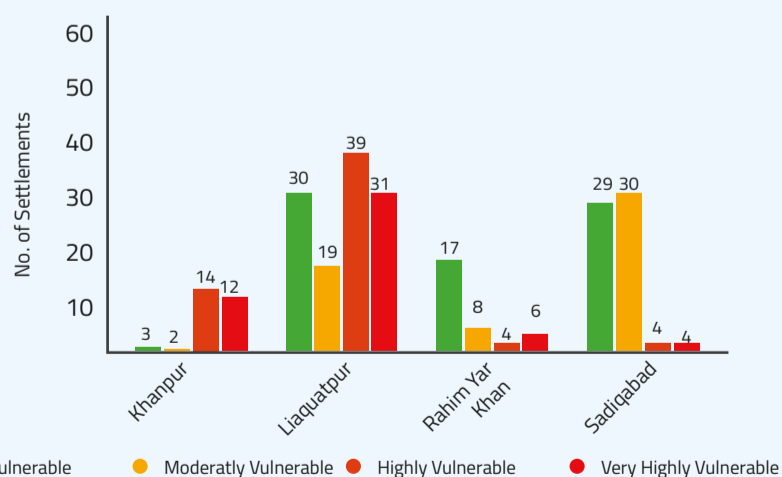
Panjnad Headworks		Islam Headworks	
Year	Discharge (Cs)	Year	Discharge (Cs)
1973	802,516	1955	4,925,581
1976	710,000	1988	306,425
1983	826,774	1992	183,902
1992	812,152	1995	160,421
2010	310,117	2010	22,798
2013	317,261	2013	70,932

Peak Discharge River Sutlej

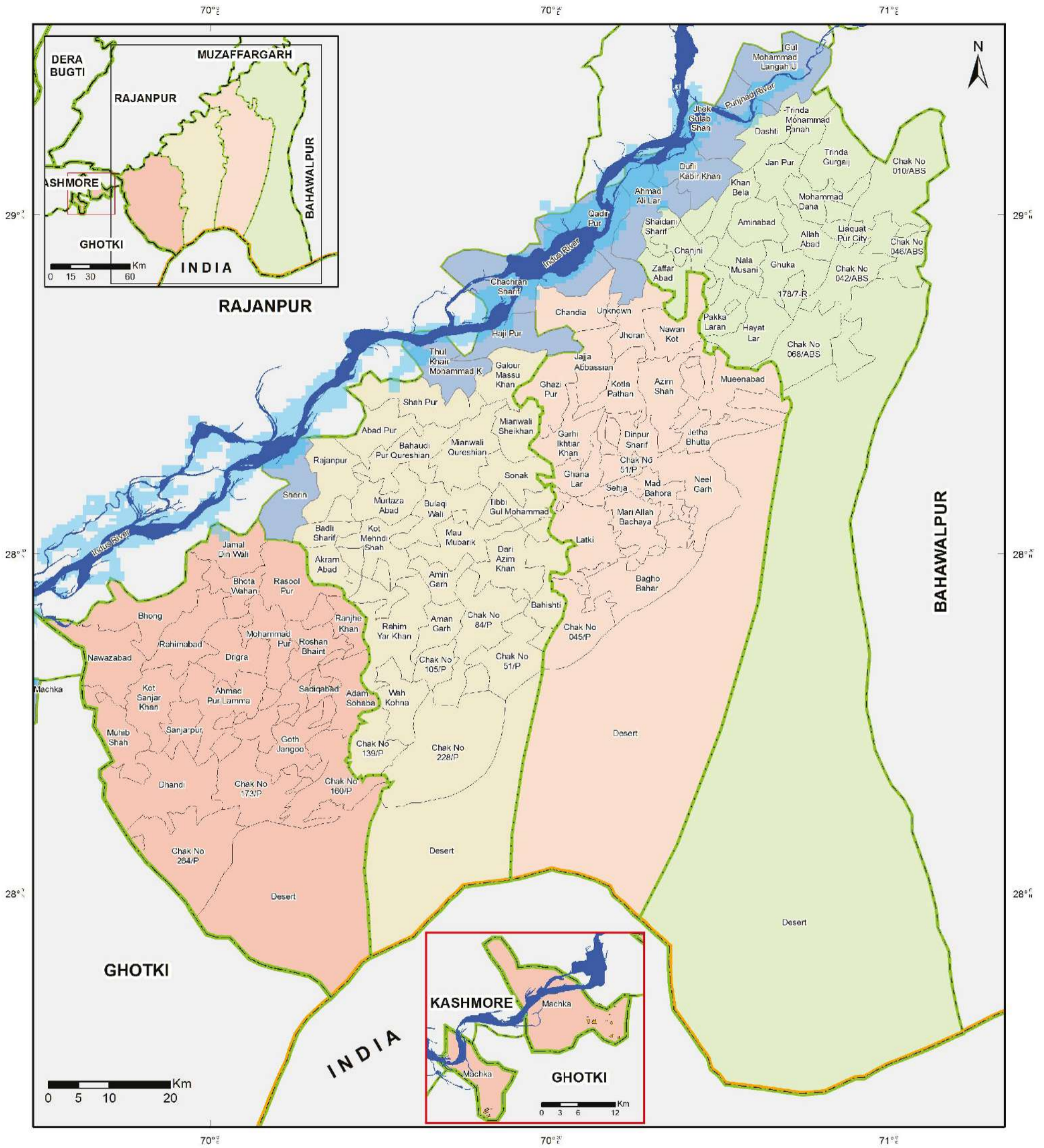
Flood Loses 2010

Houses Damaged	22,000
Area Affected	400,000 Acres
Population Affected	1,000,000 (70% women and children)
Population Displaced	250,000
School Buildings Affected	113
Health Facilities Affected	5
Roads Damaged	240 km
Cattlehead Displaced	900,000

Tehsilwise Distribution of Settlements Vulnerable to Floods Based on Inundation Frequency (2010-2015)



FLOOD HAZARD 10 YEAR RETURN PERIOD



Legend

Flood 10 Year Return Period	Tehsil Boundary
Flood Exposed UCs	Khanpur
River and Water Body	Liaquatpur
Union Council Boundary	Rahim Yar Khan
District Boundary	Sadiqabad
Provincial Boundary	
Line of Control	
International Boundary	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

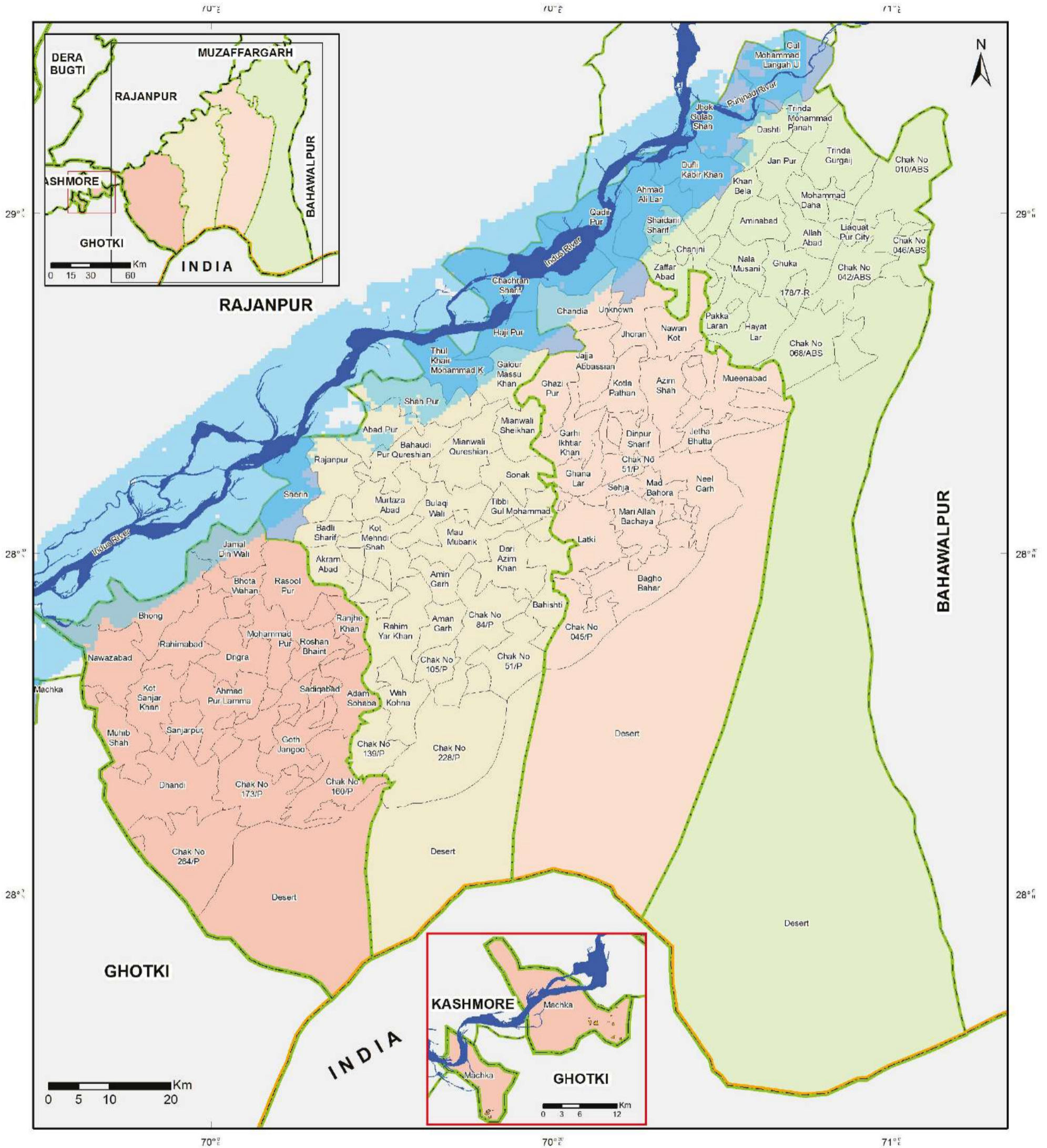
MAP INFORMATION

Data Source(s):
NDMA,
SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-MAR-2016-HAZ-04-NDMA-002
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

FLOOD HAZARD 50 YEAR RETURN PERIOD



Legend

Flood 50 Year Return Period	Tehsil Boundary
Flood Exposed UCs	Khanpur
River and Water Body	Liaquatpur
Union Council Boundary	Rahim Yar Khan
District Boundary	Sadiqabad
Provincial Boundary	
Line of Control	
International Boundary	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

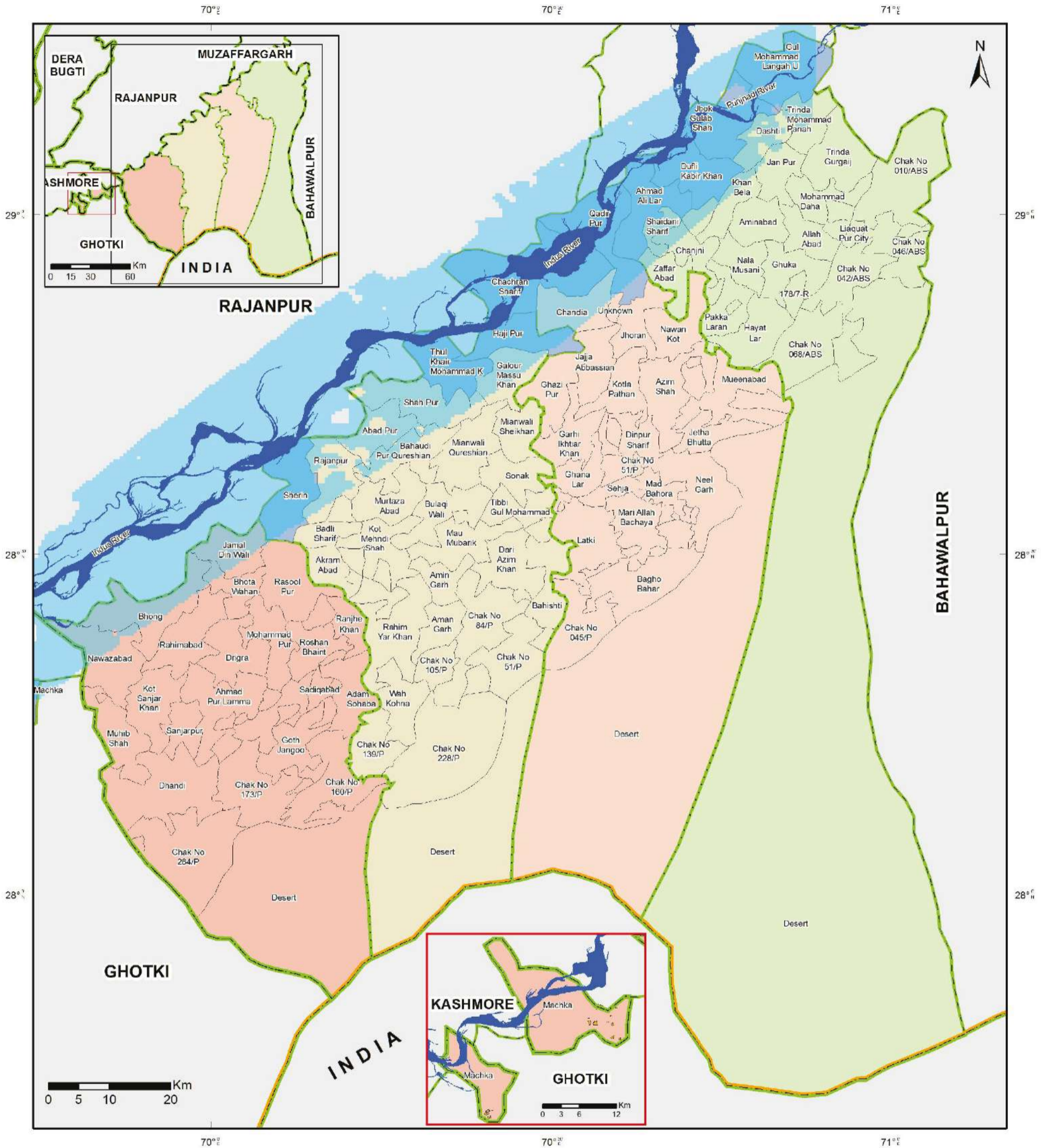
MAP INFORMATION

Data Source(s):
NDMA,
SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-MAR-2016-HAZ-04-NDMA-003
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

FLOOD HAZARD 100 YEAR RETURN PERIOD



Legend

- | | |
|------------------------------|-----------------|
| Flood 100 Year Return Period | Tehsil Boundary |
| Flood Exposed UCs | Khanpur |
| River and Water Body | Liaquatpur |
| Union Council Boundary | Rahim Yar Khan |
| District Boundary | Sadiqabad |
| Provincial Boundary | |
| Line of Control | |
| International Boundary | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
NDMA,
SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-MAR-2016-HAZ-04-NDMA-004
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017



C

EXPOSURE ASSESSMENT

- DROUGHT
- EARTHQUAKE
- FLOOD



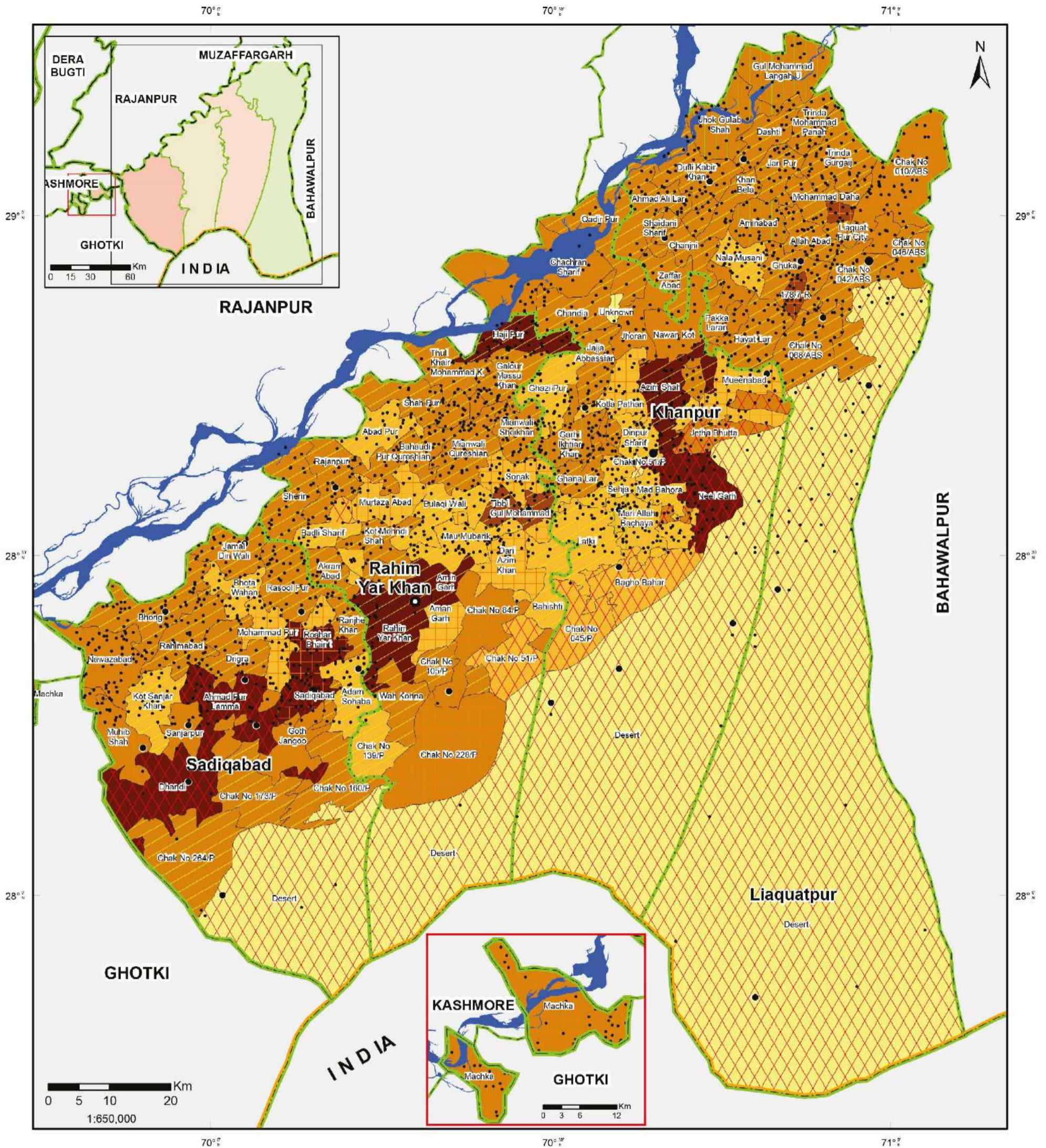
UNION COUNCILS	DEMOGRAPHICS			SETTLEMENTS	LAND USE & LAND COVER TYPE (AREA IN HA)					AGRICULTURE CROPS (AREA IN HA)			DROUGHT PRONE	FREQUENTLY DROUGHT PRONE
	POPULATION	MALE	FEMALE		CROP IRRIGATED	CROP IN FLOOD PLAIN	CROP RAINFED	CROP MARGINAL	ORCHARDS	KHARIF CROP		RABI CROP		
										RICE	SUGARCANE	WHEAT		
ABAD PUR	37,534	19,437	18,098	23	2,725	2,397	0	145	485	1	1,140	2,126	MO	MI
AKRAM ABAD	52,660	28,641	24,019	16	4,278	0	0	24	223	0	1,575	1,570	MO	MO
AMAN GARH	38,439	19,902	18,536	0	3,282	0	0	0	43	0	219	1,904	SE	MO
AMIN GARH	116,487	60,233	56,254	9	4,852	0	0	45	76	0	451	2,809	MO	MO
BADLI SHARIF	35,737	18,814	16,922	16	3,650	0	0	211	135	0	1,484	1,212	MO	MO
BAHAUDI PUR QURESHIAN	52,026	27,570	24,456	41	5,260	0	0	279	1,729	2	1,911	2,372	MO	MI
BAHISHTI	38,059	19,821	18,238	8	5,557	0	0	0	36	7	245	2,376	MO	MO
BULAQI WALI	37,432	19,440	17,991	40	6,310	0	0	36	875	0	2,290	2,485	MO	MO
CHAK NO 105/P	43,023	22,385	20,638	0	3,781	0	0	44	30	0	242	2,642	MO	MO
CHAK NO 139/P	36,652	18,887	17,765	1	5,184	0	0	61	28	0	383	2,757	MO	MO
CHAK NO 228/P	44,475	23,409	21,066	6	11,202	0	0	9	38	2	280	7,606	SE	SE
CHAK NO 51/P	31,604	16,551	15,053	6	7,788	0	0	0	177	28	511	4,934	EX	MO
CHAK NO 84/P	54,293	28,229	26,064	2	10,178	0	0	0	160	4	510	7,612	SE	SE
DARI AZIM KHAN	31,834	16,470	15,364	17	6,395	0	0	0	26	3	578	4,314	SE	SE
DESSERT	0	0	0	1	875	0	0	0	0	0	0	446	EX	SE
GALOUR MASSU KHAN	45,465	23,557	21,908	37	5,804	0	0	0	0	212	1,256	2,068	MO	MI
HAJI PUR	111,189	57,831	53,358	33	4,851	116	0	0	0	357	423	2,120	MO	MI
KOT MEHNDI SHAH	47,331	24,814	22,517	22	5,604	0	0	157	284	0	1,964	2,074	MO	MO
MAU MUBARIK	29,273	15,124	14,149	46	6,312	0	0	78	344	0	1,285	3,354	MO	MO
MIANWALI QURESHIAN	46,501	24,009	22,491	52	5,688	0	0	583	1,427	9	1,679	2,394	MO	MO
MIANWALI SHEIKHAN	46,258	24,001	22,257	40	4,621	0	0	13	233	81	1,769	1,730	MO	MO
MURTAZA ABAD	32,142	16,883	15,259	23	4,610	0	0	0	1,691	0	2,354	1,581	SE	SE
RAHIM YAR KHAN	357,548	186,056	171,492	19	7,969	0	0	61	112	0	560	5,139	MO	MO
RAJANPUR	47,658	25,399	22,259	32	3,181	3,279	0	64	406	0	2,247	2,232	MO	MO
SHAH PUR	44,205	23,139	21,066	38	3,636	3,385	0	27	912	34	2,274	2,740	MO	MI
SHERIN	44,625	23,772	20,854	30	3,279	4,893	0	90	254	25	2,205	2,732	MO	MO
SONAK	39,078	19,921	19,157	40	6,563	0	0	12	44	7	1,668	2,920	SE	SE
THUL KHAIR MOHAMMAD K	42,188	22,105	20,083	25	3,339	2,818	0	0	189	30	1,024	3,089	MO	MO
TIBBI GUL MOHAMMAD	67,910	34,955	32,955	29	4,430	0	0	0	30	7	1,230	1,960	MO	MO
WAH KOHNA	40,943	21,365	19,579	1	5,437	0	0	100	125	0	819	3,130	MO	MO
DISTRICT TOTAL:	5,445,880	2,838,074	2,607,809	2,612	600,729	53,262	56	11,609	16,060	10,966	113,002	312,122		

LEGEND: **NO** NO DROUGHT **MI** MILD DROUGHT **MO** MODERATE DROUGHT **SE** SEVERE DROUGHT **EX** EXTREME DROUGHT

Elements at Risk According to Drought Severity

ELEMENTS AT RISK	DROUGHT PRONE					FREQUENTLY DROUGHT PRONE				
	EX	SE	MO	MI	NO	EX	SE	MO	MI	NO
Population	592,371	1,264,652	3,304,512	224,809	59,536	293,300	1,076,783	3,175,178	841,083	59,536
Settlements	219	548	1,665	175	5	59	620	1,471	456	6
Crop Irrigated	104,880	138,579	327,138	29,237	895	23,346	184,105	327,867	63,858	1,553
Crop in Flood Plain	0	18,255	30,926	4,081	0	0	18,255	20,542	14,465	0
Crop Rainfed	0	42	0	14	0	0	42	0	14	0
Crop Marginal	2,389	3,285	5,696	218	21	1,814	2,711	5,945	1,118	21
Orchards	491	2,732	12,806	32	0	123	2,834	9,206	3,897	0
Rice	805	4,218	5,428	516	1	0	4,723	5,018	1,187	38
Sugarcane	7,512	24,100	75,691	5,609	90	2,197	26,815	68,181	15,637	172
Wheat	47,282	82,089	165,074	17,151	525	9,276	98,944	166,475	36,622	805

SETTLEMENTS, VILLAGES, MAJOR TOWNS AND POPULATION EXPOSED TO DROUGHT



Legend

- District Headquarter
- Tehsil Headquarter
- Major Towns
- Settlements / Villages

Population Distribution

- Abc < 10000
- Abc 10001 - 20000
- Abc 20001 - 40000
- Abc 40001 - 60000
- Abc 60001 - 80000
- Abc > 80000

