No.

ISLAMIC REPUBLIC OF PAKISTAN
PROJECT FOR THE DEVELOPMENT OF REPAIR FACILITIES FOR AGRICULTURAL DEVELOPMENT CONSTRUCTION EQUIPMENT
PRELIMINARY STUDY REPORT

DECEMBER 2004

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

G M
J R
04-269

ISLAMIC REPUBLIC OF PAKISTAN
PROJECT FOR THE DEVELOPMENT OF REPAIR FACILITIES FOR AGRICULTURAL DEVELOPMENT CONSTRUCTION EQUIPMENT
PRELIMINARY STUDY REPORT

DECEMBER 2004

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

Islamic Republic of Pakistan—Project for the Development of
Repair Facilities for Agricultural Development
Construction Equipment
Preliminary Study Report

Contents

Foreword

Based on a request from the Islamic Republic of Pakistan, the Japanese government has decided to conduct a preliminary study with regard to the project to develop repair facilities for construction equipment used in agricultural development, and JICA has carried out the study.

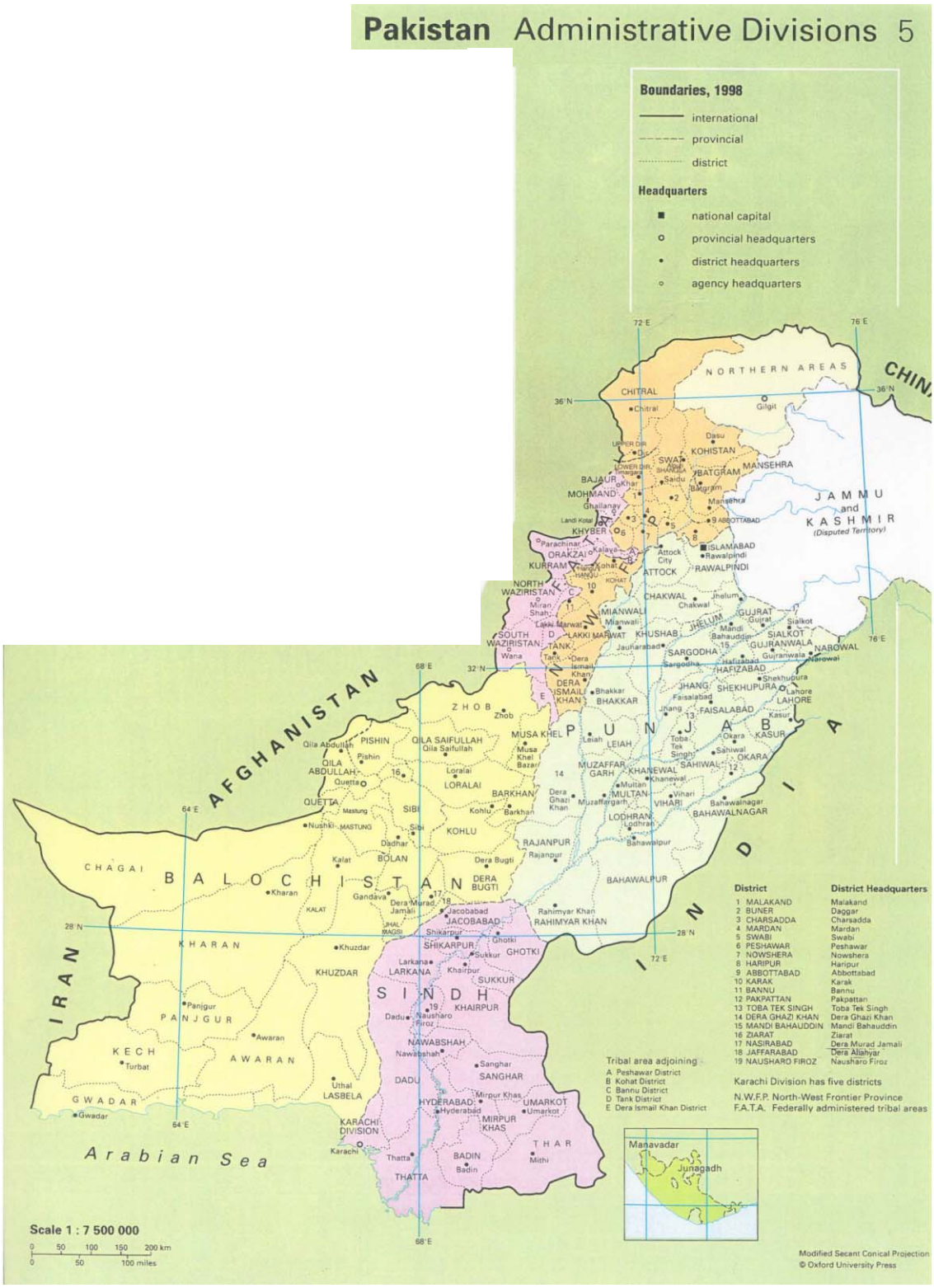
From June to July 2004, a JICA study group was dispatched to Pakistan. The team held discussions with members of the Pakistani government, performed onsite investigations, and conducted some further work after their return to Japan to bring this report to completion.

I hope this report contributes both to the promotion of the said project and to the further fostering of friendly relations between the two countries.

Finally, I would like to extend my sincerest gratitude to all those who gave their cooperation and support to the study.

