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1. List of Abbreviations

AHU	Al-Hussein Bin Talal University
ASEZA	Aqaba Special Economic Zone Authority
ASL	Above Sea Level
BAU	Al-Balqa's Applied University
CEO	Chief Executive Officer
DMO	Destination Management Organization
DOA	Department of Antiquities
EIA	Environmental Impact Assessment
FDI	Foreign Direct Investment
GNI	Gross National Income
GNP	Gross National Product
GDP	Gross Domestic Product
GRP	Gross Regional Product
ICOMOS	International Council of Monuments and Sites
ICT	Information and Communication Technology
IT	Information Technology
JETT	Jordan Express Tourist Transportation
JOD	Jordanian Dinar
JTB	Jordan Tourism Board
MOTA	Ministry of Tourism and Archaeology
OUV	Outstanding Universal Value
OECD	Organization for Economic Cooperation and Development
PAP	Petra Archaeological Park
PAPOP	Petra Archaeological Park Operational Plan

PDTRA	Petra Development and Tourism Region
PNT	Petra National Trust
PRA	Petra Regional Authority
PRC	Petra Region Planning Council
NCARE	National Center for Agricultural Research and Extension
R&D	Research and Development
RSCN	Royal Society for Conservation of Nature
SWOT	Strengthens, Weaknesses, Opportunities and Threats
TQM	Total Quality Management
UNEP	United Nations Environmental Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	United States Dollar
UGC	User Generated Content
USAID	United States Agency for International Development
WWTP	Waste Water Treatment Plant

2. Translation of Arabic names frequently used in the report

عابدية	'Abaidiyyah	1
عالية	'Alaya	2
ابو خشيبة	Abu-Khsheibeh	3
عمارين	Amaariin	4
عمارات	'Amaraat	5
عشيرة ، جمع: عشائر	Ashiirah, pl Ashaa'ir	6
عوادات	'Awadhaat	7
بعجة	Ba'aja	8
بيضة	Baidha	9
البقاء	Al-Balqa'	10
بني عطا	Bani 'Ata	11
بدو	Bedou	12
بضبه	Bedebdeh	13
بيت الأتباط	Beit al-Anbat	14
بيت زمان	Beit Zaman	15
بدول	Bidoul	16
بير دبغات	Bi'r Dabbaghat	17
بير حماد	Bi'r Hammad	18
داره	Dara	19
دير	Deir	20
دلاغة	Dlagha	21
الجي	Elgi	22
فلاحات	Falahaat	23
فراجات	Farajaat	24
فضول	Fdoul	25
حموله ، جمع: حمائل	Hamulah, pl Hamayil	26
حسنات	Hasanat	27
حضره	Hadrah	28
حمادين	Hamadiin	29
الحي	Al-Hayy	30
جبل هارون	Jabal Haroun	31
جبل البكرة	Jbel al-bakra	32
هالي	Helali	33
هيشة	Hisheh	34
هالات	Hilalaat	35
هليلا	Hlayla	36
الخرنه	Al-Khazneh	37
خليفات	Khlaifaat	38
خليفة	Khlaifah	39
الخبته	Al-Khutba	40
لياته	Layathnah	41

معان	Ma'an	42
معافيه	Ma'aaifah	43
مقام نبي هارون	Maqam Nebi Haroun	44
مشاعده	Masha'adah	45
مشاعلة	Mashaa'lah	46
محمية مسعودة	Masoudha Reserve	47
ميري	mirri	48
نملة	Namala	49
نصارات	Nasaraat	50
نوافله	Nawafлах	51
قبيلة ، جمع: قبائل	Qabilah, pl. Qabaa'il	52
قضا	Q'adha	53
قصر البنت	Qasr al-Bint	54
القصير	Al-Qassir	55
قرقرة	Qurayqra	56
قصور عمرة	Quseir Amra	57
راجف	Rajif	58
محمية رحمة	Rahmeh Reserve	59
راس الحمرة	Ras el-Humrah	60
رواضية	Rawadhiah	61
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الرواحل	Al-Rawahel	63
الرميل	Al-Rmail	64
الرويس	Al-Rwais	65
صيرة	Sabra	66
ينابيع الصده	Al-Saddeh springs	67
سلامين	Salamiin	68
سعيديين	Sa'idiyyiin	69
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سيق	Siq	76
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سيق البارد	Siq al-Barid	78
شوبك	Shaubak	79
طيبة	Taybeh	80
طيبة زمان	Taybet Zaman	81
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وادي عربية	Wadi Araba	87
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وادي فيدان	Wadi Fidan	89
وادي قوير	Wadi Ghweir	90
وادي المتاهة	Wadi al-Matahah	91
وادي موسى	Wadi Musa	92
وادي المحمد	Wadi al-Muhmadh-	93
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وحدات	Wihdat	98

3. Initial Diagnostic Report



A Strategic Master Plan for Petra Region

Initial Diagnostics Report

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1 PURPOSE AND METHODOLOGY

The objective of the initial diagnostics report is to lay the foundation for the Strategic Master Plan for the Petra Region by identifying and documenting the key short (2-3years), medium (3-7 years) and long (7-20 years) term issues related to:

- Protecting and enhancing the surroundings around Petra Archaeological Park
- Sustainable tourism development within the Petra Region
- Socio-economic study including the local and regional economic, fiscal, demographic, public services
- Social development and cultural and values for all six local communities within the region
- Land use and urbanization
- Infrastructure and public services
- Environment

In line with the Terms of Reference, a rapid assessment has been carried out, largely based on existing information. Numerous studies, reports and analyses have been prepared for Petra Region in the past, which have been carefully assessed. Annex 9.1 provides a summary matrix of the main reports. In annex 9.4, all the reviewed documents and relevant literature are listed.

In addition to gathering, reviewing and analyzing existing data and reports, meetings with the client and stakeholders on the regional, national and international levels have proved essential to understand the current situation. These meetings have aimed at establishing contact, building good working relationships, understanding the concerns and main issues and involve the stakeholders in the planning process. In total, more than 50 meetings have been conducted in this time period, all listed in annex 9.2.

In addition, a number of experts from the team have visited the various communities in Petra Region, the Petra Archaeological Park as well as other attractions in the Petra Region and surrounding areas. These observations provide valuable insight about the situation on the ground and substantiated the information received from documents and meetings.

2 SOCIO-ECONOMIC ANALYSIS

National context

Table 1 shows the relative position of Jordan to its neighbors in terms of some basic economic indicators¹. Jordan has experienced the highest GNI per capita increase in the

¹ Data for the Palestine Territories was lacking for 2007.

region, with 66% growth between 2000 and 2007, amounting to USD 5.370 in 2007. The highest GNI per capita is recorded in Israel with USD 26.730. Egypt and Syria rank lower with USD 5.090 and USD 4.300 respectively. Lebanon has achieved in comparison to Jordan a relatively high level of GNI at USD 11.020. Jordan Israel and Lebanon are relatively smaller countries (89,213km², 22,072km²,10,400km², respectively), while Syria and Egypt are significantly larger (185,180km², 1,001,450km², respectively).

Another distinctive feature of the Jordanian economy is the low share of agriculture to the value added of only 3% compared to 14% in Egypt, 7% in Lebanon and 18% in Syria. This indicator has to be seen in the context of the high degree of urbanization in Jordan (urban population accounted for 78% in 2008) as well as general water scarcity. Accordingly, the service sector exercises a high importance. Its share in value added, however, reduced from 72% to 67% in the period from 2000 to 2007 while the share of industry increased from 26% to 30%. This development is interpreted positively as, together with the increase in exports, it is an indicator of strengthened competitiveness. The service and manufacturing industries, furthermore, are often interlinked and a growing industry sector strengthens the demand for knowledge intensive-business services. In relation to the service industry, tourism also plays a relatively important role for Jordan.

Table 1: Basic Economic Indicators

2007 / % increase since 2000	Jordan		Israel		Egypt		Lebanon		Syria	
GNI per capita, PPP (current international \$)	5370	65,74%	26730	24,44%	5090	42,58%	11020	42,93%	4300	36,51%
Agriculture, value added (% of GDP)	3	50,00%			14	-17,65%	7	0,00%	18	-25,00%
Industry, value added (% of GDP)	30	15,38%			36	9,09%	22	-4,35%	35	-7,89%
Services, etc., value added (% of GDP)	67	-6,94%			50	0,00%	70	0,00%	47	23,68%
Exports of goods and services (% of GDP)	54	28,57%	43	16,22%	30	87,50%	23	64,29%	39	11,43%
Life expectancy at birth, total (years)	72	1,41%	81	2,53%	70	2,94%	72	1,41%	74	2,78%
Population growth (annual %)	3	50,00%	2	-33,33%	2	0,00%	1	0,00%	2	-33,33%
Population, total in 1000	5.719	19,20%	7.180	14,17%	80.061	14,09%	4.162	10,34%	20.083	21,63%

Source: World Development Indicators, World Bank

Regional context

The Petra region is located in the administrative district of Ma'an, which is divided into two sub-districts: Shaubak to the north and Wadi Musa to the south. The extreme west of the Petra Archaeological Park (PAP) is located in Q'adha belonging to Aqaba. Ma'an accounts for about 1.9% of the Jordanian population. The proportion of male and female population corresponds approximately to the national level (52% male). Significant population growth is expected in the Ma'an District, as the crude birth rate in 2008 was 28.4 compared to the crude death rate of 2.9. Ma'an is the largest District accounting for 37% of the national area, is, however, also the one with the lowest population density.

Table 2: Characteristics of Ma'an District

	Ma'an	%	Jordan
Estimated population (end 2009)	113700	1,9%	5980000
... Male	59600	1,9%	3082000
... Female	54100	1,9%	2898000
Crude Birth rate (2008)	28,4	93,5%	30,3
Crude Death rate (2008)	2,9	90,5%	3,2
Area in 1000 km ²	32832	37,0%	88778
General Crimes (2007)	805	1,9%	42996
Business Establishments (2006)	2266	1,5%	147023
Quarrying of stone, sand and clay	22	16,5%	133
Manufacturing of wearing apparel; dressing and dyeing of fur	45	2,1%	2124
Retail Trade	1274	1,9%	68832
Hotels and restaurants	149	2,2%	6648
Land Transport	10	2,4%	414
Activities of membership organisations	9	3,1%	290
Recreational, cultural and sporting activities	18	1,9%	959
<i>Department of Statistics, Jordan</i>			

In 2006, the Ma'an District region hosted 1.5% of Jordanian business establishments, which is lower than its share of the population. According to the census of 2006, Ma'an District displays a relatively large number of establishments compared to the national level in one primary sector: quarrying of stone, sand and clay and one secondary sector: manufacturing of wearing apparel, dressing and dyeing of fur. The service sector appears to be relatively strong with an above average number of establishments in retail trade, hotel and restaurants, land transport, activities of membership organizations and recreational, cultural and sporting activities. Ma'an belongs to the least agricultural districts in Jordan. For climatic reasons most of the villages are located at altitude or transition zones (UNESCO 1994).

Size and population of Petra Region

The 264km², which make up Petra Archaeological Park (PAP), are contained within a broader special administrative district of 755km² called the Petra Development and Tourism Region Authority (PDTRA). Within the Petra Region are six communities with a total population of 28,760 in 2009, over 15,000 of whom live in the main town, Wadi Musa. The total area of the six villages together is less than 12km². As table 3 indicates it, Taybeh, with 5,719 inhabitants, is the second largest community, followed by Rajif (1,434) and Dlagha (1,674). Umm Sayhoun (1,631) and Baidha (401) are the smallest communities.² In Umm Sayhoun, however, higher birth rates have been reported that will lead to a stronger population growth in this community.

² Bi'r Hammad, southwest of Dlagha, is a recognized "community," though it is not a settled village in terms of the constructed environment. It is a center for the fully nomadic family groups of the Sayidiyeen tribe. No census statistics are available for Bi'r Hammad, which signals a larger gap in concrete knowledge of the status of the non-settled bedouin.

Table 3: Population numbers for the main communities in the Petra Region in 2009

Name of the community	Female	Male	Total
Wadi Musa	8184	8901	17085
Taybeh	2815	2904	5719
Rajif	838	836	1674
Dlagha	716	718	1434
Umm Sayhoun	806	825	1631
Baidha	191	210	401
Total	13550	14394	27944
<i>DOS 2009, population projection</i>			

The average household size in Petra is 5.41 being roughly the same as the Jordanian average. The Sigma study from 2000³, indicates even higher numbers for the average size of the household. The household size in Wadi Musa was with 7.4 individuals per household the highest one of the three communities compared in the Petra region. The population in Wadi Musa was estimated at 12,488 in 1999. The population of Taybeh was estimated to be 4,730 in June 1999, while the size of household in 1996 was 7.2. In Umm Sayhoun the population was estimated at 1236 in 1999. The household size was given at 6.8 individuals per household. However, it has to be noted that there is a major discrepancy between the perception of the population size in Umm Sayhoun by the local population and the data provided by official sources.⁴

As the Sigma study provides population numbers for Wadi Musa, Taybeh and Umm Sayhoun, the yearly average growth rate from 1999-2009 can be calculated with the following formula:

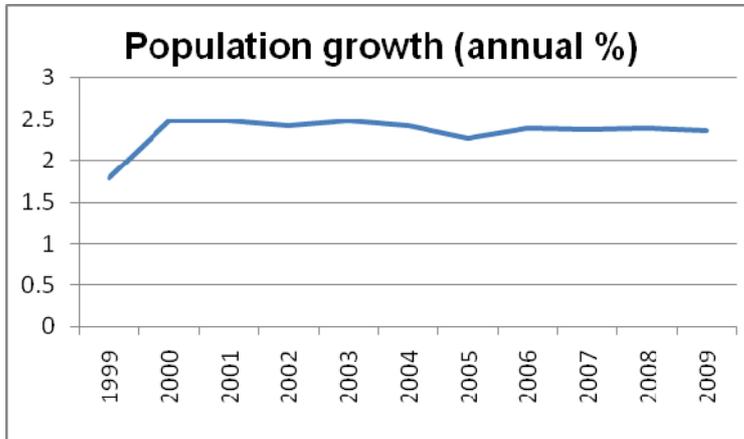
$$\sqrt[n]{\frac{P_n}{P_o}} - 1 = i$$

The highest growth rate is measured in Wadi Musa with approximately 3,2% followed by Umm Sayhoun with 2,8% and Taybeh with 1,9%. According to DOS statistics the official growth rate for Jordan is on average 2.2%. The World Development Indicators published by the World Bank show a relative constant yearly growth rate of about 2,3% over the last 10 years as can be shown in the following graph.