Drought Prone Union Council

- No Drought
- Mild Drought
- Moderate
- Severe
- Extreme

Other Features

- Line of Control
- International Boundary
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary

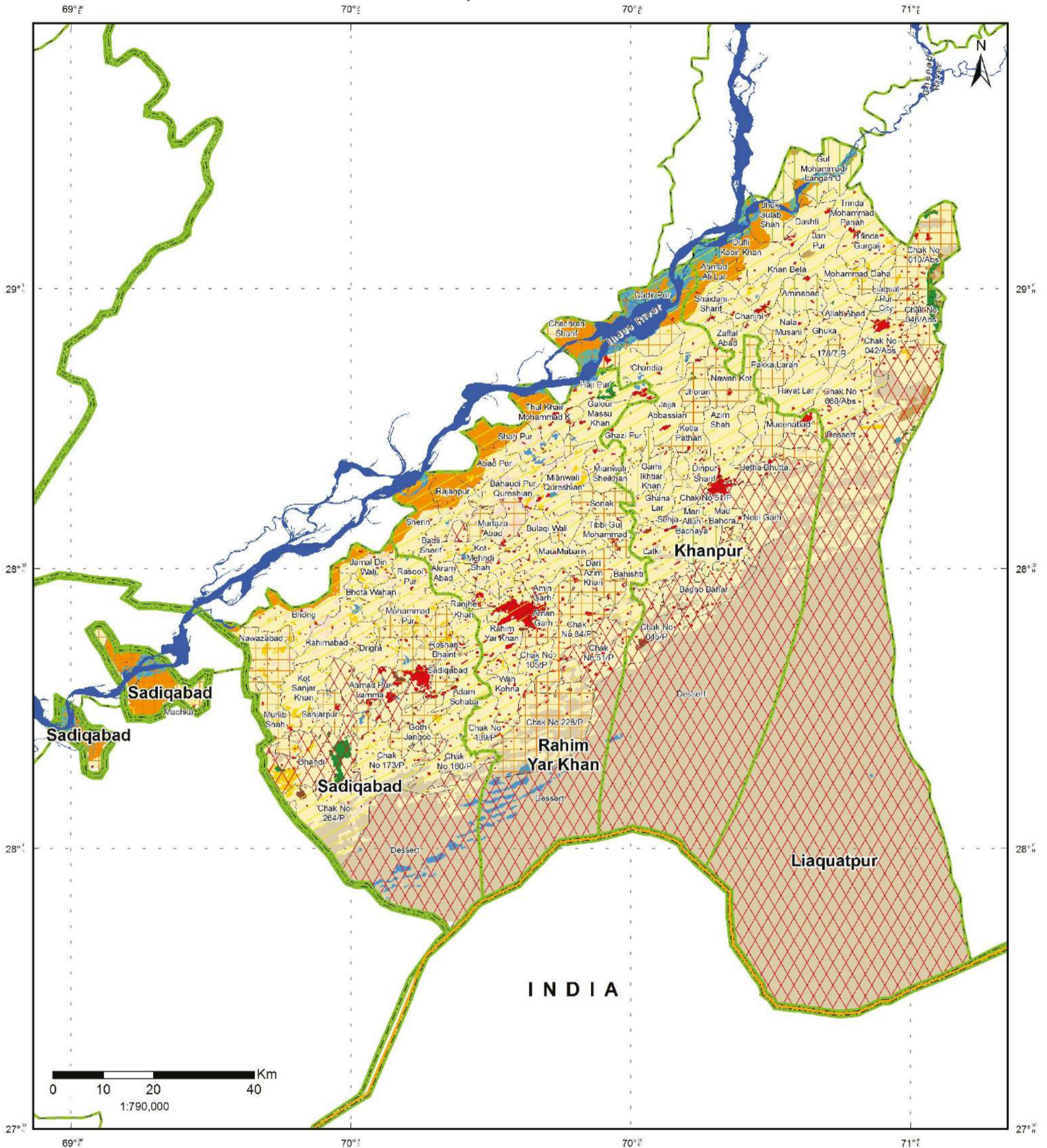
Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-APR-2016-EXP-02-NDMA-DP-C(POP-SET)
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

LAND USE & LAND COVER EXPOSED TO DROUGHT



Legend

Bare Areas	River and Water Body	Drought Prone Union Council
Bare Areas with Sparse Natural Vegetation	Union Council Boundary	No Drought
Built-up	Tehsil Boundary	Mild
Crop in Flood Plain	District Boundary	Moderate
Crop Marginal and Irrigated Saline	Provincial Boundary	Severe
Crop Rainfed	Line of Control	Extreme
Crop Irrigated	International Boundary	
Forest - Natural Trees and Mangroves		
Natural Vegetation in Wet Areas		
Orchards		
Range Lands - Natural Shrubs and Herbs		
Snow and Glaciers		
Wet Areas		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984

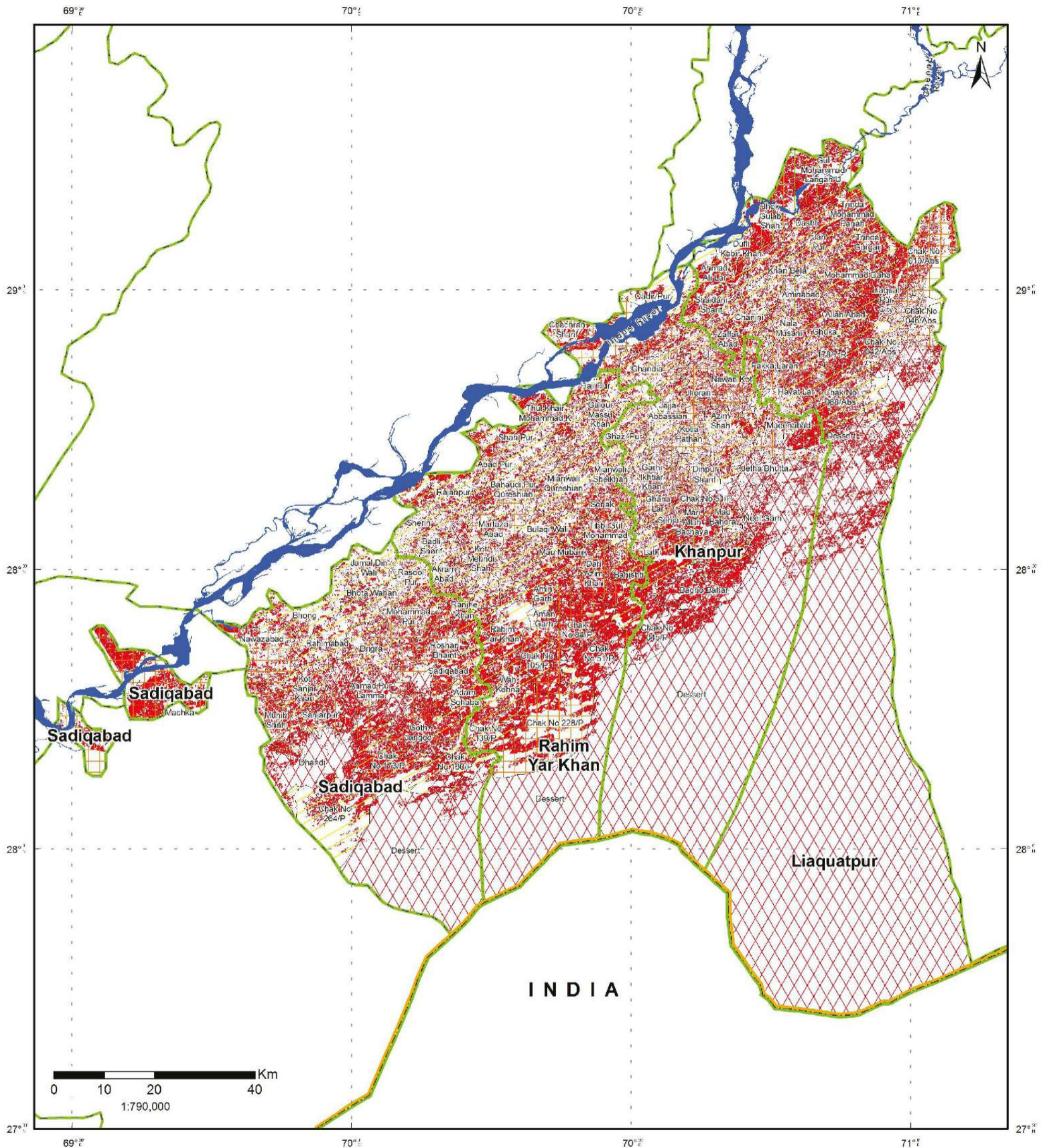
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-02-NDMA-DP-LULC

Prepared by: Project Management Unit, NDMA

Last Updated: 10th May, 2017

CROP EXPOSED TO DROUGHT (RABI SEASON)

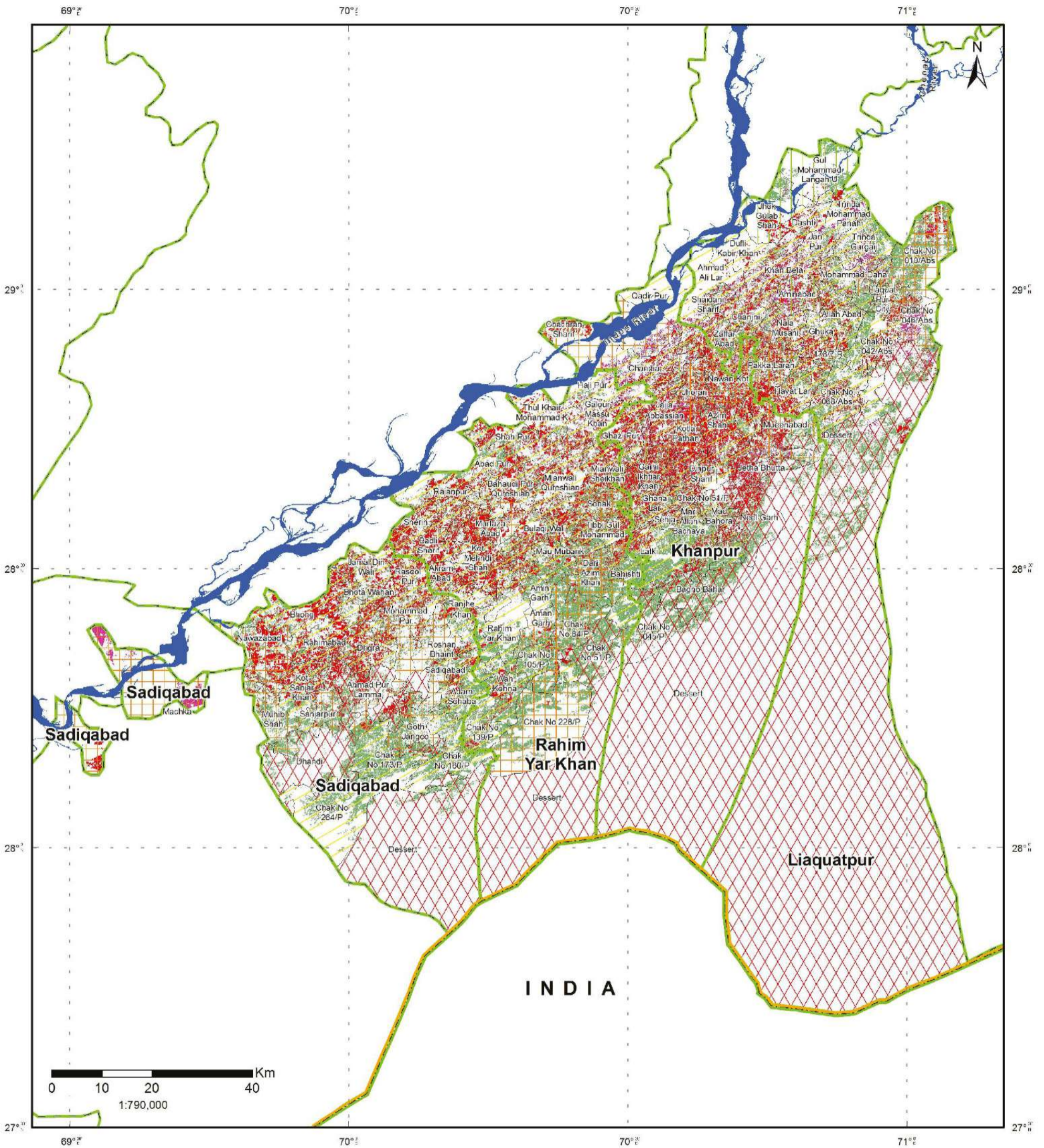


Legend	
Wheat	River and Water Body
Union Council Boundary	Tehsil Boundary
District Boundary	Provincial Boundary
Line of Control	International Boundary
No Drought	Mild
Moderate	Severe
Extreme	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION
 Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-APR-2016-EXP-02-NDMA-DP-RB-CROPS
 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017

CROP EXPOSED TO DROUGHT (KHARIF SEASON)



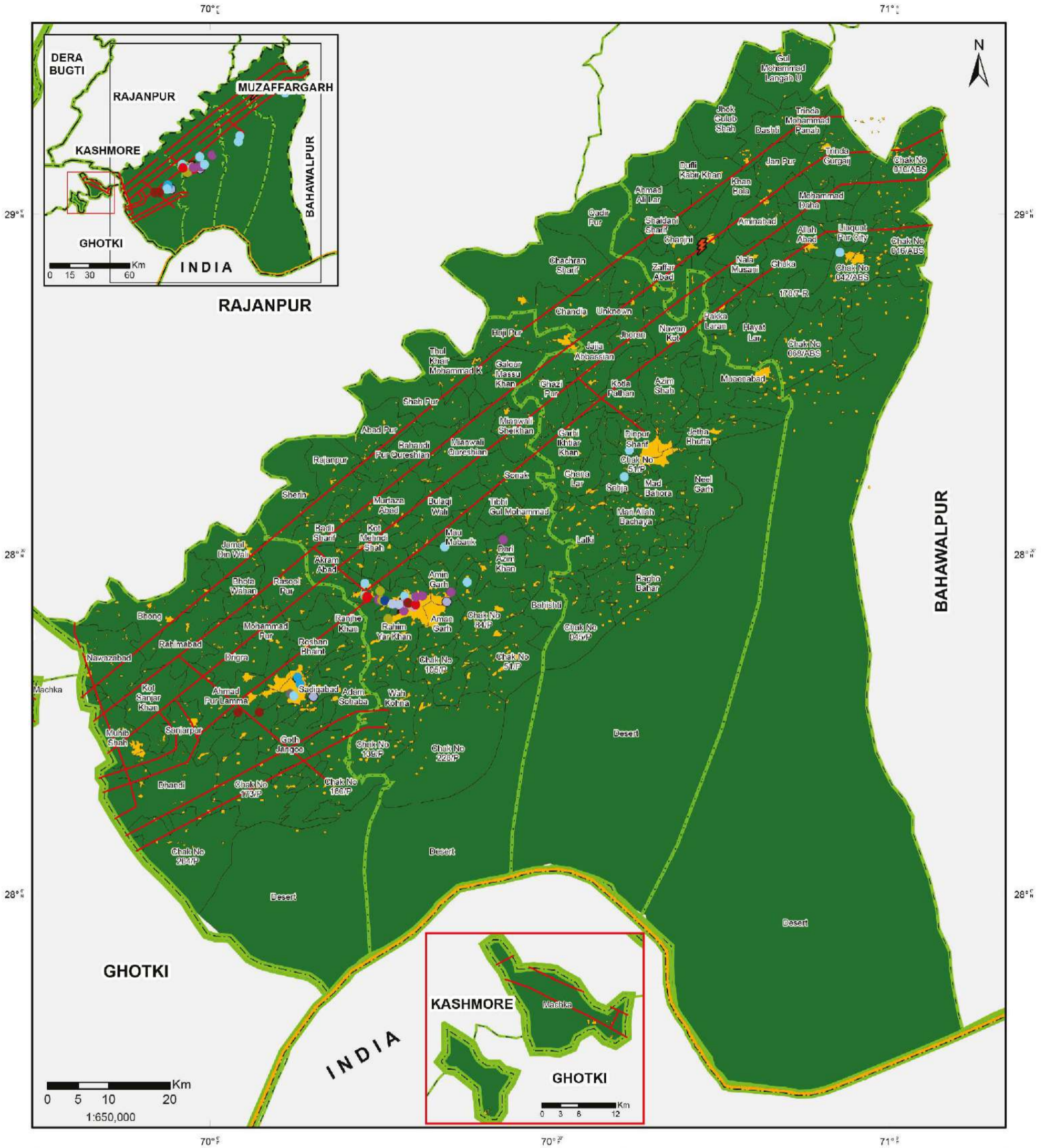
Legend		Drought Prone Union Council	
	Cotton		River and Water Body
	Rice		Union Council Boundary
	Sugarcane		Tehsil Boundary
			District Boundary
			Provincial Boundary
			Line of Control
			International Boundary
			No Drought
			Mild
			Moderate
			Severe
			Extreme

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-APR-2016-EXP-02-NDMA-DP-KH-CROPS
 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017

BUILT UP, MAJOR INDUSTRIES & CRITICAL INFRASTRUCTURE EXPOSED TO EARTHQUAKE 50 YEAR RETURN PERIOD



Legend

● Sugar Mill	● Oil Storage
● Cotton Industry	⚡ Grid Station
● Oil Mill	— Sui Northern Gas Pipeline
● Textile Industry	■ Builtup Area
● Flour Mill	▭ Union Council Boundary
● Agriculture based Industry	▭ Tehsil Boundary
● Chemical and Fertilizer Industry	▭ District Boundary
● Cosmetics Industry	▭ Provincial Boundary
● Phramaceutical Industry	— Line of Control
● Ice Factory	— International Boundary
● LPG Industry	
● Plastic Manufacturing Industry	
● Ceramic Industry	

Hazard Zone (g)*

1 (0.05-0.08) Very Low

Zones are categories as per classification of Pakistan Engineering Council. Symbol "(g)" represent Gravitational Acceleration

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

Logos: Government of Punjab, WFP, United Nations World Food Programme

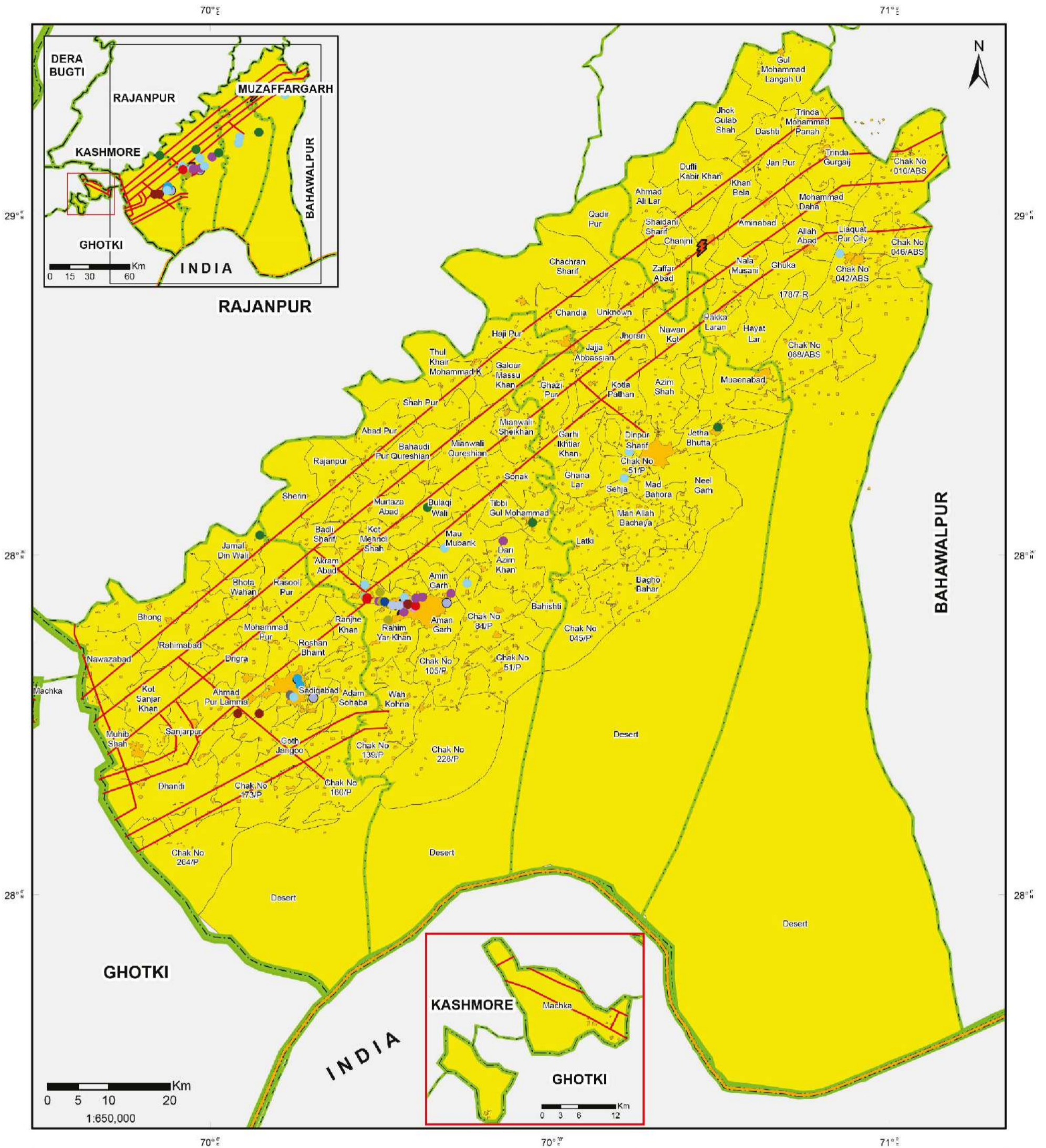
MAP INFORMATION

Data Source(s): Punjab Agricultural Board, Government of Punjab
Directorate General of Petroleum Concessions

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-50-C(BU-MI-CI)
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

BUILT UP, MAJOR INDUSTRIES & CRITICAL INFRASTRUCTURE EXPOSED TO EARTHQUAKE 475 YEAR RETURN PERIOD



Legend

- Sugar Mill
- Cotton Industry
- Oil Mill
- Textile Industry
- Flour Mill
- Agriculture based Industry
- Chemical and Fertilizer Industry
- Cosmetics Industry
- Phramaceutical Industry
- Ice Factory
- LPG Industry
- Plastic Manufacturing Industry
- Ceramic Industry
- Oil Storage
- ⚡ Grid Station
- Sui Northern Gas Pipeline
- Builtup Area
- ▭ Union Council Boundary
- ▭ Tehsil Boundary
- ▭ District Boundary
- ▭ Provincial Boundary
- ▭ Line of Control
- ▭ International Boundary
- Hazard Zone (g)***
- 2B (0.16-0.24) Medium

Zones are categories as per classification of Pakistan Engineering Council. Symbol "(g)" represent Gravitational Acceleration

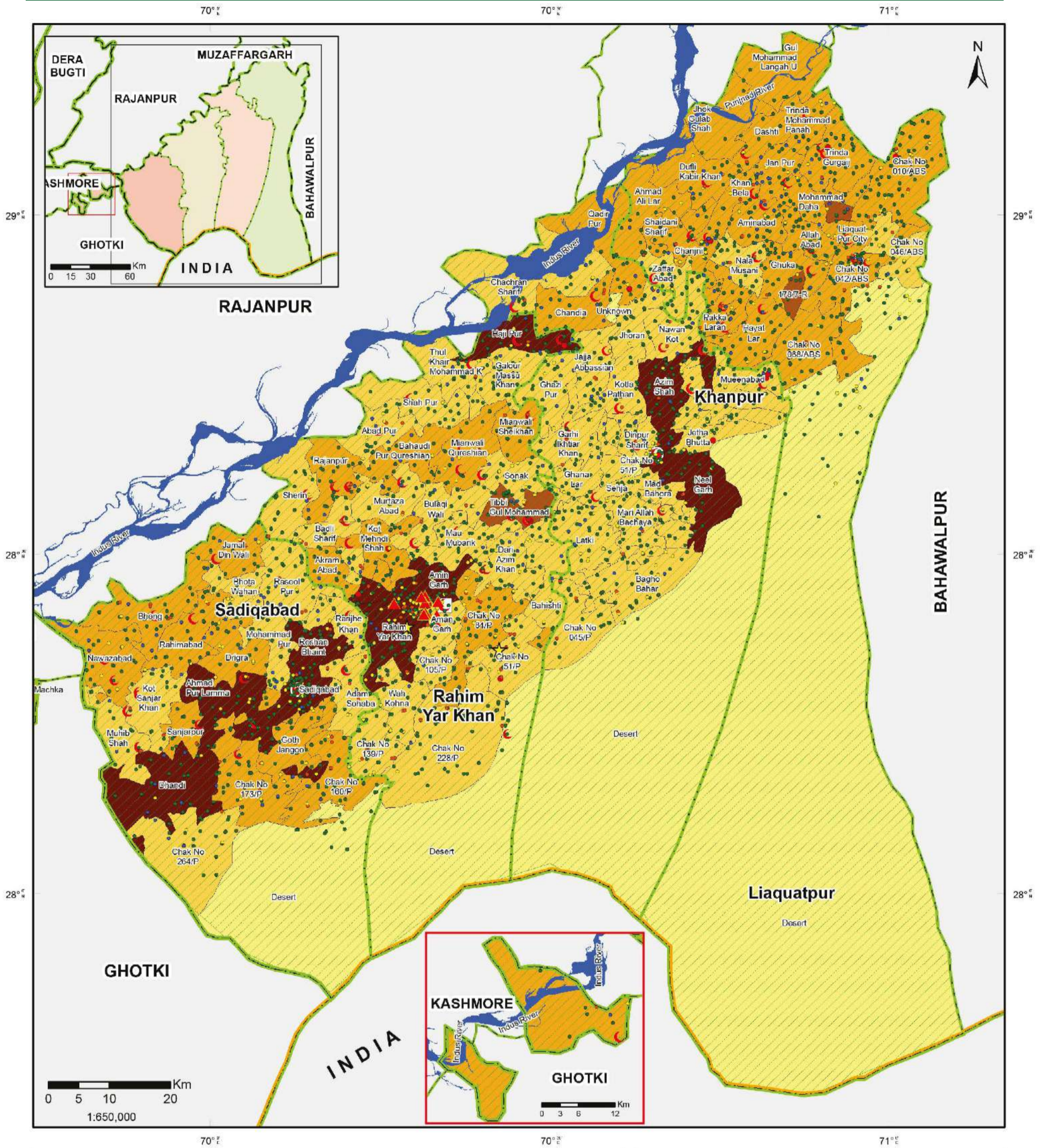
Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION
 Data Source(s): Punjab Agricultural Board, Government of Punjab
 Directorate General of Petroleum Concessions