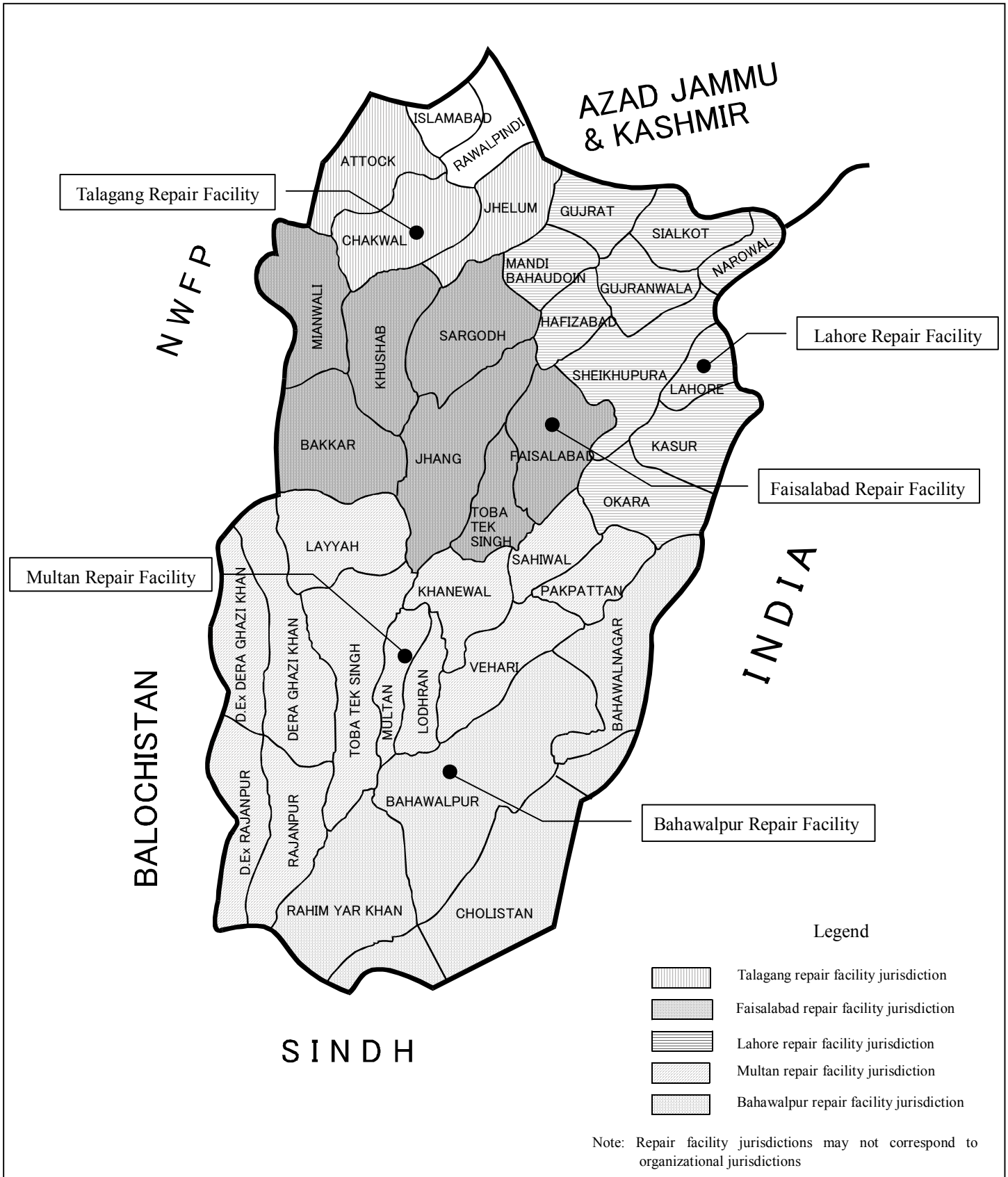
December 2004

Seiji Kojima, Vice President
Japan International Cooperation Agency

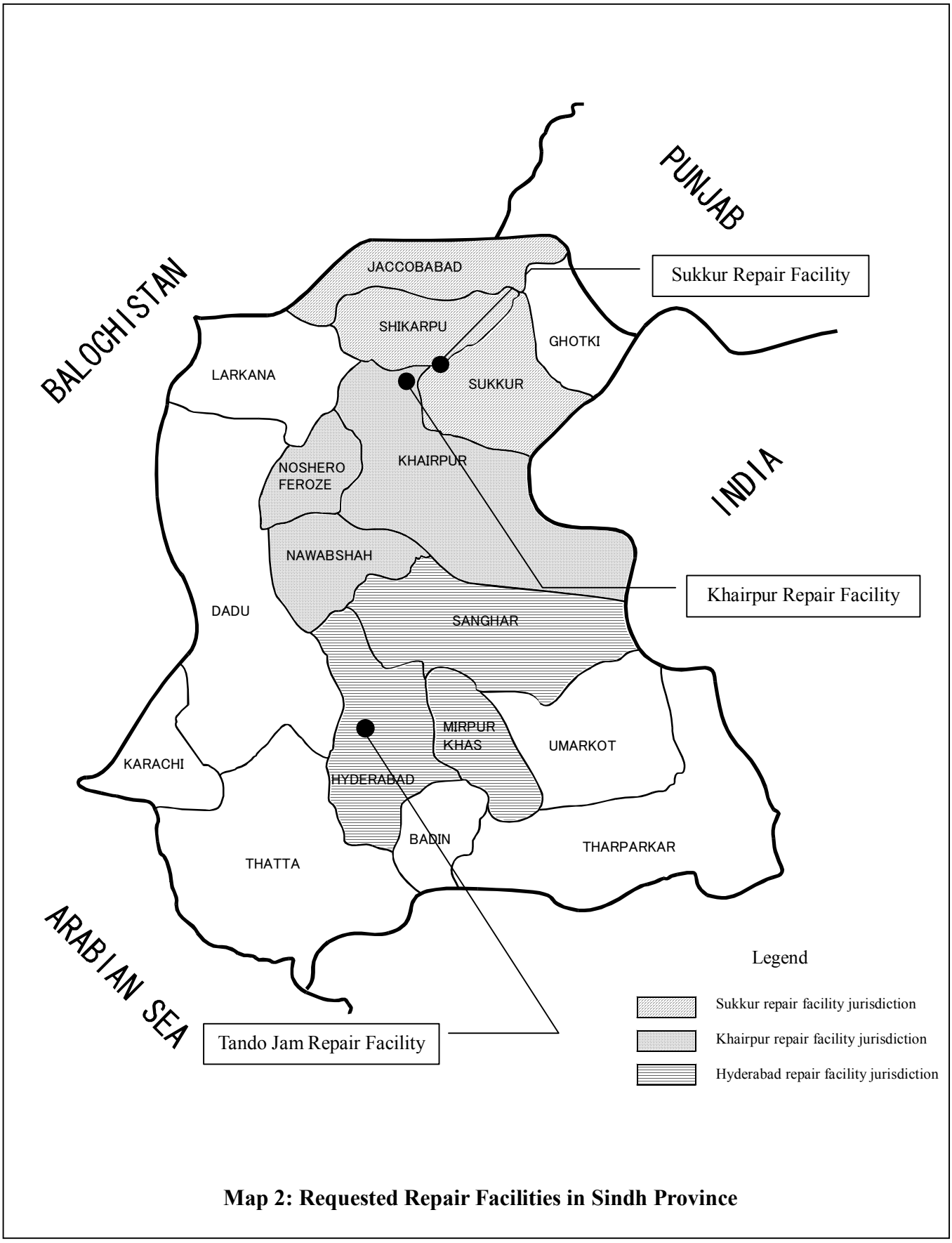


Source: The New Oxford Atlas for Pakistan

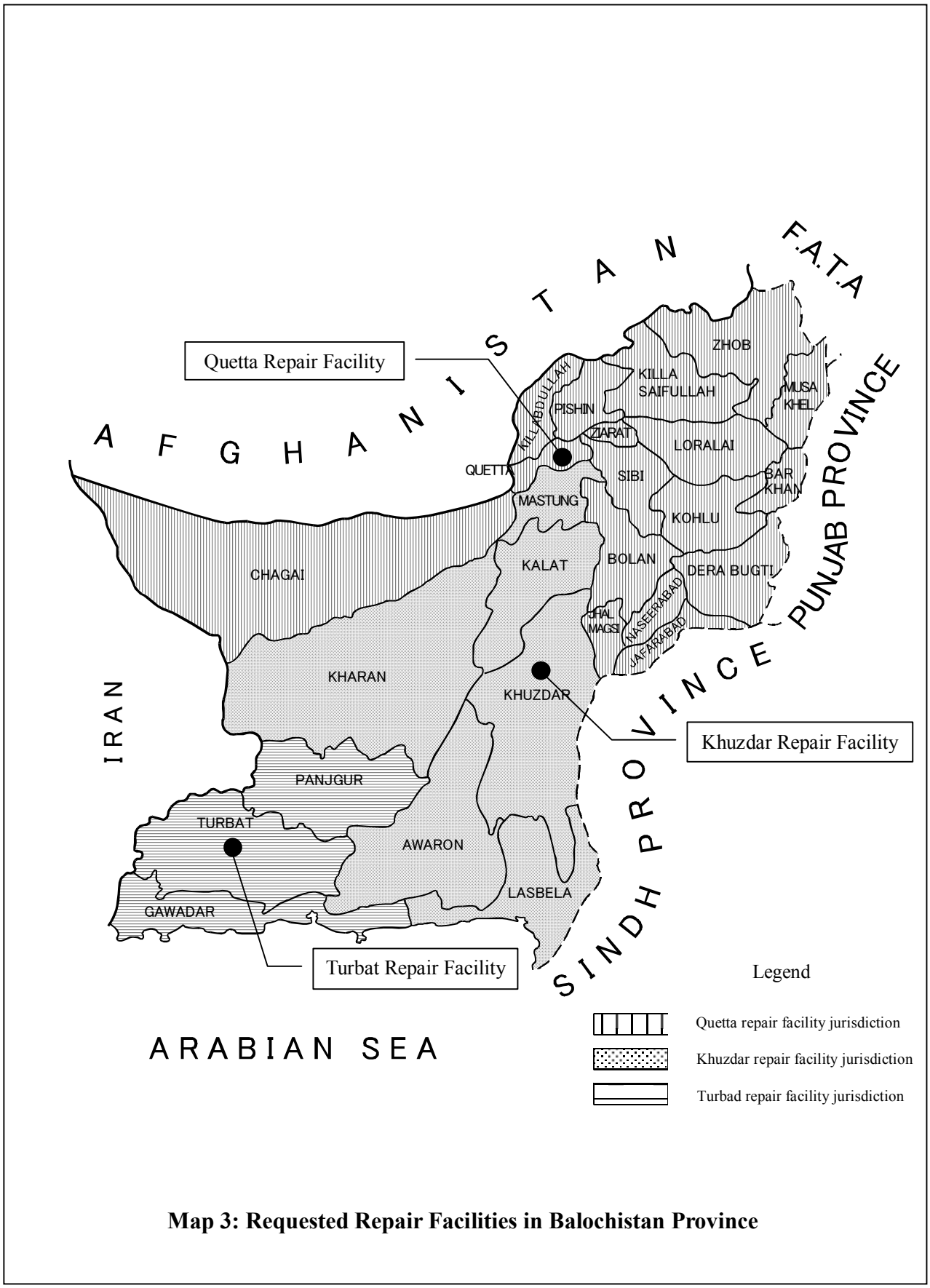
Map: Pakistan's Administrative Divisions



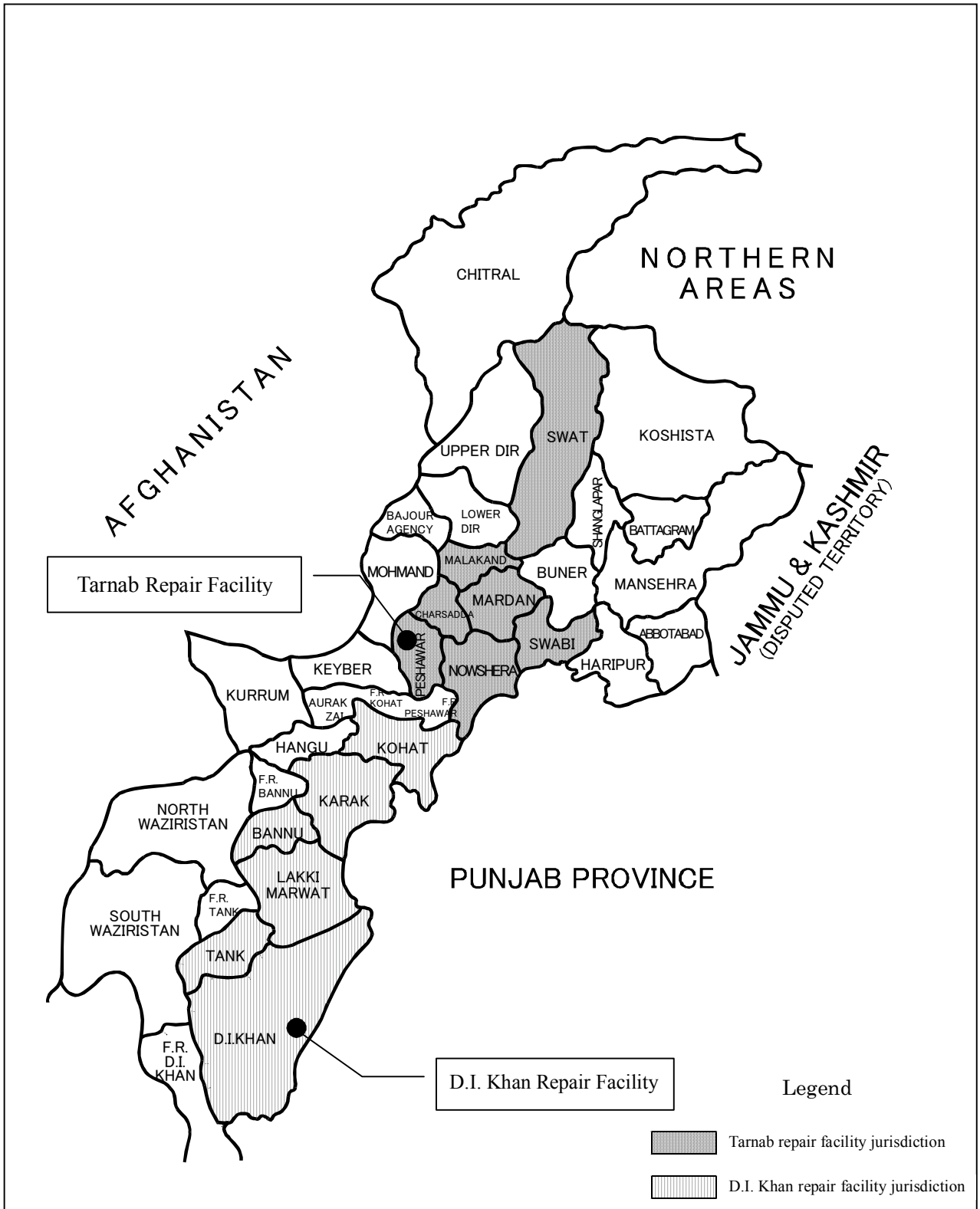
Map 1: Requested Repair Facilities in Punjab Province