³ Sigma 2000)

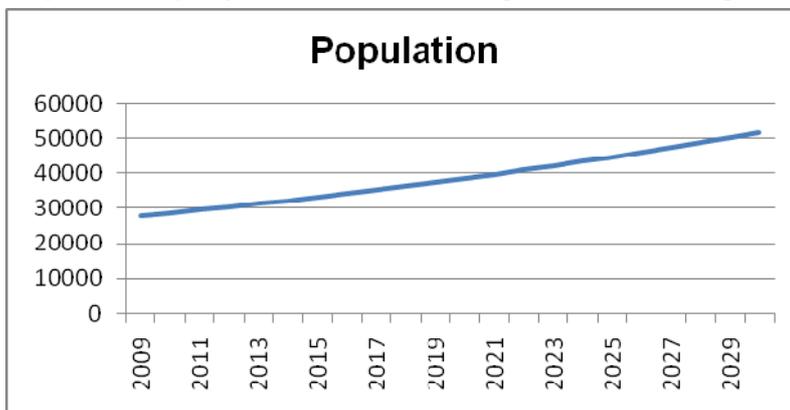
⁴ During the interviews and workshops we conducted in the Petra region repeatedly heard people estimating that Umm Sayhoun has about 3000 inhabitants. This would be nearly the double of the numbers indicated by the official statistics.

Average annual population growth rate for Jordan (source World Bank statistics)



Considering the rural and traditional context of the Petra region, as well as, the population development in the past 10 years, one can expect at least a growth rate of 3%. This would mean that the population will nearly double in the next 20 years, as shows it the prediction in graph 2.

Population projection in Petra Region at annual growth rate of 3%



Officially no settled community is supposed to be located with PAP. However, according to observations, a few families (figures were estimated at between 20 and 25) are still living in the PAP. A survey of household characteristics conducted in 2009 suggests that 0.5% of the rural population is fully nomadic (see n.3), which would indicate that some 140 people live in 743km² (area of Petra region without the area of the communities) corresponding to a population density of 0.19/km² (Jordan Population and Family Health Survey 2009). If all the fully nomadic Bedouin lived year-round within PAP proper (which they do not), population density would still reach only 0.54/km²

Culture

The communities of the Petra Region identify themselves primarily in terms of family/tribal affiliations, and each village belongs to a distinct tribe or clan group. Debate over which tribal groups have inhabited the region longest is controversial, because claims to primacy undergird claims to land ownership. While all of the tribes might loosely be described as "bedou," in 2005 the UNESCO World Heritage Convention recognized the "cultural space" of three of the tribes of Petra Region – the `Amaariin, the Bidoul and the Sa`idiyyiin – as "masterpieces of world heritage." All of the tribes are Sunni Muslim.

Economic base

Until the 1970s the economic base of the Region's population was mainly agriculture and nomadic pastoralism. Since then tourism has become an increasingly important income source for all the communities except Dlagha and Rajif. Tourism is especially critical for Wadi Musa and Umm Sayhoun. As Wadi Musa has grown a layer of local service industries has developed: Wadi Musa now rivals Ma'an as a commercial hub for the region and the other villages depend on it for most needs, e.g., mechanics, bakeries, supermarkets, construction, etc.

Kinship structures (social organization)

Communities are consistently identified with kinship groups. Wadi Musa is the only community which sustains any diversity at all, and it is minimal. "Tribes" (*qabilah*, pl. *qabaa'il*) are subdivided into what might be called "clans" (*hamoulah*, pl. *hamayil*), which are further subdivided into extended family groups (*ashiirah*, pl. *ashaa'ir*). In brief, the tribal affiliations of the six communities are described in table 4.

Table 4: Community affiliation of tribes

Village	Tribe (qabilah)
Baidha	al-`Amaariin
Umm Sayhoun	al-Bidoul
Wadi Musa	al-Layathnah
Taybeh	al-Layathnah
Rajif	al-Rawajfeh (clan of Bani `Atiyyah)

Dlagha	al-Sa`idiyin
Not affiliated with a settled community	al-Sa`idiyin

For Baidha, Umm Sayhoun, Rajif and Dlagha it is safe to say that the community is represented by a single kinship group. Layathnah is such a relatively large group (+20,000), however, that its sub-groups are more significant to the socio-economic structure of the region. Table 5 shows the different branches of the Layathnah clan.

Table 5: Layathnah clans and extended family groups

Village	Clan (hamayil)	Extended family (ashiirah)
Wadi Musa	`Abaidiyyah	Hilalaat Hasanaat Twaisaat Mashaa`lah Nasaraat
	`Alaya	Nawaflah `Amaraat Masha`adah Hamadiin Sbaihaat Ma`aaifah Shamasiin
	Bani `Ata	Salamiin Farajaat Fdoul Falahaat
Taybeh	Shrouir	Sa`idaat

		Rawadhiah `Awadhaat Khlaifaat Khlaifah
--	--	---

These clans and families, especially in Wadi Musa, struggle for political and economic dominance, and marriages within and across clan and family lines are important elements of social structure. There is also a strong tendency within businesses and interest groups to involve as many members as possible from one's own family, first, and by extension one's clan. Thus, for example, a tour operator is likely to employ mostly his own family in his business.

The Layathnah (Wadi Musa and Taybeh)

Wadi Musa

The Layathnah clans of Wadi Musa (see table 5) dominate the commerce and politics of the Petra Region. They settled the main watercourses and associated springs of Wadi Musa and Wadi Sidr, and the community embraces the entrance to the Nabataean antiquities site of Petra. These clans of the Layathnah are by far the most numerous in the Region, and they pioneered the tourism industry. From guarding the entrance to the Nabataean city in the 19th century, they went on to be the first "tour guides" in the 20th: early tourists were signed over by the police into the care of individual Layathnah guides, who were then personally responsible for the travelers' safety. Their position in Petra tourism is still evident in the 21st century, as they dominate almost exclusively the local hotel and restaurant industry, tour offices, guides and horse culture. The Layathnah are distinctive also for their relatively advanced level of education.

Taybeh

The Shroul clan of Layathnah who inhabit the village of Taybeh have not been significantly involved in tourism until the 1990's, when the five-star hotel Taybeh Zaman was constructed there. At the time of its opening, it was the first five-star hotel in the Region. Taybeh is the second-largest community in the Region, with an economic base of livestock husbandry and agriculture, significantly augmented by government employment in civil and military service.

The Bidoul

The Bidoul (+2000) are often referred to as a tribe, and they occupy Umm Sayhoun, immediately adjacent to the PAP boundary. Until 1985 they occupied the caves of the ancient Nabataean city of Petra, which is now the main tourism attraction. They have traditionally dominated the souvenir trade and donkey transport within the Park. When the antiquities were declared a National Park, the Bidoul were moved to a planned housing project – Umm Sayhoun – just outside the Park boundary. Today the Bidoul work as tour guides, second in importance only to the Layathnah of Wadi Musa, and they dominate seasonal work on excavations within the antiquities site. Two problems continue to create tension between the Bidoul and their neighbours, the Layathnah: (1) Umm Sayhoun was established on land belonging to the Hasanat of the Wadi Musa Layathnah; (2) planning for demographic growth was insufficient and there is now an urgent need to expand the community, which is still surrounded by Hasanat land.

Amaariin

The `Amaariin traditionally spent winters in Wadi `Araba and summers in the highlands of Shaubak and Hisheh, at the northern end of what is now the Petra Region. They are now largely settled in villages in the same areas (Qurayqra, Hlayla, Bi'r Dabbaghat, etc.). The village of Baidha, also called iskan al-`Amaariin (the `Amaariin housing) or simply "Amaariin", was established at the same time Umm Sayhoun was and for the same reasons. Like Umm Sayhoun, the housing project was poorly planned, without appropriate delineation of land ownership and access to utilities. Today the `Amaariin of Baidha are significantly involved in tourism in Siq al-Barid (also known as "Little Petra"), as souvenir vendors and part-owners of the oldest and most successful campground in the Region. They are also the second largest group in the farming cooperative associated with the Wadi Musa Wastewater Re-Use Project at Sidd al-Ahmar, at the northern end of PAP.

Rawajfah

The Rawajfah are the clan which occupy the village of al-Rajif. While they trace their ancestry to Bani `Atiyah, the Bani `Atiyah are no longer a presence in Jordan, and the Rawajfah are autonomous socially and politically. Prince Hassan (brother of the late King Hussein and former Crown Prince) established a palace at Rajif which served as his southern home, and until the 21st century Rajif benefited from Prince Hassan's patronage – e.g., the construction of a large mosque, establishment of parks, advantages within the military hierarchy and scholarships for bright students. Today the economic base of Rajif is primarily livestock husbandry and agriculture augmented by military service. Rajif is largely uninvolved with tourism.

Sa`idiyyiin

The Sa`idiyyiin occupy primarily the southwestern end of the Petra Region, and their settled community within the Region is Dlagha. They also have more important settlements at al-Risha and Bi'r Mathkour in Wadi `Araba. They are distinctive within the Petra Region for having the largest proportion of fully nomadic families. With Baidha, they are the most economically disadvantaged and least educated communities of the Petra Region. Unlike the `Amaariin of Baidha, however, their economic base is overwhelmingly livestock husbandry augmented by military service. They are virtually uninvolved in the tourism sector. The Sa`idiyyin are presently involved in land dispute with the Bidoul over Jurf Himar.

Labor market

Jordan has experienced a significant increase of its labor force from 1,438,516 in 2000 to 1,908,660 in 2008 (World Bank Development Indicators) corresponding to a growth of 33% in this time period. The increase in labor force was higher than the population growth due to favorable demographic conditions i.e. a relatively high proportion of young people. In Petra 39% of the population is less than 15 years of age, higher than the Kingdom's average of 37.3%. Jordan reportedly benefits from a relatively well-educated labor force, a high proportion of whom hold university degrees. Based on this comparative strength the Kingdom's development policy focuses on shifting towards a knowledge-based economy with higher value production. Petra is no exception to having a well-educated labor force. According to a study conducted by al-Hasanat (2008), 43% of the respondents between 18 and 30 of age had a university degree. Table 6 shows that the percentage of the respondents with a university degree decreases for higher age groups. 29% of the respondents aged 31-40 have a university degree and 14% of those in the age category 41-50. Overall, 35% of the respondents to the survey hold a university degree.

Table 6: Amount of students per age category and educational level

Age category	Educational Level								Total
	University		High School		Preparatory Education		Elementary Education		
18-30	93	43%	74	34%	31	14%	17	8%	215
31-40	22	29%	31	41%	15	20%	8	11%	76
41-50	5	14%	10	28%	11	31%	10	28%	36
51-60	0	0%	2	17%	5	42%	5	42%	12
≥ 61	0	0%	0	0%	2	100%	0	0%	2
Total	120	35%	117	34%	64	19%	40	12%	341

AlHasanat, 2009

The high qualification of the work force in Jordan and in Petra should overall be advantageous to social and economic development. It should also, however, be considered whether these qualifications match the needs of the local economy. Clearly the local economy is currently dominated by the service industry, particularly tourism related services. Due to diminishing returns on agriculture, it was reported that public services and the army are also desired employers.

According to official statistics (MOTA Jan.-March 2010), the tourism sector employs approximately 1,800 persons in Petra Region. This figure seems comparatively low when considering the number of hotel rooms of more than 2,000 and the number of visitors per year to PAP of almost one million. Only 35 jobs are listed under "Tourist Restaurants", though there are clearly more than 35 restaurants in Wadi Musa alone. Hence we assume that the number of people working in tourism and tourism related sectors is considerably higher than the official figure.

Due to the penetration of the labor force with university graduates, the medium and higher positions are staffed with qualified people. The situation is more problematic for the lower level work force such as waiters, room cleaning, concierge service, cooks, service providers e.g., donkey, horse and camel guides, etc. Few schools, training institutes or programs provide qualifications on this level. Furthermore, there are no apprenticeship programs because people below 18 years of age are not officially allowed to work. This rule, however, is often ignored by families earning their income by providing direct services to tourists, e.g., donkey, camel and horse rides. Short-term financial incentives, the requirement to sustain growing families and lacking awareness about the importance of education often leave children in this segment of society deprived of education, which in the medium-and long-run aggravates a number of social and economic problems (high population growth, limited economic opportunities, limited service levels in tourism, etc.).

A striking feature of the tourism labor market is the low participation of women, at only 10% (MOTA). In most major destinations in many parts of the world the female participation in the tourism labor market is rather high. According to the interviews held, the low level in Petra is linked to cultural and religious norms. 77 trained and registered tour guides, most of them with a BA degree or equivalent, work in the PAP and in the Petra region. It is also striking that only four of them are Bidoul from Umm Sayhoun. According to MOTA, about 17% of the tourism work force in Jordan are non-Jordanian workers, mostly from Egypt and other neighboring countries for low-grad / low-pay jobs.

Unemployment

As of 2009 the unemployment rate in the Petra Region (9%) is lower on average than the Kingdom as a whole (14%). However, in the Petra Region, unemployment is concentrated in the communities of Dlagha and Rajif, which have benefited to a lesser extent from the growth in the tourism industry than other communities. Table 7 illustrates that, in 2009, the total number of unemployed amounted to 980, 59% of which were women. 46% of all unemployed are aged between 21 and 25. Although the exact share of this age group of the overall labor force is not known, it is still evident that the proportionate unemployment rate must be higher. Hence young people apparently encounter significant difficulties in entering the labor market. In this age group, approximately two thirds of all the unemployed are female: women thus face even higher obstacles to entering the labor market. The higher age groups account for a lower number of the unemployed. This might either be due to better job opportunities or quite conversely due to limited prospects. The female share in unemployment also varies significantly depending on the age group. It is low for the age groups 36-40 and above 40, as well as below 20 years of age. Furthermore, the females unemployment rate drops for the age group between 26 and 30. Most likely these fluctuations relate to women entering and dropping out of the labor market due to cycles related to family and social norms as well as limited social services such as childcare.