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-475-C(BU-MI-C)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 2nd May, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO EARTHQUAKE 50 YEAR RETURN PERIOD



Legend

- | | | |
|--------------------------------------|------------------------------|-------------------------------|
| District Headquarter Hospital | Middle School | Return Period 50 Years |
| Tehsil Headquarter Hospital | Primary School | Very Low (Zone 1) |
| Civil Hospital & Tuberculosis Clinic | Masjid/Maktab School | River and Water Body |
| Basic Health Unit | | Tehsil Boundary |
| Rural Health Centre | Building Distribution | District Boundary |
| Maternal/Child Health Centre | Abc < 3000 | Provincial Boundary |
| University | Abc 3000 - 6000 | Line of Control |
| College | Abc 6000 - 9000 | International Boundary |
| Higher Secondary School | Abc 9000 - 12000 | |
| High School | Abc > 12000 | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



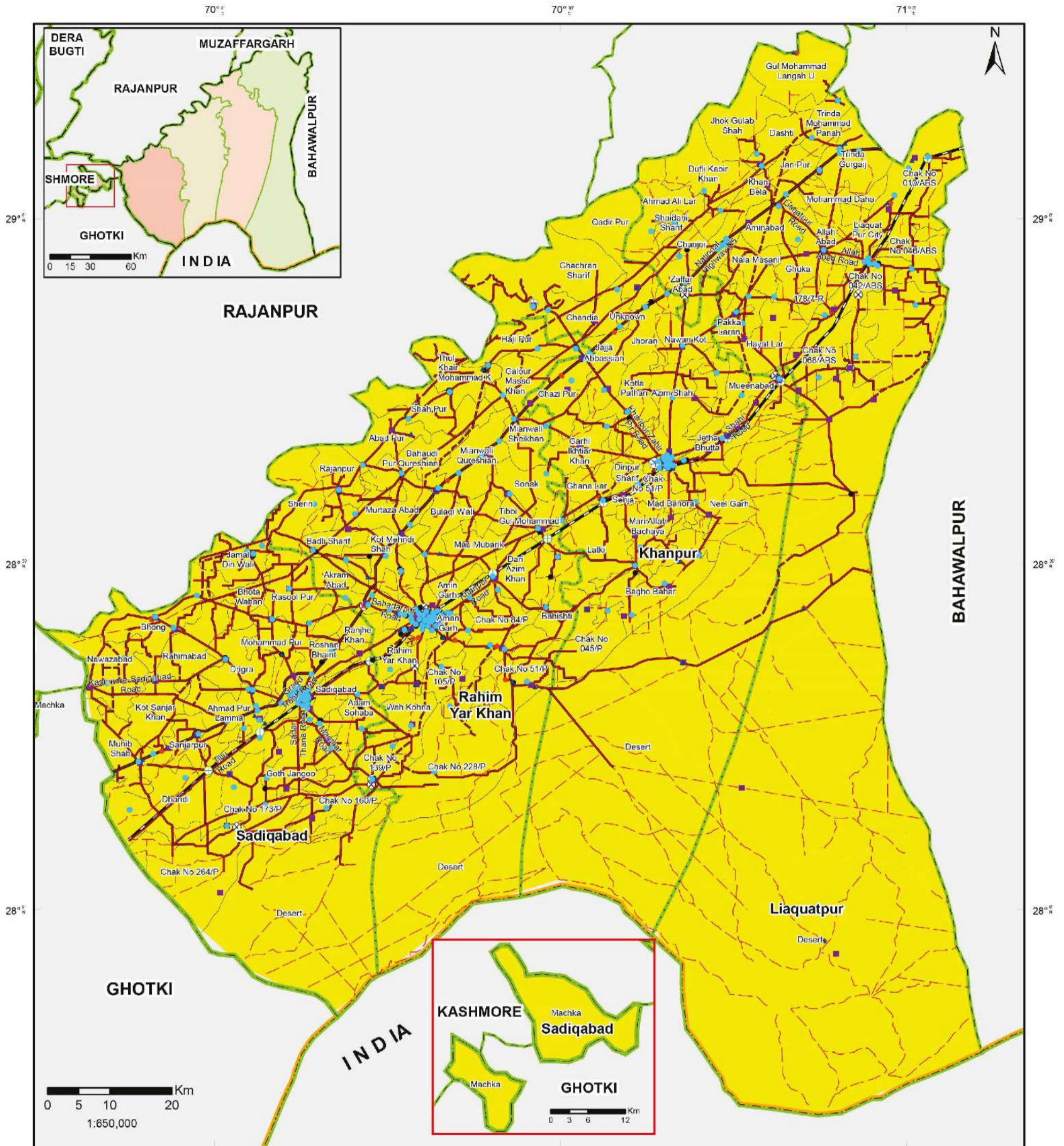
MAP INFORMATION

Data Source(s):
 Pakistan Bureau of Statistics
 School Education Department
 World Health Organization
 Health Department Punjab

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-475-C(HF-EF-BD)
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO EARTHQUAKE 475 YEARS RETURN PERIOD



Legend

- | | | |
|-----------------------------|------------------------------|--------------------------------|
| ● Mobilink | 🌉 Bridge | ▭ Union Council Boundary |
| ■ Telenor | 🛣️ Motorway | ▭ Tehsil Boundary |
| ▲ Ufone | 🛣️ Trunk/Highway | ▭ District Boundary |
| ● Warid | 🛣️ Metalled Roads | ▭ Provincial Boundary |
| ● Zong | 🛣️ Unmetalled Road | ▭ Line of Control |
| ✈️ Airport | 🛣️ Cart track | ▭ International Boundary |
| ✈️ Air Field/Landing Strips | 🛣️ Pack track | Return Period 475 Years |
| 🚂 Railway Station | 🛣️ Broad Gauge Railway Track | 🟡 Moderate (Zone 2B) |
| 🚌 Bus Station | 🛣️ Other Gauge Railway Track | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



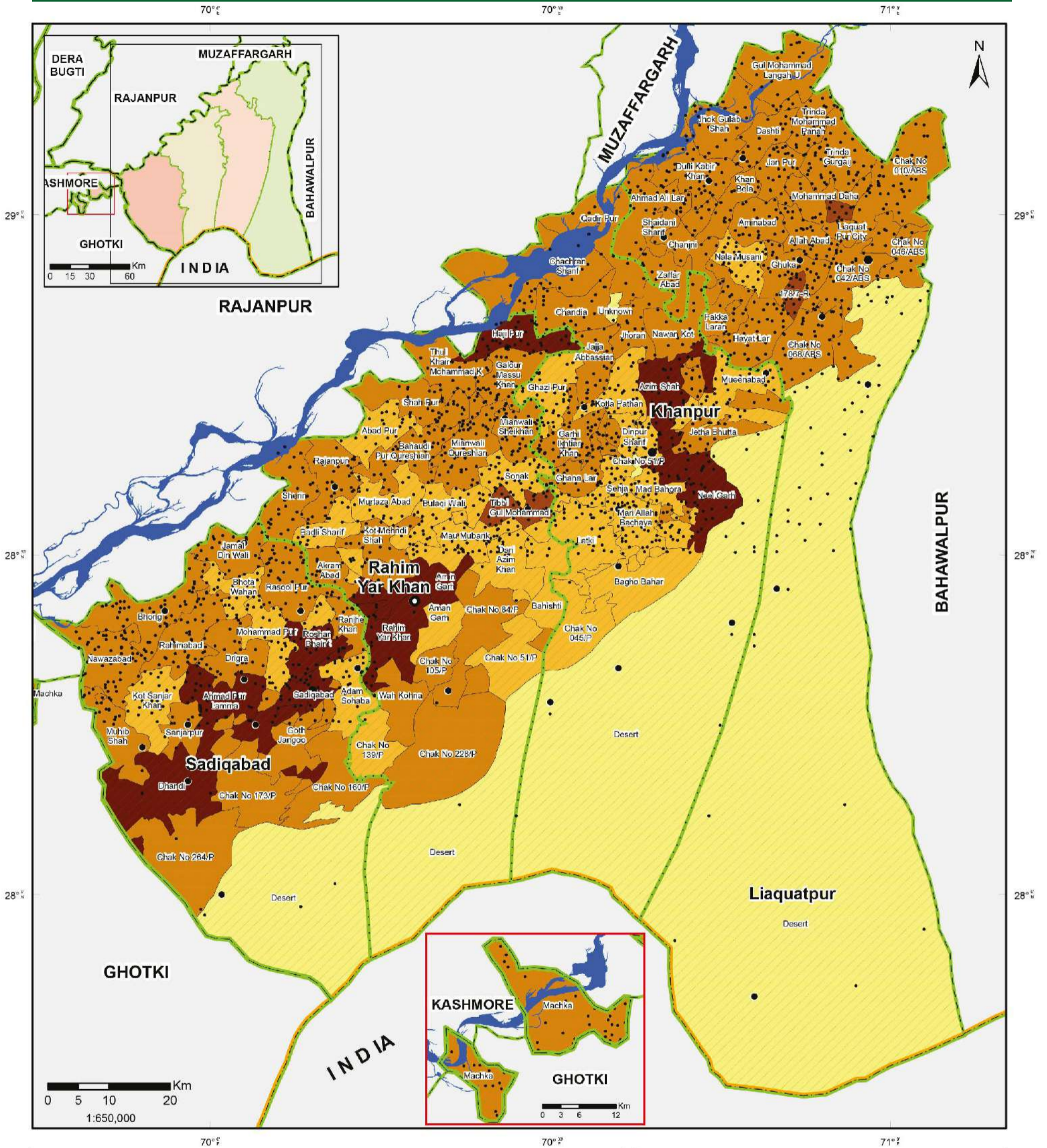
MAP INFORMATION

Survey of Pakistan
National Highway Authority
Pakistan Telecommunication Authority

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-475-C(TR-CT)
Prepared by: Project Management Unit, NDMA
Last Updated: 4th May, 2017

SETTLEMENTS, VILLAGES, MAJOR TOWNS AND POPULATION EXPOSED TO EARTHQUAKE RETURN PERIOD 50 YEARS



Legend

- District Headquarter
 - Tehsil Headquarter
 - Major Towns
 - Settlements / Villages
- Population Distribution**
- Abc < 10000
 - Abc 10001 - 20000
 - Abc 20001 - 40000
 - Abc 40001 - 60000
 - Abc 60001 - 80000
 - Abc > 80000
- Earthquake Hazard**
- Very Low (Zone 1)
 - River and Water Body
 - Abc Tehsil Boundary
 - ABC District Boundary
 - Provincial Boundary
 - Line of Control
 - International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

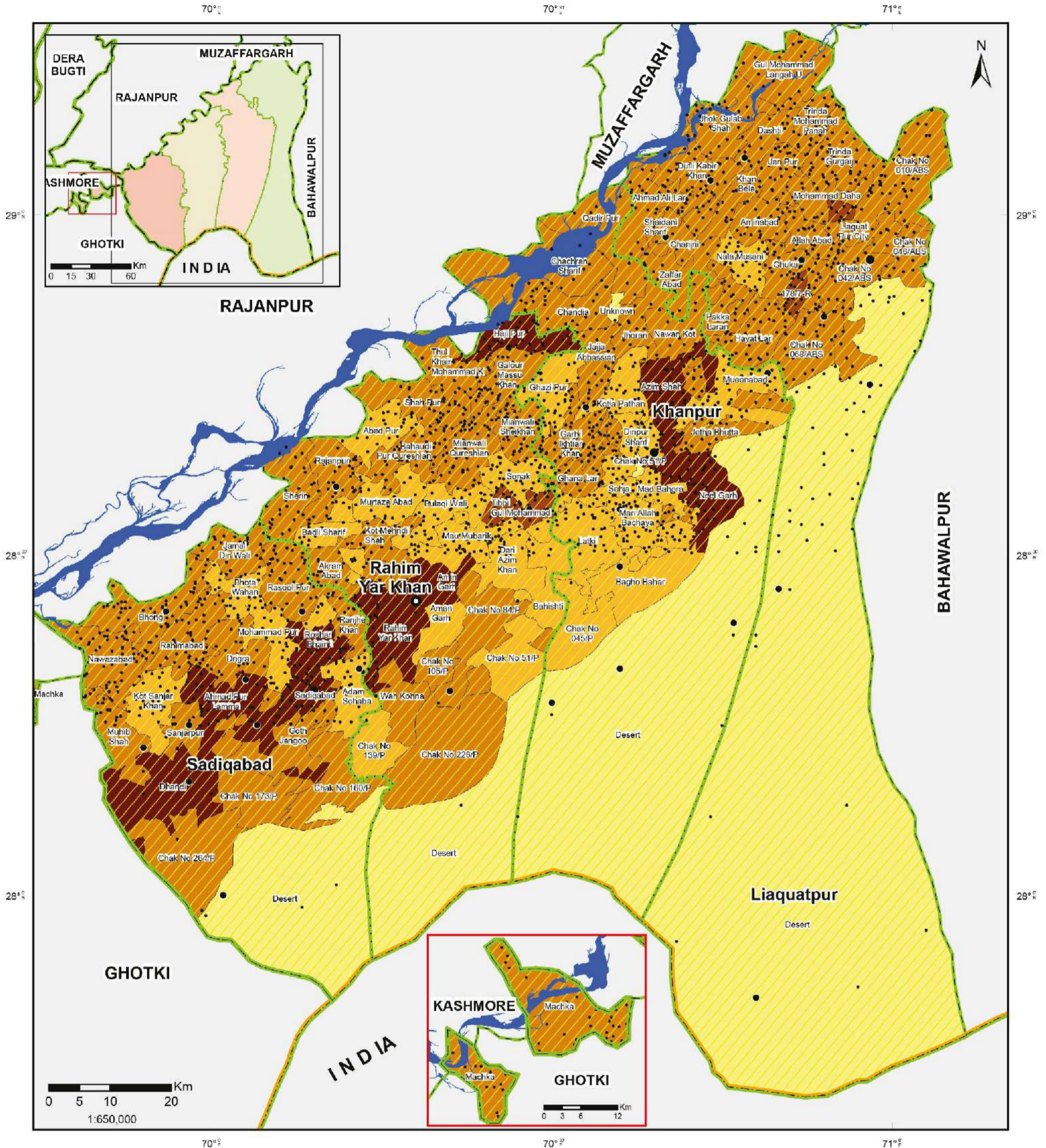


MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-50-C(POP-SET)
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

SETTLEMENTS, VILLAGES, MAJOR TOWNS AND POPULATION EXPOSED TO EARTHQUAKE RETURN PERIOD 475 YEARS



Legend

- District Headquarter
 - Tehsil Headquarter
 - Major Towns
 - Settlements / Villages
- Population Distribution**
- | | |
|-----|---------------|
| Abc | < 10000 |
| Abc | 10001 - 20000 |
| Abc | 20001 - 40000 |
| Abc | 40001 - 60000 |
| Abc | 60001 - 80000 |
| Abc | > 80000 |
- Earthquake Hazard**
- ▨ Moderate (Zone 2B)
 - River and Water Body
- Boundaries**
- Abc Tehsil Boundary
 - ABC District Boundary
 - ▭ Provincial Boundary
 - Line of Control
 - ▭ International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

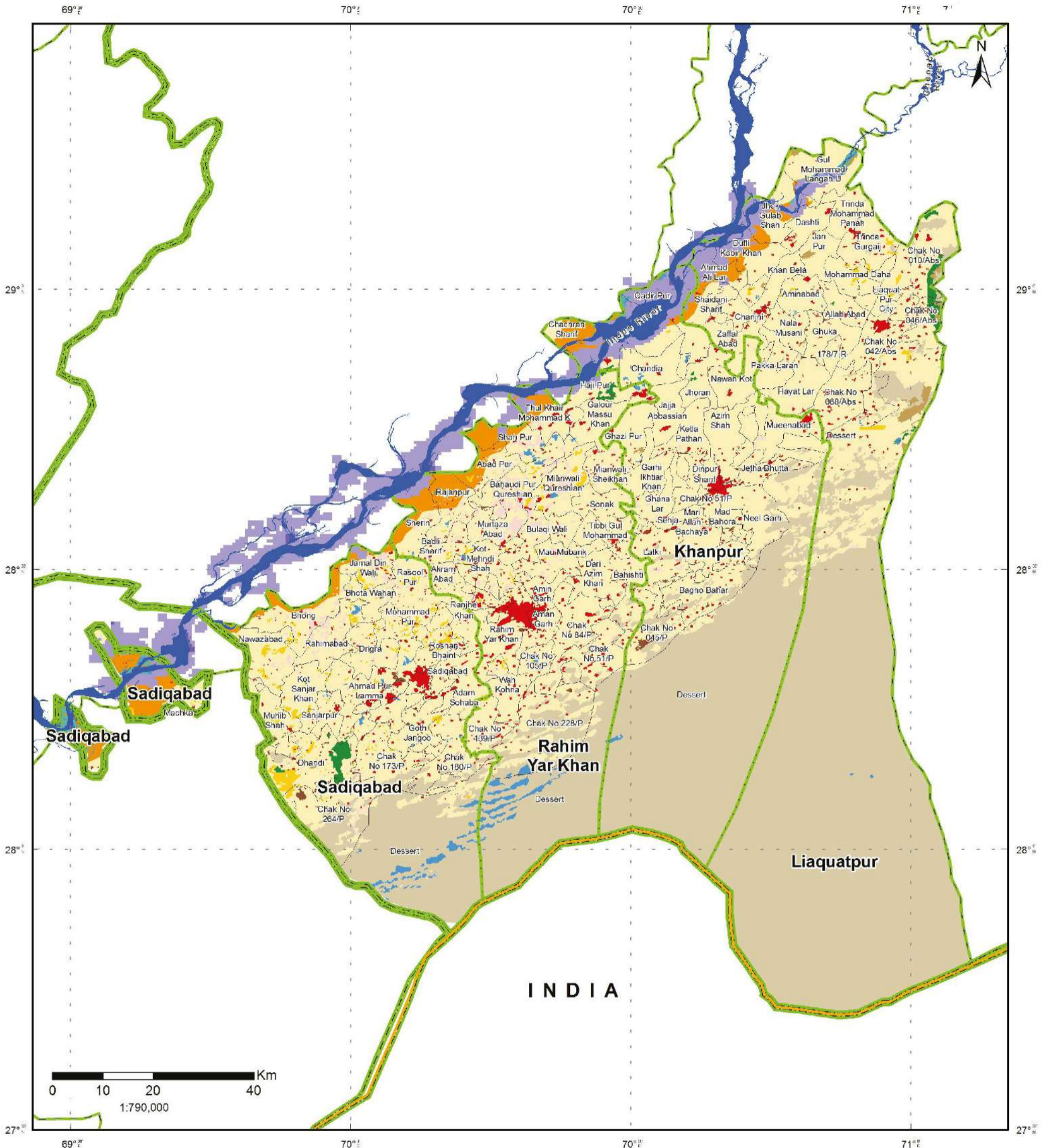


MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Survey of Pakistan





Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-475-C(POP-SET)
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

LAND USE & LAND COVER EXPOSED TO FLOOD RETURN PERIOD 10 YEARS



Legend		Return Period 10 Years	
	Bare Areas		No Flood
	Bare Areas with Sparse Natural Vegetation		Low
	Built-up		Medium
	Crop in Flood Plain		High
	Crop Marginal and Irrigated Saline		Very High
	Crop Rainfed		
	Crop Irrigated		
	Forest - Natural Trees and Mangroves		
	Natural Vegetation in Wet Areas		
	Orchards		
	Range Lands - Natural Shrubs and Herbs		
	Snow and Glaciers		
	Wet Areas		
	River and Water Body		
	Union Council Boundary		
	Tehsil Boundary		
	District Boundary		
	Provincial Boundary		
	Line of Control		
	International Boundary		

**Multi Hazard Vulnerability & Risk
Assessment, Rahim Yar Khan
Punjab, Pakistan**

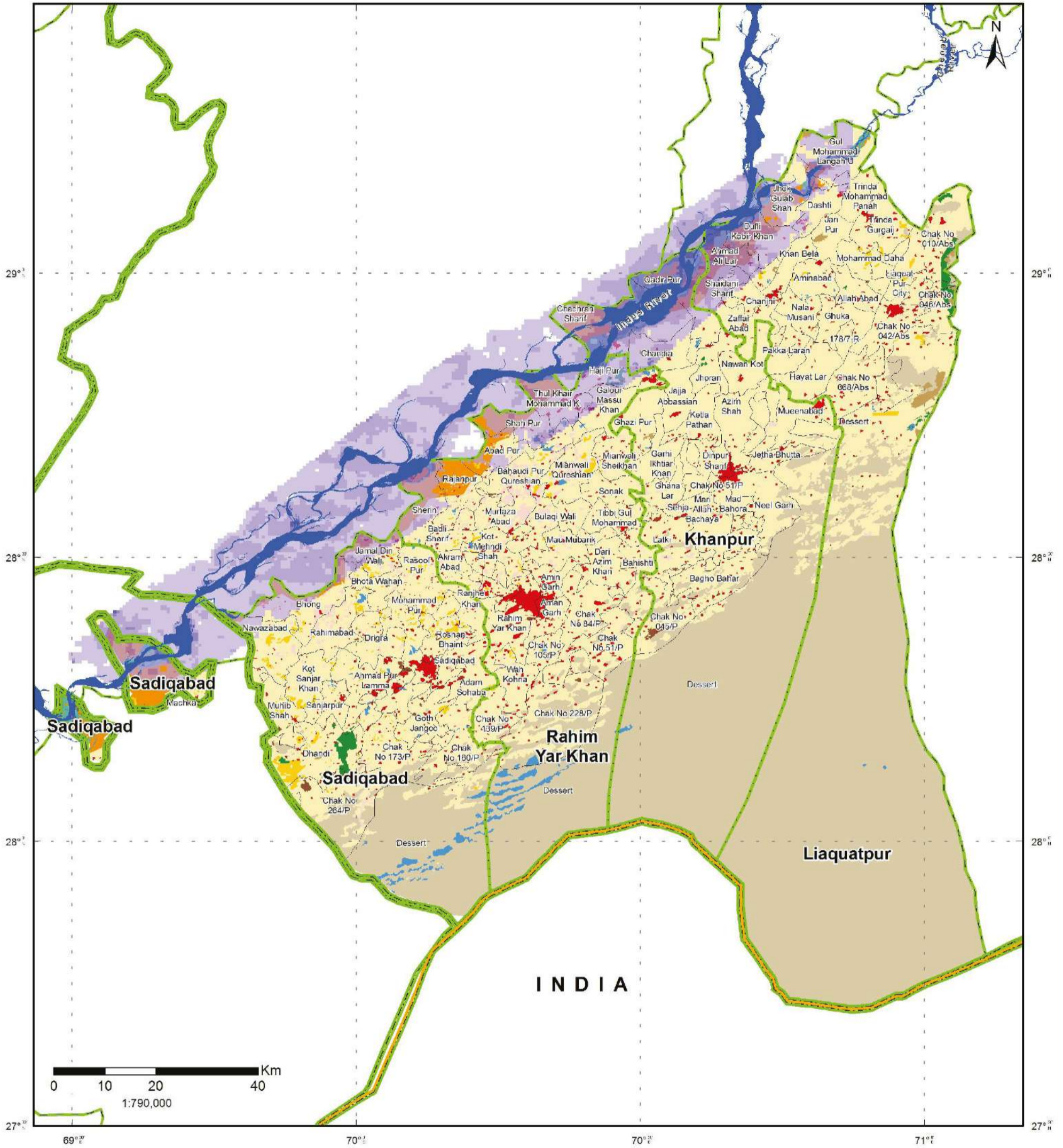
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-10-LULC
Prepared by: Project Management Unit, NDMA
Last Updated: 10th May, 2017