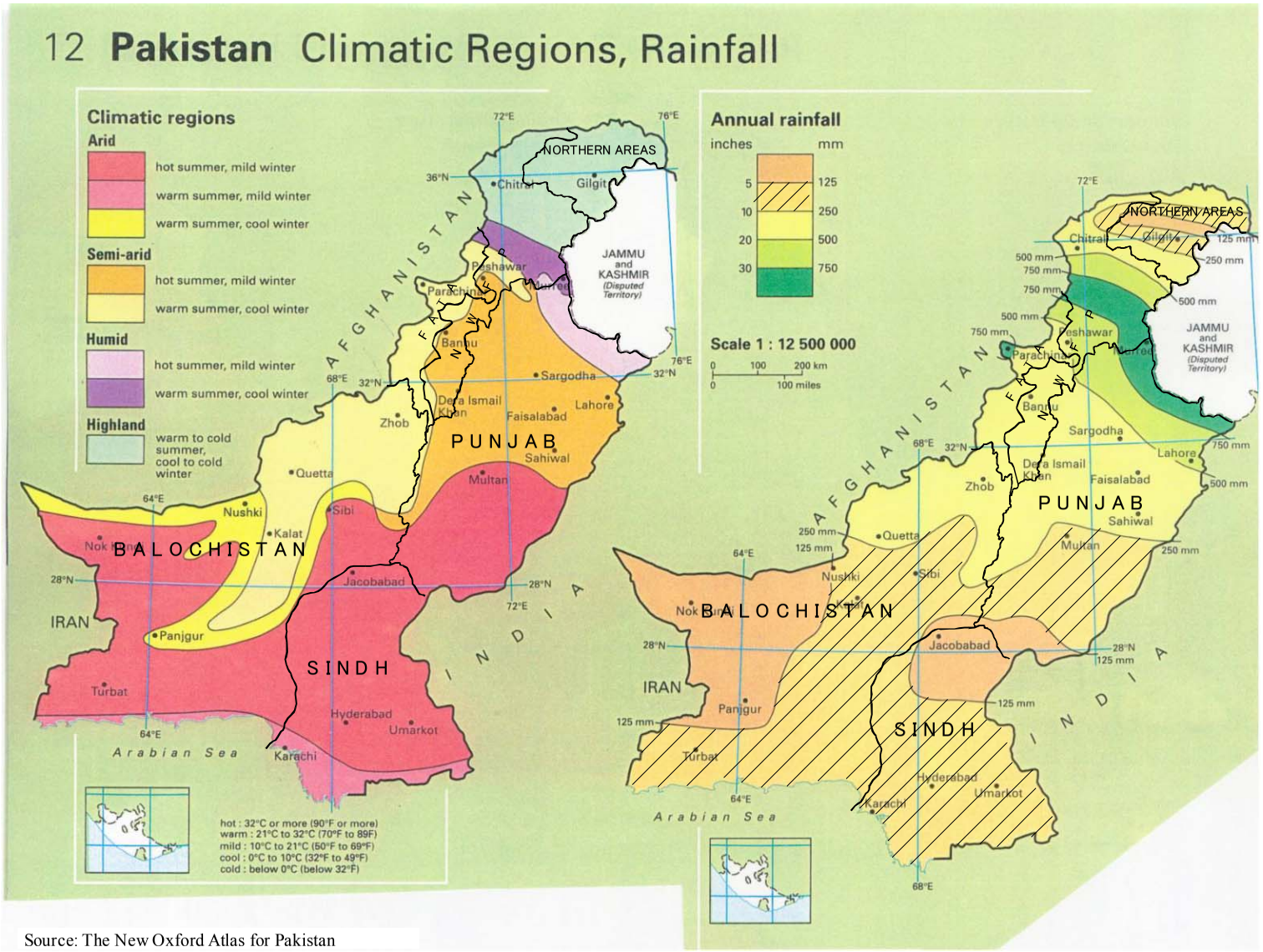
Map 2: Requested Repair Facilities in Sindh Province