Table 7: Unemployment per age group and gender in the Petra Region 2009

age	Total	female	% female	% of total
15-20	136	65	48%	14%
21-25	447	296	66%	46%
26-30	215	120	56%	22%
30-35	89	62	70%	9%
36-40	60	27	45%	6%
and above 40	33	8	24%	3%
Total	980	578	59%	100%

Al-Hasanat, 2009

Table 8 confirms the general trend that education enhances job opportunities as hardly any unemployed were recorded among those who hold a Masters Degree. On the other hand, more than half of the unemployed hold less than a highschool diploma (tawjih) or higher academic degree. The group with low education is thus overrepresented among the unemployed and those holding a Masters Degree underrepresented as compared to their proportionate share in the total labor force. However, as the distribution of educational levels within the labor force is not known in sufficient detail (only Table 8 is available), it cannot be said whether BA and highschool diploma holders are under- or overrepresented. Table 8 also shows the female share of unemployment per education level. The numbers were standardized to the overall share of female unemployed, as more of them have provided information about their educational level than men. The figures indicate that well-educated women face greater challenges to find jobs than do

men, probably due to lack of opportunity within their educational specialization in Petra region. Further, this is also partly because men are still viewed as the breadwinners of the family, which is a common cultural and social barrier in the region. The traditional roles, particularly in urban areas where the presence of the extended family norm is diminishing, operate to hinder the employability of women and girls or to press them to withdraw from the labor force. In addition, as often reported, women's unemployment is mainly shaped by the hostile attitudes of conservatives against the physical mobility of women, and, thereby restricts the employment opportunities for women and girls. In Petra in particular, such normative views are prevalent in that opportunities for women, while increasing, are still limited to particular sectors. Well-educated men find middle management jobs in hotels, though this might not be their direct educational specialization, whereas this sector is not an option for women for cultural reasons. In general it can be observed that there has been much progress in girl's education in the Petra region, however, a gender gap is still existing when it comes to secondary education, access to employment and equal pay. Further, women are less protected in the workplace, in terms of working conditions.

Table 8: Unemployment per educational level and gender in the Petra Region 2009

Education	Total	female	% female	female standardised	% female standardised	% of total
Masters	3	3	100%	2	82%	1%
BA	132	101	77%	83	63%	24%
Diploma	119	102	86%	83	70%	22%
Other	285	183	64%	150	52%	53%
Total	539	389	72%	318	59%	100%
No indication	441	189	43%			
<i>Hasanat, 2009, own calculations</i>						

Sources for regional competitive advantage and constraints

One of the main objectives of the strategic master plan will be to contribute to the creation of jobs and income opportunities in the region. Jobs, income, productivity and competitiveness always have to be seen in the context of time. Some regions grow while some decline due to a combination of various factors.

During the last decades we have witnessed a reduction of the cost to overcome geographic distance driven by advances in technology and reductions of trade barriers. This development has promoted the agglomeration of economic activities, for which compelling evidence was found (see literature for "New Economic Geography", notably Krugman, 1991). This obviously leads to significant challenges for social and economic policy in non-metropolitan regions such as Petra. A few factors have been identified that can be the source of region-specific competitive advantage, i.e. factors that are unique

for the region and hard to transfer: i) the natural environment, ii) the built environment, iii) the institutional conditions, and iv) the regional knowledge infrastructure and learning.

Natural and built environment

The most unique source of competitive advantage in Petra Region clearly is the archaeological park, part of the region's built environment. The Petra Archaeological Park (PAP) is unique and valued on a global level and obviously not transferable. In relation to the PAP, considerable touristic infrastructure (also built environment) has been developed, especially accommodation facilities counting more than 2100 rooms and more than 4000 beds. Furthermore, some road and utility infrastructure has been constructed in response to the increased needs. However, as will be elaborated in the sections 6.3., below, infrastructure is still highly insufficient. In terms of park development, the Petra Region includes large areas of scarcely populated land, which could be brought to use for the tourism industry (part of the natural environment).

Besides tourism, only agriculture was mentioned as another potential pillar for the regional economy. However, it was reported that agricultural yields have become increasingly poor for a number of reasons: i) increasing attractiveness of other sectors, mainly tourism; ii) decreasing returns due to changed climatic conditions; and iii) insufficient knowledge, capital and plot sizes to develop competitive agriculture. Therefore, the agricultural sector faces significant challenges, which should be addressed in the context of the tourism value chain (see section 2.7., below).

Institutional Environment

The institutional environment is central to the development of regional economies and comprises formal institutions such as laws and regulations (e.g., land-use, buffer zones, etc.) and informal institutions relating to culture, norms, attitudes, etc. Some of the formal institutions, especially the legislation and constitution, relate to the state level, which is not part of this study. According to World Bank reports (World Bank, 2009, 2010), however, Jordan has progressed significantly with structural reforms and in improving its business environment.

More important for this study are the informal institutions and working mechanisms of the local economy. This "soft" environment has a significant effect on regional competitiveness and determines, for instance, the extent of entrepreneurial spirit, of regional cooperation, of openness to new ideas, of regional information exchange and learning processes. Although it needs to be noted that the short diagnostic phase is not sufficient to fully explore the mechanisms of how the economic and social systems in Petra work, the following observations provide valuable insights.

Petra is home to different communities and tribes. The tribal culture nourishes a strong sense of belonging, though they also evidence a relatively high degree of both endogamous and exogamous fragmentation. While this social character seems to be stronger in Petra Region than in the West, prosperous tourism resorts exist in Western Europe, for example, where a few strong families lead the development with a high degree of rivalry between and strong degree of cooperation within each of the families. Also in Turkey family-led corporations are among the leading in the country. Thus, a flourishing economy is feasible in this context.

However, it becomes problematic if protectionist, opportunistic and predatory behavior destroys competition. In our interviews, we have encountered some examples where such behavior has impeded economic development in Petra Region. In this document, only the observed mechanisms are described in order not to expose individuals of the Petra community.

- Free-riding: If an innovative product or service is successful, the inventor and initiator is forced to share the income with others in the community, often by abusing the mechanism of cooperatives.
- Mobbing: If an innovative product or service is successful, the inventor and initiator is forced to stop selling it (at least in the main tourism area).
- Syndication: Characteristics of products and services as well as price levels are agreed (usually in an implicit manner). Infringement of this rule will be sanctioned, e.g., mobbing.

The above mechanisms destroy the incentive for individuals or groups to be innovative and develop tourism products that add superior value to the guests. Better value and interesting products induce tourists to spend more and even stay longer in the region, thus boosting the local economy.

Another “soft” institutional issue seems to be “short-term” rent seeking. Short-term rent seeking frequently results from political instabilities and security risks. The incentive to invest in order to generate more economic value in the medium- and long-term is reduced by the uncertainty whether the fruits of the investment can be harvested. The risks are not only related to Jordan. Violence in the Middle East and terrorism abroad also have an impact on tourism demand. Although the situation currently seems to be relatively stable and the tourism industry seems to have become less sensitive to sporadic violence, the behavior of people does not change immediately. Thus, the attitude to reap benefits when the opportunity arises seems to be relatively common among those who offer services to tourists. This might indeed be rational and maximizes income in the short-run, however, it hinders the development of versatile tourism products, distribution, promotion and pricing systems that encourage tourists to stay longer and in the medium- and long-run strengthen the tourism industry.

Knowledge infrastructure and regional learning

Finally, some regions become internationally competitive because they develop a unique knowledge base. To some extent knowledge has become more mobile through information and communication technologies. However, an important part of knowledge is still lodged within the minds of people who are not always prepared to move, thus making knowledge partly regionally bound. A key element, of what has become known as the "knowledge economy" (OECD, 2003), is the continuous development of knowledge through sharing, recombining and applying it. The centers of the knowledge economy usually are usually situated at the main agglomerations hosting key research, development and educational facilities as well as a large business sector. As already mentioned, Jordan displays a high degree of urbanization and agglomeration and accordingly its higher education and research system clusters mainly in Amman.

Ma'an District, however, hosts some knowledge infrastructure, namely the Al-Hussein Bin Talal University located in Ma'an (AHU) and its associated College of Archaeology, Tourism and Hotel Management in Wadi Musa, a college of Al-Balqa' Applied University (BAU) in Ma'an and one in Shaubak. The AHU constitutes the largest higher education facility in Ma'an District comprising seven colleges and offers bachelor programs in 38 academic specializations in addition to postgraduate diplomas. The seven colleges cover arts, science, information technology, education engineering, archaeology, tourism hotel management, nursing and business administration. The BAU College in Ash-Shaubak covers the diploma programs of plant production, animal production, vocational education, home economics and accounting. The BAU College in Ma'an enrolls approximately 500 students and offers diploma courses in childhood education, nursing, banking and finance, business administration, management information systems, accounting information technology and railway engineering and transport.

The Ma'an District and the Petra Region hence have the advantage that some higher education facilities already exist and that the Kingdom's policy emphasizes education. However, in order to be effective from a social and economic perspective, a strong cooperation between the higher education sector, the business sector and the policy level is required (the "triple helix model," Leydesdorff and Etzkowitz, 1996). According to the information gathered through our interviews, a certain degree of cooperation exists between the hotel sector and the College of Archaeology and Tourism Hotel Management as well as between tour guides and the same institution.

Despite the relatively well-developed knowledge infrastructure, Petra has not yet managed to harvest the social and economic potential of the PAP and at the same time exploits this outstanding resource in a non-sustainable way. Thus, while knowledge might exist in some places in the region, it does not feed through to the socio-economic system. This problem relates back to the shortcomings of the “soft” institutional factors. Knowledge and regional learning requires a certain degree of openness for innovation and variation as well as an elongation of the economic perspective.

Value chain linkages and spreading economic value

In non-metropolitan areas such as Petra Region, economic success always requires a degree of specialization in one industry or related industries. The obvious specialization for Petra lies in tourism since the PAP (if preserved) will always be a distinct competitive advantage on a global scale; not many regions have such an advantage. However, such a distinct resource can also be a curse because it is comparably easy to reap some economic benefit from it with low effort, while never maximizing the resource. Given political stability and security, tourists will always come to see the park, which has happened, and by offering some basic services additional value can be created. This can then create a certain inertia fettering innovation and investments in medium-term projects. Furthermore, the relative attractiveness of other sectors such as agriculture reduces, which consequently lead to a thinning out of these sectors. This phenomenon has become known as “Dutch disease” or “Resource Curse”, being closely interlinked with the soft institutional and knowledge related issues addressed above.

This rather problematic scenario contrasts with one where the lead industry interlinks with other sectors in the value chain and thus spreads economic value broadly in the region. The tourism industry, in general, is known to have the potential for large cross-sector impacts. In Austria, for instance, it is estimated that the indirect economic effects of tourism double the direct effects; for example, approximately 8% of Austrian GDP is directly earned through tourism, but including the indirect effects of tourism the figure is estimated to be 16%, according to Statistik Austria. Sectors related to tourism are manifold, including agriculture, handicraft production, archaeology, arts, manufacturing of wearing apparel, retail and business services. There was once a traditional focus on agriculture in Petra Region and Ma’an District shows an overrepresentation in the manufacture of wearing apparel. However, these sectors currently are not very competitive. Several handicraft associations exist in the Petra region, which are producing high-quality products with original designs. Nearly each of the communities has one of these initiatives, such as the Nabatean Women Association located in Wadi Musa producing handmade silver ware or the Taybeh Women Association producing pottery ware. If these two associations base their products directly on Nabatean designs from the Petra heritage, the Rajif Association for Children with Special Needs sells products, such as pastry or carpets with a strong social component, as children with

special needs make them. Another original initiative is the Amariin center for Craft and Fabrics, recently established in Baidha, producing handbags and other objects out of recycled materials. However, all these local handicraft production associations have one major issue in common: the lack of possibilities to market their products. It appears that they are unable to get strategically located selling points in Wadi Musa or in the PAP, and that tourists are not aware of their products. The prices of their products are higher than cheap imports from abroad, which is one explanation why local vendors are not selling the women's products. Furthermore, the competitiveness among communities and the tribal system prevent the creation of effective co-operations or common initiatives to sell products. In general, based on our interviews it can be observed that a great number of people - especially women – would like to get more involved in this sector.

In addition, some more innovative ideas for marketing other local products, such as dairy products, medicinal plants or embroidery etc, can be observed. There seems to be considerable local potential of handicraft production, which, if it is more effectively linked in the value-chain, could secure a reliable revenue source especially for women.

As far as the local food supply for tourists is concerned, regional agricultural production seems to serve only a small segment of the market, while bigger hotels and restaurants obtain their products from wholesalers located outside of the region. This can be explained through the quantity, quality and reliability of products needed and by the high standard of the hotels, which wholesalers are more likely to satisfy. Hence it would require knowledge, investments, openness and some hard work to strengthen the linkages of the tourism industry with other sectors and consequently build competitive advantage in these related sectors within the Petra region, which eventually lead to the creation of a stronger local wholesale market.

3 Petra Archaeological Park

As mentioned above, the main resource and product that is currently region-specific and competitive on an international level is the Petra Archaeological Park. The PAP, therefore, will be a cornerstone of the Strategic Master Plan both in terms of generating better living conditions, income and jobs as well as in terms of protecting and preserving the site. Hence, this section is devoted to an evaluation of the PAP and other heritage assets in the region in order to take it into due consideration in the further discussions and planning efforts.

Petra: a World Heritage Site with Universal Cultural Value

Petra, rediscovered in 1812 by the Swiss explorer J.L. Burckhardt, was declared a World Heritage Site in 1985 as an outstanding example of living interaction between man and nature. The PAP, along with the early Islamic Quseir Amra and the archaeological site of Umm al-Rasas, one of three cultural sites in Jordan on the World Heritage list and certainly the most popular.

The site, populated for over 20,000 years, from the Paleolithic age to the present, includes one of the highest concentrations of monuments and archaeological sites in the world. In 1994, the UNESCO listed 2,000 rock carved monuments. Petra also includes unique examples of human technical activities, such as the copper mines at Umm al-Amad, dating back to the fourth millennium B.C., and the ancient Nabataean hydrological system which is interwoven with the landscape of the entire region (UNESCO 2000).

Statement of Outstanding Universal Value

Although Petra has been recognized as World Heritage Site since 1985, it is only since July 2010 that the World Heritage committee has approved a **statement of outstanding universal value** (OUV) for Petra. This statement is an expression of the values and other attributes, which make this property so unique in the world. The OUV statement is fundamental for:

- Future site conservation work
- The evaluation of the present situation
- The strategic work presently undertaken
- Monitoring the state of conservation in the years to come.