LAND USE & LAND COVER EXPOSED TO FLOOD RETURN PERIOD 50 YEARS



Legend

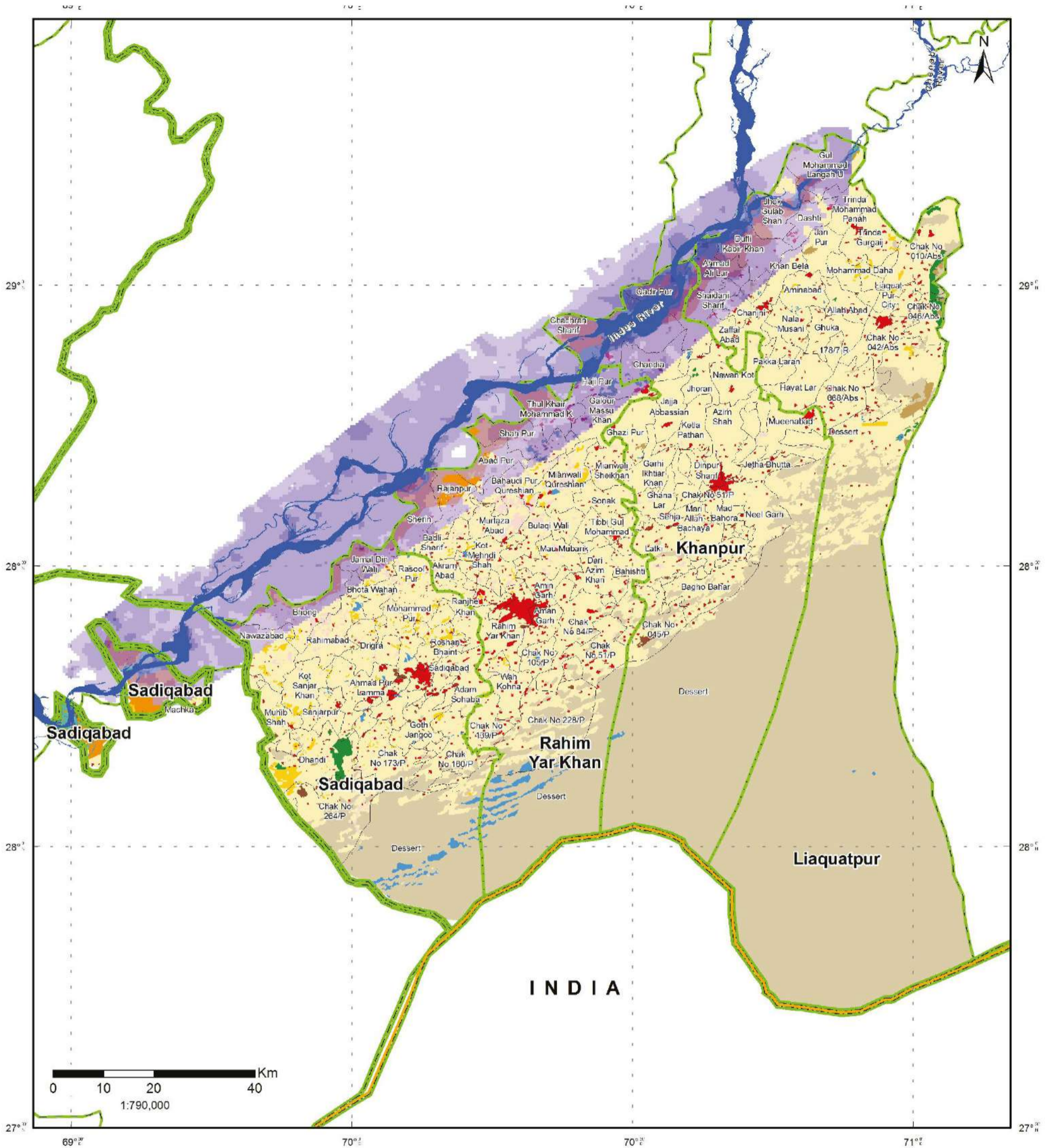
Bare Areas	River and Water Body	Return Period 50 Years
Bare Areas with Sparse Natural Vegetation	Union Council Boundary	No Flood
Built-up	Tehsil Boundary	Low
Crop in Flood Plain	District Boundary	Medium
Crop Marginal and Irrigated Saline	Provincial Boundary	High
Crop Rainfed	Line of Control	Very High
Crop Irrigated	International Boundary	
Forest - Natural Trees and Mangroves		
Natural Vegetation in Wet Areas		
Orchards		
Range Lands - Natural Shrubs and Herbs		
Snow and Glaciers		
Wet Areas		

**Multi Hazard Vulnerability & Risk
Assessment, Rahim Yar Khan
Punjab, Pakistan**

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Landcover-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-50-LULC
 Prepared by: Project Management Unit, NDMA
 Last Updated: 10th May, 2017

LAND USE & LAND COVER EXPOSED TO FLOOD RETURN PERIOD 100 YEARS



Legend

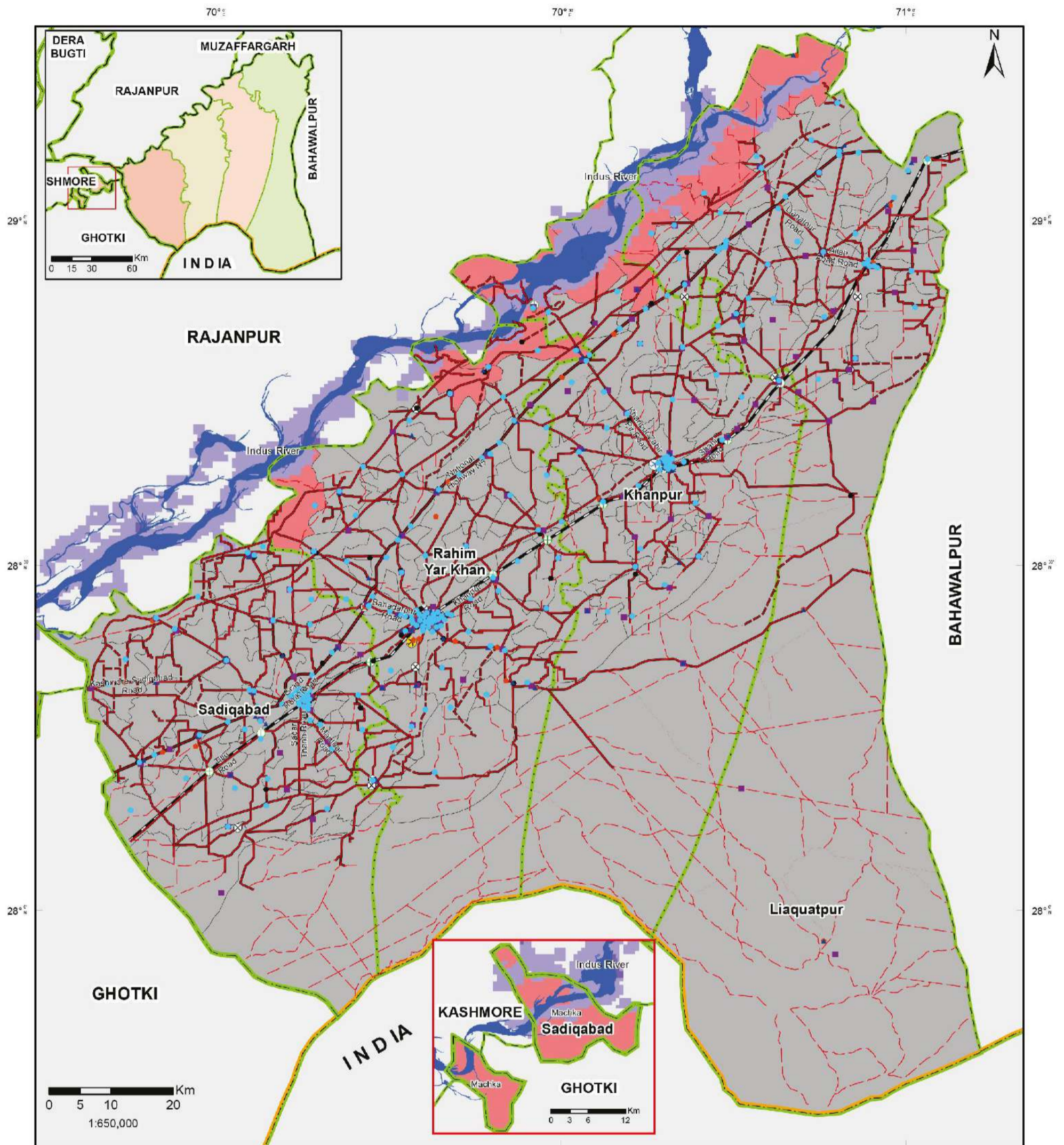
Bare Areas	River and Water Body	Return Period 100 Years: No Flood
Bare Areas with Sparse Natural Vegetation	Union Council Boundary	Low
Built-up	Tehsil Boundary	Medium
Crop in Flood Plain	District Boundary	High
Crop Marginal and Irrigated Saline	Provincial Boundary	Very High
Crop Rainfed	Line of Control	
Crop Irrigated	International Boundary	
Forest - Natural Trees and Mangroves		
Natural Vegetation in Wet Areas		
Orchards		
Range Lands - Natural Shrubs and Herbs		
Snow and Glaciers		
Wet Areas		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Landcover-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-100-LULC
 Prepared by: Project Management Unit, NDMA
 Last Updated: 10th May, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO FLOOD 10 YEARS RETURN PERIOD



Legend

- | | | |
|----------------------------|-----------------------------|--------------------------|
| ● Mobilink | — Bridge | ■ River and Water Body |
| ■ Telenor | — Motorway | — Tehsil Boundary |
| ▲ Ufone | — Trunk/Highway | — International Boundary |
| ● Warid | — Metalled Roads | — Provincial Boundary |
| ● Zong | — Unmetalled Road | — Line of Control |
| ⊙ Airport | — Cart track | ■ Exposed UCs |
| ⊙ Air Field/Landing Strips | — Pack track | ■ Unexposed UCs |
| ⊕ Railway Station | — Broad Gauge Railway Track | — District Boundary |
| ⊗ Bus Station | — Other Gauge Railway Track | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

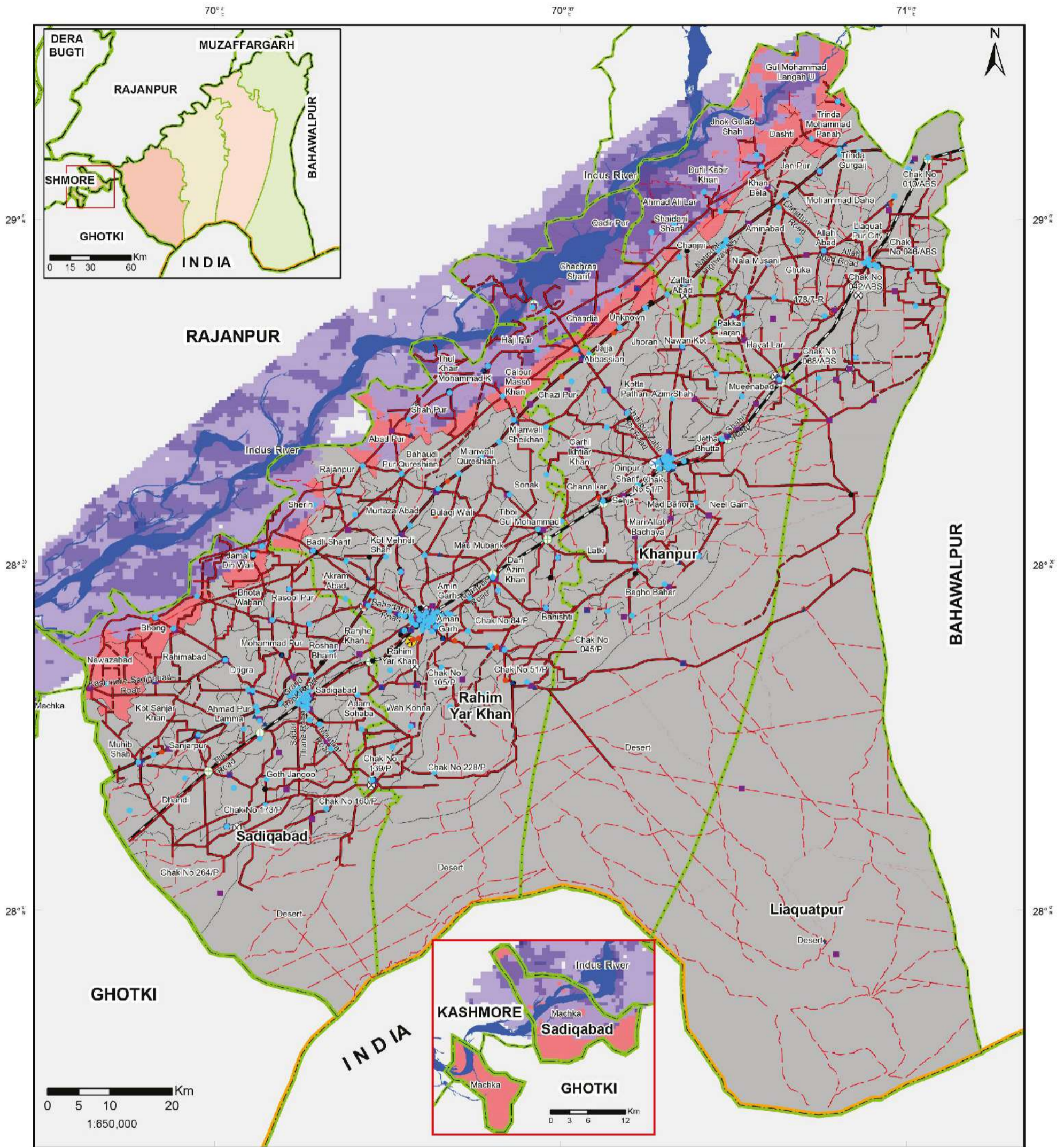


MAP INFORMATION
 Survey of Pakistan
 National Highway Authority
 Pakistan Telecommunication Authority

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-10-C(TR-CT)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 4th May, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO FLOOD 50 YEARS RETURN PERIOD



Legend

- | | | |
|----------------------------|-----------------------------|--------------------------|
| ● Mobilink | ⚡ Bridge | ■ River and Water Body |
| ■ Telenor | ⚡ Motorway | ▭ Tehsil Boundary |
| ▲ Ufone | ⚡ Trunk/Highway | ▭ District Boundary |
| ● Warid | ⚡ Metalled Roads | ▭ International Boundary |
| ● Zong | ⚡ Unmetalled Road | ▭ Provincial Boundary |
| ✈ Airport | ⚡ Cart track | ▭ Line of Control |
| ✈ Air Field/Landing Strips | ⚡ Pack track | ■ Exposed UCs |
| 🚂 Railway Station | ⚡ Broad Gauge Railway Track | ■ Unexposed UCs |
| 🚌 Bus Station | ⚡ Other Gauge Railway Track | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



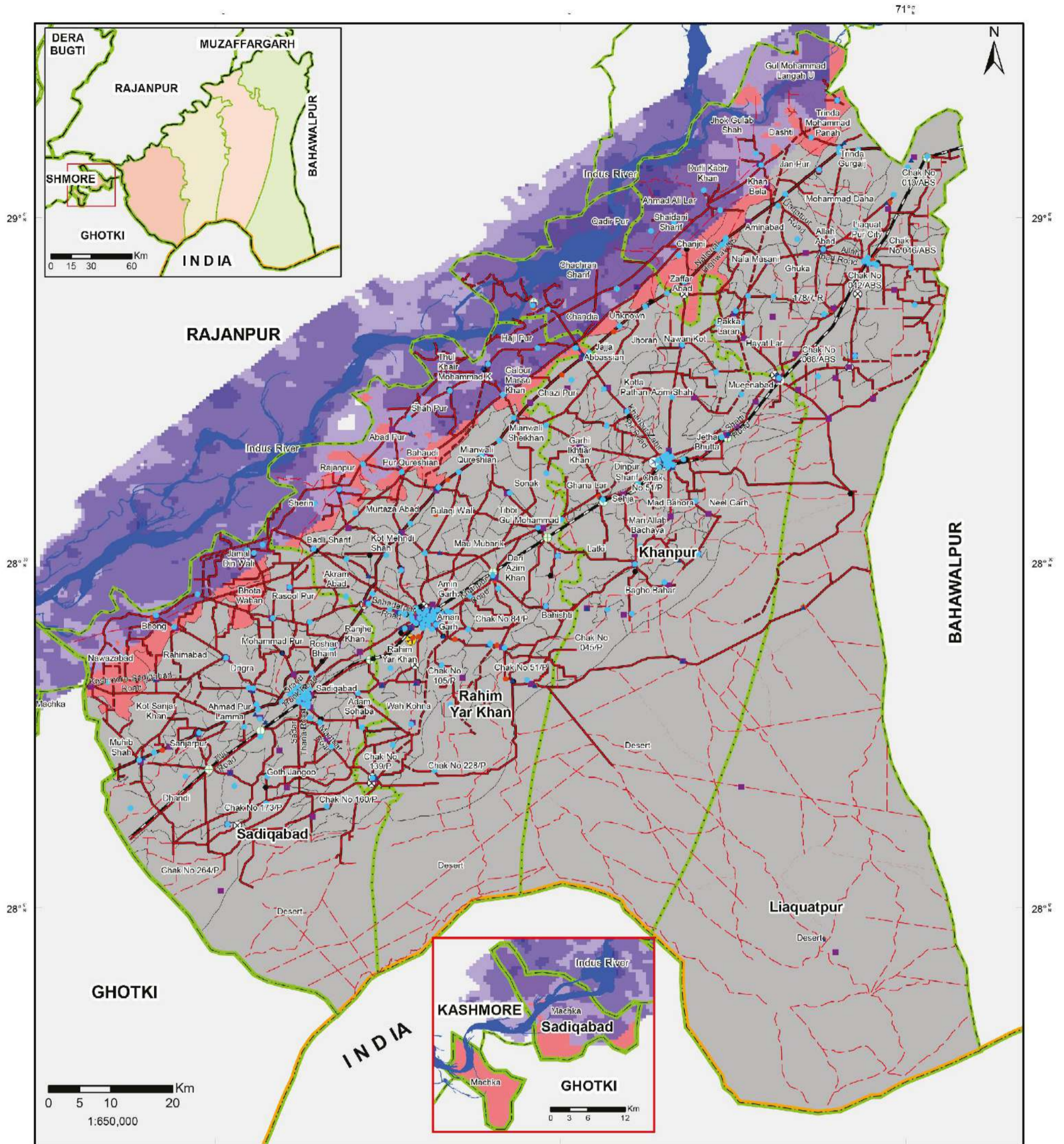
MAP INFORMATION

Survey of Pakistan
National Highway Authority
Pakistan Telecommunication Authority

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-50-C(TR-CT)
Prepared by: Project Management Unit, NDMA
Last Updated: 4th May, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO FLOOD 100 YEARS RETURN PERIOD



Legend

● Mobilink	⌒ Bridge	■ River and Water Body
■ Telenor	— Motorway	■ Exposed UCs
▲ Ufone	— Trunk/Highway	■ Unexposed UCs
● Warid	— Metalled Roads	■ Tehsil Boundary
● Zong	--- Unmetalled Road	■ District Boundary
✈ Airport	— Cart track	■ Provincial Boundary
✈ Air Field/Landing Strips	— Pack track	— Line of Control
🚂 Railway Station	— Broad Gauge Railway Track	— International Boundary
⊗ Bus Station	— Other Gauge Railway Track	

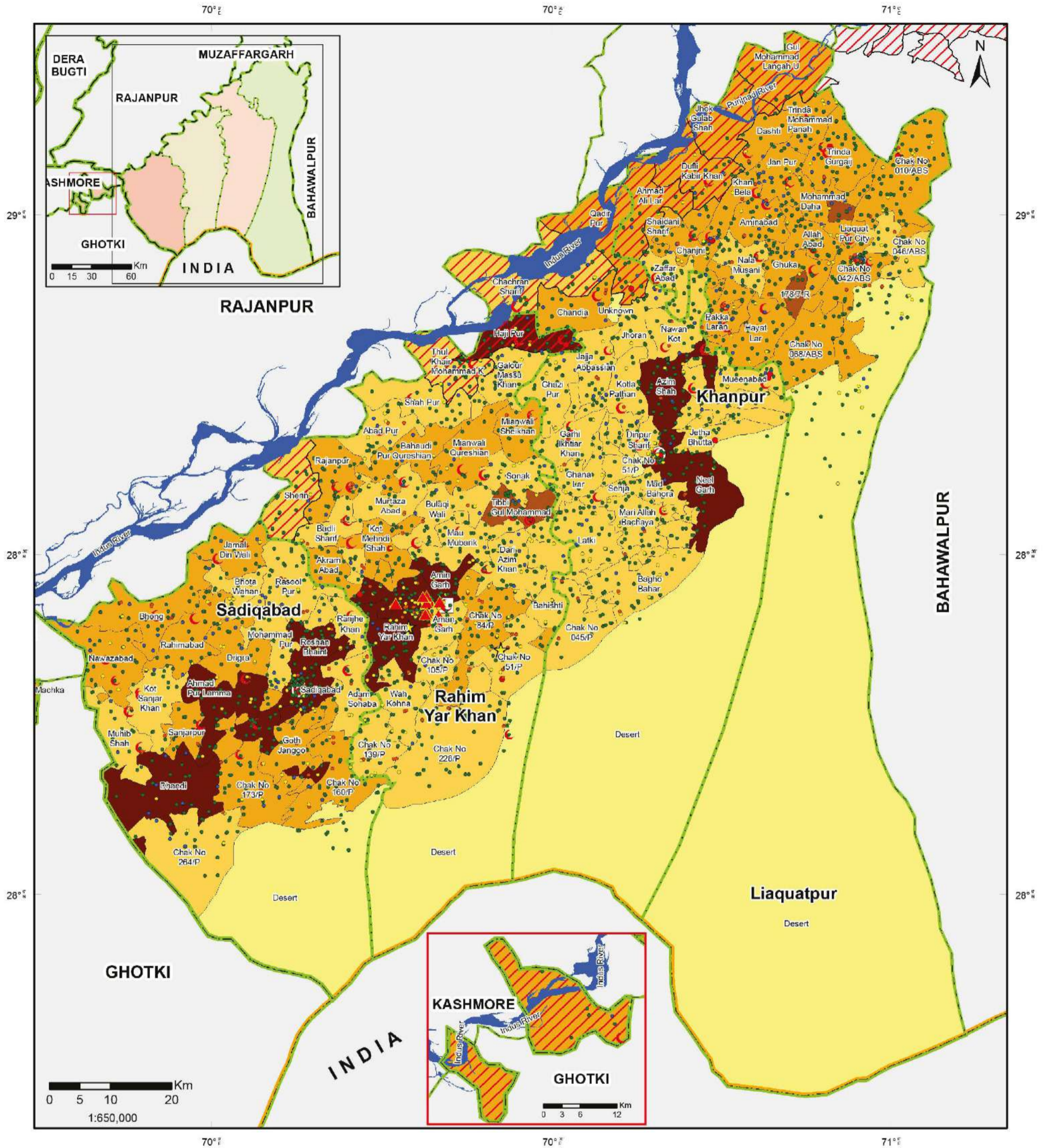
Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION
 Survey of Pakistan
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 Pakistan Telecommunication Authority

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-100-C(TR-CT)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 4th May, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO FLOOD 10 YRP



Legend

- | | | |
|--------------------------------------|------------------------------|------------------------|
| District Headquarter Hospital | Middle School | River and Water Body |
| Tehsil Headquarter Hospital | Primary School | Tehsil Boundary |
| Civil Hospital & Tuberculosis Clinic | Masjid/Maktab School | District Boundary |
| Basic Health Unit | | Provincial Boundary |
| Rural Health Centre | Building Distribution | Line of Control |
| Maternal/Child Health Centre | < 3000 | International Boundary |
| University | 3000 - 6000 | |
| College | 6000 - 9000 | |
| Higher Secondary School | 9000 - 12000 | |
| High School | > 12000 | |
| | Exposed UCs | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