Map 3: Requested Repair Facilities in Balochistan Province

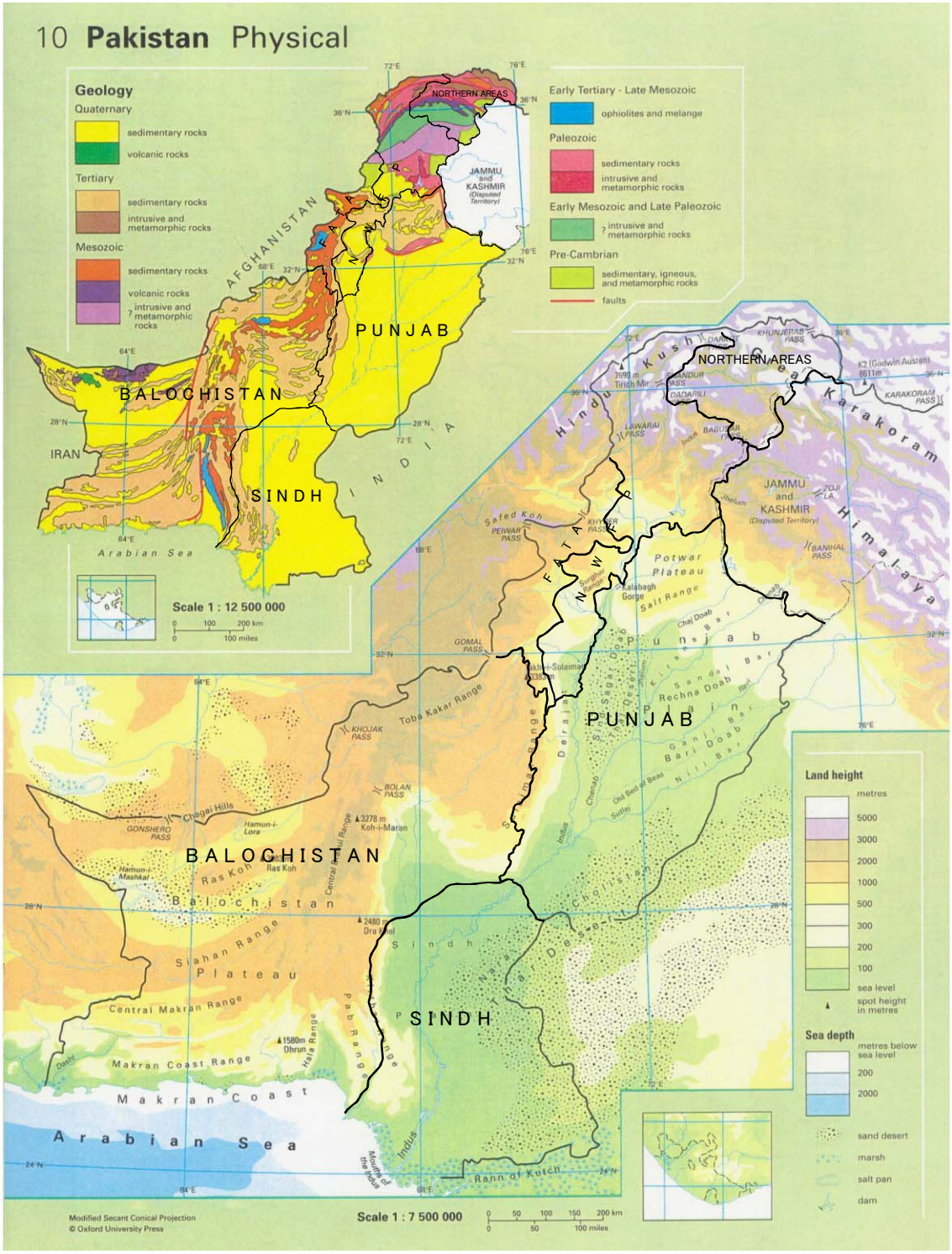


Map 4: Requested Repair Facilities in North-West Frontier Province



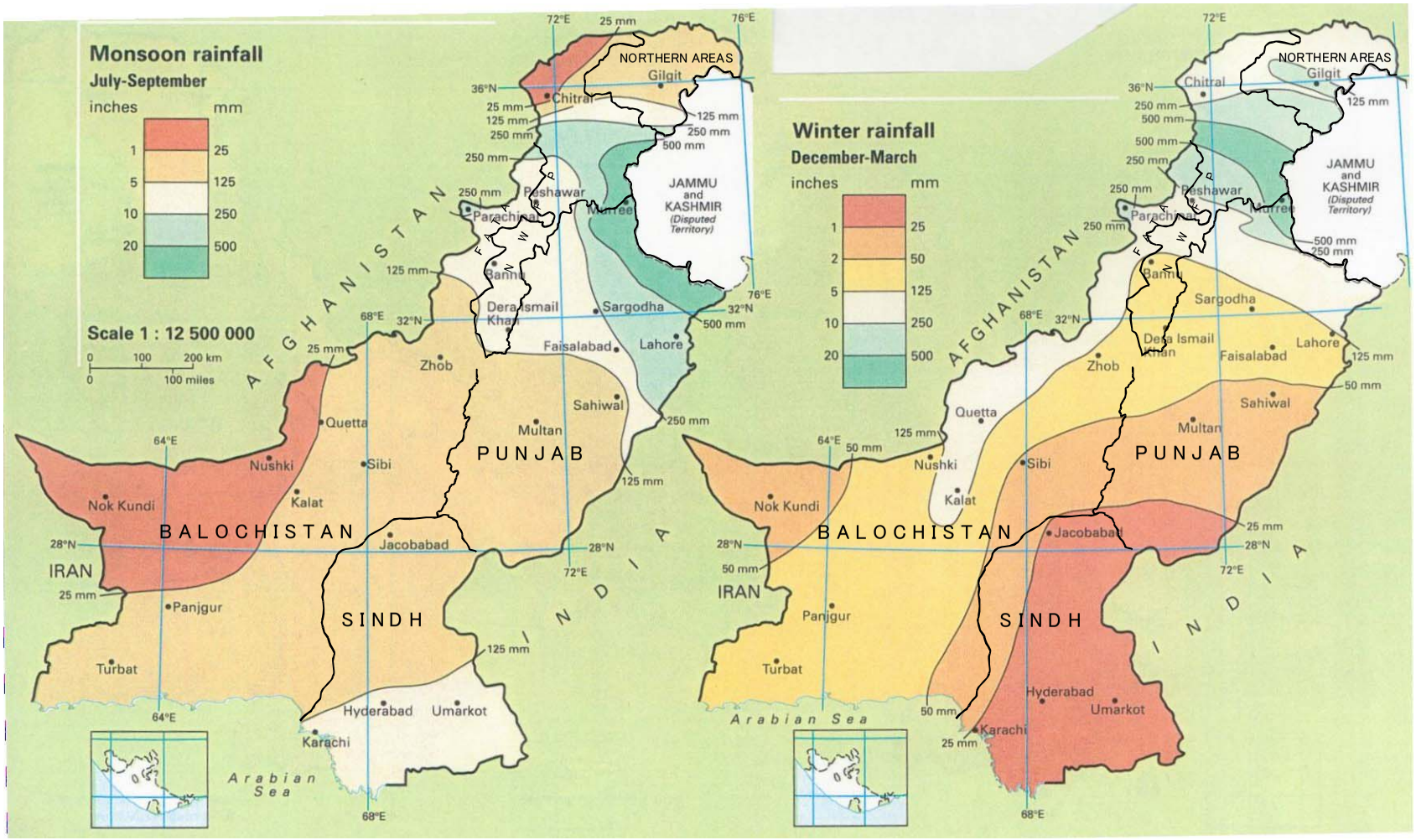
Source: The New Oxford Atlas for Pakistan

Chart 1: Pakistan's Climatic Regions (left) and Annual Rainfall



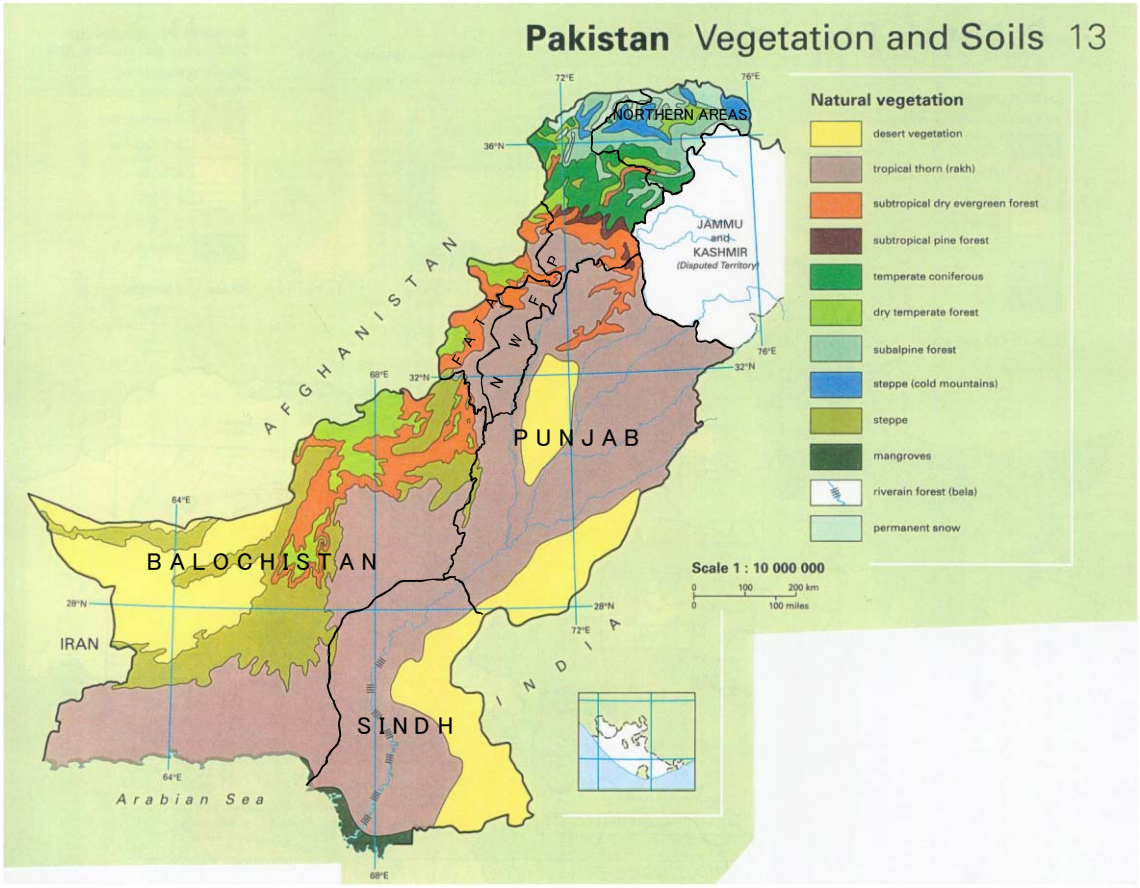
Source: The New Oxford Atlas for Pakistan

Chart 2: Pakistan's Geology and Terrain



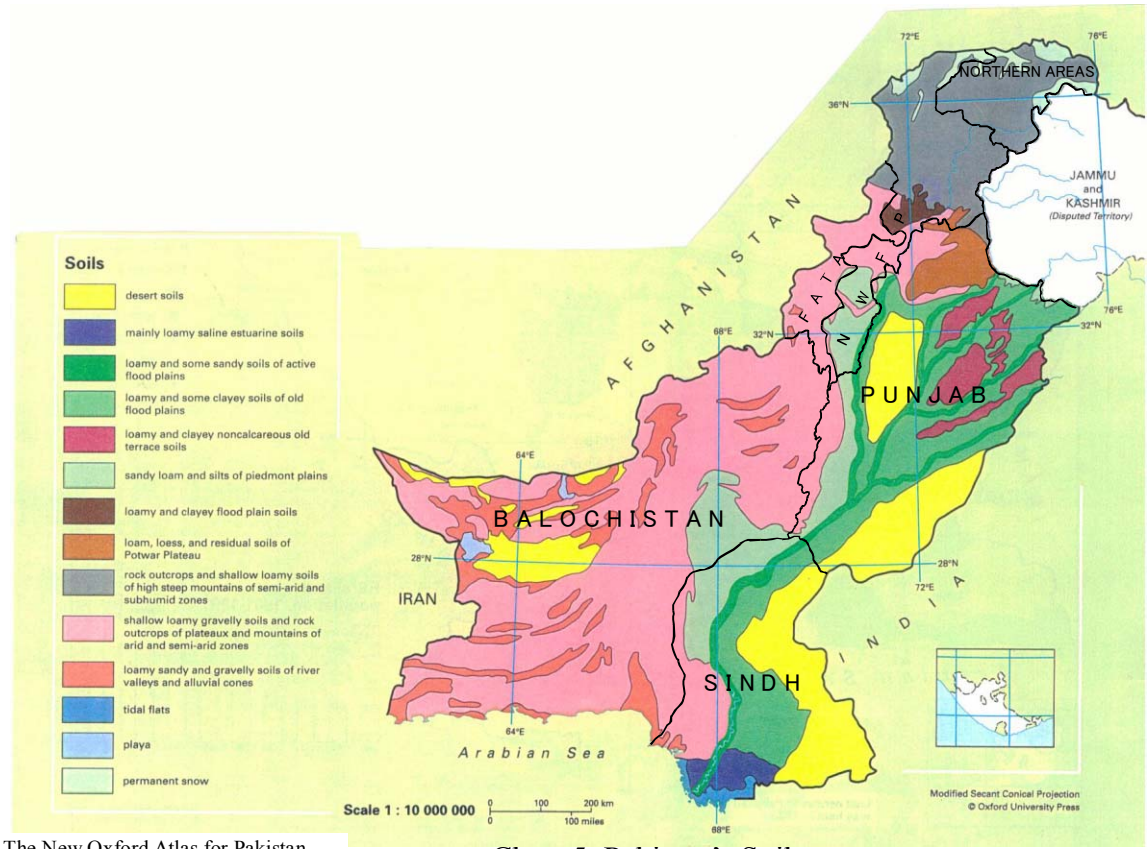
Source: The New Oxford Atlas for Pakistan