The statement consists of five equally important sections. For strategic planning, however, section 3 (conserving the integrity of the site), section 4 (respect and maintain the authenticity of the culture heritage) and section 5 (ensure proper management and legal protection) deserve particular attention.

Section one consists of a synthesis, which summarizes the significance of the place: *“the outstanding universal value of Petra resides in the vast extent of elaborate tomb and temple architecture; religious high places; the remnant channels, tunnels and diversion dams that combined with a vast network of cisterns and reservoirs which controlled and conserved seasonal rains, and the extensive archaeological remains including of copper mining, temples, churches and other public buildings”*

Section two indicates the World Heritage Criteria that Petra fulfils:

- (i) To represent a masterpiece of human creative genius;
- (iii) To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
- (iv) To be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

Among other assets criterion (i) notes: *“The dramatic Nabataean /Hellenistic rock cut temple/Tombs approached via a natural winding rocky cleft (the Siq), which is the main entrance from the East of a once extensive trading city, represent a unique artistic achievement.”*

Section three emphasizes the notion of **integrity**. This section of the statement is of a particular interest since it describes a situation, which needs to be addressed. Among others it is indicated *“the monuments are subject to ongoing erosion due to wind and rain, exacerbated in the past by windblown sand due to grazing animals reducing groundcover. The resettlement more than 20 years ago of the Bidul tribe and their livestock away of from their former seasonal dwellings in the Petra basin to a new village at Umm Sayhoun was aimed in section at arresting this process. They are also vulnerable to flash flooding along Wadi Musa through the winding gorge (Siq), if the Nabataean diversion system is not continually monitored, repaired and maintained.”* The statement also acknowledges pressure from tourism, which has increased greatly since the time of inscription, particularly congestion points such as the Siq, which is the main entrance to the city from the East. The statement continues, *“The property is also vulnerable to the infrastructure needs of local communities and tourists. A new sewerage treatment plant has been provided within the property to the north with the recycled water being used for an adjacent drip irrigation-farming project. Further infrastructure development proposed inside the boundary includes electricity supply and substation, community/visitor centre, an outdoor theatre for community events, picnic areas, camping ground and a new restaurant near the Qasr al-Bint temple, all of which have the potential to impact on the integrity of the property.”*

Section four deals with the notion of **authenticity**. *“The natural decay of the sandstone architecture threatens the authenticity of the property in the long-term.”*

Section five consists of a statement on **protection** and management requirements. The statement specifies *‘There is a long-term need for a framework for sustainable*

development and management practices aimed at protecting the property from damage resulting from the pressure of visitors, while enhancing revenues from tourism that will contribute to the economic and social viability of the region.”

Decision of the World Heritage Committee on Petra

At its 34th session in Brasilia 2010, the World Heritage Committee issued a decision concerning the Petra World Heritage site, in which many more urgent problems show up. In this document the World Heritage Committee expresses its concern regarding the state of conservation of the Siq and about the lack of a comprehensive conservation and management policy.

The committee requests Jordan to carry out the necessary work on the unstable rock on the south side of the Siq in order to ensure the safety of visitors as well as to limit any further damage. They also request the state party to carry out adequate studies to determine the impact of the planned tourist related activities on the property, to inform the World Heritage Centre of any construction projects planned in the Dara area and to refrain from initiating any activity which may affect the integrity of the property. The state party is also urged to finalize the management plan for the property by integrating the successive draft management plan and studies and have it legally endorsed and implemented. Furthermore the state party is requested to establish as early as possible a clear management mechanism and adequate structure with the priority of maintaining the outstanding universal value of the property. Previous reports not only mention the lack of an approved management plan for the property, but also the lack of clear boundary delimitations.

At its session in Brasilia (July 2010) the World Heritage Committee asked the World Heritage Centre jointly with ICOMOS to undertake a reactive monitoring mission to Petra to assess the state of conservation of the property, the advancement of the works on the Siq and to discuss the planned actions, as well as the progress in the finalization of the management plan. This UNESCO/ICOMOS mission is scheduled to take place in January, 2011 (PNT), and Jordan has been asked to submit by first February 2011 a progress report to the World Heritage Committee on the implementation of the above recommendations.

The cultural space of the Bedou in Petra and Wadi Rum.

UNESCO has inscribed the cultural space of the Bedou in Petra and Wadi Rum in 2008 on the representative list of the intangible heritage of humanity. The tribes specified for heritage conservation are the Bidoul (Umm Sayhoun), `Amariin (Baidha) and Sayidiyeen (Dlagha, Bi'r Hammad). Important reasons for their inscription are their medicinal and

pastoral traditions, which are dependent on the conservation of range and biodiversity within the Region. This may have important implications for the strategic planning efforts since their culture should not be allowed to further degrade. The nomination file will still need to be assessed and information gathered from UNESCO on the state of conservation.

The Boundary of the Petra Archaeological Park

In 2007, an area of 264km² was established as the Petra Archaeological Park. Even though the boundaries of the PAP have been defined, it is not clearly visible on the ground where the boundaries actually are. Thus at present activities are taking place on the fringes of the park area and it is not quite clear whether they are within or outside the park boundaries. It seems that the eastern and northern boundaries are fairly well determined, while the south and west ones are more disputed. More importantly, the logic by which the boundaries of PDTRA, the Petra Archaeological Park and the proposed buffer zone are based is not clear.

The question of establishing a buffer zone around the park has been discussed since the establishment of the park, but no conclusion has been reached so far. The issue of establishing buffer zones is to be discussed in more detail with the local population and will have to consider the current agricultural activities. This would have to follow UNESCO's recommendation to create a zone, "surrounding the nominated property which has complementary legal and/or customary restrictions placed on its use and development to give an added layer of protection to the property ... and should include ... areas or attributes that are functionally important". (UNESCO 2008a, 136)

The boundary of this buffer area is contained in one hard copy map from the Petra National Park Management Plan (137). It is not available in digital form nor does it appear to have a formal legal description. As a result, it is likely that knowledge of the boundary area is not widely held and has little impact of local or national land use and administrative decision-making. The currently available mapping for Petra Region including the boundaries and zoning is incomplete and insufficient at the moment (c.f. map 2 shows the currently available definition of the park boundary). Furthermore, there is no map available including the names of the different neighborhoods in Wadi Musa or any of the communities. However, this is linked to the fact that most of Wadi Musa's streets are unnamed, as are those of the villages.

Threats to the Petra Archaeological Park

The protection of the Petra Archaeological Park is not only of utmost interest to the international community, particularly UNESCO, but is also of highest interest for Petra

Region as it constitutes and will remain a lasting potential source for prosperity due to its unique and universal nature. In this context regional socio-economic development, at the core of the Strategic Master Plan, will need to ensure that development does not degrade PAP, but that resources and mechanisms are installed which actually assist the preservation and conservation of the site.

Many studies have focused on the threats for the PAP. Furthermore, UNESCO monitors the site and also requests certain actions, as mentioned above. This diagnostic does not, therefore, repeat all the threats in detail here but provides a summary of the most important issues, which are also addressed in the Statement of OUV and the decision of the World Heritage Committee at its 34th session in Brasilia 2010 (see above). Accordingly, the threats can be categorized as follows: i) threats related to the natural decay of the site, ii) threats related to economic activity in the site; now mainly tourism, and iii) treats related to developments in the surroundings of the park:

- Threats related to natural decay:
 - Include processes such as wind, soil erosion, an increase of maximum temperature or flooding;
 - Waste left by tourists and locals in and around the park is a visual and natural pollution of the environment;
- Threats related to economic activity on the site, mainly tourism:
 - Increasing numbers of visitors coming to PAP and touching, walking and sitting on the sandstone or changing the humidity level inside of the tombs when they visit them;
 - Degradation by horses or other animals (donkeys, camels, goats) inside the park; the animals are often used to offer services to tourists or provide supplies for souvenir shops and restaurants. Currently, there is no management policy for animals within or outside the Park with the exception of the horses, which are regulated;
 - Lack of adequate toilet facilities have led to the spoiling of caves in a clearly unacceptable manner;
 - Licensing of campgrounds within Park boundaries is in contravention of best practices in the management of protected parks. Permitted without prior Environmental Impact Assessments (EIAs), these campsites cause extensive damage to the natural and archaeological heritage of Petra as well as to site significance and integrity. The only campsite now operating within Park boundaries is the Amariin Camp;
- Threats related to developments in the surroundings of the PAP:
 - Visual/aesthetical pollution through constructing new buildings or adding upper floors to existing constructions - including the (illegal) expansion (also upward through adding floors) in parts of Wadi Musa and Umm Sayhoun);
 - Car Parks at the entrance to the PAP have a negative visual impact and engine emissions, diesel fumes are particularly harmful;

- Cutting trees, excessive agriculture and construction in the wadis increase the impact of wind, soil erosion and flash flooding.

While the above list hardly does justice to the magnitude of the task of preserving the PAP, it does highlight the importance of effective protection and management practices. Diligent consideration will need to be applied to the many planning decisions outside the park related to land use patterns, agriculture, tourism policies, products and pricing systems, irrigation systems, reforestation, etc., will have a significant impact on the integrity and authenticity of the PAP. It is essential, as the foundation of sustainable site management, to calculate and respect the site's carrying capacity (Table 9).

Table 9: Carrying capacity studies for PAP

Carrying Capacity studies	Hourly No. of visitors	Daily No. of visitors	Monthly No. of visitors (max./min.)	Annual No. of visitors
UNESCO study 1994 carrying capacity maximum (whole PAP)	600 - 700	3000-3500	90,000 -105 000	1,1 million – 1.26 million
US/ICOMOS carrying capacity maximum study, present situation 1996	400-600	2000-3000	60 000 - 90 000	730 000 – 1.1million
US/ICOMOS Second entry option using Siq and the Turkmaniyya Road carrying capacity	575-860	2900-4300	87000-129 000	1.1 million - 1.6 million

Economic Activity in the Petra Archaeological Park

This section provides an analysis of the current economic activities in the PAP, including the number of visitors, the services provided in the park and the ticket policy.

Number of visitors

The tourism statistics for the last ten years clearly shows a dramatic rise in the number of visitors coming to the PAP (table 10). This number slowed after 2001 and during the economic crisis last year. In 2008 a record number of 813,267 visitors was recorded. This number is likely to be exceeded in 2010 as the figures for the first six months indicate an increase compared to the previous highs during the same period in 2008. The lower arrival figures in past years were usually linked to conflicts in the region. Whereas only ten years ago tourists stayed away for a longer time after a conflict, more

recently the sensitivity of the tourism market to conflicts has declined and tourist volume returns within much shorter periods.

Table 10: Number of visitors to PAP 2000 – 2010

Year	Monthly No. of visitors Maximum	Monthly No. of visitors Average	Annual No. of visitors
2010 (first six months)	120,437 (April)	78,585	471,509 (six months) <i>950,000 (extrapolated)</i>
2009	98,862 (Oct)	60,676	728,108
2008	99,616 (Oct)	67,772	813,267
2007	80,794 (April)	48,429	581,145
2006	68,613 (April)	29,947	359,36
2005	57,528 (April)	32,766	393,186
2004	47, 452 (April)	25,856	310,271
2003	28,247 (Oct)	13,388	160,658
2002	19,716 (April)	13,236	158,837
2001	46,041 (April)	19,267	231,203
2000	82,848 (April)	40,100	481,198
<i>Petra National Trust</i>			

There are two peak seasons each year: spring and autumn. April and October are usually the months with the highest number of visitors: a high of 120,437 was reached in April 2010. This implies that during that month an average of 4,000 people per day visited the park. As this is only the average, it can well be assumed that on some days 5,000 or more people visited the park, clearly exceeding the estimated maximum carrying capacity calculated by studies as shown above. PAP management confirmed that on some days the daily maximum carrying capacity was exceeded. Correspondingly, there was an increase in visitor complaints regarding an uncomfortable congestion of visitors, animals and carriages in the Siq and some other points in the park.

The months with the lowest number of visitors are usually December, January (except during the European and US Christmas holidays) and February, certainly linked to climatic conditions in Petra. Traditionally, the summer months between mid-June and mid-September were low seasons as well. However, recently visitor numbers have increased during that traditional vacation period. Tour Operators also confirm that the extreme differences between high and low seasons have recently evened out. Especially during summer there has been a strong increase in demand.

Services and facilities provided

Officially, the PAP is open daily and all year round, in summer from 6am to 6pm and in winter from 6am to 4pm. In fact the closing time has been established as sunset. Visitors can purchase tickets to the PAP at the Visitor Center located just outside Petra Park entrance gate. A new Visitor Center is currently under construction on the site of the existing one.

The Visitor Center distributes several brochures introducing Petra and various main monuments in Arabic, English, French, Spanish, German and Italian. Also several maps (aerial view map and physical relief of the area) can be obtained there. The Visitor Center also provides maps for the two main self-guided trails, which are the main trails leading from the Visitor Center to Qasr al-Bint (4km, 2.5-3 hours) and the Royal Tombs Trail leading from after the theater to al-Khutba High Place (2.5-3 hours). In addition guides can be hired at the Center to explore several other trails not advised to be explored alone., Surprisingly, however, the two trails to the Monastery and to Aaron's Tomb are not mentioned in this material.

Adjacent to the Visitor Center are located the Badiya Police station, Tourism Police Office and a small the post office. The Petra Tour Guide Association and the so-called Petra Horse Association are located in the Visitors' Center.

The Visitor Center includes souvenir shops, which sell local handicrafts, jewelry created by Jordanian designers and necessities for tourists (batteries, hats etc.). Further souvenir shops are located inside the park. The offering of the shops is fairly uniform and unvaried.

Signage for visitors who do not arrive with pre-organized bus tours is inadequate and even the Visitor Center is not easy to find. The information provided by signs, maps and

also by the gatekeepers does not meet the standard one would expect from one of the world's leading tourism attractions.

The ticket price includes a short ride on horseback from the entrance to the park to the beginning of the Siq (approximately 600m). Visitors are not made clearly aware of this service: although theoretically 353 horses are available for that purpose, in fact far fewer are actually present even at times of high visitor frequency. The horses are guided by young men who aggressively solicit fairly high tips (5-7 JOD) from visitors who are actually using the horses, but are unaware or unsure of the fact that they have already paid for this service. In fact only a minority of visitors actually use the horses.