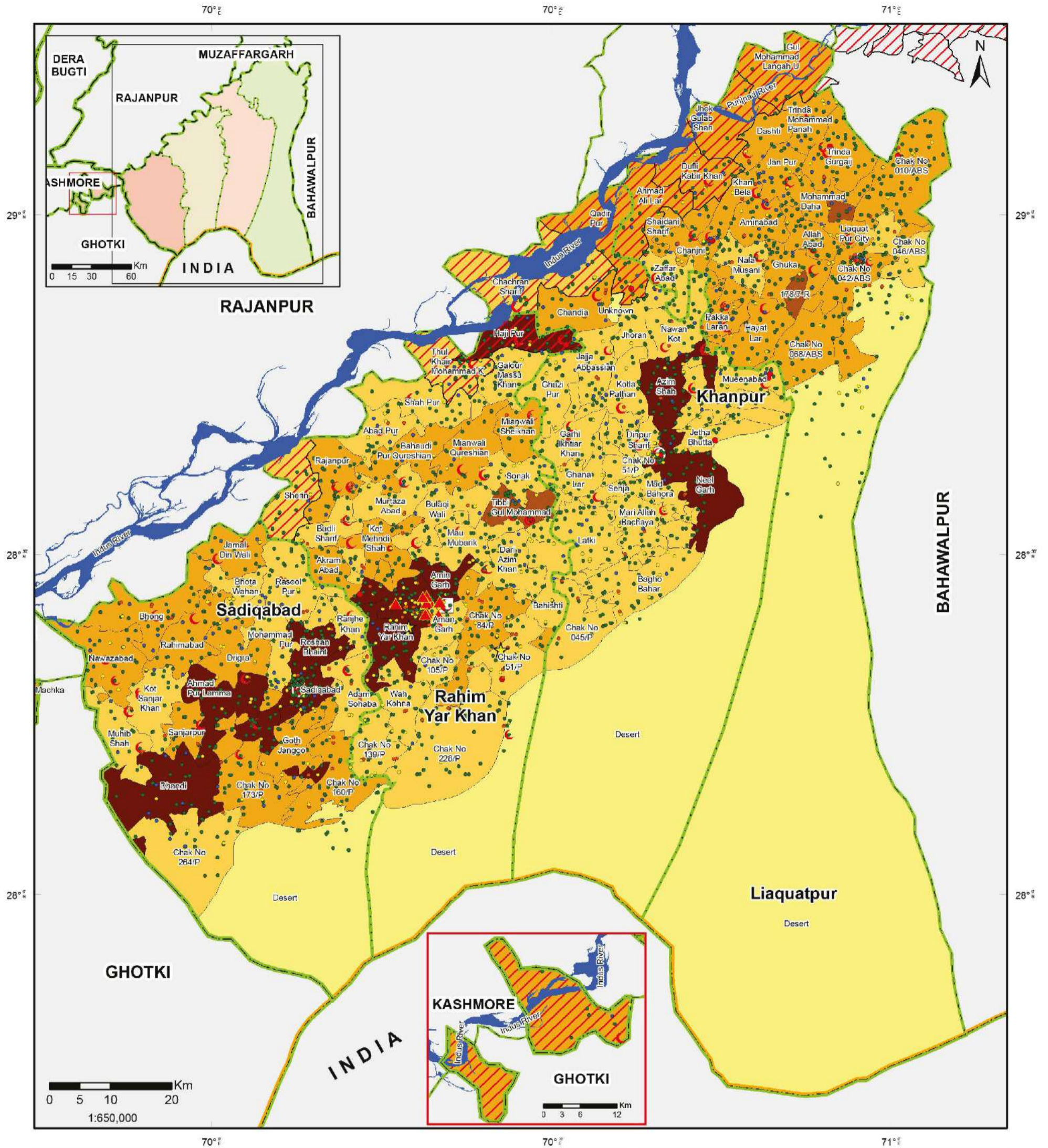
MAP INFORMATION

Data Source(s):
 Pakistan Bureau of Statistics
 School Education Department
 World Health Organization
 Health Department Punjab

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-10-C(HF-EF-BD)
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO FLOOD 50 YRP



Legend

- | | | |
|--------------------------------------|------------------------------|------------------------|
| District Headquarter Hospital | Middle School | River and Water Body |
| Tehsil Headquarter Hospital | Primary School | Tehsil Boundary |
| Civil Hospital & Tuberculosis Clinic | Masjid/Maktab School | District Boundary |
| Basic Health Unit | Building Distribution | |
| Rural Health Centre | Abc < 3000 | Provincial Boundary |
| Maternal/Child Health Centre | Abc 3000 - 6000 | Line of Control |
| University | Abc 6000 - 9000 | International Boundary |
| College | Abc 9000 - 12000 | |
| Higher Secondary School | Abc > 12000 | |
| High School | Exposed UCs | |

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan



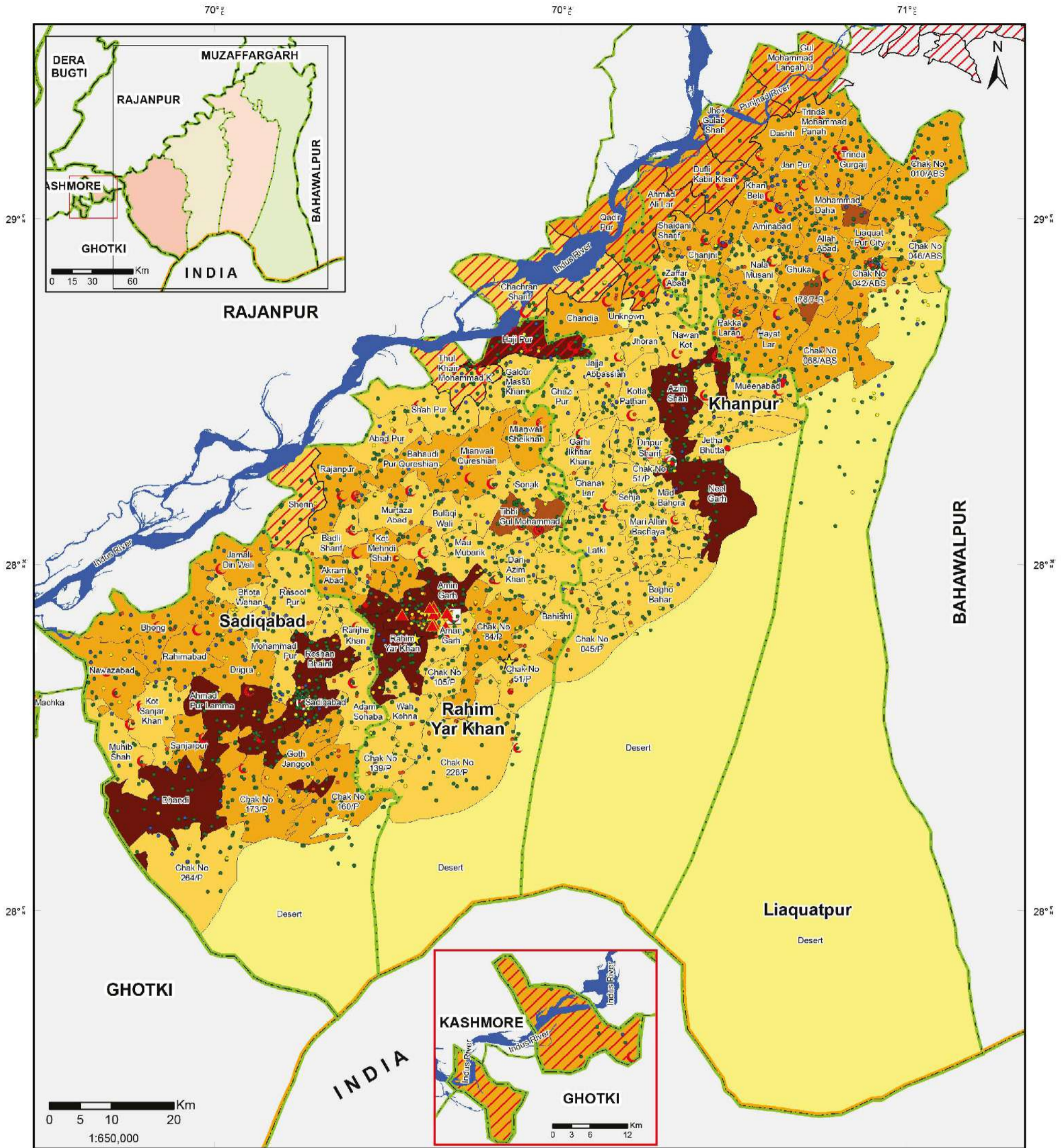
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Last Updated: 2nd May, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO FLOOD 100 YRP



Legend

District Headquarter Hospital	Middle School	River and Water Body
Tehsil Headquarter Hospital	Primary School	Tehsil Boundary
Civil Hospital & Tuberculosis Clinic	Masjid/Maktab School	District Boundary
Basic Health Unit		Provincial Boundary
Rural Health Centre	Building Distribution	Line of Control
Maternal/Child Health Centre	abc < 3000	International Boundary
University	abc 3000 - 6000	
College	abc 6000 - 9000	
Higher Secondary School	abc 9000 - 12000	
High School	abc > 12000	
	Exposed UCs	

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

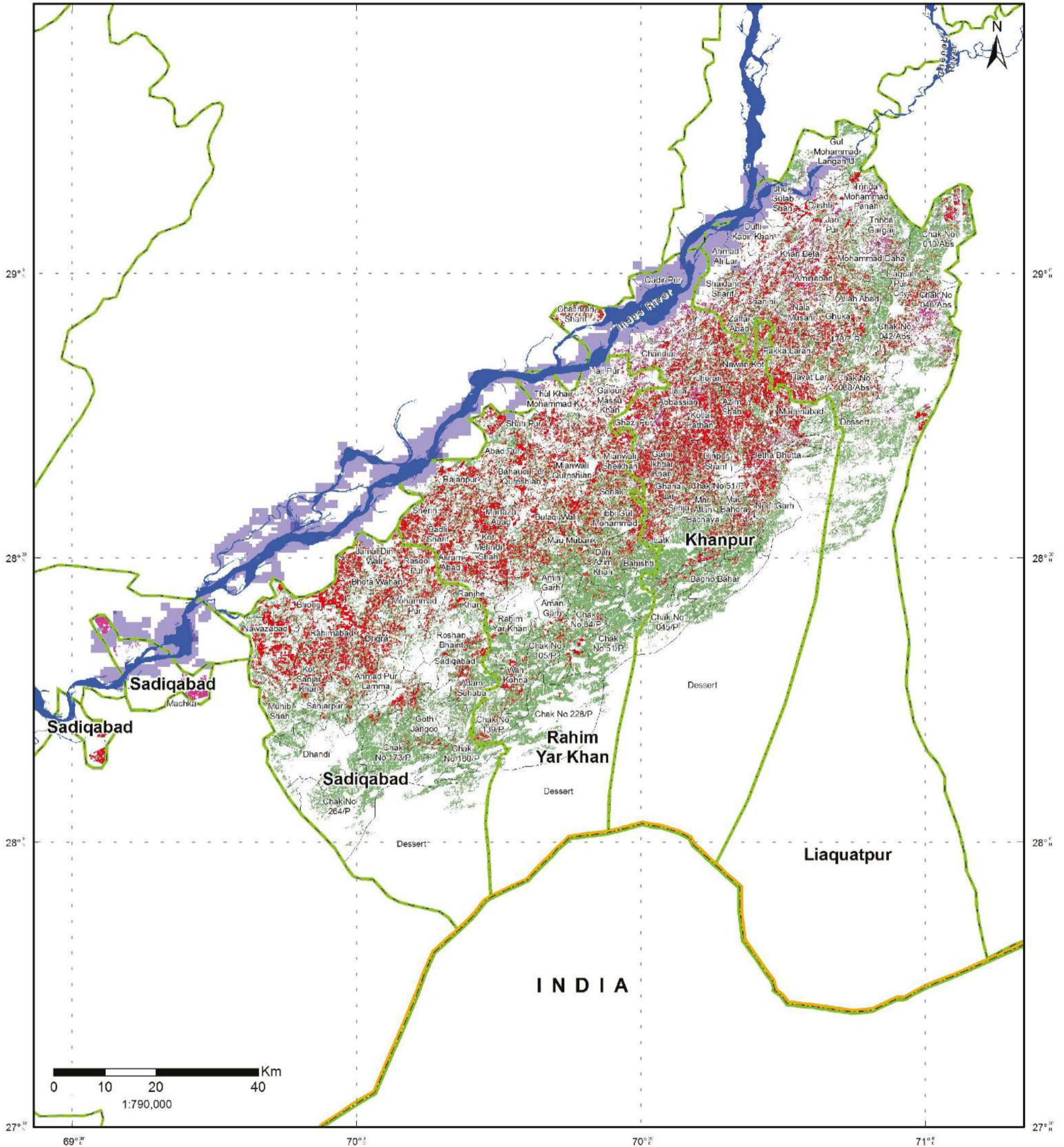
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Datum: WGS 1984
Units: Degree

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Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

CROP EXPOSED TO FLOOD RETURN PERIOD 10 YEARS (KHARIF SEASON)



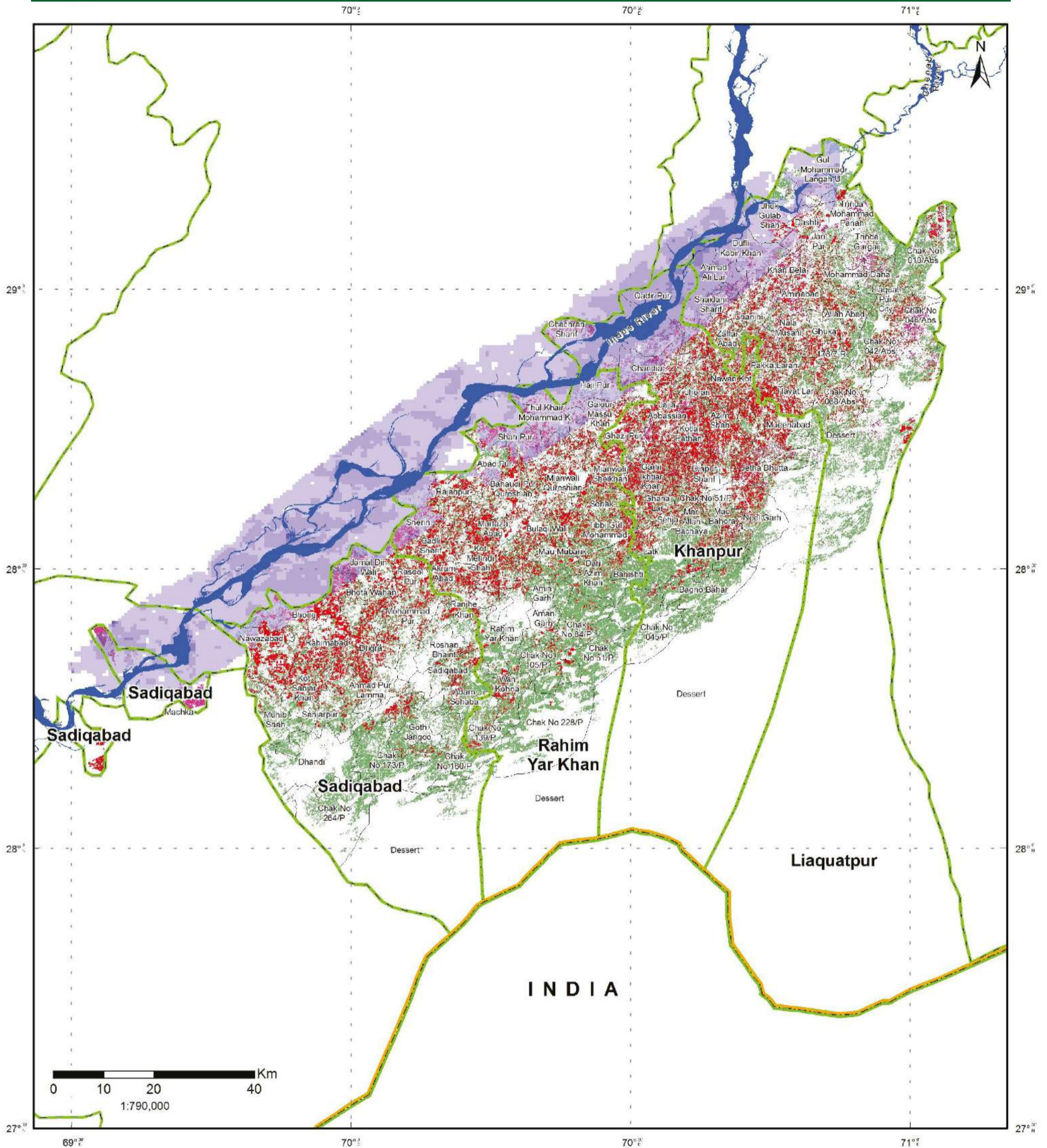
Legend		Return Period 10 Years	
 Cotton	 River and Water Body	 No Flood	 Low
 Rice	Abc Union Council Boundary	 Medium	 High
 Sugarcane	Abc Tehsil Boundary	 Very High	
	ABC District Boundary		
	 Provincial Boundary		
	 Line of Control		
	 International Boundary		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-10-KH-CROPS
 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017

CROP EXPOSED TO FLOOD RETURN PERIOD 50 YEARS (KHARIF SEASON)



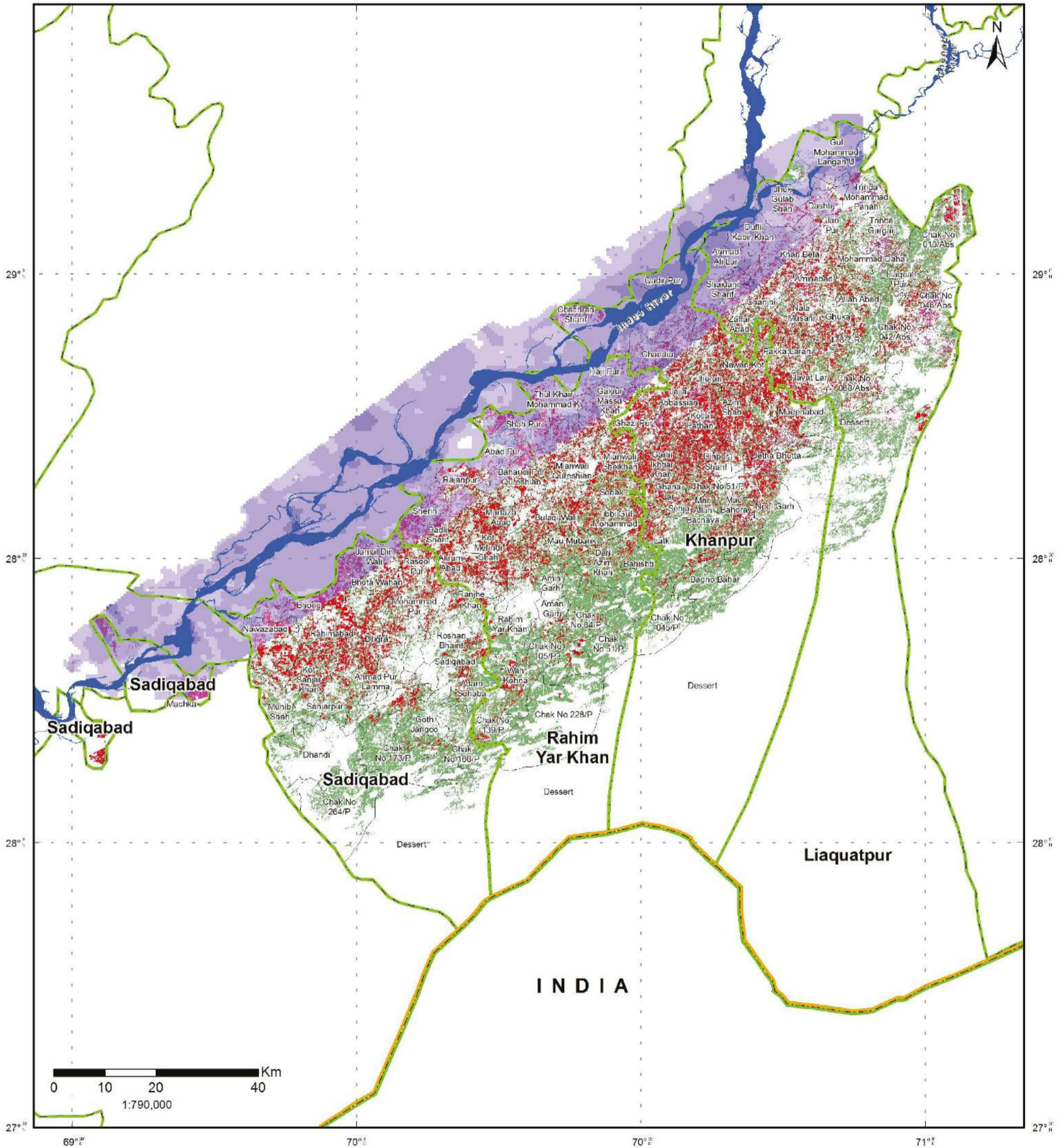
Legend		Return Period 50 Years	
	Cotton		No Flood
	Rice		Low
	Sugarcane		Medium
	River and Water Body		High
	Union Council Boundary		Very High
	Tehsil Boundary		
	District Boundary		
	Provincial Boundary		
	Line of Control		
	International Boundary		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-628-APR-2016-EXP-04-NDMA-50-KH-CROPS
 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017

CROP EXPOSED TO FLOOD RETURN PERIOD 100 YEARS (KHARIF SEASON)



Legend		Return Period 100 Years	
 Cotton	 River and Water Body	 No Flood	 Low
 Rice	 Union Council Boundary	 Medium	 High
 Sugarcane	 Tehsil Boundary	 Very High	
	 District Boundary		
	 Provincial Boundary		
	 Line of Control		
	 International Boundary		

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
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 Prepared by: Project Management Unit, NDMA
 Last Updated: 15th May, 2017



D

VULNERABILITY ASSESSMENT

- SOCIAL VULNERABILITY
- FOOD SECURITY



Vulnerability Assessment has been undertaken in terms of:

- (a) Physical Dimension
- (b) Social Aspects
- (c) Agro based Food Security

Exposure is defined as the interaction of element at risk and hazard. The hazard severity, extent or magnitude of various return periods indicates the degree to which the elements at risk are exposed to a particular hazard. Primary and secondary sources were used for exposure analysis and it was performed by overlaying hazard information with elements at risk. Elements at risks were considered in the dimensions of population, building, essential & critical infrastructures and livelihood.

Physical Vulnerability Analysis (PVA)

For fragility analysis of buildings the structures are classified into engineered and non-engineered constructions. The engineered structures are analyzed by conducting laboratory experiments on building constituent materials such as brick units, mortar, brick assemblages, brick panels and brick walls for masonry structures and concrete cylinders, reinforcing steel bars, structural beam-column members for reinforced concrete structures. However, the complexity of non-engineered buildings, that depend solely on material properties are not reliable owing to the complexity of structure for modeling. On National scale the construction typologies in Pakistan are primarily based on the type of material used in the construction of walls, floors and roof, and the overall construction quality of a structure typology.

Based on the type used according to EMS-98 the building vulnerability scoring for earthquake and flood hazard are given below where fragility against earthquake is calculated using shake table test and numerical analysis approach, while flood vulnerability scoring is based on historical damage statistics.

Building Vulnerability Scoring

Building Types	EMS-98	Vulnerability Score	
		Floods	Earthquakes
Reinforced Concrete	RC1	2.5	3.09
Stone Masonry	M1	5.4	5.56
Mud/Adobe Masonry	M2	7.14	7.14
Brick Masonry	M5	3.66	3.79
Wood/Bamboo Traditional	M7	4.82	2.50
Block Masonry	M8	4.24	5.00
Others Undefined	00	5	6.25

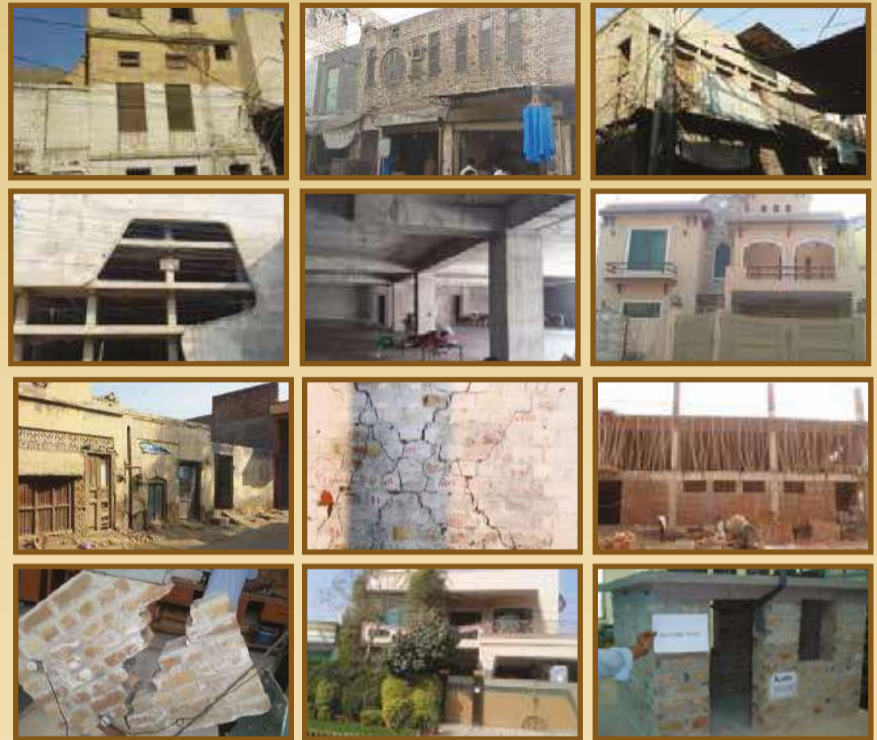
Building Vulnerability Scoring as per PBS Classification

Building Types	Floods	Earthquakes
Kaccha	6.5	7
Semi-Pacca	5.0	6
Pacca	2.5	3

The damage state of building material based on the repair cost ratio i.e. the ratio of the cost of repair to the total building cost is given below.