Chart 3: Rainfall in the Monsoon Season, July through September (left) and in the Winter Season, November through March (right)



Source: The New Oxford Atlas for Pakistan

Chart 4: Pakistan's Natural Vegetation

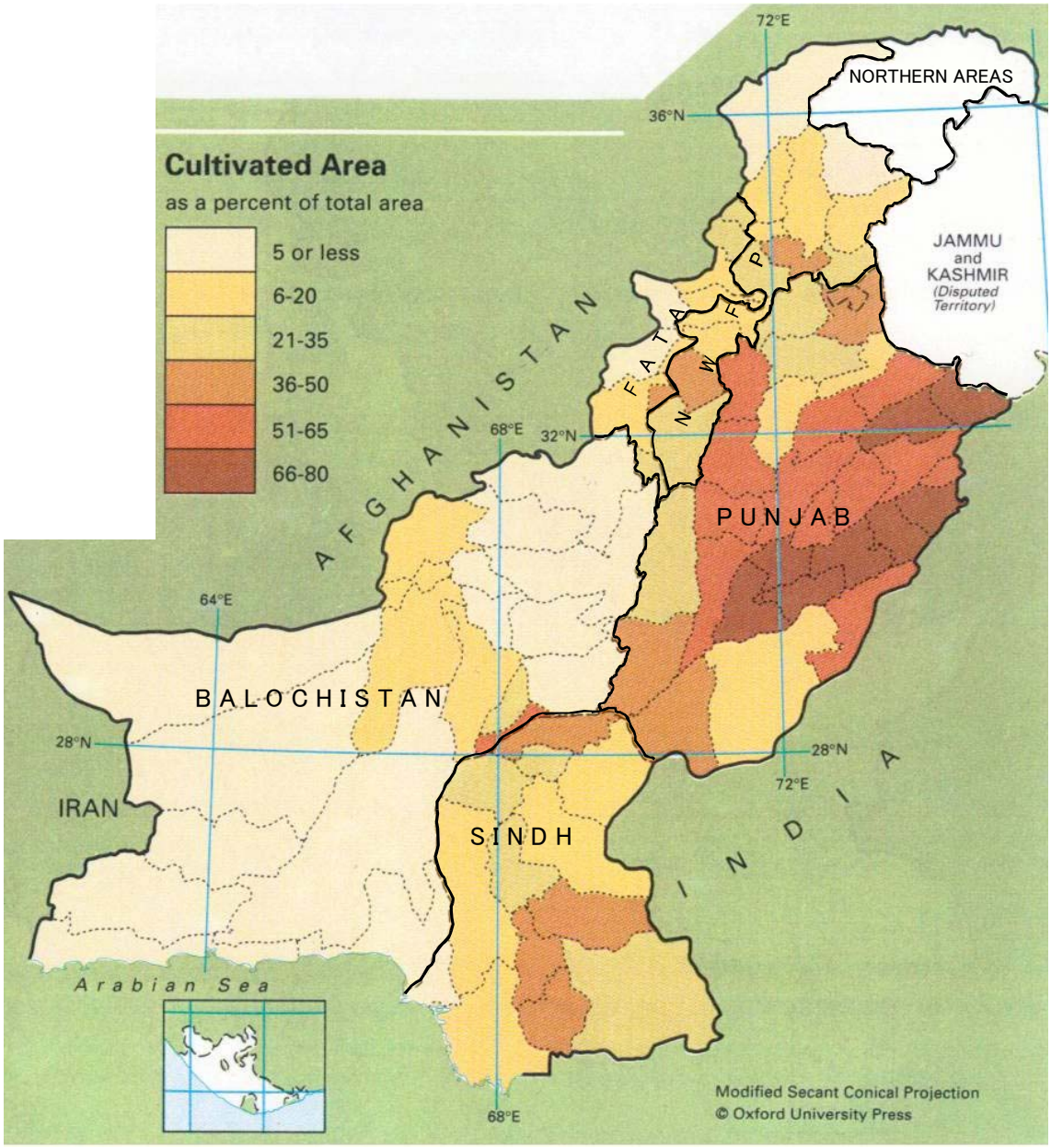


Source: The New Oxford Atlas for Pakistan

Chart 5: Pakistan's Soils

Source: Pakistan Water Sector Strategy

Chart 6: Groundwater Distribution and Quality



Source: The New Oxford Atlas for Pakistan

Chart 7: Cultivated Area as a Percent of Total Area (%)

Land Slated for Development (Sindh Province)

Bulldozer under the jurisdiction of the Khairpur Subdivision office, plowing the desert

Lake beside the location shown on the left (present year-round—does not dry up)

The same location as above, cultivated with bulldozers and converted to cotton fields

Bulldozer under the jurisdiction of the Sukkur Subdivision office, plowing the desert

7 kilometers from the location shown on the right: watercourse (canal end)

A portion of the bulldozer-plowed land shown above

Land Slated for Development (Balochistan Province)

Bulldozer belonging to the Quetta District office, reclaiming rocky desert around Quetta for farmland

Land similar to that on the left, pre-development

Embankment made from stones collected during the reclaiming process above; retains rainwater and protects against soil erosion

Groundwater drilling (performed by the Power and Irrigation Department)

Bulldozer belonging to the Quetta District office (operating for 37,000 hours), removing stones to develop an apple orchard beside a seasonal river

Bulldozer belonging to the Turbat District office, rented to farmers for Rs 80/hr. × 40 hr., subsidized

Land Slated for Development (Balochistan Province)

Bulldozer belonging to the Turbat District office, preparing a test site for the Directorate of Agriculture: trial cultivation of dates

Land similar to that on the left, pre-development

Land Slated for Development (Punjab Province)

Bulldozer belonging to the Faisalabad District office, reclaiming a dry riverbed for farmland

Terrain similar to that on the left, pre-development

Leveling farmland near the location shown above

Bulldozer preparing for a fishpond (under the jurisdiction of the Faisalabad District office)

Bulldozer under the jurisdiction of the Bahawalpur District office, developing farmland at an altitude of about 3 meters for water retention

Land similar to that above before work began

Land Slated for Development (Punjab Province)

A location similar to that above, pre-development

A location similar to that on the left, post-reclamation; cotton is being cultivated

Land Slated for Development
(North-West Frontier Province)




Land near Peshawar (90 minutes away by car) that farmers are planning to develop with bulldozers. They are saving up the bulldozer rental fees little by little and gradually reclaiming the area into farmland, intending to plant vegetables and wheat. The water source is groundwater, at a distance of about 150 meters below ground.

Vegetables cultivated on reclaimed land

Abbreviations

CMTI	Construction Machinery Training Institute
FATA	Federally-Administrated Tribal Area
MINFAL	Ministry of Food, Agriculture and Livestock
NWFP	North-West Frontier Province
WAPDA	Water and Power Development Authority
2 KR	Second Kennedy Round

CHAPTER I: STUDY OVERVIEW

Section 1.1: History Behind the Requests

The Islamic Republic of Pakistan covers 796 thousand square kilometers, ranging in latitude from 25º30′N to 36º45′N and in longitude from 61º00′E to 47º30′E. The entire plains region falls in a subtropical zone, containing many arid regions with rainfall under 130 mm a year. In the year 2000, its gross domestic product (GDP) was $61.638 million, of which the agricultural sector is the main industry; it comprises 23.3 percent of GDP (April 2003) and utilizes close to half of the labor population.

The population of Pakistan, currently around 140 million people, is growing at just under 2 percent a year. Due to a system of production and distribution lacking in organization and planning, Pakistan has increased food imports to cover shortfalls in the production of essential consumable goods. This is adversely affecting the economy. Agricultural development is a leading issue since it provides a means to increase food production and stabilize food supplies.

There are 9 million hectares of cultivable wasteland in the four provinces of Punjab, Sindh, Balochistan, the North-West Frontier Province (NWFP), and the Federal Administrative Tribal Areas (FATA), which are the subjects of this study; we anticipate increased cultivation of these areas by heavy machinery and additional dams that will allow ponds and groundwater to be used for agriculture. In the past, Japan has supplied more equipment and materials for agricultural development to assist in increasing the production of food; however, as many of these materials and equipment have been used for a longer period than they were designed for, many are now obsolete and irreparable. This heavy machinery is used by agrigultural development firms directly owned by the Ministry of Agriculture or is lent to farmers; it is repaired and maintained at construction equipment repair facilities run by the Agricultural Bureau in each province. However, the number of workable machines is decreasingly yearly due to a lack of repair equipment and spare parts. The governments of the four provinces have requested that we provide spare parts, materials, and equipment for repairs, along with grant aid for the provision of training on equipment installation and use, in order to improve on this situation and to enable the equipment and materials provided by Japan to be used effectively.

Section 1.2: Pakistani National Agencies Making the Requests

The Ministry of Food, Agriculture & Livestock (MINFAL) is compiling requests from the four target provinces (Punjab, Sindh, Balochistan, and the NWFP) and the FATA region. With regard to the framework for implementing this study, MINFAL will handle coordinating duties for each province/region as the representative institution; the Agricultural Bureau of each province/region will act as the implementing agency.

Section 1.3: Request Details

Subsection 1.3.1: Target Areas

The repair facilities in three of the provinces and the FATA region will make plans for the allocation of materials and equipment (Punjab province, 4; Sindh province, 3; Balochistan province, 4; FATA region, 1); the requests do not specify which particular areas will be designated for agricultural development.