The ticket price also includes guide service with adequate interpretation of the site by an officially licensed tour guide, a service that works well for some (particularly tours organized by the more experienced bona fide tour operators), but not so well for others. There are complaints - especially from individual travelers – that tour guides make them believe the tour ends at the Treasury, whereas it is to last throughout the visitors stay at PAP if they wish so. It should be said that the local guides' fees are 50% or even less than what a licensed guide contracted by a tour operator would pay for an all-day or even half-day tour.

There is also the service of a carriage ride (at extra cost) through the Siq to the Treasury. The carriages offer a very shaky and rather uncomfortable ride. A feeling of uneasiness and shakiness is heightened by the high speed of the carriages through the narrow Siq, which is often overcrowded, because of traffic in both directions and the fact often that children are running alongside, peddling souvenirs or begging.

The PAP includes two restaurants at the end of the main road. The Basin Restaurant (operated by the Crown Plaza) has a capacity of more than 300 customers. The second is the Nabataean Tent Restaurant, which can accommodate more than 400 persons. Both places serve Arabic and international food. In addition several of the small shaded outlets around the park sell drinks and offer a place to rest.

The Petra Museum, located near the restaurants, is a small museum on Nabataean culture including, for example, pottery works and coins. The location of the museum at the end of the visitor experience rather than at the beginning of their visitation has been reported as inadequate in terms of space and interpretive programs. If the museum would be located at the beginning of their visit, visitors could be oriented to what they are

about to see, learn about what has been found through excavation, etc. and then visit the site. Archaeologists made comments that the museum is inadequate in terms of space and interpretive programs. However, they valued its central location to the park because they could quickly go to the museum for research when being on the field excavating.

The main restrooms of the park are located at the Visitor Center; additional units exist 30m to the left of the Center. Inside of the PAP restrooms are located next to the theater inside a cave, in the Basin area, as well as 5 portable bathrooms close to other main monuments. The restrooms are considered inadequate by many comments. Rubbish disposal facilities are provided along the main walking routes.

In addition, the park offers a "Petra by Night" experience three times a week, during which candles are lit in front of the treasury and nostalgic music played. This program that is being organized by two of the leading local tour operators together with other local stakeholders, is quite popular and is receiving overwhelmingly good comments

Pricing policy

The pricing policy differentiates depending on the number of days visiting the park and whether visitors have an overnight stay in Jordan as shown in table 11.

Table 11: Old and new admission fees to PAP

Duration / Admission fee	Tourists with overnight stay in Jordan or cruises (01.01. – 29.02.2010)	Day - visitors (01.01. – 29.02.2010) without overnight stay in Jordan	Tourists with overnight stay in Jordan or cruises (starting from 01.11.2010)	Day- visitors (starting from 01.11.2010) without overnight stay in Jordan
1 Day Ticket*	33 JOD	40 JOD	50 JOD	90 JOD
2 Day Ticket*	38 JOD		55 JOD	
3 Day Ticket *	43 JOD		60 JOD	
<i>PDTRA Service Ticket Poster</i>				

Starting from the 1st of January 2010 ticket prices were raised, as new facilities were made accessible and services included, such as the horse ride from the gate to the Siq entrance, access to the museum and scheduled guiding services in Arabic and English. On the other hand a considerable reduction is now being offered to those visitors who are intending to stay for two or three days, by adding a charge of just 5 JOD for each additional day.

Another raise of the admission fee will be effective as of the 1st of November 2010. In return for this already – also in the international context – rather high admission fee, it is planned that tourists and day-visitors will enjoy considerable added value through free access to new additional services of hospitality and interpretation services, an ecologically sound back road transport system that will save them the walk back through the Siq, eco-toilets, additional rest areas and more information stations. The new ticketing system should encourage foreign visitors to stay longer in Petra and to return several times to the Park. A truly high fee of JOD 90 will be charged for visitors who do not stay overnight in either Petra or in Jordan.

These entrance fees only apply to international tourists; Jordanian nationals and residents pay a much lower symbolic price -- presently only 1 JOD. Coupons for additional optional services can be booked at the Visitor Center of the park. These additional services include horse carriage tours from the PAP entrance to the treasury or roundtrips for senior or disabled visitors (from the gate to the treasury or to Qasr al-Bint). Private guided tours such as the ancient city tour, which includes the main sites of the PAP, a four-hour tour which can be further extended by exploring the Deir Trail or the High Place of Sacrifice.

Recently the PAP has invested in a new electronic ticketing system, which – according to our interviews – technically allows for online booking, assigning of time slots and price differentiation during the day. These instruments are currently not used to influence the visitor flows.

4 Tourism in Petra Region

Source markets and spending

As already noted above, the number of visitors to PAP has increased dramatically in the last decade. Table 12 shows that Europe is the single most important source market for Petra: even in times of crisis every second visitor comes from Europe; in better times up to two thirds of all visitors are Europeans. The number of domestic Jordanian visitors remains fairly stable in absolute terms. Between 75,000 and 100,000 Jordanians visit

Petra annually. Because domestic visitors pay a relatively low entrance fee these have a relatively low economic impact, but the numbers show what a strong part of the Jordanian identity Petra has become. The other major international source markets are the Americas (primarily the USA) and Asia, (primarily Japan), with China and India as long-term strong potentials.

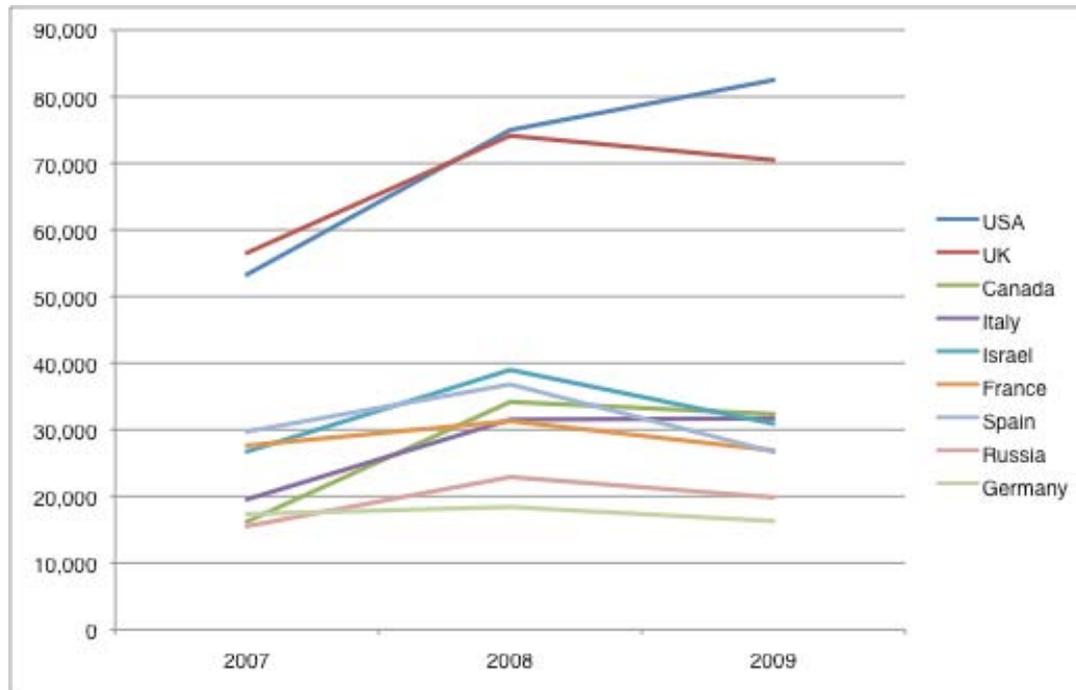
The table also shows visitor volatility and specifically foreign visitors' reaction to crises in the region (e.g., Lebanon and Gaza). However, it also shows the surprisingly quick recovery of visitor numbers back to normal, with actual strong growth since 2007, which seemed to have been damped only slightly by the world economic crisis in 2009.

Table 12: Origin of visitors coming to PAP between 2005 and 2010

Year	Total	Jordanian	Europeans	Americans	Asians	Rest
2010*)	471,509	10.35%	62.75%	12.79%	9.97%	4.14%
2009	728,108	14.46%	62.51%	12.03%	7.74%	3.26%
2008	813,267	9.33%	60.84%	10.20%	12.96%	6.67%
2007	581,145	17.67%	48.81%	8.49%	15,01%	10.02%
2006	359,366	24.58%	47.42%	10.40%	13.62%	3.98%
2005	393,186	20.82%	51.18%	13.56%	11.73%	2.71%
*) I-VI						
<i>Petra National Trust</i>						

On a country level, Graph 3 shows the 9 main source markets. 2009 was seriously impacted by the economic crisis and, interestingly, only the number of visitors from the US increased from 2008 to 2009. All other international source markets experienced a drop of differing intensity depending on the impact of the crisis. It is noteworthy that the strong Asian growth markets of China, India and South Korea have not yet “discovered” Jordan to the same extent that they have come to Europe in recent years. Here is certainly a strong growth potential.

Origin of visitors by country between 2007 and 2009



JTP Statistics

According to the IPSO survey, the average length of stay of tourists in Jordan was 5.9 days in 2009. It was noted that the share of tourist who had previously visited Jordan was 23.2%. No in-depth studies were made to assess the expenditure of tourists in the Petra area. However, the Jordan Tourism Board (JTB) regularly conducts what they call “exit polls” among tourists leaving Jordan at “Queen Alia” Airport in Amman. Most, if not all, of the tourists visiting Jordan through Amman have also visited Petra. Table 13 shows the total expenditure for the key source markets and compares this figure with the number of visitors of the PAP. Accordingly, a rough estimation for the expenditures of tourists per visit depending on the source markets can be made. American and British tourists spend on each visit an average of JOD 990 and JOD 887 respectively. Germans are the group with the highest spending per visit of JOD 2,475 on average followed by the Russians with JOD 2,153 and the French with JOD 1,705. Canadians and Spanish spend significantly less. Hence, the ranking of the source markets differs depending on the use of either total expenditure or total arrivals as indicator. Clearly, total expenditure is the more important indicator. If the same value added can be reached with fewer visitors the negative impacts of tourism are also reduced (e.g., traffic, waste, pollution).

Despite the missing data about the expenditures in Petra, it can well be assumed that the income potential in the region is not fully exploited for a number of reasons, including:

- Gifts and souvenirs are not up to expectations (great potential for improvement);
- Gifts & souvenirs are of low quality;
- Most of the gifts and souvenirs are made outside of Jordan, or they are not authentically Jordanian-made;
- One day tours from Egypt and Israel mostly come with their own food and drink, due to the short duration of the visit;
- Quality of food outside the hotel area is not of best standards;
- Lack of things to do/ entertainment;
- Lack of attractions;
- Hotels get the better part of tourist expenditure;
- AND most importantly lacking: tourism products, organization and marketing to keep tourists in Petra for a longer time period.

Table 13: Average tourist expenditure in Jordan in 2009

Nationality	Total expenditure of tourists (JOD)	Arrivals 2009	Expenditure per visit in JOD
US-Americans	81,664,776	82,502	990
British	62,506,854	70,485	887
French	45,863,744	26,901	1,705
Russians	42,725,768	19,843	2,153
Germans	40,324,781	16,296	2,475
Italians	32,735,333	31,718	1,032
Canadians	24,334,576	32,354	752
Spanish	20,579,961	26,681	771
<i>JTB Statistics, own calculations</i>			

Position of the Petra Region in the tourism industry

Visiting the Petra Archaeological Park is with no doubt one of the main reason why tourists come to Jordan. According to the IPSOS International Visitor Exit Survey Final Analysis Report from July 2010 73,9% of visitors surveyed came for leisure purpose to Jordan. Among them, 86,7% came for the first time to Jordan and the vast majority had

been to Petra (86, 4%). Other places explored by first time visitors in Jordan were Amman (85,5 %), the Dead Sea (74, 3%), Wadi Rum (54,1%), Jerash (52%), Aqaba (45,7) and Madaba (44,4%). This clearly shows that Petra is Jordan's main tourist attraction.

On a regional level Jordan has to compete with strong tourist destinations, as can be seen from the data provided by the WTO Tourism Barometer 2010 summarized in the table below. The leading destinations in the Middle East are Saudi Arabia, Egypt and United Arab Emirates. Egypt is with its archaeological monuments, seven World Heritage sites and several sea resorts clearly the most traditional and long standing tourist destination in the Middle East, while the United Arab Emirates has only emerged in the recent ten years as major destinations, mainly due to its positioning as flight connection hub. Saudi Arabia as traditional destination for religious pilgrimage can be considered as special case.

Table 14: International tourist arrivals and tourist receipts in the Middle East in 2008

Country	International Tourist Arrivals 2008 (1000)	International Tourist Arrivals Change 07/08 (%)	Tourism receipts 2008 (million US \$)
Bahrain	-	-	1,166
Egypt	12,296	15,9	10,985
Jordan	3,729	8,7	2,943
Lebanon	1,333	-	7,192
Oman	1,273	13,3	804
Palestine	387	46,6	74
Saudi Arabia	14,757	28	9720
Syrian Arab Republic	5,430	30,6	--
United Arab Emirates	--	--	7,162
Yemen	404	6,6	886
<i>WTO Tourism Barometer Volume 8, No1 January 2010</i>			

On a global scale the tourism market in the Middle East is rather small, but is predicted by the WTO to follow the worldwide trend of tourism growth in the next years.

Visitor opinions and satisfaction

The IPSOS International Visitor Exit Survey Final Analysis Report from July 2010 indicates that nearly all (95%) of the 5947 visitors asked indicated that their expectations of their stay in Petra were fulfilled regardless of their nationalities or ages group:

- Most of the respondents (91.6%) would as a consequence definitely recommend visiting Jordan to their friends and relatives.
- For 41.8% of the questioned visitors Petra represented the best experience of their trip to Jordan (other answered that Petra city is great, walking in Petra or history/monuments of Petra).
- Most of the tourists who said that they would return to Jordan within the next three years were those who had already been several times in Jordan before.
- The safety situation in Jordan obtained the highest satisfaction rate.
- Visitors asked about how tourism could be improved in Jordan overwhelmingly indicated the transport system (e.g., roads conditions, cleanliness or availability of transports). Lack of available transportation was reported as a main complaint in Jordan.
- Other missing activities mentioned were: places to dance, horseback rides in desert, golf courses, sand surfing, food variety and driving in the desert.
- Tourists asked about their most unpleasant experiences in Jordan stated that these were: unclean streets and touristic areas, annoying taxi drivers, poor services at hotels, traffic jams, hot weather, poor service in the airport, high taxi prices, unfriendly or inadequately knowledgeable tourist guides, unclean restrooms in touristic areas, transportation and bad food.
- Another complaint of tourists and a reason why some tourists would not come back to Jordan is that they judge that they do not get enough value for money, for to them prices in Jordan appeared too high.