Damage State	Repair Cost Ratio
Slight	0 - 5%
Moderate	5 - 20%
Heavy	20 - 50%
Severe	50 - 100%

Buildings Surveyed for Physical Vulnerability Assessment



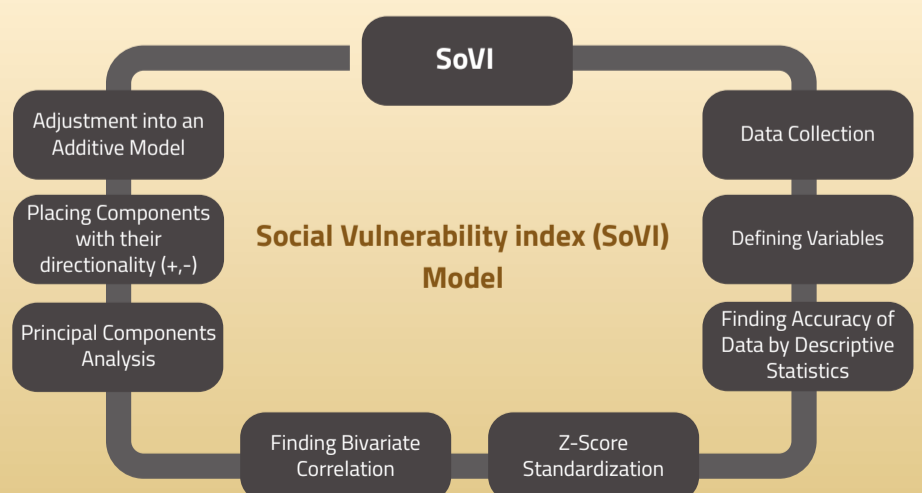
Social Vulnerability Assessment (SVA)

The Social Vulnerability Assessment focuses on the vulnerability characterization of communities, considering both the vulnerabilities of physical systems and the social conditions that can increase or decrease the impact of disasters in the considered area. The assessment is based on susceptibility of populations to loss, which is quantified using the methodology known as Social Vulnerability Index (SoVI). The SoVI for District Khushab is given in the table below.

Factors	Component	Directionality	Variance Observed(%)
1	Age, Education, Health Outcome, Socioeconomic Status	Positive	29.76%
2	Rural Farm Populations	Positive	12.5%
3	Information Access	Negative	6.9%
4	Children with Disabilities	Positive	5.99%
5	Social Benefits	Negative	5.66%
6	Infant safety	Negative	5.61%
7	Low income laborers	Positive	5.31%
8	Poverty/Need for External Income Source	Positive	5.22%
9	Preventative Health Measures	Negative	5%

To obtain a final composite score of social vulnerability, the factors were added to obtain the aggregated factor i.e. the Social Vulnerability Index for each of the District:

$$\text{SoVI Score} = \text{Factor 1} + \text{Factor 2} + \text{Factor 3} + \text{Factor 4} + \text{Factor 5} + \text{Factor 6} + \text{Factor 7} + \text{Factor 8} + \text{Factor 9}$$



FOOD SECURITY AGAINST DROUGHT

Tehsil	Union Council	Drought Severity Score	Area of UC (sq.km)	Agricultural Land (sq.km)	%age of Agri to Total Land	Total Population Rural UCs (98 Census)	Food Insecurity	Food Insecurity Ranking
Sadiqabad	Sanjarpur	4	46.23	42.02	90.90%	28,889	36,361	5
Sadiqabad	Nawazabad	4	102.83	94.03	91.44%	27,902	36,576	5
Sadiqabad	Mohammad Pur	4	76.30	70.41	92.27%	23,037	36,910	5
Sadiqabad	Sadiqabad	4	22.68	20.97	92.46%	25,929	36,986	5
Khan Pur	Mueenabad	4	82.98	76.73	92.47%	24,879	36,988	5
Rahim Yar Khan	Dari Azim Khan	4	68.62	64.21	93.57%	18,874	37,429	5
Khan Pur	Jhoran	4	53.53	51.14	95.53%	28,351	38,210	5
Rahim Yar Khan	Sonak	4	68.78	66.05	96.03%	23,169	38,414	5
Sadiqabad	Dhandi	5	219.95	169.23	76.94%	30,263	38,471	5
Khan Pur	Kotla Pathan	4	58.89	56.93	96.68%	23,780	38,670	5
Rahim Yar Khan	Murtaza Abad	4	65.04	63.01	96.89%	19,057	38,755	5
Liaqat Pur	Pakka Laran	4	52.10	50.75	97.41%	29,535	38,966	5
Khan Pur	Nawan Kot	4	79.43	77.55	97.64%	26,826	39,056	5
Liaqat Pur	178/7-r	4	28.14	27.52	97.83%	38,984	39,131	5
Khan Pur	Neel Garh	5	104.56	83.13	79.50%	23,910	39,751	5
Rahim Yar Khan	Chak No 51/p	5	94.77	79.65	84.05%	18,738	42,023	5
Khan Pur	Jetha Bhutta	5	76.95	67.66	87.92%	28,740	43,960	5
Sadiqabad	Ahmad Pur Lamma	5	92.85	83.60	90.03%	30,504	45,015	5
Khan Pur	Chak No 51/p	5	4.97	4.53	91.02%		45,512	5
Liaqat Pur	Chanjni	3	42.53	38.38	90.24%	24,459	27,072	4
Liaqat Pur	Trinda Gurgaij	3	85.09	77.83	91.46%	32,239	27,439	4
Rahim Yar Khan	Wah Kohna	3	61.88	56.62	91.50%	24,275	27,450	4
Sadiqabad	Adam Sohaba	3	64.54	59.32	91.91%	21,772	27,572	4
Rahim Yar Khan	Sherin	3	92.58	85.16	91.99%	26,458	27,596	4
Rahim Yar Khan	Mianwali Qureshian	3	82.79	76.98	92.98%	27,570	27,893	4
Rahim Yar Khan	Shah Pur	3	85.43	79.59	93.17%	26,209	27,951	4
Rahim Yar Khan	Kot Mehndi Shah	3	64.86	60.45	93.20%	28,062	27,961	4
Liaqat Pur	Dashti	3	47.78	44.58	93.30%	31,667	27,991	4
Liaqat Pur	Jan Pur	3	46.72	43.82	93.80%	30,928	28,141	4
Sadiqabad	Jamal Din Wali	3	61.60	57.80	93.83%	31,321	28,150	4
Liaqat Pur	Allah Abad	3	44.25	41.56	93.92%	27,505	28,175	4
Liaqat Pur	Chak No 068/abs	3	91.65	86.40	94.28%	25,654	28,283	4
Rahim Yar Khan	Badli Sharif	3	42.37	39.96	94.31%	21,188	28,292	4
Liaqat Pur	Nala Musani	3	45.74	43.21	94.47%	16,828	28,341	4
Rahim Yar Khan	Tibbi Gul Mohammad	3	47.17	44.59	94.53%	13,315	28,359	4
Khan Pur	Sehja	3	27.82	26.33	94.64%	21,384	28,392	4
Rahim Yar Khan	Mianwali Sheikhan	3	51.24	48.66	94.96%	27,426	28,488	4
Khan Pur	Chandia	3	72.85	69.42	95.30%	31,220	28,589	4
Liaqat Pur	Zaffar Abad	3	45.86	43.78	95.46%	22,679	28,639	4
Liaqat Pur	Shaidani Sharif	3	37.13	35.50	95.61%	28,312	28,682	4
Rahim Yar Khan	Bulaqi Wali	3	75.48	72.21	95.68%	22,193	28,703	4
Khan Pur	Ghazi Pur	3	68.44	65.65	95.91%	25,456	28,774	4
Sadiqabad	Rahimabad	3	81.58	78.26	95.93%	33,491	28,778	4
Rahim Yar Khan	Bahaudi Pur Qureshian	3	75.58	72.69	96.17%	30,846	28,851	4
Khan Pur	Mad Bahora	3	52.13	50.17	96.24%	23,800	28,872	4
Khan Pur	Azim Shah	3	90.87	87.63	96.43%	24,745	28,930	4
Rahim Yar Khan	Galour Massu Khan	3	60.17	58.04	96.46%	26,956	28,938	4
Rahim Yar Khan	Rajanpur	3	71.81	69.29	96.49%	28,256	28,948	4
Rahim Yar Khan	Mau Mubarik	3	69.69	67.34	96.63%	17,356	28,989	4
Sadiqabad	Rasool Pur	3	90.01	87.04	96.71%	27,281	29,013	4

FOOD SECURITY AGAINST DROUGHT

Tehsil	Union Council	Drought Severity Score	Area of UC (sq.km)	Agricultural Land (sq.km)	%age of Agri to Total Land	Total Population Rural UCs (98 Census)	Food Insecurity	Food Insecurity Ranking
Rahim Yar Khan	Akram Abad	3	46.75	45.24	96.77%	31,222	29,032	4
Liaqat Pur	Ghuka	3	59.39	57.47	96.78%	27,339	29,033	4
Liaqat Pur	Khan Bela	3	40.37	39.08	96.81%	26,485	29,044	4
Sadiqabad	Ranjhe Khan	3	35.90	34.76	96.83%	27,400	29,050	4
Liaqat Pur	Trinda Mohammad Panah	3	48.05	46.77	97.34%	29,845	29,203	4
Khan Pur	Jajja Abbassian	3	55.71	54.29	97.45%	27,285	29,235	4
Sadiqabad	Bhota Wahan	3	41.53	40.48	97.48%	23,218	29,243	4
Rahim Yar Khan	Abad Pur	3	58.89	57.52	97.68%	22,254	29,303	4
Sadiqabad	Drigra	3	72.14	70.52	97.75%	29,667	29,324	4
Sadiqabad	Bhong	3	110.03	107.56	97.76%	30,197	29,327	4
Liaqat Pur	Hayat Lar	3	84.77	82.93	97.83%	27,399	29,348	4
Sadiqabad	Kot Sanjar Khan	3	73.15	71.89	98.29%	21,745	29,486	4
Khan Pur	Ghana Lar	3	66.28	65.42	98.70%	26,237	29,610	4
Liaqat Pur	Chak No 010/abs	4	148.16	109.73	74.06%	26,575	29,624	4
Liaqat Pur	Mohammad Daha	3	56.80	56.56	99.58%	31,380	29,873	4
Liaqat Pur	Chak No 046/abs	4	66.59	53.02	79.63%	23,615	31,850	4
Rahim Yar Khan	Aman Garh	4	41.43	33.25	80.26%	22,790	32,104	4
Khan Pur	Chak No 045/p	5	95.38	62.14	65.15%	16,580	32,574	4
Sadiqabad	Muhib Shah	4	72.65	61.82	85.10%	26,255	34,041	4
Rahim Yar Khan	Chak No 84/p	4	116.57	103.38	88.68%	32,190	35,471	4
Khan Pur	Bagho Bahar	5	107.85	76.74	71.15%	24,908	35,576	4
Sadiqabad	Goth Jangoo	4	89.90	80.43	89.47%	31,967	35,786	4
Sadiqabad	Roshan Bhaint	4	50.81	45.67	89.88%	20,096	35,953	4
Khan Pur	Mari Allah Bachaya	2	60.40	57.64	95.44%	25,170	19,088	3
Liaqat Pur	Aminabad	2	51.34	49.39	96.20%	28,106	19,239	3
Khan Pur	Garhi Ikhtiar Khan	2	62.52	61.01	97.59%	25,865	19,518	3
Rahim Yar Khan	Chak No 228/p	4	228.77	112.49	49.17%	26,369	19,669	3
Rahim Yar Khan	Haji Pur	3	71.35	49.67	69.62%	25,533	20,885	3
Sadiqabad	Chak No 160/p	3	108.93	81.12	74.47%	32,615	22,340	3
Rahim Yar Khan	Rahim Yar Khan	3	107.95	81.42	75.42%	26,536	22,627	3
Liaqat Pur	Dufli Kabir Khan	3	87.33	66.44	76.08%	28,926	22,824	3
Sadiqabad	Chak No 173/p	3	102.74	79.48	77.36%	28,117	23,207	3
Liaqat Pur	Ahmad Ali Lar	3	87.91	69.00	78.48%	24,414	23,544	3
Liaqat Pur	Chak No 042/abs	3	111.29	87.74	78.84%	31,311	23,652	3
Rahim Yar Khan	Amin Garh	3	62.56	49.72	79.48%	29,330	23,843	3
Rahim Yar Khan	Chak No 105/p	3	47.03	38.56	81.97%	25,508	24,591	3
Sadiqabad	Machka	4	239.47	148.49	62.01%	35,135	24,804	3
Rahim Yar Khan	Bahishti	3	66.42	55.93	84.20%	22,565	25,260	3
Khan Pur	Chachran Sharif	4	194.45	123.79	63.66%	27,041	25,464	3
Rahim Yar Khan	Thul Khair Mohammad Khan	3	74.55	63.47	85.14%	25,013	25,542	3
Rahim Yar Khan	Chak No 139/p	3	60.38	52.72	87.32%	21,731	26,197	3
Khan Pur	Latki	3	92.27	81.11	87.90%	24,509	26,369	3
Khan Pur	Dinpur Sharif	3	67.49	60.02	88.92%	22,895	26,676	3
Liaqat Pur	Jhok Gulab Shah	2	92.26	74.19	80.41%	24,938	16,083	2
Liaqat Pur	Gul Mohammad Langah	2	108.12	87.00	80.46%	27,004	16,092	2
Khan Pur	Qadir Pur	3	108.16	58.32	53.92%	30,345	16,176	2
Sadiqabad	Chak No 264/p	3	165.29	92.21	55.78%	26,628	16,735	2
Rahim Yar Khan	Dessert	5	478.24	8.75	1.83%	-	915	1
Khan Pur	Dessert	5	1385.19	89.23	6.44%	-	3,221	1
Sadiqabad	Dessert	5	539.64	42.77	7.92%	-	3,962	1
Liaqat Pur	Dessert	5	3040.81	310.19	10.20%	-	5,100	1

Drought Hazard Severity Score	
No Drought	1
Mild	2
Moderate	3
Severe	4
Extreme	5

Food Insecurity Index	
Food Secure	1
Mild Food Secure	2
Moderately Food Insecure	3
Highly Food Insecure	4
Severely Food Insecure	5

FOOD SECURITY AGAINST FLOOD

Tehsil	Union Council	Flood Hazard Score (Riverine + Flash)	Area of UC (sq.km)	Agricultural Land (sq.km)	Agricultural Area Exposed	Percentage Agricultural Land Exposed	Total Population (Rural UCs)	Food Insecurity	Food Insecurity Ranking
Khan Pur	Chachran Sharif	4	194.45	123.79	123.78	100.00%	27,041	40,000	5
Liaquat Pur	Ahmad Ali Lar	4	87.91	69.00	69.00	100.00%	24,414	40,000	5
Rahim Yar Khan	Shah Pur	3	85.43	79.59	72.99	91.71%	26,209	27,512	4
Rahim Yar Khan	Sherin	3	92.58	85.16	79.74	93.64%	26,458	28,092	4
Liaquat Pur	Dufla Kabir Khan	3	87.33	66.44	66.44	100.00%	28,926	29,999	4
Rahim Yar Khan	Thul Khair Mohammad K	3	74.55	63.47	63.47	100.00%	25,013	30,000	4
Khan Pur	Qadir Pur	4	108.16	58.32	46.77	80.20%	30,345	32,079	4
Rahim Yar Khan	Galour Massu Khan	3	60.17	58.04	37.36	64.38%	26,956	19,313	3
Sadiqabad	Bhong	3	110.03	107.56	78.98	73.43%	30,197	22,029	3
Liaquat Pur	Dashti	3	47.78	44.58	33.44	75.03%	31,667	22,508	3
Sadiqabad	Jamal Din Wali	3	61.60	57.80	45.86	79.34%	31,321	23,802	3
Khan Pur	Chandia	3	72.85	69.42	58.62	84.44%	31,220	25,331	3
Rahim Yar Khan	Abad Pur	3	58.89	57.52	48.93	85.07%	22,254	25,521	3
Liaquat Pur	Shaidani Sharif	3	37.13	35.50	30.86	86.93%	28,312	26,080	3
Liaquat Pur	Jhok Gulab Shah	3	92.26	74.19	64.79	87.33%	24,938	26,200	3
Rahim Yar Khan	Haji Pur	3	71.35	49.67	43.68	87.94%	25,533	26,383	3
Liaquat Pur	Gul Mohammad Langah U	3	108.12	87.00	77.94	89.59%	27,004	26,876	3
Rahim Yar Khan	Bahaudi Pur Qureshian	3	75.58	72.69	24.17	33.26%	30,846	9,977	2
Sadiqabad	Nawazabad	3	102.83	94.03	33.64	35.78%	27,902	10,733	2
Rahim Yar Khan	Rajanpur	3	71.81	69.29	39.75	57.37%	28,256	17,210	2
Sadiqabad	Machka	3	239.47	148.49	85.84	57.81%	35,135	17,342	2
Rahim Yar Khan	Chak No 51/p	2	94.77	79.65	0.04	0.05%	18,738	9	1
Sadiqabad	Rahimabad	3	81.58	78.26	0.14	0.18%	33,491	53	1
Rahim Yar Khan	Murtaza Abad	2	65.04	63.01	0.17	0.27%	19,057	54	1
Sadiqabad	Rasool Pur	3	90.01	87.04	0.33	0.38%	27,281	114	1
Rahim Yar Khan	Chak No 228/p	3	228.77	112.49	2.59	2.30%	26,369	691	1
Liaquat Pur	Jan Pur	2	46.72	43.82	2.91	6.63%	30,928	1,326	1
Liaquat Pur	Zaffar Abad	3	45.86	43.78	4.68	10.68%	22,679	3,204	1
Sadiqabad	Bhota Wahan	3	41.53	40.48	5.94	14.68%	23,218	4,405	1
Liaquat Pur	Khan Bela	3	40.37	39.08	8.71	22.28%	26,485	6,684	1
Liaquat Pur	Chanjni	3	42.53	38.38	10.76	28.04%	24,459	8,413	1
Liaquat Pur	Trinda Mohammad Panah	3	48.05	46.77	13.57	29.02%	29,845	8,705	1

Flood Hazard Severity Score	
0.3	1
3.1 - 6	2
6.1 - 9	3
9.1 - 12t	4
> 12	5

Food Insecurity Index	
Food Secure	1
Mild Food Secure	2
Moderately Food Insecure	3
Highly Food Insecure	4
Severely Food Insecure	5

Cumulative Severity of both Riverine and Hill torrents/ Flashfloods has been taken in account for the assessment.

$$\text{Food Insecurity} = (\text{Hazard Severity}) * (\text{Percentage of Agriculture to Total Land}) * (\text{Percentage of Agriculture Dependent Population to Total Population})$$

E

RISK ASSESSMENT



**Population
Density**



**Building
Density**



**Health
Facilities**



**Communication
Towers**



**Major
Industries**



Roads



**Education
Facilities**



Railway



**Critical
Infrastructure**

The given study has employed Integrated Risk Assessment Model, as shown in the figure below, for the cumulative risk assessment of study district. The Model takes into account both quantitative and qualitative risk assessment approaches. The methodology is based on multi criteria evaluation as well as analytical hierarchy process. For this purpose, set of indicators for each risk factors have been carefully taken based on the availability as well as the specific context of the study district. In the given methodology four separate dimensions of risk are considered as "factor Components" i.e. hazard, exposure, vulnerability and capacity. To analyze the value of factor components, a combination of quantitative, qualitative and contextual indicators have be assigned to each factor component. Each factor consists of a sets of indicators which cover several aspects of risk. The Risk Index considered a total of 52 indicators to cover physical, economic, demographic, social, environmental and economic dimensions of risk. Specific weights have been assigned to each indicator in order to acutely calculate its impact on risk. The maximum sum of all the elements of weights and indicators can have minimize value of 100, whereas the minimum sum is 0. The risk formula used in the Study is given below:

$$\text{Risk} = (\text{Hazard} \times \text{Vulnerability} \times \text{Exposure} / \text{Capacity})$$

Five classes have been devised to categorize risk between "No to Very Low" Risk to "Very High Risk".

Risk Score	Risk State
>4.1	Extremely High
3.1-4.0	High to very High
2.1-3.0	Moderate to High
1.1-2.0	Low to moderate
0-1.0	No to very Low

Earthquake Hazard Severity Score		
3.0 - 3.9 Richter Scale	1	Very Low
4.0 - 4.9 Richter Scale	2	Low
5.0 - 5.9 Richter Scale	3	Moderate
6.0 - 6.9 Richter Scale	4	High
7 more Richter Scale	5	Very High
0 represents No Hazard		

Flood Hazard Severity Score		
0.3	1	Very Low
3.1 - 6	2	Low
6.1 - 9	3	Moderate
9.1 - 12t	4	High
> 12	5	Very High
0 represents No Hazard		

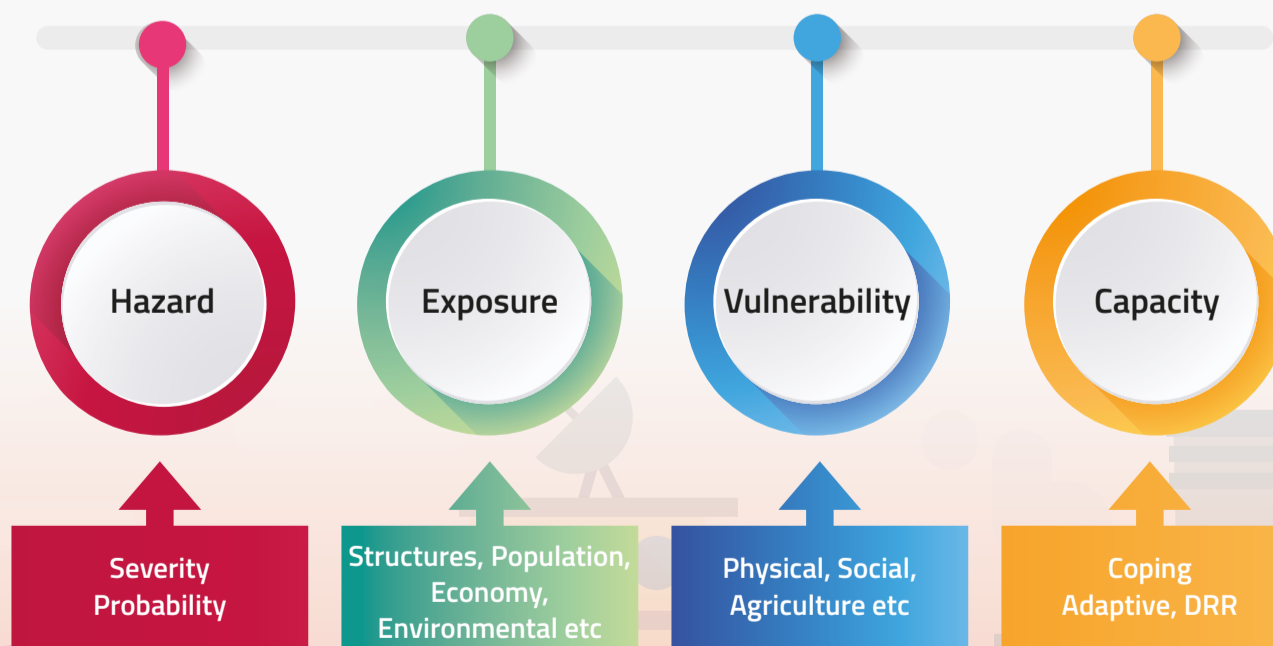
Drought Hazard Severity Score		
No Drought	1	Very Low
Mild	2	Low
Moderate	3	Medium
Severe	4	High
Extreme	5	Very High
0 represents No Hazard		

Exposure Scoring Scale	
1	No to Negligible
2	Low
3	Medium
4	High
5	Extremely High

Vulnerabilty Scoring Scale	
1	No to Negligible
2	Low
3	Medium
4	High
5	Extremely High