Subsection 1.3.2: Nature of Cooperation

The agricultural bureaus of the following three provinces and the FATA region have requested technical assistance as well as materials and equipment for repairs in order to properly equip repair facilities.

Number of target repair facilities:

Punjab Province:	4
Sindh Province:	3
Balochistan Province:	1
FATA Region:	1

Spare parts for construction machinery have also been requested for the four provinces and the FATA region in order to properly equip workshops. The number of bulldozers to be repaired is listed by province as follows:

Punjab Province:	88
Sindh Province:	138
Balochistan Province:	238
FATA Region:	41

Section 1.4: Purpose of the Preparatory Study

Based on the above requests, we have decided to conduct a preparatory study to confirm the following details. This study will serve the purpose of determining whether such grant aid is appropriate and will also assist in determining what type of aid is feasible.

1. The details of aid requested for each province are not clear from the current request.
2. More materials, equipment, and spare parts for repair are being requested; however, we anticipate that repairs may not be sufficient for machines that have exceeded their expected economic life.

3. Data on the agricultural development plans of each province, on which people will be using the construction machinery, and on who will profit from the agricultural development is incomplete. Therefore, we cannot confirm the appropriateness of the plans or the requisite amounts of machinery and equipment.
4. Whether the agricultural bureau of each province has the necessary organization, infrastructure and implementation ability (budgeting, personnel, etc.) to put an implementation structure into effect for this project and to provide the maintenance is unclear.
5. Certain points regarding the location of the Agriculture Bureau repair facilities are also unclear; since there is a trend toward privatization, these details must be confirmed as well.

Section 1.5: Essential Personnel for Preparatory Study Team

1. Mr. Kyojin Mima
   Leader
   Manager, Operations Group II, Grant Aid Department
   Japan International Cooperation Agency

2. Ms. Yoko Maeda
   Project Coordinator
   Agriculture, Environment & Disaster Team
   Operations Group II, Grant Aid Department
   Japan International Cooperation Agency

3. Mr. Hiroei Ishihara
   Farmland Development Plan
   Nichigi Crown, Inc.

4. Mr. Akira Mutsuda
   Repair Facility Inventory Planning

5. Mr. Shinichi Mori
   Maintenance & Management Planning
   IMG, Ltd.

Section 1.6: Primary People to Survey

Japanese Embassy

Mr. Ken Matsunaga	First Secretary
Mr. Washin Shimura	Second Secretary
Mr. Teruo Kobayashi	Second Secretary

Ministry of Economic Affairs and Statistics, Economic Affairs Division

Mr. Muhammad Ashraf Khan	Joint Secretary

Ministry of Food, Agriculture and Livestock

Mr. Mumtaz Ashmad	Additional Secretary
Mr. Abdul Karim Chaudhry	Director General

Farm Machinery Institute, Agricultural Research Council

Dr. Nadeem Amjad	Director

Panjab Province

Agricultural Department

Dr. Arif Nadeem	Secretary
Dr. Muhammad Rafiq-ur-Rafman	Director General
Mr.Wali Mohammad Meman	

Directorate Agricultural Engineering, Faisalabad

Mr. Abdul Majeed Jameel	Director

Sindh Province, Agricultural Engineering Department

Mr. Agha Abdul Quadir	Director
Mr. Irsad Ahmed Ansari	Deputy Director

Balochistan Province, Agricultural Engineering Department

Mr. Syed Saadat Hussain Naqvi	Director
Mr. Abdul Razaque Langove	Superintending Engineer

NWFP, Directorate of Agricultural Engineering

Mr. Saifullah Khan	Director

FATA, Agricultural Engineering Department

Mr. Rahmat Ali Khan	Director
Mr. Hidayatullah Jan	Technical Officer

University of Agriculture, Faisalabad

Prof. Dr. Bashir Ahmad	Vice Chancellor
Mr. Ibrar H. Khan	Project Director

JICA Pakistan Office

Mr. Nobuyuki Yamaura	Office Director
Mr. Akira Takahashi	Office Staff

Section 1.7: Study Schedule

Day #	Date	Day	Leader	Project Coordinator	Farmland Development Plan	Repair Facility Inventory Planning	Maintenance & Management Planning	Lodging, etc.
1	6/13	Sun.	Narita (11:00 AM)TG647 → BKK (3:30 PM), BKK (8:00 PM) TG505 → Lahore (10:40 PM)					
2	6/14	Mon.	Lahore (6:30 AM.) PK356 → ISB (7:20 AM.) Courtesy calls to Japanese Embassy (EOJ), JICAISB, Economic Affairs Division (EAD), Ministry of Food, Agriculture & Livestock (MINFAL)					Islamabad (ISB)
3	6/15	Tue.	AM: Conference with representatives of MINFAL, Punjab Province, Sindh Province, Balochistan Province, the Federal Administrative Tribal Areas (FATA), and North-West Frontier Province (NWFP) ・ Explanation of grant aid from Japan ・ Explanation of requisite conditions for project PM: Tour of the Construction Machinery Training Institute (CMTI)					ISB
4	6/16	Wed.	AM: Conference with representatives of MINFAL, Punjab Province, Sindh Province, Balochistan Province, the Federal Administrative Tribal Areas (FATA), and North-West Frontier Province (NWFP) ・ Detailed explanation of each province's requests and background data ・ Confirm schedule for study PM: ・ Tour of Farm Machinery Training Institute (FMTI) ・ Tour of Talagang workshop (Punjab Province)					ISB
5	6/17	Thu.	ISB (11:00 AM) PK613 → Lahore (12:05 PM) ・ Courtesy call to & conference with Punjab Province Agricultural Bureau ・ Tour of Niazbeg workshop and surrounding agricultural development areas					Lahore
6	6/18	Fri.	・ Tour of Faisalabad workshop ・ Tour of surrounding agricultural development areas					Lahore
7	6/19	Sat.	・ Lahore (10:00 AM) PK323 → QUETTA (11:25 AM) ・ Tour of surrounding agricultural development areas ・ Conference with Balochistan Agricultural Bureau					Quetta
8	6/20	Sun.	・ Tour of Quetta Workshop QUETTA (4:20 PM) PK352 → ISB (5:45 PM)					ISB
9	6/21	Mon.	Discussion of Minutes (Conference with representatives of MINFAL, Punjab Province, Sindh Province, Balochistan Province, the Federal Administrative Tribal Areas (FATA), and North-West Frontier Province (NWFP)					ISB
10	6/22	Tue.	AM: Discussion about, signing of M/D PM: Interim report to embassy					ISB
11	6/23	Wed.	ISB (11:00 AM) PK309 → Karachi (8:55 PM)		Islamabad → Peshawar (by car) NWFP Agricultural Bureau: Discussion & Data Collection			Peshawar
12	6/24	Thu.	Karachi → BKK → Narita		Conference with NWFP Agricultural Bureau			Peshawar
13	6/25	Fri.			Peshawar → Islamabad			ISB
14	6/26	Sat.			Organization of Data			

15	6/27	Sun.			Islamabad (5:05 PM) PK369 → Karachi (7:00 PM)		
16	6/28	Mon.			Karachi → Hyderabad Conference with Sindh Agricultural Bureau		
17	6/29	Tue.			9:00 AM. Conference with Assistant Chief of Sindh Agricultural Bureau 11:30 AM. CAT Karachi study Karachi (3:30 PM) PK392 → Sukkur (4:30 PM)	Conference with Sindh Agricultural Bureau Hyderabad → Karachi	
18	6/30	Wed.			Field survey of Sukkur & Khairpur	Karachi (4:00 PM) PK308 → Islamabad (5:55 PM)	
19	7/1	Thu.			Field survey of Sukkur & Khairpur Sukkur (9:25 PM) PK391 → Karachi (10:20 PM)		
20	7/2	Fri.			Karachi (7:45 AM) PK525 → Turbat (9:25 AM) Field survey of Turbat		
21	7/3	Sat.			Field survey of Turbat Turbat (3:35 PM) PK558 → Karachi (5:10 PM)		
22	7/4	Sun.			Karachi (2:00 PM) PK352 → Quetta (3:20 PM)	Islamabad (10:30 AM) PK363 → Quetta (11:55 AM)	
23	7/5	Mon.			Conference with Balochistan Province Agricultural Bureau		
24	7/6	Tue.			Conference with Balochistan Province Agricultural Bureau Quetta (5:05 PM) PK328 → ISB (6:30 PM) ISB (7:30 PM) PK381 → Lahore (8:20 PM)		
25	7/7	Wed.			Conference with Punjab Province Agricultural Bureau		
26	7/8	Thu.			Lahore (10:30 AM) PK385 → Multan (11:50 AM)	Conference with Punjab Province Agricultural Bureau	
27	7/9	Fri.			Field survey of Multan		
28	7/10	Sat.			Field survey of Multan		
29	7/11	Sun.			Multan (6:25 PM) PK388 → Islamabad (9:10 PM)	Lahore (8:20 PM) PK388 → Islamabad (9:10 PM)	
30	7/12	Mon.					
31	7/13	Tue.					
32	7/14	Wed.					
33	7/15	Thu.			Report on results of field surveys (JICA Office)		
34	7/16	Fri.					
35	7/17	Sat.					

CHAPTER II: EXTERNAL CONDITIONS FOR THE SECTOR

Section 2.1: Top-Ranked Development Plans

Subsection 2.1.1: National Development Plans

There are two National Development Plans: the Government of Pakistan's Ten–Year Perspective Development Plan (2001-2011) and the Three-Year Development Program (2001-2004). Issues in the Ten-Year plan requiring urgency have been compiled as the Three-Year Plan.