The main subjects of written complaints by foreign visitors to Petra were (based on a sample of complaint mails written to the JTB in 2008 and 2009):

- Mistreatment and abuse of donkeys and horses in PAP. This is the subject of the majority of the complaints: visitors were shocked about the poor condition of the animals and the violence with which they are being treated.
- Complaints about donkey guides telling lies in order to get money from tourists, but never returning the money as promised.

- Better ways to transport visitors into Petra, especially older people; horse carriages are often overpriced, especially on the way out of the park (this was a complaint issued before the new ticketing system was established).
- Dirtiness of the park, e.g., around the Treasury and worse in the tombs/caves; not enough dustbins provided.
- High amount of horse and donkey droppings on hiking paths (e.g., entrance to al-Khazneh and climbing to the Deir).
- Speeding taxis scaring the visitors.
- Dangerous unguarded scaffolding, which in fact caused the death of an Australian citizen.

However, especially regarding the mistreatment of horses first measures have already been undertaken, as since last year a professional horse trainer from the USA has been employed by PAP to teach the local horse guides how to better treat their animals. He also has developed new more comfortable horse carriages.

Access to Petra Region from key markets

Jordan has two major international airports. The largest is located near Amman (Queen Alia International Airport) and the second largest in Aqaba (the King Hussein International Airport). The first is served by several Middle Eastern/Arab and international airlines, such as Air France, Air Italia, bmi, Iberia, Lufthansa, Turkish Airlines and Delta, while the second is reserved mainly for charter flights and low-cost airlines. The small Marka international airport close to Amman is now mainly serving national and regional flight routes. Further, Royal Jordanian Airlines flies to more than nearly 60 different destinations worldwide, including main European cities, Asia (e.g., Hong Kong, Delhi) and North America (e.g., New York, Montreal).

The King Hussein International Airport is served by two regular internal flights between Amman and Aqaba, run by Royal Jordanian. The airport serves a few charter flights from Europe. ASEZA will terminate the current incentive scheme for King Hussein International Airport (50,000 Euro per ten flights), which may affect the charter business drastically. Royal Jordanian did comment that they would consider regular direct international flights to Aqaba once the product in Aqaba is ready (when more rooms are available)

In order to travel from Amman or Aqaba to Petra, daily bus services or taxis can be used or cars rented from a number of international and Jordanian chains in Amman and Aqaba as well as in Petra. However, many tourists come through organized tours as well as on day trips from Eilat or even from Taba, Sinai and Sharm al-Sheikh in Egypt.

Daily minibuses run to Petra from Amman Wihdat bus station. The journey takes about three and a half hours. Luxury Jett buses offer day trips from Amman to Petra including guided tours. Other important touristic places in Jordan are connected by bus to Petra (local mini bus services) such as Aqaba (several daily buses), Wadi Rum (1.5 hours by minibus) or Madaba via the scenic King's Highway. The circulation inside of Wadi Musa and the connection to nearby places, such as Baidha, is provided by two bus services. One notable drawback to both the Amman Wihdat and Wadi Musa bus services is that the bus stations are unmarked, and the destinations of buses usually appear only in Arabic script on the backs of the buses. No timetable is published, nor are they signed at the stations. Wihdat is a half-hour taxi ride from West Amman, in one of the large Palestinian refugee "camps," and most taxi drivers speak little English (or any language other than Arabic). In short, the average tourist would be hard-pressed to find his way to Wadi Musa from Amman on a public bus.

Passengers from cruise-ships calling on Aqaba have become an increasingly important group of visitors to Petra. With a travel time of about 1.5 hours, virtually none of them will stay overnight in the Petra Region nor anywhere else in Jordan, the economic benefit is restricted to the port taxes, bus transfer, some shopping and the entrance ticket to PAP. Most ships arrive in January and February, which is a low season for Petra. Cruise passengers will not have to pay the higher fee for other day visitors that are not staying overnight anywhere in Jordan. According to ASEZA, slightly more than 100 cruise ships called on Aqaba in 2009. With the worldwide boom in cruise tourism this figure can be expected to grow significantly during the coming years. The number of passengers that actually traveled to Petra could not be established; an intelligent guess put the number at 'over 5.000 visitors'.

Accommodation Facilities

40 hotels of all categories serve travelers in the vicinity of the PAP. Among these, six five-star hotels provide the largest capacity of rooms/beds. Some of the larger hotels include the Crown Plaza, the Grand View, the Petra Mövenpick, the Mövenpick Nabataean Castle, Petra Marriott, the Taybet Zaman and the Bait Zaman Hotel. Most of these are located on the main road above Wadi Musa. Three campgrounds exist near Baidha, a few hundred meters from Little Petra. These are the Amariin Bedouin ecological camp, the "Seven Wonders Camp," and the King Aretas IV or "Helali" camp.

Table 14 shows per classification category the number of hotels, suites, rooms, beds and persons employed. The largest capacity (1,381 beds) is provided by the five-star accommodation facilities, followed by the three-star category (956 beds). The total

number of employees was reported to be 1,130, which, however, seems to be rather low by international comparison. This might be due to self-employment or also employment or help of family members in the business.

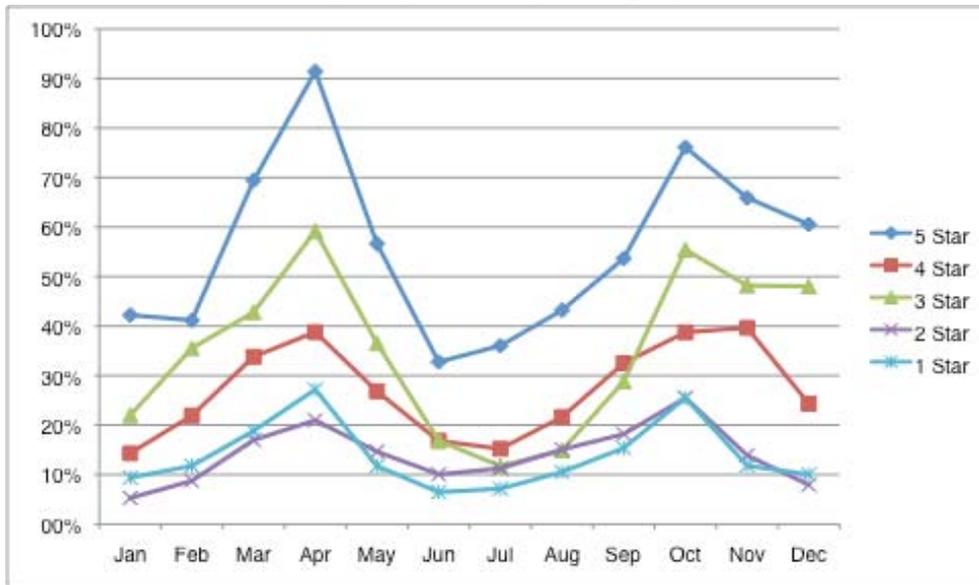
Table 15: Accommodation facilities in Petra Region

Petra	No. of Hotels	Suite	Room	Bed	Jordanian		Non Jordanian		Total
					M	F	M	F	
Five Stars	6	70	760	1,381	604	15	21	4	644
Four Stars	2	8	234	455	119	0	2	0	121
Three Stars	7	1	504	956	184	6	53	1	244
Two Stars	2	0	109	224	14	0	3	0	17
One Stars	7	0	212	419	37	3	6	0	46
Camping	2		50	90	9	0	0	0	9
TOTAL	26	79	1,869	3,525	967	24	85	5	1,081
Unclassified Hotels	14	0	233	484	34	5	10	0	49
Total Petra	40	79	2,102	4,009	1,001	29	95	5	1,130
<i>MOTA 2010</i>									

As shown in Graph 4 the occupancy rates are highest in the five-star segment, followed by the three-star segment. One- and two-star accommodation facilities struggle significantly to fill the beds and the situation with four-star hotels is not much better. According to the data, the season peaks in April and October with considerable drops in between. In April 2009, however, an occupancy rate of almost 100% is observed in the five-star segment. As five-star hotels account for the largest number of rooms, the average occupancy in 2009 reached 40% for the whole year. In 2010, better occupancy rates are expected. Given the relatively low overall occupancy rate and the drops in the low season, measures are needed to extend the stay of visitors. By focusing on extending the stay and less on attracting more visitors, the pressure on the PAP can be

reduced while at the same time the value can be increased without the need of additional infrastructure.

Accommodation occupancy rates by category in 2009



MOTA

Tourism products currently offered and other attractions

The variety of tourism products is potentially relatively high in Petra Region. Also, a large number of leisure, recreational, sporting and cultural activities can already be organized. Additionally, during the interviews numerous additional products were mentioned. Despite these opportunities, the average number of overnights in the region is just above 1 night implying that most tourists don't consider it worth staying longer.

As there is no lack of ideas about additional attractions and activities, the problem rather lies in the professional organization, marketing and packaging of tourism products. At the moment, information about the various attractions and potential activities in Petra Region is seriously inadequate. Even the Visitor Center provides hardly any information on services outside the park. Marketing on the ground is thus insufficient. What is more, tourists need to know about the tourism products before they arrive so that they can plan their travels and book rooms accordingly for a number of days in Petra Region. They could, for instance, combine their visit to the PAP with some of the activities already offered (see below) or even choose Petra to be their base for exploring other attractions in Jordan. Such marketing, however, requires organization and professional

management so that tourists, travel agencies and tour operators can be certain that they will receive what they book in advance and/or actually do what they plan for a longer stay in the region. Also, single products are usually not attractive enough to bind tourists longer in the region. It will be required to create interesting packages for specific target groups.

Tourism products and services

The table below summarizes the strength and weaknesses of the main products and services currently offered in the Petra region..

Tourist Product	Strengths	Weaknesses
Horses	<ul style="list-style-type: none"> • Authentic Bedouin product • Good image ('Indiana Jones') • Relatively good looking, well cared horses 	<ul style="list-style-type: none"> • Only 600 m at the entrance, led at the holster • No introduction • Not offered outside of park
Horse-drawn Carriages	<ul style="list-style-type: none"> • Principally attractive and colorful alternative to walking the Siq 	<ul style="list-style-type: none"> • No introduction • Not offered outside of park • Complaints about ill-treated horses, reckless driving congested traffic & dangerous situations • Construction fault provides uncomfortable bumpy ride
Donkey rides	<ul style="list-style-type: none"> • Donkey seen outside the Arab world as a 'sympathetic' animal 	<ul style="list-style-type: none"> • Presently illegal status inside PAP also in context with child labor • Complaints about ill treatment • Not offered outside of park • May be azardous due to lack of regulations
Camel rides	<ul style="list-style-type: none"> • Most authentic animal is expected by tourists 	<ul style="list-style-type: none"> • Available only inside the PAP • No introduction to culture and riding techniques offered • Not offered outside of park • Reputation of 'hard to ride'
Horse & camel trekking inside the Park, away from the main tourist routes	<ul style="list-style-type: none"> • Many very attractive alternate routes, e.g., to the base of Jebel Haroun (Aaron's Tomb) 	<ul style="list-style-type: none"> • Not much promoted • Lack of well trained guides
Horse & camel trekking outside the Park	<ul style="list-style-type: none"> • Attractive programs by local Tour Operators are already on the market • More treks of any length could be offered, e.g. from Dana in Tafilah to Petra OR from Petra to Wadi Rum and/or Aqaba etc. 	<ul style="list-style-type: none"> • Accessible through local tour operators • Not much promoted alternative to 'mass tourism'
Camps in the Baidha/ Little Petra area	<ul style="list-style-type: none"> • Several camps of varying quality and price range available 	<ul style="list-style-type: none"> • Not well enough marketed • No camping grounds for self-campers available

		<ul style="list-style-type: none"> • Ecological soundness not guaranteed in all camps • Some camps inside PAP borders – status in need of clarification
Hiking within and around PAP	<ul style="list-style-type: none"> • There are some attractive hiking paths that offer new and unusual views • Hiking is worldwide on the rise 	<ul style="list-style-type: none"> • Only few treks are marked and mapped • Vast potential of historical, environmental, anthropological and cultural interpretation underused
Petra By Night Program/event: Three nights a week tourists are able to visit Petra at night	<ul style="list-style-type: none"> • Excellent, attractive and successful program 	<ul style="list-style-type: none"> • Opportunity for interpretation of Nabatean Culture should be better used
Little Petra as Event site	<ul style="list-style-type: none"> • Music and dinner overlooking the caves of Petra is a very attractive product for exclusive guests and MICE tourists 	<ul style="list-style-type: none"> • Only for very limited numbers
Bedouin Festival event in Little Petra done by the Amariin Bedouin Camp	<ul style="list-style-type: none"> • Was very popular and attractive one time event • Great potential as a permanent event 	<ul style="list-style-type: none"> • As one time event bad cost-effectiveness ratio • Needs longtime careful planning – also to protect Bedouin identity
Petra Kitchen:	<ul style="list-style-type: none"> • Well established & attractive product: • Tourists are taught Arabic-Jordanian cooking and eating the products of their work 	<ul style="list-style-type: none"> • No introduction • Not offered outside of park
Jewelry-making sessions	<ul style="list-style-type: none"> • Visitors watch local women making jewelry • High class tasteful products 	<ul style="list-style-type: none"> • Very poor marketing • Jealousy among local traders needs to be overcome
Bedouin museum in the Amariin Camp near Baidha	<ul style="list-style-type: none"> • Nice for the camp, but little outside effect • Could be an attractive offer 	<ul style="list-style-type: none"> • Not enough marketing to open up to outside visitors
The old village of Rajif	<ul style="list-style-type: none"> • Example of old Jordanian village architecture • Good substance • Excellent potential for extending visitor stay 	<ul style="list-style-type: none"> • Needs political consensus in the village to pursue • High investment needed
The old village of Elgee in Wadi Musa - an example of local village architecture	<ul style="list-style-type: none"> • Only a concept design as of yet, it seems like a sound idea for an authentic tourist center offering guests a glimpse of local life-style. 	<ul style="list-style-type: none"> • Too early for any kind of judgment
Authentic old Jordanian villages turned into hotels ()	<ul style="list-style-type: none"> • Taybet Zaman and Beit Zaman among the most popular hotels, because they offer local flavor 	<ul style="list-style-type: none"> • Need to find sites of comparable attractiveness
Hammams & SPAs	<ul style="list-style-type: none"> • Several hammams exist in Wadi Musa for locals and visitors for relaxing and cleaning (e.g. Petra, Salome and the Loofah Turkish Bath and others, • A charmingly reconstructed bath is at Taybet Zaman. 	<ul style="list-style-type: none"> • Not much promoted so far • Visitors often unsure about hygienic standard

Other natural and cultural heritage attractions

While the PAP certainly constitutes the key attraction, other heritage assets in Petra Region and its surrounding have the potential to enrich visitors' experience, extend the length of stay, increase value creation and take pressure from the PAP by better balancing the visitor flows. Below a short list of the main attractions is provided:

“Little Petra”

Siq Al-Barid, also referred to as “Little Petra”, is located near Baidha, a ten-minute drive north of Petra and strongly resembles the main site. Actually it is a very attractive ‘chamber version” of the main site, which gives visitors a gist of what can be seen at the larger Petra. Dating back to the early 1st century AD, it is assumed that Little Petra was an important suburb of Petra that can be entered through a narrow opening, similar to the Siq but at a much smaller scale.