Capacity Scoring Scale	
1	No to Negligible
2	Low
3	Medium
4	High
5	Extremely High

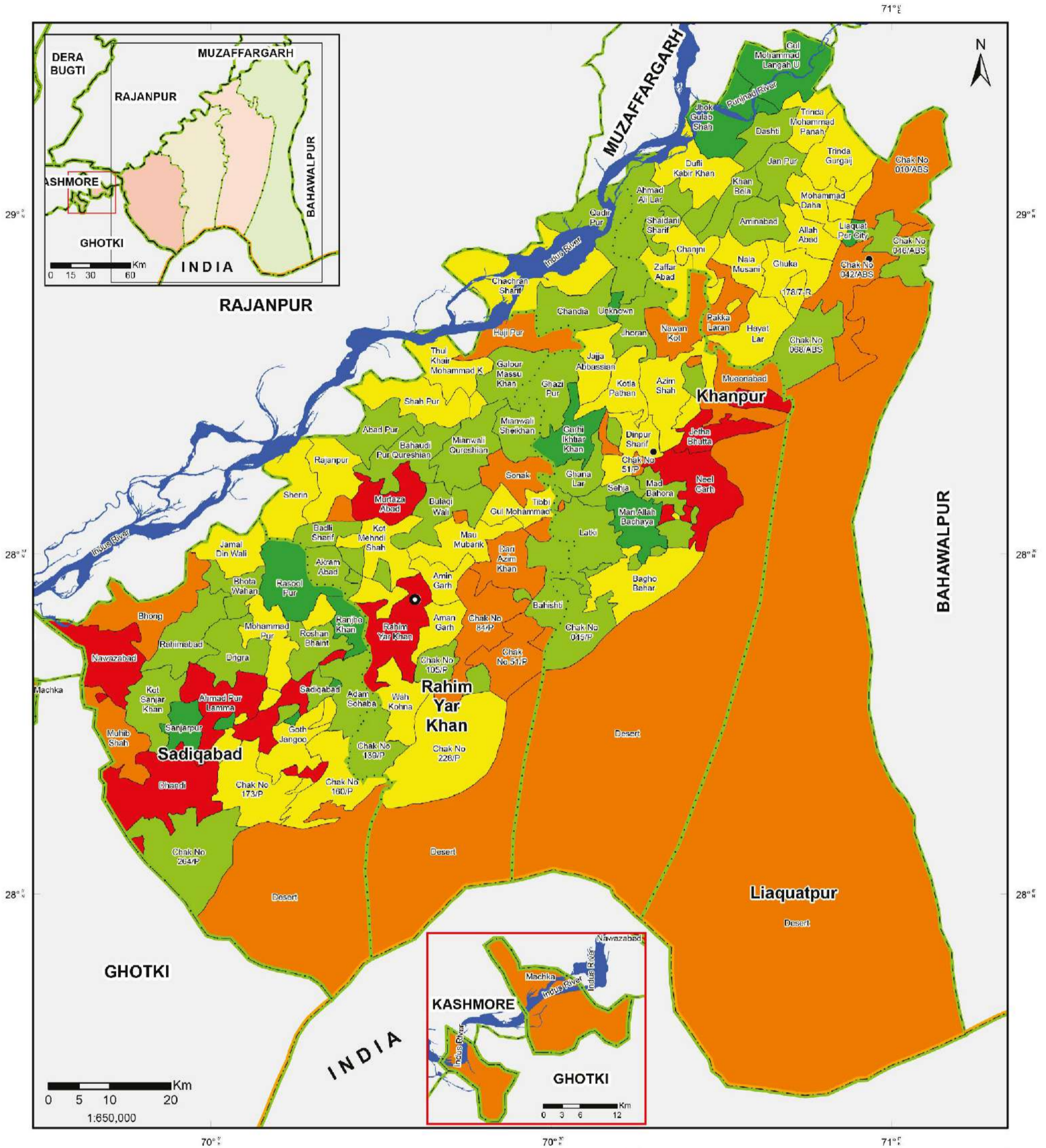
Disaster Risk Impact Factor



UNION COUNCILS	HAZARD			EXPOSURE		VULNERABILITY			COPING CAPACITY	RISK			OVERALL
	FLOOD YRP 100	DROUGHT	EARTHQUAKE YRP 475	FLOOD	EXPOSURE	FLOOD	DROUGHT	EARTHQUAKE		FLOOD	DROUGHT	EARTHQUAKE	
QADIR PUR	4.00	2.00	3.00	0.88	0.67	2.00	3.00	2.00	3.00	5	2	2	3
RAHIM YAR KHAN	0.00	2.00	3.00	2.25	2.33	3.50	4.50	3.50	3.00	1	5	5	4
RAHIMABAD	1.00	2.00	3.00	1.25	1.33	1.50	1.50	1.50	3.00	1	2	4	3
RAJANPUR	1.00	2.00	3.00	1.25	1.33	2.25	3.00	2.25	3.00	5	3	3	4
RANJHE KHAN	0.00	2.00	3.00	1.00	1.00	1.00	1.00	1.00	3.00	1	1	2	2
RASOOL PUR	1.00	2.00	3.00	1.13	1.00	1.50	1.50	1.50	3.00	1	1	3	2
ROSHAN BHAINI	0.00	3.00	3.00	1.13	1.00	1.75	2.00	1.75	3.00	1	2	4	3
SADIQABAD	0.00	3.00	3.00	0.63	0.67	1.50	2.00	1.50	3.00	1	2	2	2
SANJARPUR	0.00	3.00	3.00	1.13	1.00	1.00	1.00	1.00	3.00	1	1	3	2
SEHJA	0.00	2.00	3.00	1.00	1.00	1.75	3.00	1.75	3.00	1	2	2	2
SHAH PUR	2.00	2.00	3.00	1.00	1.00	2.50	3.50	2.50	3.00	5	3	3	4
SHAHIDANI SHARIF	1.00	2.00	3.00	0.88	0.67	2.25	3.00	2.25	3.00	5	2	3	4
SHERIN	2.00	2.00	3.00	1.00	1.00	2.50	3.50	2.50	3.00	5	3	3	4
SONAK	0.00	3.00	3.00	1.25	1.33	1.75	3.00	1.75	3.00	1	4	2	3
THUL KHAIIR MOHAMMAD K	2.00	2.00	3.00	1.00	1.00	2.25	3.50	2.25	3.00	5	3	2	4
TIBBI GUL MOHAMMAD	0.00	2.00	3.00	1.13	1.33	2.00	3.00	2.00	3.00	1	3	3	3
TRINDA GURGAJI	0.00	2.00	3.00	1.25	1.33	1.50	2.50	1.50	3.00	1	3	2	2
TRINDA MOHAMMAD PANAH	1.00	2.00	3.00	1.13	1.33	2.25	3.00	2.25	3.00	3	3	3	3
UNKNOWN	1.00	1.00	3.00	0.38	0.33	1.50	2.00	1.50	3.00	1	1	1	1
WAH KOHNA	0.00	2.00	3.00	0.88	1.00	2.25	3.50	2.25	3.00	1	3	3	3
ZAFFAR ABAD	1.00	2.00	3.00	1.13	1.33	2.00	2.50	2.00	3.00	1	3	3	3

Risk = (Hazard x Exposure x Vulnerability/Capacity)

DROUGHT RISK



Legend

- District Headquarter
- Tehsil Headquarter
- Drought Risk**
- Very Low
- Low
- Medium
- High
- Very High
- River and Water Body
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

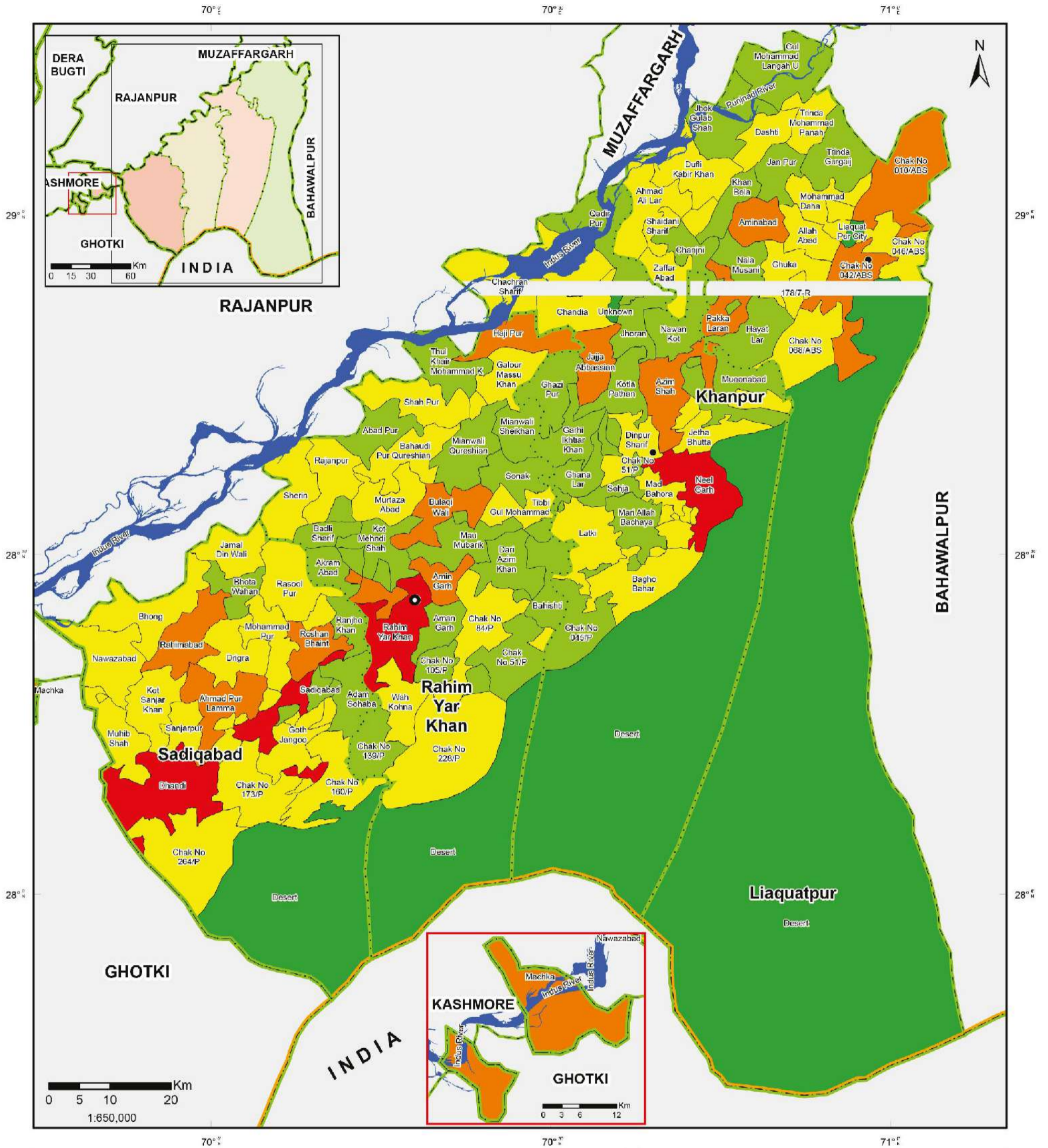


MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-MAY-2016-RSK-NDMA-DROUGHT
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

EARTHQUAKE RISK



Legend

- District Headquarter
- Tehsil Headquarter
- Earthquake Risk**
- Very Low
- Low
- Medium
- High
- Very High
- River and Water Body
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

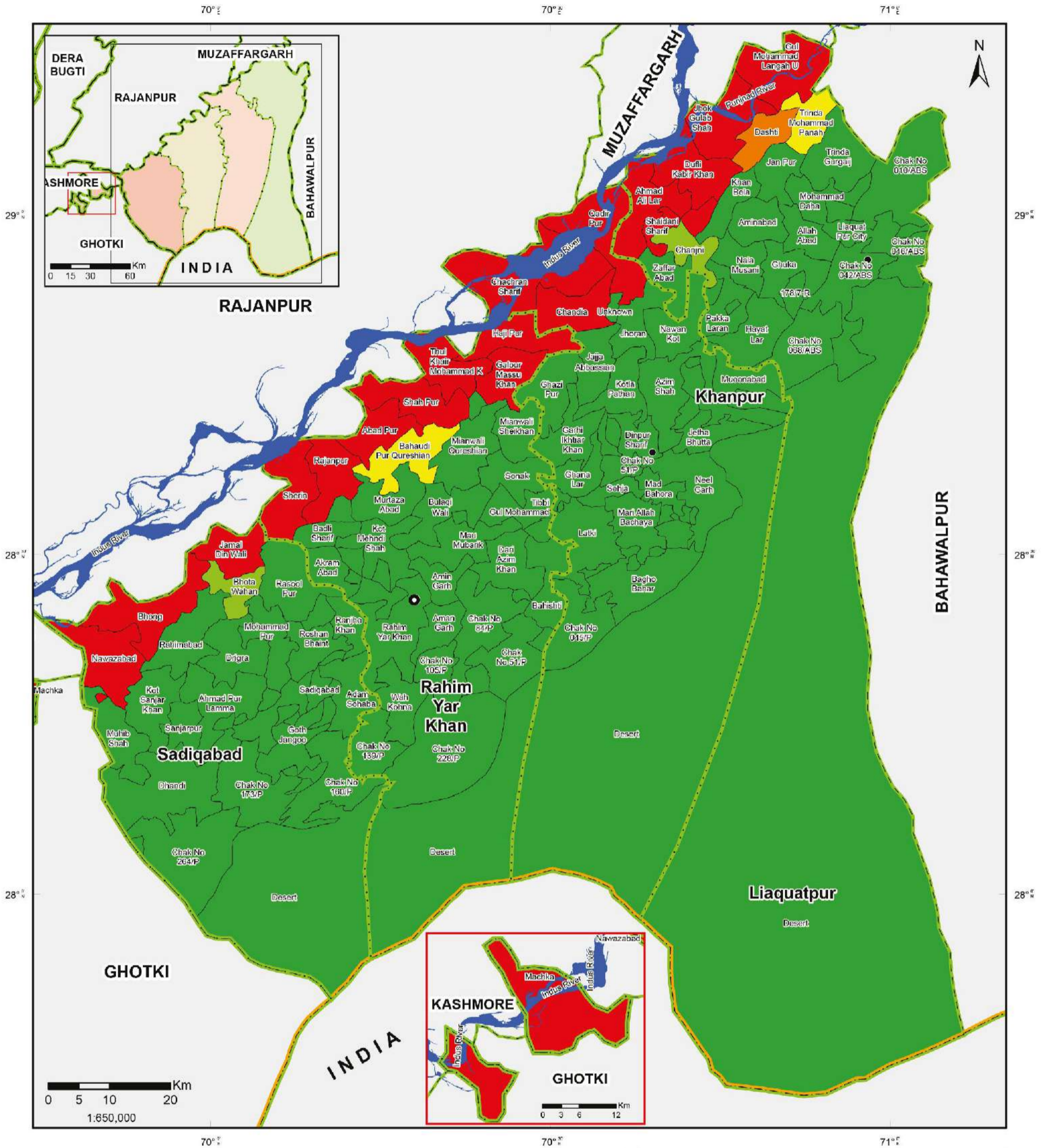


MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-MAY-2016-RSK-NDMA-EQ
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

FLOOD RISK



- Legend**
- District Headquarter
 - Tehsil Headquarter
 - River and Water Body
 - **abc** Tehsil Boundary
 - **ABC** District Boundary
 - Provincial Boundary
 - Line of Control
 - International Boundary
- Flood Risk**
- abc** Very Low
 - abc** Low
 - abc** Medium
 - abc** High
 - abc** Very High

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

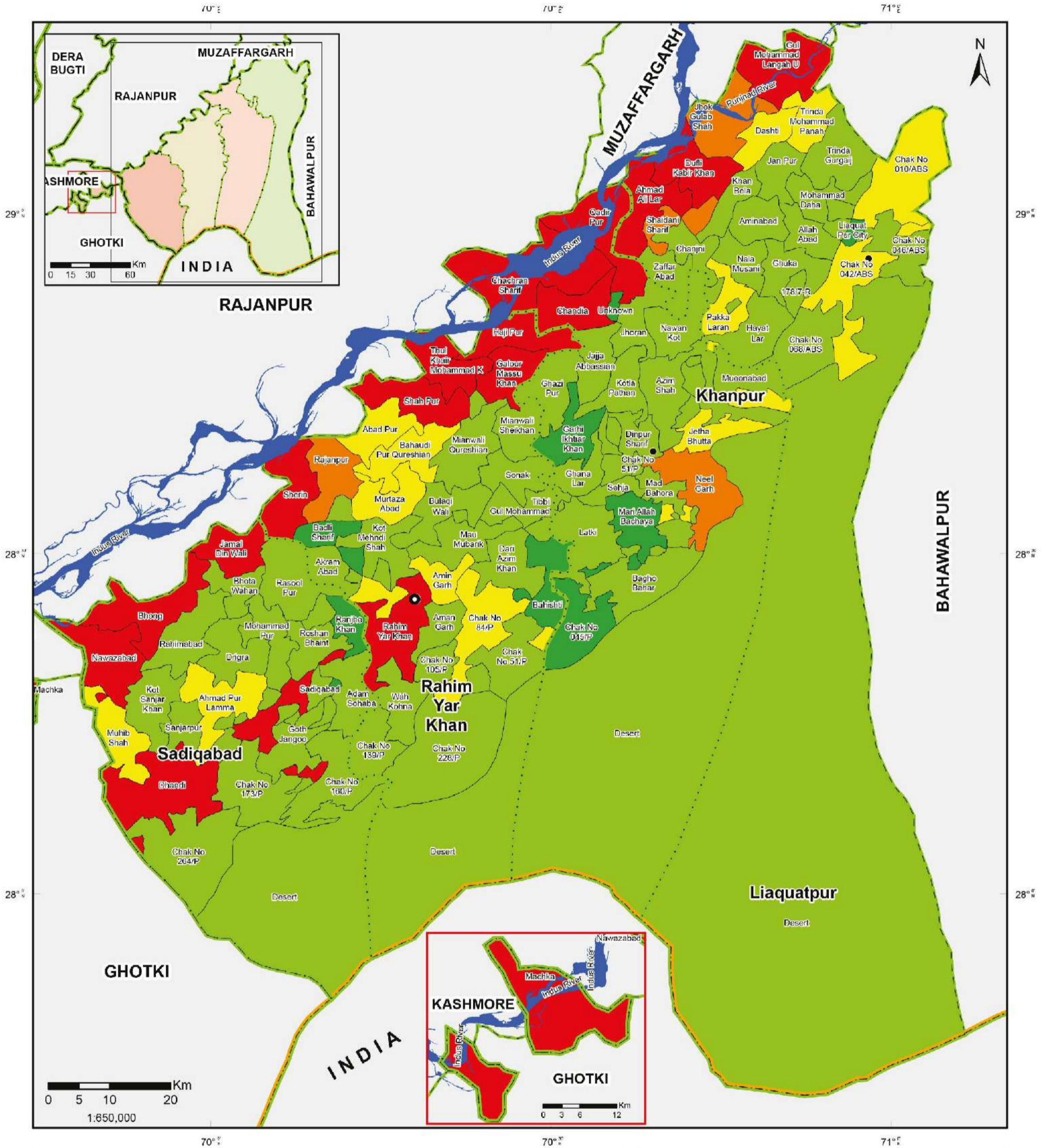


MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-628-MAY-2016-RSK-NDMA-FLOOD
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

COMPOSITE RISK



Legend

- District Headquarter
- Tehsil Headquarter
- Composite Risk
 - Very Low
 - Low
 - Medium
 - High
 - Very High
- River and Water Body
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Rahim Yar Khan, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree
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Prepared by: Project Management Unit, NDMA
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GLOSSARY OF TERMS

Acceptable Risk	The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions.
Accountability	Obligation to demonstrate that work has been conducted in compliance with agreed rules and standards or to report fairly and accurately on performance results vis a vis mandated roles and/or plans. This may require a careful, even legally defensible, demonstration that the work is consistent with the contract terms.
Activity	Actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources.
Adaptation	The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
Affected Area	An area or part of country affected by disaster.
Alluvium Deposits	A deposit of clay, silt, and sand left by flowing floodwater in a river valley or delta, typically producing fertile soil.
Avalanche	An avalanche (also called a snow slide) is a rapid flow of snow down a sloping surface of a mountain. Avalanches are triggered due to mechanical failure of the snow when the forces on the snow exceed its cohesion strength.
Average Household Size	Average Number of persons per household.
Bare Area with Sparse Natural Vegetation	Sand Dunes with natural vegetation, bare rocks (with sparse vegetation) and desert flat plains are included in this class.
Bare Areas	This class describes areas that have very less natural and manmade vegetation cover which include sand dunes and barren land.
Base-Line Study	An analysis describing the situation prior to a development intervention, against which progress can be assessed or comparisons made.
Basic Health Unit (BHU)	The BHU is located at a Union Council and serves a catchment population of up to 25,000. Services provided at BHU are promotive, preventive, curative and referral. BHU provides all PHC services along with integral services that include basic medical and surgical care. MCH services are also part of the services package being provided at BHU. BHU provides first level referral to patients referred by LHWs. BHU refers patients to higher level facilities as and when necessary.
Built-up Area	It defines all built areas (urban, industrial, airport etc.) with all vegetated areas linked to the built-ups such as gardens, golf courses, urban recreation parks, plots devoted to urban expansion etc.
Capacity	The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.
Capacity Building	Efforts aimed to develop human skills or societal infrastructure within a community or organization needed to reduce the level of risk. In extended understanding, capacity building also includes development of institutional, financial, political and other resources, at different levels of the society.
Census	Census is an official count or a survey, especially of a population.
Climate Change	(a) The Inter-governmental Panel on Climate Change (IPCC) defines climate change as: "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external force or to persistent anthropogenic changes in the composition of the atmosphere or in land use". (b) The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".
Climatology	Climatology or climate science is the scientific study of climate, scientifically defined as weather conditions averaged over a period of time.
Coping Capacity	The means by which people or organizations use available resources and abilities to face a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions.
Craton	The term craton is used to distinguish the stable portion of the continental crust from regions that are more geologically active and unstable. Cratons can be described as shields, in which the basement rock crops out at the surface, and platforms, in which the

basement is overlaid by sediments and sedimentary rock.

Critical Facilities	The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency.
Crop Irrigated	Areas used for the production of annual crops, such as corn, vegetables, soybeans, tobacco and cotton. This class also includes all land being actively tilled.
Crop Marginal and Irrigated Saline	Crop marginal and irrigated saline are identified as those areas which are currently used for agriculture with low and unstable rainfall or higher rainfall areas intensively used, relative to user capability, under existing population densities, traditional technologies and institutional structures.
Crop Rainfed	The term rainfed agriculture is used to describe farming practices that rely only on rainfall for water.
Cyclone	A large-scale system of winds that spiral in toward a region of low atmospheric pressure. Because low-pressure systems generally produce clouds and precipitation, cyclones are often simply referred to as storms. A tropical cyclone is one that forms over warm tropical waters. Such a system is characterized by a warm, well-defined core and can range in intensity from a tropical depression to a tropical cyclone. While tropical cyclones can produce extremely powerful winds and torrential rain, they are also able to produce high waves and damaging storm surge.
Debris Flow	This is a phenomenon in which soil and rock on the hillside or in the riverbed are carried downward at a dash under the influence of continuous rain or torrential rain.
Demographics	It is the statistical data relating to the population and particular groups within it.
Density	Density refers to number of elements (population, buildings, roads etc.) per unit area.
Disaster	<p>A catastrophe or a calamity in an affected area arising from natural or man-made causes or by accident which results in substantial loss of life or human suffering or damage to, and destruction of property.</p> <p>A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.</p>
Disaster Management	Managing the complete spectrum of disaster including preparedness, mitigation, response, recovery, relief and rehabilitation.
Disaster Risk	The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.
Disaster Risk Management (DRM)	The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.
Disaster Risk Reduction (DRR)	The concept and practice of reducing disaster risks through systematic efforts to analyses and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.
District Head Quarter (DHQ)	The District Head Quarters (DHQ) Hospital is located at District headquarters level and serves a population of 1 to 3 million, depending upon the category of the hospital. The DHQ hospital provides promotive, preventive, curative, advance diagnostics, inpatient services, advance specialist and referral services. All DHQ hospitals are supposed to provide basic and comprehensive care.
Drought	A drought is an extended period when an area notes a deficiency in its water supply when the demand for water exceeds the supply. Generally, this occurs when an area receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region.
Early Warning	The provision of timely and effective information, through identified institutions, to communities and individuals so that they could take action to reduce their risks and prepare for effective response.
Earthquake	Earthquake is defined as shaking and vibration at the surface of the earth resulting from underground movement along a fault plane of from volcanic activity or due to movement of plate boundaries of the Earth. The scale of earthquakes is measured by moment magnitude and the shaking intensity at each location is usually reported by Mercalli intensity scale.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Element at Risks	Elements at Risk include all tangible (population, essential and critical infrastructure, building, crops and so on) and intangible elements (monetary values) that are at risk to any potential damage during extreme events.
Elevation	The measurement of height of a surface above sea level or ground level.