One strategic goal of the above plans is to **"promote the development/use of rainwater, river ways and mountainous regions"**. One of the operational elements incorporated for achieving this is to **"develop abandoned cultivable land by flattening the land and introducing irrigation"**. The development of agricultural land is one of the top priorities of the Pakistani government.

This three-year plan will reach completion in June of 2004 (the Pakistani government's fiscal year is from July to June). Creation of a new three-year plan is now underway, but the completion date has not yet been determined.

Subsection 2.1.2: Provincial Development Plans

There are no individual development plans for the provinces subject to the current study, i.e., Punjab Province, Sindh Province, Balochistan Province, the North-West Frontier Province (NWFP), and the FATA Region; however, these provinces/regions are conducting development work in accordance with the national government's above-noted development plans. In Punjab Province, this work involves the agricultural sector under the Ten-Year Perspective Development Plan (2001-2011), while the Tenth Five-Year Plan (2003-2008) is being devised in Balochistan Province. However, only the project names and (anticipated) yearly budget forecasts are detailed in these; the specific nature of the plans is not noted.

Section 2.2: Plans Related to the Development of Agricultural Land

Subsection 2.2.1: Plans for the Development of Agricultural Land

None of the four provinces subject to this study, i.e., Punjab Province, Sindh Province, Balochistan Province and the North-West Frontier Province (NWFP), have development plans that specify particular areas of land.

Development plans being devised by each province are based on demand for land development by individual land-owning farmers. The area scheduled for development, as noted in these plans, is determined by multiplying the sum of the operational capacity of existing bulldozers and the number of bulldozers expected to be supplied

from Japan by the average area of agricultural land capable of being prepared in the number of bulldozer hours, as derived from past results. The provincial governments have, therefore, not designated specific land areas for development in their goals for agricultural land development. There are related plans such as "Plans for the Development of Water Resources" and "Plans for the Allotment of National Governmental Lands to Landless Farmers" as noted below; while some of the lands slated for development have been specified in these plans, they are not organically tied in with the agricultural development plans of each province.

Cultivable but as yet uncultivated land that has been targeted as future agricultural land is still undeveloped due to reasons such as a lack of water supplies and a lack of machinery for development, such as bulldozers. This land also includes desert, desert-like lands, rocky land, and so on. Hence, these are regions that impose severe natural conditions on the reclamation of future potential agricultural lands. The following construction work was confirmed by our field surveys: the leveling of sand dunes in the desert regions of southern Punjab Province and northern Sindh Province; and development in Balochistan Province involving the removal of stones from stony topsoil and the excavation of underlying layers of soil. In addition to this, terraced fields are being created in the hillside developments of Peshawar in the NWFP, where erosion is a severe issue.

An overview of the land use status for each province is included below. The table below includes lands under direct control of the national government for the NWFP. There are approximately 9 million hectares of unused cultivable land throughout Pakistan.

Table 2-1: Nationwide Land Usage

(Unit: 1 million hectares)

By Province	Area	Cultivated Land Area	Unused Cultivable Land Area[1]	Forests	Land Not Suitable for Cultivation[2]
Punjab	20.63	12.31	1.80	0.52	3.01
Sindh	14.09	5.87	1.27	0.84	6.12
NWFP	10.17	1.87	1.25	1.32	3.91
Balochistan	34.72	2.07	4.84	1.13	11.33
Nationwide	79.61	22.12	**9.16**	3.81	24.37

Source: Pakistan Statistical Yearbook 2003; Federal Bureau of Statistics, Government of Pakistan

[1]Unused cultivable land area: Land that has not been cultivated due to lack of water, land, labor, or sufficient funds.

[2]Land not suitable for cultivation: Land that is being used for farmers' houses, livestock shelters, outbuildings, roads, or waterways.

The future goals of each province for development are as follows:

1. Punjab Province

Table 2-2: Three-Year Land Development Project for Punjab Province

	Goals for Development of Agricultural Land	2004-05	2005-06	2006-07	Total
1	Development of unused cultivable land (ha)	8,094	8,094	8,094	24,282
2	Development of borderline lands as agricultural lands (ha)	4,047	4,047	4,047	12,141
3	Development of eroded lands (ha)	4,047	4,047	4,047	12,141
4	Construction of mini dams (# of locations)	25	25	25	75
5	Construction of water reservoirs (# of locations)	400	400	400	1,200

1) Development of Unused Cultivable Land

The three-year plan for the Punjab project forecasts the development of as yet uncultivated cultivable land yearly, assuming the use of 250 bulldozers. Of these 250 machines, the plan anticipates the provision of 100 by the provincial government; 150 will have repairs made with aid from Japan. Based on past results, this development plan forecasts the use of bulldozers by 1,600 farmers per year.

Table 2-3: Development Plans for Unused Cultivable Land in Punjab Province

Goals for Development of Agricultural Land	2004-05	2005-06	2006-07
Developable area of unused cultivable land (ha)	8,094	8,094	8,094
Lands designated for development	Distributed among 34 districts in the province	Same as at left	Same as at left
Number of operable bulldozers	120HP (K) : 180 90HP (C) : 70 Total 250	120HP (K) : 180 90HP (C) : 70 Total 250	120HP (K) : 180 90HP (C) : 70 Total 250
Number of farming households benefiting (# of users)	1,600	1,600	1,600
Water sources for target areas	Due to the special nature of these development plans, it is difficult to specify the water supplies for developed agricultural land. However, the following are potential sources of water: 1. 37% of geographical land area: Natural irrigation 2. 27%: Regions Irrigated by canals 3. 20%: Use of groundwater (Depth: 5-50 meters) 4. Flood irrigation for the Khushab, Mianwali and D.G. Khan districts and for areas close to irrigation canals		

Note: "K" indicates Komatsu-made; "C" indicates Caterpillar-Mitsubishi-made
Developable land area per year = 250 units x 2000 hours/# of units x 1 acre/every 25 hours = 20,000 acres (8,094 ha)
Number of beneficiaries = 20,000 acres ÷ 12.5 acre/person = 1,600 people

2) Development Plans for Borderline Cultivable Lands

The borderline cultivable lands referred to here means regions fed by rainwater, deserts, and lands damaged by flooding and salinification. Regions specifically targeted are the hilly terrain of the western regions, the rainwater-fed regions of the southwestern sector, and the southern desert regions. The national government of Pakistan is anticipating that farmers in these regions will want to develop these lands in the future.

Table 2-4: Development Plans for Borderline Cultivable Lands

Goals for Development of Agricultural Land	2004-05	2005-06	2006-07
Developable area of unused cultivable lands (# of acres)	4,047	4,047	4,047
Lands designated for development	Attock, Chakwal, Rawalpindi, Jelum Gujrat, Sialkot, Narowal, Khushab, Bakkar, Layyah, D.G.Khan, Rajanpur, Bahawalpur, Mianwali and each district		
Number of operable bulldozers	120HP（K）: 85 90HP（C）: 40 Total 125	120HP（K）: 85 90HP（C）: 40 Total 125	120HP（K）: 85 90HP（C）: 45 Total 125
Number of farming households benefiting (# of users)	800	800	800
Water sources for target areas	1. 20%: Use of groundwater (depth: 30-50 m) 2. Flood water irrigation for the Khushab, Mianwali, and D.G. Khan areas and for regions close to irrigation canals 3. Reservoirs, dug wells. Farmers will construct water containment facilities with bulldozers.		

Note: "K" indicates Komatsu-made; "C" indicates Caterpillar-Mitsubishi-made

Developable land area per year = 125 units x 2000 hours/unit x 1 acre/each 25 hours = 10,000 acres (4,047 ha)

Number of beneficiaries = 10,000 acres ÷ 12.5 acres/person = 800 people

2. Sindh Province

A project to repair 4,000 water canals (terminal canals supplying water to cultivated land) is currently underway in Sindh Province with aid from the World Bank. However, these plans include all provinces and do not designate specific regions.

As the repair of water canals makes it easier to irrigate cultivated land, we anticipate that demand for bulldozers will increase as the desire among regional farmers to develop land increases.

The Machinery Division of the Sindh Agricultural Bureau has created a ten-year land development plan which is premised on purchasing 20 bulldozers themselves, as well as on the expectation of having 222 new bulldozers provided through grant aid from Japan or from another donor.

Table 2-5: Land Development Plans for Sindh Province

Name of Program	1. The Supply of 222 Bulldozers to Sindh Province	2. The Purchase of Earth-moving Equipment (bulldozers anticipated)
Budget	Currently under consideration	Currently under consideration
Targeted Fiscal Years	From: 2003-2004 To: 2013-2014	From: 2003-2004 To: 2013-2014
Targeted Regions	Entire province	Entire province
Number of People Benefiting	・ Absentee landlords: 1% ・ Farmers owning land: 65% ・ Tenant farmers: 34%	・ Absentee landlords: 1% ・ Farmers owning land: 65% ・ Tenant farmers: 34%
Developable Land Area (Ha)	1,182,150	
Land Area Targeted for Development (Ha)	202,350	210,440
Number of Bulldozers Scheduled for Use	222 Units: 100-130HP	20 Units: 100-130HP
Primary Products to be Cultivated	・ Wheat ・ Rice ・ Sugarcane ・ Cotton	・ Wheat ・ Rice ・ Sugarcane ・ Cotton

3. Balochistan Province

The five-year agricultural land development project for Balochistan for the years 2003-2008 is noted in the table below. This plan has been calculated from the number of bulldozers currently owned and their estimated operable hours. This development plan does not designate specific agricultural lands in conjunction with the provincial development strategy.