The site includes tombs, temples, water channels and cisterns carved out of the rock as well as the remains of frescoes on plaster. Its carrying capacity was estimated to be 990 visitors/day according to the UNESCO in 1994.

The Prehistoric Sites of Baidha, Ba'aja, Shkaret Msa'ad and Wadi Sabra

Within the Petra region are a network of archaeologically important and visually striking neolithic sites. Situated 300 meters away from the main entrance to the Little Petra site, the prehistoric settlement at Baidha is considered to be one of the oldest settlements in the World. Going back to around 10,000 years BC, evidence was found of prehistoric humans, whose lifestyle was shifting from hunters and gatherers to settling and building structures. Shkaret Msa'ad is a 30 minutes drive down the Namala pass at the northern end of the PAP, but it is situated next to the road. Ba'aja (three sites) and Wadi Sabra require longer walks, but in both cases are strikingly scenic. Some work by PNT and a consortium of archaeological teams has been done toward establishing a "Neolithic Trail," including guide training modules and interpretive signage.

Aaron's Tomb (Maqam Nebi Haroun)

It is believed that Moses' brother Aaron died and was buried in the Petra area and a white-domed Mameluke shrine site (*maqam*), built in the 14th century, commemorates this important personality, who plays a role in all three monotheistic religions. Aaron's Tomb is located at the top of Aaron's Mountain (Jabal Haroun), the highest peak in the area (1350m asl), is still a place of pilgrimage for locals. Within the past decade and international team excavated the Byzantine church and shrine site, the earliest known

sacred site marking Aaron's tomb. The Byzantine site is conserved and also visible next to the Mameluke shrine. Jabal Haroun is a relatively challenging all-day excursion, which can either be walked in its entirety, or approached by camel or horse and then walked for the last few hundred, steep meters.

Shaubak Castle

The Castle is located 25 km to the north of Wadi Musa along the Kings Highway (*the Via Nova Traiana*). The Crusader castle was built by Baldwin I of Jerusalem in 1115 and was originally called 'Krak de Montreal' or 'Mons Regalis', in honor of the king's contribution to its construction (Mount Royal). In its historic heydays about 6000 people resided in and around the castle. It was attacked several times by Salah ad-Din, who finally conquered it in 1189 after a two-year siege. The Mamelukes restored the castle in the 14th century.

Dana Biosphere Reserve

Driving north on the Kings Highway for about 50 km, the Dana Nature Reserve, Jordan's largest nature reserve and a Biosphere Reserve, is located to the west of the road and extends over 320 square kilometers. Dana's significance for biodiversity is the fact that the wadi plunges over 1500m through four bio-geographical zones, from the arid Mediterranean oak-juniper forests of the Dana highlands to the Sudanian sub-tropical zones of Wadi Feynan at the bottom. The reserve includes a guesthouse, a campsite and a range of tours and trails.

Wadi Feynan, Wadi Fidan, Wadi Ghweir

At the bottom of the Dana watershed is the RSCN Eco-lodge at Wadi Feynan. Dana and Feynan are connected by a popular 15-km trail. Several other wadis that open from the plateau between Shobak and Dana – including Wadi Ghweir, which holds a year-round stream and waterfalls – are popular excursions from the Petra area. Wadis Feynan and Fidan, and the famous mines at Umm al-Amad, all hold fascinating remains of the ancient (Early Bronze age-Roman period) copper mining trade.

Wadi Rum

Situated approximately 80 – 90 minutes driving time away from Petra, Wadi Rum is one of the most famous and most visited true desert destinations in the world. The beautiful red sandstone desert became famous through the British archaeologist, officer and writer T.E. Lawrence, also known as 'Lawrence of Arabia' and his book *The Seven*

Pillars of Wisdom. Wadi Rum, together with Petra and Aqaba is considered the 'Golden Triangle' that MUST be seen by visitors of Jordan.

Aqaba

Located one and a half hours south of Petra at the shores of the Red Sea is an important gateway for visitors to Petra from the Egyptian resorts of Sharm el Sheikh, Hurghada, Dahab and Taba. Jordan's only port city was of great importance since ancient times and has become in recent years a popular seaside resort and a hotspot for divers and snorkelers due to its marine life. Aqaba enjoys a warm water temperature all year round and is becoming an increasingly popular cruise ship destination as Jordan's only cruise ship port, with Petra being clearly the main reason for cruise ships to call there.

Beside the major attractions mentioned above, there are numerous other natural and cultural assets to be explored:

1. Abu-Khsheibeh

- Located south/south-west of Petra, at least 13km from Rajif Road, not accessible by road
- Natural rock wilderness
- Beautiful rock formations/sculptures
- Located within the sanctuary area
- Dominated by juniper and small endemic shrubs

2. Al-Rwais

- East-west of Petra, Musa – Taybeh scenic road, about 6km from Wadi Musa spine road, near Ain Musa, agricultural and unpaved road
- Dominated by agricultural lands and small shrubs
- The altitude is 1635 above sea level

3. Wadi el-Muhmadh

- 5.5 km from Umm Sayhoun-Baidha road, rough and eroded road, Walking/climbing paths
- Rock wilderness
- Ancient archaeological sites
- Water wells

4. Al-Saddeh springs

- Remote from road, no paved access road, walking/climbing paths
- Natural beauty
- Flowing water
- Rock wilderness
- Dominated by juniper and small endemic shrubs

5. Hadrah Ruins

- Can be accessed (walking distance) from Dlagha – Wadi Araba road
- Archaeological importance
- Beautiful rock formations/sculptures
- Located within the sanctuary area

6. Sabra

- Can be accessed (walking distance) from Dlagha – Wadi Araba road:
- Natural rock wilderness
- Beautiful rock formations/sculptures

7. Ras el-Humrah

- West/north-west of Petra, at least 20km from Baidha, no access road
- Rock wilderness
- Ancient archaeological sites

8. Al-Rmail

- Near the Baidha-Hisheh-Shaubak road, rough and eroded road, upgraded by MPWH
- Mixture of agricultural and pasture land
- Dominated by juniper and small native shrubs

9. Al-Tajrah

- 3hours walking from the treasury, no paved access road, walking/climbing paths
- Rock Wilderness

10. Al-Qassir Ruins

- Can be accessed (walking distance) from Baidha – Wadi Araba road
- Rock Wilderness
- Ancient archaeological site (Bronze age)

Tourism and Protected Areas

The Petra Archaeological Park and the related tourism facilities, hotels, and related offerings comprise a major land use within the PDTRA. The challenges and benefits of this land use are well described in the previous planning studies outlined in this report and in this diagnostic as well.

Adjacent and within the Petra Region there are two conservation reserves managed by the Royal Society for the Conservation of Nature (RSCN). Mas'oudah Reserve was been approved by the government several years ago, but has since encountered some opposition from the Sa`idiyyiin and the Dlagha community, the local community whose tribal lands would be encompassed within the boundaries of the reserve. Thus Mas'oudah's precise delineation is still a matter of debate. In its original configuration Mas'oudah would occupy over a third of the Region's area (map 10); in its revised form it would closer to one-fifth.

Rahmah Special Conservation Area (SCA), which overlaps part of the southernmost region of the PDTRA, has been approved and is currently functioning. For clarity of management these reserves should be either entirely within the PDTRA and boundaries adjusted accordingly or entirely outside the PDTRA. Rahmah SCA and Mas'oudah, if formally adopted, would have the potential both to increase the tourism industry in the region and to benefit villages currently unaffected by the Petra Archaeological Park.

Consideration should be given to a strategy of “corridors and linkages” by which the boundaries of the Petra Archaeological Park, Mas'oudah Reserve, Rahmah SCA, and the Dana Reserve to the north are connected by protected areas of open space to allow for the movement of wildlife between these environmental units (see Section 6.1.3 Ecosystem Integrity, below). Similarly, connections to the Wadi Araba might also be considered in order to provide a transect of habitat types from the mountaintops to the corridor of the Jordan River.

5 Land-Use and Urbanization

Existing Land Ownership

The complexities of land ownership in Jordan and the Petra region are spelled out in great detail in the Dar Al Handasah report. Because of the way Islamic inheritance law works, a great deal of land is owned by more than one family member (often dozens) and is therefore difficult to buy or sell, because all the property owners must agree to sell and sign any transaction. While family ownership's can be extensive plot sizes tend to be small and people are often reluctant to sell. The changing circumstances brought about by the growth in tourism have generated greater interest in the actual direct sale of land to hotels and other commercial bodies.

PDTRA has within its GIS database some land ownership data for the area surrounding Wadi Musa and the immediate vicinity of the park. There does not appear to be available land ownership data for the entire Petra area, unless it is assumed that any land not within the parcel data is public land. Nor does there appear to be a formalized system by which PDTRA receives regular updates of changing land ownership records or agricultural leases from the Ministry of Finance. This lack of coordinated system of transactional records presents a significant impediment to effectively managing land use within the Petra region.

There are currently five existing land uses within the Petra region. These are: 1) urban development (as represented by the communities of Baidha, Umm Sayhoun, Wadi Musa, Taybeh, Rajif, and Dlagha), 2) agriculture, 3) forestry, 4) protected areas, such as

the Masoudah and Rahmeh Reserves and 5) tourism zones as represented by the Petra Archaeological Park. To our knowledge there is no ongoing mining within the Petra region though there are lands with potential for mineral development, particularly copper as designated by the Natural Resource Authority. Finally, the protection of important natural resources would suggest that some areas within the Petra should be designated as open space, free from all economic activity including agriculture because of their environmental sensitivity. These lands may or may not be contained within formally designated protected areas or tourism zones.

Urban development occurs in a series of towns and villages generally aligned along the Scenic Road from Baidha to Rajif and including the nearby town of Dlagha. As it is the case throughout the world, urban development typically follows the availability and extension of infrastructure – a road by which farmers can take produce to market, a water supply, and increasingly the presence of electricity and telecommunication facilities. We are not aware of formal plans or strategies regarding the logical extension of utilities within the Petra region. New infrastructure improvements appear to be reactive rather than proactive in their planning. Consideration should be given to mapping the location of existing infrastructure and in identifying those lands within reasonable proximity of existing infrastructure systems. These lands might then be delineated within an urban service boundary, which defines those lands with priority for urban services. Such an urban service boundary can provide a key tool in managing urban growth and also places emphasis in upgrading services and facilities for existing developed areas rather than expanding into new “greenfield” areas in response to development pressures.

Agriculture, especially the planting of dry-farmed barley, is practiced on small cleared fields throughout the region (including PAP), wherever there is a pocket of soil. There are also small orchards – mainly olives but also other fruit trees – throughout both PAP and the wider Region. Larger farms are concentrated on the eastern margin of the Region, which is privately owned land, less steep and more suitable for farming. Some of this farming no doubt occurs on private lands, some on “mirri” or family owned lands, and some on government owned lands. Agriculture is typically dependent upon proper soil and slope conditions and the availability of water. It is our understanding there is a national policy to retain the country’s limited agricultural resources. The proper management of this resource, however, must begin with a clear understanding of where agriculture can and currently does exist. If there is a desire to maintain traditional Bedouin practices and provide alternatives to a heavily tourism based economy, then the preservation of existing agriculture is important. Aerial photography and satellite imagery may provide the means to map existing areas of row crops (barley, etc.). Future land use plans would then protect these areas from development.

It is our understanding from conversations with the Department of Land and Surveys that the Ministry of Finance provides leases for agricultural lands within the Petra region, however, this process does not appear to be coordinated with PDTRA in any way and a digital record of existing land leases does not appear to be within the possession of PDTRA. It is also our understanding that leases can petition the ministry to convert lands from an agricultural use to urban uses (though this process is very difficult). Understanding the location of these leases is, therefore, important to understanding where future urbanization may occur. Similarly the use of aerial photography should allow a general identification of areas within row crop production although these areas may shift over time. One might conclude that all areas currently within row crop agriculture are those lands, which due to slope, soil condition, aspect and other factors are economically viable for agricultural production. The existing condition is a reflection of the indigenous knowledge of local residents of lands suitable for agriculture. The consultant team has identified and requested from the Ministry of Agriculture, agriculture soils maps of region. These maps, however, have not been forthcoming from the Ministry. By comparing the existing areas of agricultural production from the aerial photography with a slope map of the region and the Ministry of Agriculture's slope maps, it may be possible for a future land use plan of the Petra region to define agricultural lands with reasonable accuracy.