Emergency Management	The management and deployment of resources for dealing with all aspects of emergencies, in particularly preparedness, response and rehabilitation.
Employment	The “employed” comprises all persons ten years of age and above who worked at least one hour during the reference period and were either “paid employed” or “self-employed”. Persons, employed on permanent/regular footings, who have not worked for any reason during the reference period are however, treated as employed.
Entity	Any government or non-government organization, national or international stakeholders including Federal, Provincial and District agencies and United Nations’ agencies relevant to Disaster Management as described in Section 23-2 [(a) and (d)] of NDM Act 2010, which is interested in the execution of MHVRA activity hereinafter referred to as Entity.
Eolian Deposits	Eolian Deposits are the Wind-blown deposits on Planetary surface.
Evaluation	The systematic and objective assessment of an on-going or completed project, program or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision making process of both recipients and donors.
Evaporites	Evaporites are individual minerals found in the sedimentary deposit of soluble salts that results from the evaporation of water.
Exposure	People, property, systems, or other elements present in hazard zones that are subject to potential losses.
Flash Flood	A flash flood is a phenomenon of rapid flooding (mostly less than 6 hours) of geomorphic low-lying areas due to downpour or heavy rains caused by low depression, climate front line (thunderstorm) or cyclone.
Flood	Flood is a phenomenon of inundation by water coming from a direct rainfall or river, drainage or other water bodies, such as lakes or seas due to overflowing from ordinary boundary between land and water or water surging.
Flood Plain Deposits	Floodplain deposits are also called as Alluvial Plain, flat land area adjacent to a stream, composed of unconsolidated sedimentary deposits (alluvium) and subject to periodic inundation by the stream.
Food Insecurity	The state of being without reliable access to a sufficient quantity of affordable and nutritious food.
Forecast	Estimate of the occurrence of a future event (UNESCO, WMO). The term is used with different meanings in different disciplines.
Geography	Geography is the study of the Earth and its features, its inhabitants, and its phenomena.
Geological Composition	Geological composition is the fundamental unit of lithostratigraphy that contain certain amount of rock strata that have a comparable lithology, facies or other similar properties.
Geology	Geology is an earth science concerned with the solid Earth, the rocks of which it is composed and the processes by which they change over time.
Geospatial Data Bank	Spatial Data and Geographic Information Management System (GIS) data relevant to disaster and the corresponding data integration in the form of geospatial data bank. In the context of disaster management, following types of data is required: <ul style="list-style-type: none"> i. Data on the disastrous phenomena (e.g. landslides, floods, earthquakes), their location, frequency, magnitude etc. ii. Data on the environment in which the disastrous events might take place: topography, geology, geomorphology, soils, hydrology, land use, vegetation etc. iii. Data on the elements that might be destroyed if the event takes place: infrastructure, settlements, population, socioeconomic data etc. iv. Data on the emergency relief resources, such as hospitals, fire brigades, police stations, warehouses etc.
GLOF	“GLOF” refers to a Glacial Lake Outburst Flood that occurs when water in a glacier lake suddenly discharges due to a breach of a moraine dam (glacier lake). The results can be catastrophic to the downstream riparian area. (Richardson and Reynolds 2000).
Hazard	A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.
Hazard Analysis	Identification, studies and monitoring of any hazard to determine its potential, origin, characteristics and behavior.
Hill Torrent (Flood)	Hill torrent floods are basically a rapid flooding of geomorphic steep surface areas at alluvial cones or floodplain areas caused by overflowing water from channels due to rapid velocity and any amount of flow quantity.
Household	A household is defined to be constituted of all those persons who usually live together and share their meals. A household may consist of one person or more than one person who may or may not be related to each other.
Human-Induced Disasters	Natural disasters that are accelerated/ aggravated by human influence. A landslide, for example, may be purely natural, as a result of a heavy rainfall or earthquake, but it may also be human induced, as a result of an over steepened road-cut.

Human-Made Disasters	Events which are caused by human activities (such as atmospheric pollution, industrial chemical accidents, major armed conflicts, nuclear accidents, oil spills etc.)
Impacts	Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.
Indicators	Indicators are variables or parameters used to describe drought conditions. Examples include precipitation, temperature, streamflow, groundwater and reservoir levels, soil moisture, snowpack, etc.
Indices	Indices are typically a computed numerical representation of drought severity, assessed using climatic or hydro-meteorological inputs including the indicators listed above. In short, they aim to measure the qualitative state of drought on the landscape for a given time period. Indices are technically indicators as well. Monitoring the climate at various timescales allows identification of short-term wet periods within long-term droughts or short-term dry spells within long-term wet periods.
Infant Mortality Rate	The number of deaths of infants under one year of age per 1000 live births in a given year.
Irrigated Area	Irrigated agricultural area refers to the area in which the moisture of soil is controlled for the better growth of seeds and better crop production by providing water through different mode of water supply such as rivers, major, minor or distributary canals, tube wells, wells, spraying or other water to the crops.
Irrigation Sources	It refers to the source(s) by means of which the cultivated area is irrigated partially or wholly.
Land Cover	Land Cover is defined as the observed (bio) physical cover on the earth's surface.
Land Use	Land Use is characterized by the arrangements, activities and inputs that people undertake in a certain type of land in order to produce, change or maintain it.
Land Use Planning	The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses. Land-use planning can help to mitigate disasters and reduce risks by discouraging high-density settlements and construction of key installations in hazard-prone areas, control of population density and expansion Mitigation Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.
Landslide	A landslide is a phenomenon in which the movement of a mass of rock, debris, or earth down a slope due to gravity. The materials may move by falling, toppling, sliding, spreading, or flowing. Since a large amount of soil mass usually moves, serious damage can occur.
Latitude	Latitude is a geographic coordinate that specifies the north–south position of a point on the Earth's surface. Latitude is an angle (defined below) which ranges from 0° at the Equator to 90° (North or South) at the poles.
Longitude	Longitude is a geographic coordinate that specifies the east-west position of a point on the Earth's surface. It is an angular measurement, usually expressed in degrees
Meander-Belt	The part of a valley bottom across which a stream shifts its channel from time to time especially in flood.
Middle Schools	Middle Schools are the schools that provide education from 5 th to 8 th grade.
Mitigation	The lessening or limitation of the adverse impacts of hazards and related disasters.
Monitoring & Evaluation (M&E)	A continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds.
Mortality Rate	Number of deaths recorded in a population of particular region in a year.
Mouza / Deh	It is a territorial unit with a separate name, definite boundaries, and area precisely measured and divided into plots / khasras / survey numbers. Each mouza is a revenue estate and has a cadastral map maintained in the land revenue record with a Hadbast Number except Sindh Province. Mouza, Deh, Village, Killi and Chak are the names commonly used for it. The term mouza / deh is widely used in the settled areas while the term village and or killi are used in the unsettled areas. There may be one or more settlements, abadies, basties, dhokes, goths, etc. in the territory of a mouza / deh. The mouzas / dehs may also have scattered inhabitation while there may be some mouzas without population as well.
Multi Hazard Vulnerability and Risk Assessment (MHVRA)	Multi Hazard Vulnerability and Risk Assessment is a comprehensive study which intends to evaluate the expected vulnerabilities, risks and losses due to different hazardous events; both natural or man-induced.
Multi Hazards	The term Multi Hazards, as the name would suggest, are the hazards evolved from multiple sources, either inter-related or independent phenomena, and are subject to joint probability theory and analysis.

National Authority	National Authority means National Disaster Management Authority (NDMA).
Natural Disasters	Events which are caused purely by natural phenomena such as earthquakes, floods, cyclones etc.
Nullah	A Pakistani term, used for small rivers a streams carrying fresh water or sewerage disposal.
Performance Indicator	A variable that allows the verification of changes in the development intervention or shows results relative to what was planned.
Physical / Structural Vulnerability	The measure of the fragility structure, engineered or non-engineered, and its associated susceptibility to the natural stresses such as earthquake, flood etc.
Piedmont	Piedmont, in geology, landform created at the foot of a mountain or mountains by debris deposited by shifting streams.
Population Growth Rate	The growth rate is the rate at which a population is increasing (or decreasing) in a given year.
Population Projections	Population Projections are estimates of population number typically based on an estimated population consistent with most recent decennial census and are produced using cohort-component method.
Precipitation	Precipitation is the water that falls from the clouds towards the ground, especially as rain or snow.
Preparedness	Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.
Prevention	Activities to ensure complete avoidance of the adverse impact of hazards.
Primary Healthcare	The primary care facilities include Basic Health Units (BHUs) and Rural Health Centers (RHCs) mainly preventive, outpatient and basic inpatient care.
Primary School	A primary school is an education facility in which children receive primary or elementary education, coming after preschool and before secondary school.
Quality Assurance	Quality assurance encompasses any activity that is concerned with assessing and improving the merit or the worth of a development intervention or its compliance with given standards. Note: examples of quality assurance activities include appraisal, RBM, reviews during implementation, evaluations, etc.
Range Lands	Range Lands are vast natural landscapes grasslands, shrub lands and wood lands.
Recovery	Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.
Relative Humidity	The amount of water vapour present in air expressed as a percentage of the amount needed for saturation at the same temperature.
Reliability	Consistency or dependability of data and evaluation judgments, with reference to the quality of the instruments, procedures and analyses used to collect and interpret evaluation data.
Relief / Response	The provision of assistance during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration.
Residual Risk	The risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained.
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.
Retrofitting	Reinforcement of existing buildings and structures to become more resistant and resilient to the forces of natural hazards.
Risk	The combination of the probability of an event and its negative consequences.
Risk Assessment	A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.
Risk Management	The systematic approach and practice of managing uncertainty to minimize potential harm and loss.
Risk Transfer	The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.

River	A river is a natural waterway, usually freshwater, flowing toward lower level of water surface such as a lake, a sea, or another river.
Riverine Flood	Flood is a phenomenon of inundation by water coming from a river, drainage or other water bodies, such as lakes or seas due to overflowing from ordinary boundary between land and water or water surging.
Rural Area	A rural area is an open area that has very low population and building density. Generally rural areas are away from cities/towns and its inhabitants are mostly linked with agriculture based livelihood.
Rural Health Centre (RHC)	The RHCs have 10-20 inpatient beds and each serves a catchment population of up to 100,000 people. The RHC provides promotive, preventive, curative, diagnostics and referral services along with inpatient services. The RHC also provides clinical, logistical and managerial support to the BHUs, LHWs, MCH Centers, and Dispensaries that fall within its geographical limits. RHC also provides medico-legal, basic surgical, dental and ambulance services.
Secondary Health Care	It is an intermediate level of health care that is concerned with the provision of specific technical, therapeutic or diagnostic services. It is the first referral level serving a district or a tehsil. Specialist consultation procedures and hospital admissions fall into this category of care. The role of a district hospital in primary health care has been expanded beyond being dominantly curative and rehabilitative to include promotional, preventive and educational roles as part of a primary health care approach.
Secondary School or Higher School	Secondary Schools are the schools which provide education from grade 8 till Intermediate Level, i.e. 12 th Grade or FSc.
Sedimentary Rocks	Sedimentary rocks are types of rock that are formed by the deposition and subsequent cementation of that material at the Earth's surface and within bodies of water.
Slope Failure	In this phenomenon, a slope abruptly collapses when the soil that has already been weakened by moisture in the ground loses its self-cohesiveness under the influence of rain or an earthquake. Due to sudden collapse, many people fail to escape if it occurs near a residential area, thus leading to a higher rate of fatalities.
Social Vulnerability	Characteristics of social systems that create the potential for harm or loss to it
Steppe Climate	A semi-arid climate or steppe climate is the climate of a region that receives precipitation below potential evapotranspiration, but not as low as a desert climate.
Storm Surge	A Storm Surge is phenomena of sea level rise associated with a low-pressure weather system, typically a tropical cyclone. Therefore, an early warning plan for "storm surge" should be incorporated with that of "cyclone".
Streambed	A stream bed is the channel bottom of a stream or river, the physical confine of the normal water flow
Structural / Non-Structural Measures	Structural measures refer to any physical construction to reduce or avoid possible impacts of hazards, which include engineering measures and construction of hazard-resistant and protective structures and infrastructure. Non-structural measures refer to policies, awareness, knowledge development, public commitment, and methods and operating practices, including participatory mechanisms and the provision of information, which can reduce risk and related impacts.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs. (Brundtland Commission, 1987)
Tehsil Head Quarter (THQ)	These hospitals are located at each THQ and serves a population of 0.5 to 1.0 million. At present majority of THQ hospitals have 40 to 60 beds. The THQ hospital provides promotive, preventive, curative, diagnostics, in patients, referral services and also specialist care. THQ hospitals are supposed to provide basic and comprehensive Emergency Obstetric and New born Care (EmONC). THQ hospital provides referral care to the patients including those referred by the Rural Health Centers, Basic Health Units, Lady Health Workers and other primary care facilities.
Tertiary Healthcare	Tertiary care hospitals are located in the major cities for more specialized inpatient care. Tertiary care is specialized consultative health care, usually for inpatients and on referral from a primary or secondary health professional.
Tsunami	A tsunami is a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or a large lake. Earthquakes, volcanic eruptions and other underwater explosions, landslides, avalanche, meteorite impacts and other disturbances above or below water all have the potential to generate a tsunami.
Unemployment	The "unemployed" comprises all the persons ten years of age and above who during the reference period were without work, currently available for work and are seeking work.
Urban Area	An Urban area is human settlement with high population density and infrastructure of built environment. Urban areas are created through urbanization and are categorized by urban morphology as cities, towns, conurbations and suburbs.
Urban Flood	Flood and inundation phenomena occurring in the city or built-up areas.

Veterinary Facility

It refers to the availability of veterinary facilities for livestock with qualified veterinarian (Doctor / Assistant) for provision of medical facilities for farm animals.

Vulnerability

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Wet Areas

Areas which are naturally covered with fresh or saline water such as river and lakes are grouped in this class.

Wheat Procurement Centre

These centres are established every year at the time of wheat harvest in surplus wheat producing areas particularly of the Punjab and Sindh provinces by the Provincial Food Departments and or Pakistan Agricultural Services and Storage Corporation (PASSCO) at appropriate locations. These centres are not permanent in nature and their number in a tehsil / district varies on year to year basis depending upon the procurement policy.

LIST OF ACRONYMS

AMS	Assistant Medical Superintendent	MOVERE	Mobilization of Volunteer for Emergency Response Exercise
APWMO	Assistant Principal Women Medical Officer	MPE	Most Probable Earthquake
AWO	Automatic Weather Observation	MS	Medical Superintendent
AWS	Automatic Weather Station	MSSP	Micro Seismic Study Program (Pakistan Atomic Energy Commission)
C&W	Communication & Works	MM	Moment Magnitude
CBDRM	Community Based Disaster Risk Management	NARC	National Agricultural Research Center
CBEWS	Community-Based Early Warning System	NCEG	National Center of Excellence in Geology
CMO	Casualty Medical Officer	NDI	NOAA Drought Index
CRI	Composite Risk Index	NDMA	National Disaster Management Authority
DC	Deputy Commissioner	NDMC	National Disaster Management Commission
DCO	District Coordination Officer	NDMP	National Disaster Management Plan
DDMA	District Disaster Management Authority	NDMP-SC	Steering Committee for National Disaster Management Plan
DDRMP	District Disaster Risk Management Plan	NDRIS	National Disaster Risk Information System
DEWS	Disease Early Warning System	NDVI	Normalized Difference Vegetation Index
DHQ	District Headquarter Hospital	NDWI	Normalized Difference Water Index
DM	Disaster Management	NEOC	National Emergency Operations Centre
DMS	Deputy Medical Superintendent	NFPP	National Flood Protection Plan
DRR	Disaster Risk Reduction	NHA	National Highway Authority
DSHA	Deterministic Seismic Hazard Assessment	NHEPRN	National Health Emergency Preparedness and Response Network
ENT	Ear, Nose, Throat	NIDM	National Institute of Disaster Management
EPI	Expanded Program on Immunization	PARC	Pakistan Agricultural Research Council
EWS	Early Warning System	PASSCO	Pakistan Agricultural Services and Storage Corporation
PDMA	Provincial Disaster Management Authority	PBC	Pakistan Broadcasting Corporation
FFC	Federal Flood Commission	PBS	Pakistan Bureau of Statistics
FGD	Focus Group Discussion	PCIW	Pakistan Commissioner for Indus Waters
GIS	Geographic Information System	PCRWR	Pakistan Center for Research on Water Resources
GLOF	Glacial Lake Outburst Flood	PDMA	Provincial Disaster Management Authority
GMPE	Ground Motion Prediction Equation	PDSI	Palmer Drought Severity Index
GOERE	Government Officer Emergency Response Exercise	PGA	Peak Ground Acceleration
GPS	Global Positioning System	PHDI	Palmer Hydrological Drought Severity Index
GSP	Geological Survey of Pakistan	PIPD	Provincial Irrigation and Power Department
HFA	Hyogo Framework for Action	PMD	Pakistan Meteorological Department
HTC	Hydro-Thermal Coefficient	PMO	Principal Medical Officer
INGOs	International Non-governmental Organizations	PMU	Project Management Unit
LSWI	Land Surface Water Index	PRA	Participatory Risk Assessment
M&E	Monitoring and Evaluation	PSC	Project Steering Committee
MBT	Main Boundary Thrust	PSHA	Probabilistic Seismic Hazard Assessment
MCE	Maximum Considered Earthquake	PTA	Pakistan Telecommunication Authority
MGDs	Millennium Development Goals	PTCL	Pakistan Telecommunication Company Limited
MHVRA	Multi Hazard Vulnerability and Risk Assessment	PTWC	Pacific Tsunami Warning Center
MKT	Main Karakorum Thrust	PWMO	Principal Women Medical Officer
MMT	Main Mantle Thrust		
MO	Medical Officer		

R&D	Research and Development	TMA	Tehsil Municipal Administration
RDMC	Regional Drought Monitoring Centre	UC	Union Council
RP	Return Period	UN	United Nations
SFDRR	Sendai Framework for Disaster Risk Reduction	VCI	Vegetation Condition Index
SMA	Soil Moisture Anomaly	VegDRI	Vegetation Drought Response Index
SMDI	Soil Moisture Deficit Index	VIC	Variable Infiltration Capacity
SMO	Senior Medical Officer	WAPDA	Water and Power Development Authority
SMRFC	Specialized Medium Range Forecasting Centre	WASA	Water and Sanitation Agency
SOP	Survey of Pakistan	WFP	World Food Program
SoVI	Social Vulnerability Index	WHO	World Health Organization
SPEI	Standardized Precipitation Evapotranspiration	WMO	World Meteorological Organization
SPI	Standard Precipitation Index	WMO	Women Medical Officer
SPI	Stream Power Index	WOE	Weight of Evidence (Statistical Model)
SPT	Standard Penetration Test	WRF	Weather Research and Forecast (Name of Numerical Calculation Model)
SRSI	Standardized Reservoir Supply Index		
SSFI	Standardized Stream Flow Index		
SSI	Semi Structured Interviews		
SUPARCO	Pakistan Space and Upper Atmospheric Research Commission		
SWI	Standardized Water-Level Index		
SWMO	Senior Women Medical Officer		
SWS	Soil Water Storage		
SWSI	Surface Water Severity Index		
SWSI	Surface Water Supply Index		
TCI	Temperature Condition Index		
THQ	Tehsil Headquarter Hospital		

DATA SOURCES

DATA TYPE	DATA SOURCE
Agriculture Based Industries	Directorate of Agriculture, Crop Reporting Service, Punjab, Lahore x(Development Statistics-2015)
Animals Slaughtered in Recognized and Un-recognized Slaughter Houses by Type in the District	Directorate of Livestock and Dairy Development (Ext.) Punjab,Lahore
Annual Cellular Subscribers	Pakistan Telecommunication Authority (PTA)
Area Sown under Wheat, Rice, Cotton and Sugarcane in the District	Directorate of Agriculture, Crop Reporting Service, Punjab, Lahore.
Area Sown by Mode of Irrigation	Bureau of Statistics, Punjab, Lahore (2013-2014)
Birth Registration	Multiple Indicator Cluster Survey (MICS) Punjab: 2011
Broadband Subscribers by Technology	Pakistan Telecommunication Authority (PTA)
Building Distribution	PBS
Canal System	Agriculture Department Punjab
Cellular Communication Towers	Pakistan Telecommunication Authority (PTA)
Child Delivery - Location and Type of Assistance	Pakistan Social and Living Standard Measurement (PSLM): 2013-2014
Child Statistics	Multiple Indicator Cluster Survey (MICS) Punjab: 2011
Climatology	http://www.Myweather2.Com/City-Town/Pakistan/Khushab/Climate-Profile.Aspx http://en.Climate-Data.Org/Location/3077/
Diesel and Electric Tube wells Installed by Ownership	Directorate of Agriculture Crop Reporting Service, Punjab, Lahore.
Distribution Of Land Use/ Land Cover (LU/LC)	Space and Upper Atmosphere Research Commission (SUPARCO)
Education Facilities	School Education Department, Government of Punjab
Elevation Bands	National Aeronautics and Space Administration (NASA)
Establishment of Private Poultry Farms in the District (2013-14)	Directorate of Poultry Research Institute, Punjab, Rawalpindi
Flood Inundation Frequency	National Disaster Management Authority (NDMA)
Geology	Geological Survey of Pakistan (GSP)
Health Facilities	Health Department Punjab/ District Health Information System Punjab (Government Of Punjab)
Household Characteristics	Multiple Indicator Cluster Survey (MICS) Punjab: 2011
Industries	District Officer (E&IP), Khushab
Key Indicators - Child Mortality Statistics	Multiple Indicator Cluster Survey (MICS) Punjab: 2011
Khushab City Land Use Map 2013	NDMA
Landline Service	District Pre-Investment Study – 2012, Directorate Of Industries, Punjab Poonch House, Multan Road, Lahore.
Literacy Rate- 2015	2015 Projected

DATA TYPE	DATA SOURCE
Literacy Ratio	Pakistan Social and Living Standard Measurement (PSLM): 2014-2015
Major Industries	District Officer(E&IP), Khushab
Metaled Roads Length By Type Zone and District	Planning & Design Directorate, Punjab Highway Department, Lahore.
Mineral Productions	Directorate General, Mines and Minerals, Punjab, Lahore. (Development Statistics-2015)
Motor Vehicles 'Registered' By Type	Additional Director General, Excise & Taxation, Punjab, Lahore.
Number of Cattle, Sheep and Buffaloes in the District	Source:-Census of Agriculture 2000 & 2010- Census of Livestock 1996 & 2006
Number of Registered Factories & Employment Level	Bureau of Statistics, Punjab, Lahore
Number of Work Animals by Type in the District (2006)	2006 Census of Livestock, Agricultural Census Organization, Pakistan Bureau of Statistics
Percentage of children that have been immunized by Type of Antigen- Based on record and recall	Pakistan Social And Living Standard Measurement Survey (PSLM) 2013-2014
Population	Population Census 1998, Population Census Organization, Government of Pakistan. Projections were calculated on the basis of the Inter-Census Growth Rate for the two Censuses Of 1981 And 1998, and do not factor in changing Fertility And Migration Patterns.
Population by Age Group, Gender and Rural /Urban	Population Census 1998
Population by Mother Tongue- 2015	2015 Projected
Population Distribution	Pakistan Bureau Of Statistics (Population Census 1998, Population Census Organization, Government Of Pakistan. Projections Were Calculated On The Basis Of The Inter-Census Growth Rate For The Two Censuses Of 1981 And 1998, And Do Not Factor In Changing Fertility Patterns)
Population on Basis of Religion-1998	1998 Census
Post-Natal consultations of the District	Pakistan Social and Living Standard Measurement (PSLM): 2013-2014
Railway Network	Punjab Development Statistics 2011 / Respective District Offices
Sales of Fertilizer by year 2013-2014	Director General Agriculture, Punjab, Lahore
Socio-Economic Statistics of The District Khushab (In Percentage)	Multiple Indicator Cluster Survey (MICS) Punjab: 2011
Threshers and Harvesters in the District (2012-13)	Directorate of Agriculture Crop Reporting Service, Punjab, Lahore.
Total tractors in the District by 2004 Census	2004 Agricultural Census Wing & Pakistan Bureau of Statistics, Government of Pakistan, Lahore)
Tractors by Make in District (2012-13)	Directorate of Agriculture Crop Reporting Service, Punjab, Lahore
Types Of Health Facility	Health Department Punjab
Veterinary Institution in the District	Department Of Livestock & Dairy Development, Khushab

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**Project Management Unit (PMU),
National Disaster Management Authority,
Prime Minister's Office, 2nd Floor, Sector G-5/1
Constitution Avenue, Islamabad - Pakistan
www.ndma.gov.pk**