As can be seen from the table, the number of bulldozers forecast to be operable on a monthly basis during the following five-year period is 281 units. This is fewer than the 315 bulldozers currently owned, but more than the 184.2 units actually operable per month up to this point. Details regarding bulldozer numbers can be found in Subsection 4.4.3.2: Bulldozers: Units & Operating Conditions (in Balochistan Province).

Table 2-6: Land Development Plans for Balochistan Province

Facility location		District name	Operable hours targeted	Projected area of land reclaimed (ha)	Estimated units in operation monthly	
					Units in operation	Units available
Quetta	1	Quetta	71,093	4,264	7.0	7
	2	Pishin	154,035	9,238	15.2	16
	3	Killaabdullah	59,244	3,553	5.8	6
	4	Chaghi	106,640	6,396	10.5	11
	5	Loralai	94,791	5,685	9.4	10
	6	Barkhan	47,395	2,843	4.7	5
	7	Musa Kheli	47,395	2,863	4.7	5
	8	Zhob	94,791	570	9.4	10
	9	Killa Saifullah	94,791	570	9.4	10
	10	Sibi	118,489	7,107	11.7	12
	11	Ziarat	82,942	4,975	8.2	9
	12	Kohlu	106,640	6,396	10.5	11
	13	Dera Bugti	82,942	4,975	8.2	9
	14	Nasirabad	59,244	3,553	5.8	6
	15	Jaffarabad	59,244	3,553	5.8	6
	16	Jhal Magsi	106,640	6,396	10.5	11
	17	Bolan (Kachhi)	106,640	6,396	10.5	11
	Total:		**1,492,956**	**79,332**	**147.0**	**155**
Khuzdar	18	Mastung	106,640	6,396	10.5	11
	19	Kalat	130,337	7,817	12.9	13
	20	Khuzdar	201,430	12,081	19.9	20
	21	Awaran	71,093	4,264	7.0	8
	22	Kharan	118,489	7,107	11.7	12
	23	Lasbela	106,640	6,396	10.5	11
	Total		**734,629**	**44,060**	**72.5**	**75**
Turbat	24	Turbat	272,524	16,345	26.9	27
	25	Gawadar	106,640	6,396	10.5	11
	26	Panjgur	130,337	7,817	12.9	13
	Total		**509,501**	**30,558**	**50.3**	**51**
	Total		**2,737,086**	**153,950**	**269.8**	**281**

4. North-West Frontier Province

Due to the few bulldozers owned and their extreme deterioration, it is impossible to project the estimated developable land area for the land development plan.

There is a yearly program that serves as a development program. The plan for fiscal year 2003-2004 shows a land and water conservation project that could be considered related to land development plans. Only the name of the projects for the respective fiscal years and their respective budgets are noted; precise project details are unclear. At the time of the study, the 2004-2005 programs could not be made

public without obtaining the consent of the National Assembly, so it will be necessary to confirm this information in advance when implementing the current study.

Subsection 2.2.2: Water Resource Development Plans

As noted above, the development of agricultural land in each province is being pursued individually by farmers who own land and are reclaiming it themselves. The farmers would have a much greater desire to reclaim land if comparatively level land were available and if they could easily obtain water for irrigation. Accordingly, confirming a trend toward the development of future water supplies is an essential factor in projecting demand for bulldozers in these regions.

There are currently national plans for the development of water supplies underway; some of these facilities are expected to be completed in the next few years. Between 2006 and 2008, eight projects are scheduled for completion; among these, the construction of dams and water canals. By province, there is one in Punjab Province, one in Sindh Province, three in Balochistan Province, two in the NWFP, and one in the northern region. The anticipated completion dates and total area to be irrigated are noted in the following table.

Table 2-7: Water Resource Development Project Being Carried Out by the Federal Government (Includes only the provision of irrigation water)

	Project Name	Site Location (area being irrigated)	Reservoir Capacity (millions of cubic m)	Projected Area to be Irrigated (ha)	Ground-Breaking Ceremony	Anticipated Date of Completion
1	Greater Thal Canal Project	Punjab Province Bakkar, Layyah, Khushab, Jhang District	—	631,332	August 16, 2001	Stage 1: June 2005 Stage 2: June 2008
2	Rainee Flood Water Canal Project	Shindh Province Ghotki, Sukkur District	—	123,197	August 14, 2002	Dec. 2006
3	Kachhi Canal Project	Balochistan Province Jafarabad, Nasirabad, Jhal Magsi, Bolan District	—	288,551	August 14, 2002	June 2007
4	Mirani Dam Project	Balochistan Province Turbat	370	13,436	August 17, 2001	June 2006
5	Sabakzai Dam	Balochistan Province Zhob District	25	10,118	August 14, 2002	June 2005
6	Kurran Tangi Project *Details currently being determined (as of June 2004)	N.W.F.P. Bannu District	1,481	34,197	—	June 2006
7	Gomal Zam Dam	N.W.F.P. D.I. Khan District	1,407	65,966	August 22, 2001	June 2006
8	Satpara Multipurpose Dam Project	Jammu and Kashimir Skaradu	99	8,062	August 14, 2002	June 2006

Source: Vision 2025: Water Resource & Hydro-Electric Power Development; Pakistan Water & Power Development Authority (WAPDA)

Subsection 2.2.3: Plans for the Distribution of Federal Lands to Landless Farmers

According to our written and oral surveys, only Punjab Province has achieved results under the plan to "distribute federally and provincially held land to landless farmers", which was designed as one plan for implementing the agricultural strategy of the federal government's Ten-Year Perspective Plan. There were also reports that this had been implemented in Sindh Province as well; however, no results were confirmed from the written and oral surveys conducted in this study.

On September 26, 2003, the governor of Punjab announced that 46,081 hectares of provincial land would be distributed to farmers who owned no land. In response to this, the Punjab Board of Revenue undertook an inquiry into the potential for crop planting, groundwater sources, and irrigation by water canal. Surveying for this undertaking was handled by the Field Division of the Agricultural Bureau. As a result

of this inquiry, 36,628 hectares were actually distributed; of this, it has been ascertained that 15.8 percent, or 5,770 hectares, was land unsuitable for cultivation.

Of the 35 districts in Punjab Province (D. Ex. D.G. Khan has been included in D.G. Khan; D. Ex. Rajanpur has been included in Rajanpur; and Cholistan has been divided into the 3 districts of Bahawalpur, Bahawalnagar, and Raim Yar Khan), 19 of these provinces took part in the distribution of provincial land. These cover primarily the central to southern regions of the province. The breakdown for the 19 districts is indicated in Appendix 1.

The distribution track record and projections for distribution in Punjab Province are noted in the table below.

Table 2-8: Governmental Property Sales and Future Projected Sales to Landless Farmers

Fiscal Year	Province	Actual Distribution		
		Area Distributed (ha)	# of Landless Farmers Receiving Distributions	Allotment Per Person (ha/ household)
July 2001 to June 2002	Punjab Province	—	—	—
	Sindh Province	—	—	—
	FATA Region	—	—	—
	Balochistan Province	—	—	—
	NWFP	—	—	—
	Total	—	—	—
July 2002 to June 2003	Punjab Province	—	—	—
	Sindh Province	—	—	—
	FATA Region	—	—	—
	Balochistan Province	—	—	—
	NWFP	—	—	—
	Total	—	—	—
July 2003 to June 2004	Punjab Province	13,128	2,595	5
	Sindh Province	—	—	—
	FATA Region	—	—	—
	Balochistan Province	—	—	—
	NWFP	—	—	—
	Total	13,128	2,595	5
July 2004 to June 2005	Punjab Province	23,210	4,588	5
	Sindh Province	—	—	—
	FATA Region	—	—	—
	Balochistan Province	—	—	—
	NWFP	—	—	—
	Total	23,210	4,588	5

Fiscal Year	Province	Actual Distribution		
		Area Distributed (ha)	# of Landless Farmers Receiving Distributions	Allotment Per Person (ha/ household)
July 2005 to June 2011 (final year of Ten-Year Plan)	Punjab Province	—	—	—
	Sindh Province	—	—	—
	FATA Region	—	—	—
	Balochistan Province	—	—	—
	NWFP	—	—	—
	Total	—	—	—

Source: Prepared by the Preparatory Study Team based on data provided by the Combined Field Division, Agricultural Bureau, Punjab Province.

Although land that is unsuitable for agriculture due to problems with water sources or water quality is included in the above 13,128 hectares actually distributed, the percentage cannot be determined from the data. Furthermore, although Appendix 1 indicates the district name, the projected area to be distributed and the land status (suitable/unsuitable for agriculture, methods of irrigation, etc.) for future projected distributions to landless farmers in Punjab Province; the individual locations of the land distributed are not specified.

From the actual distributions to this point and future projections, we see that Punjab Province is considering the distribution of 36,337 hectares to 7,183 farming households.

The distribution of federal and provincial land to landless farmers is being done for compensation. Furthermore, said farmers must fulfill certain conditions. The Provincial Board of Revenue determines which of the qualifying farmers will receive land. Lotteries are also conducted on occasion.

The governmental conditions for distributing land to farmers without land are as follows:

(1) The candidate must not own land.
(2) There must be 5-10 family members (at minimum).
(3) After acquiring the land, candidates must live there forever.
(4) After acquiring the land, candidates must reclaim it for agriculture.
(5) Candidates must have some money with which to purchase the land. Installment payments will be made over a 15-20 year period. Up to 5 hectares may be acquired; funds of Rs 150,000 are needed for purchase.

Much of the land being distributed is land that is fundamentally unsuited for agriculture and which is subject to severe conditions. (Areas in which we conducted field surveys were deserts where sand frequently mounds up into dunes.) Bulldozers are