Prior planning studies and discussions with local residents, the various archaeological missions, and administration officials suggest that the management of traditional pastoral practices remain a contentious issue within the region. Representatives of the various archaeological missions suggested that pastoralism provides an important form of economic activity for Bedouin families and provides an alternative to tourism as a means of making a living. Such alternative economic activities in turn reduce tourism pressures on the park. Representatives of the archaeological mission, suggest that with the exception of deep plowing, agriculture does not represent a threat to the regions archaeological resources. Furthermore, one might suggest that observing the traditional Bedouin way of life, participating in tented camps, and other activities, which examine or interpret the traditional lifestyle are an important tourism offering. Thus preserving the agricultural landscape at a viable economic scale has tourism benefits as well. At this time, there do not appear to be any spatial definition of where grazing can and cannot occur.

Forestry – the Hisheh oak forest was historically a source of firewood and building materials for the Nabataean and later cultures of the Petra region. Over time much of this forest cover has been removed, with major tree removal occurring as part of the construction of the national railroad. It is not clear what measures have been taken to protect remaining oak/pistachio forests within the Petra region. In addition, studies concerning flooding within the Siq have suggested afforestation of the upper reaches of

the watersheds that drain into the PAP. However, to our knowledge no particular strategy has been put forth to identify where and how such afforestation would occur. This afforestation would logically occur on soil types, aspects, and slopes most suitable to support plant growth. Future land use recommendations should identify lands suitable for afforestation and establish standards for the protection of the remaining forests of the area. The restoration of these forests may provide new forms of economic activity for the people of the Petra region.

Tourism and Protected Areas – The Petra Archaeological Park and the related tourism facilities, hotels, and related offerings comprise a major land use within the Petra region. The challenges and benefits of this land use are well described in the previous planning studies outlined in this report and in this diagnostic as well. There are two known proposals by the Royal Center for the Conservation of Nature, Masoudah Reserve and the Rahmeh Reserve. The boundaries of these proposed reserves are partially within the Petra and partially outside. For clarity of management these reserves should be either entirely within the PDTRA and boundaries adjusted accordingly or entirely outside the Petra region. If these two reserves are formally adopted they would have the potential to both increase the tourism industry in the region and to benefit villages currently unaffected by the Petra Archaeological Park. Consideration should be given to a strategy of “corridors and linkages” by which the boundaries of the Petra Archaeological Park, Masoudah Reserve, Rahmeh Reserve, and the Dana Reserve to the north are connected by protected areas of open space to allow for the movement of wildlife between these environmental units. Similarly connections to the Wadi Araba might also be considered in order to provide a transect of habitat types from the mountaintops to the corridor of the Jordan River.

Mining – The Natural Resource Authority has identified mineral resources of national significance within the Petra region. Presumably this authority has ceded its jurisdiction over these mineral resources to the PDTRA, though this relationship is unclear at this time. Equally unclear is PDTRA policy concerning mining within the Petra region.

Open Space – Although not formally designated, there are many portions of the Petra region, which are simply not suitable for economic activity or human habitation due to their environmental constraints. The Sigma report recommended that development be prohibited on slopes greater than 30% due to their potential for erosion and the disturbance required to complete any construction on these slopes. The difficult topography in much of the Petra region would suggest that these areas are unsuitable for development. Similar steep slopes are too steep for row crop production and even for the grazing of livestock. Similarly, although not formally delineated by a hydrologic study, the wadi bottoms, which are prone to flooding should also be restricted from

development. As these areas are commonly found to have major vegetative growth due to the concentration of water, they have important environmental values as well. These too should be protected from development. Finally, although prior reports have written in general terms about the flora and fauna of the region, to our knowledge there has been no spatial mapping of critical biologic communities. It is recommended that PDTRA work with the Royal Society for the Conservation of Nature to identify and map these important habitat areas.

Existing Zoning

To date three efforts have been made to suggest zoning within the Petra region. These include:

The Petra National Park Management Plan suggested a buffer zone for the Petra Archaeological Park. The boundary of this buffer zone is in hard copy form only and does not appear to have been converted into digital form in any way or defined by a legal description. The buffer zone encompasses the majority of the PDTRA boundary, with the exception of the very eastern border and southern segment (see Map Atlas in the annex). Subsequent studies (such as Dar Al Handasah and the Sigma report) seem to suggest that this buffer zone as proposed has never been adopted nor has any legal significance. In addition the Petra National Park Management Plan also described eight zones with the PAP and buffer zone: Zone I (Archaeological Zone including Petra, Little Petra/Baidha NV), Zone II (Natural Reserve including the Siq Um-al-Aldah/Jbel al-bakra, Wadi Siyagh, and Wadi Sabra), Zone III, Hisheh Forest Reserve including the Hisheh Oak Forest, Zone IV, Intensive Grazing Management Area including Jebel Garun and Stough), Zone V, Extensive Grazing Management Area (most of the PAP), Zone VI, Sustainable Cropping Area including Ba'aja, Baidha/Sleisel), Zone VII, Watershed Protection Area (edge of the limestone plateau overhanging Petra), and Zone VIII, Village Control Area Buffer Zone, including Umm Sayhoun, Baidha, Wadi Musa, Taybeh, hotel strip within Zone VII. Although this report outlined the main objectives and recommendations for each of these areas, detailed development standards were not included nor were the boundaries of each of these zones mapped. It is not clear how these zones effect the management of the PAP if at all.

The Petra Priority Action Plan Study completed by Dar Al Handasah in 1996 contained Urban Development Plans for Wadi Musa, Taybeh, and Umm Sayhoun. It is not known if these urban development plans were ever adopted. This is the only reference we have found to urban development plans for these communities which contains recommended zonal changes for these three communities. Comprehensive zoning recommendations for these communities were not made. It is not clear to what existing zoning these zone changes are referring, although the report refers to a land and zoning plan prepared by the Ministry of Municipal Affairs, which presumably preceded the Dar Al Handasah report.

The Sigma report considered land use along the Scenic Road between Wadi Musa and Taybeh. This report did not outline recommended zoning for Wadi Musa, Taybeh, or any of the urbanized areas within the Petra region. The Sigma report outlined three zones - A, B, C to serve the scenic road between Wadi Musa and Taybeh. Zone A, near Wadi Musa is considered the most sensitive landscape where development is totally prohibited due to visual, environmental, topographical or geotechnical constraints. Zone B is considered to be sensitive landscape where restricted development could be allowed under strict development regulations, control measures and by-laws. Zone C, closest to Taybeh is considered to be sensitive landscape where limited development could be allowed under less strict regulations.

It appears that these zoning recommendations have been implemented and are being utilized to guide development in this small area of the Petra region. The Sigma report also provided guidelines that include the total protection of public lands; total protection of archaeological sites; discouraging development of land with slopes greater than 30%, or land near unstable underground; and protection of views to skylines from Petra or the Scenic Way. The Sigma report is important because it presumably proved the legal validity of protecting slopes greater than 30%, lands with geologic constraints, and important scenic areas. It does not appear that the protection of such areas from development triggered the need for compensation to private landowners. If so, then it would be possible for future land use studies to similar identify and protect lands with these attributes.

This report also provides guidelines for landscape treatment of all areas along both sides of the scenic way to control impacts to the park, as recommended in the UNESCO Management Plan which recommended the scenic road between Wadi Musa and Taybeh be managed as a buffer zone where no further building development should occur. A "sprawl" phenomenon is occurring along the main road, which connects (from north to south) Baidha, Umm Sayhoun, Wadi Musa, Taybeh and Rajif (Dlagha is off the main road). This sprawl is in part a product of the fact that specific zoning and land use plans only appears to exist from Wadi Musa to Taybeh and not including the town themselves.

By combining all the aforementioned zoning recommendations into one map, a generalized "zoning map" for the Petra regions might be obtained. However, these recommendations cover only a small fraction of the total PDTRA area. One might presume that the balance of the PDTRA lands is considered to be zoning "agricultural", however, we have found no evidence of such a formal designation. By clearly defining

and spatially designating zoning for the entire Petra region, rather than simply the urbanized areas near the Petra Archaeological Park and the park itself, clarity might be given to the long term land use strategy for PDTRA and the pressure to allow development of remote Greenfield sites reduced.

Land-use and urbanization in the context of the topography in Petra

Wadi Musa, Rajif, Dlagha and Taybeh were originally established on (relatively) level areas related to water sources. At present Wadi Musa and Taybeh are sprawling in every direction into steep slopes. We also need to point out that although several of the previous studies point out hydrologic issues with the Petra region and flooding of the archaeological site, there does not appear to date to have been any hydrologic studies of the entire PDTRA region and/or the mapping of floodplain areas. Similar there does not appear to be any spatial mapping of wadi areas critical for land protection. As a result, there is frequent encroachment into the wadis by urban development, increasing runoff (and in turn flooding of the archaeological park), reducing the potential for groundwater recharge, and reducing available prime agricultural land as well. The studies conducted involved primarily the Siq and the Nabataean water management system (for archaeological purposes). As water is a critical constraint to urban development, PDTRA requires an understanding of the available water resources of the region. Ideally the “total buildout” of urban development in the Petra region will be balanced with the available water resources so as not to create a water crisis (the country is already in a water crisis anyway).

Also the long-term impact of the potential "Red to Dead" pipeline should be considered in developing a strategic plan for the Petra region. Should this pipeline be developed along the Wadi Araba, and if new freshwater supplies pass in close proximity to Petra is could trigger a major explosion of new growth within the region and/or open new zones for agriculture.

Slopes greater than 30% are not considered developable due to risk of erosion, increased cost for infrastructure, increased need for structural elements such as retaining walls, risk from geologic hazards, protection of views, access and safety issues. Steep slopes (>30%) cover a large portion of the PDTRA study area; current development patterns indicate development on slopes greater than 30%. This slopes greater than 30% (which we recommend) was also recommended in the Dar Al Hadasah report. Obviously if this is to have any impact of managing land use, PDTRA would need these areas mapped based upon reasonable Digital Elevation Model data.

Baidha and Umm Sayhoun are recently established, "planned" communities, so they were not established in specific relation to topography and water sources. Umm Sayhoun cannot expand in any direction except east and northeast, due to topography and proximity to the PAP boundary. Development and private ownership hugs the comparatively less steep areas along the eastern margin of the Region.

Building Permits

Building permits are currently issued by the PDTRA for development throughout the region. In the absence of a comprehensive zoning plan for the entire region, it is not clear upon what basis the decision to issue a building permit is based. The following observations were made about building permits within the PDTRA region. The creation of a land use and zoning plan for the entire region is a critical tool to managing development activities.

The Amariin Bedouin Camp was established in the 1990's without permits within the boundaries of the PAP, and permitted after the fact following a court case. There are at least two campground facilities under construction at this time within the PAP, and another proposed. From 2002-2009 the number of certified buildings in the PDTRA has fluctuated but generally increased from 155 certified in 2002 to 425 certified in 2009. Wadi Musa and Taybeh experienced steady growth rate increases from 2002-2009, experiencing the most growth from 2008-2009 with a 66% increase in certified buildings in Wadi Musa and a 75% increase in Taybeh. During this same time period, Rajif, Dlagha, Baidha and Umm Sayhoun maintained a similar number of certifications each year, with the exception of a 67% increase in certified buildings in Umm Sayhoun from 2008-2009.

6 Environment

The various reports and studies listed in section 9.4, the most important of which are summarized in section 9.1, frequently focus on environmental, infrastructural and public service related issues. For details, the reader is referred to these reports. This diagnostics report elaborates on the key threats, issues and problems to be addressed in the strategic planning work.

Biodiversity

It is striking that there exists no vegetation map, no comprehensive survey, and no infrastructure for the long-term monitoring and evaluation of ecosystem integrity in the Petra Region. These are basic tools for the conservation of biodiversity, and their absence is an urgent problem. As Jordan does not yet have an IUCN Red List for flora,

it is also impossible to assess accurately the threat status of individual species. The research on fauna within the region is even poorer. While native species diversity for flora is relatively high, coverage and richness is low due to overgrazing, soil depletion and erosion, and anthropogenic devegetation. Landscape plantings are almost universally introduced species, in contra-version to PAPOP guidelines. It is safe to say that the faunal diversity is unlikely to improve until habitat is improved.

That having been said, an effort has been made by the master plan staff to compile flora species and families lists (Annex list 10.6.1 and 10.6.2), and to map broadly the phyto-geographical zones and forestation of the Region (map 12 and 13). A brief assessment of rare, endemic, medicinal and crop wild relative species is also included below.

Flora

Phyto-geography

The Petra Region encompasses elevations from 290m asl on its southwestern border to over 1,700m as in Hisheh. The dramatic elevation change coupled with the range of exposures provided by the deeply scored topography affords an abundance of microclimates, which fall within three phyto-geographical zones (see Map Atlas: Vegetation|Part1-2). Broadly speaking these are:

- At the highest elevations (above 1000m) there are remnants of Mediterranean oak-pistachio (*Quercus coccifera*-*Pistacia atlantica*) associations;
- The middle elevation (+600-1000m) is characterized as Irano-Turanian, dominated by species associated with juniper (*Juniperus phoenicia*) forest.
- At lower elevations of the western extremity of the Region is the Saharo-Arabian zone, dominated by the sidr and seyal acacia (*Zizyphus spina-christi* and *Acacia tortilis* and *A. raddiana*).

The phyto-geographical zone most visible from the main scenic roads is the Mediterranean, but the majority of habitats within the 755m², which constitutes the Region, is Irano-Turanian and Saharo-Arabian, shaped by poor, sandy soils and low precipitation. Pervasive throughout the three zones, is deforested steppe-vegetation dominated by *Artemisia sieberi* (=herba-alba), *Achillea fragrantissima*, *Thymelaea hirsuta*, *Retama raetam* and other shrub species.

Floral biodiversity

A species list (Annex list 10.6.1) has been compiled from surveys conducted by Badia Research and Development Program (2003), Petra National Trust (2004-5), Jordan's Royal Botanic Garden (2009) and an inventory of genetic materials gathered by the National Center for Agricultural Research and Extension (NCARE). A total of 388 species from 59 families have been recorded within the past decade. As Jordan's floral diversity is variously estimated at 2,200+ (Ruben 2006: 13) to 2,500+ species and 152 families (NBSAP 2003:13), the Petra Region contains some 15-17% of Jordan's unusually rich species list, and 39% of the families – an important index of rich biodiversity.

Rare and Endemic species

As there is no IUCN Red List for Jordan, no internationally recognized account exists for threatened and endangered plant species in the Region. As a rule of thumb, however, species endemic to regions with unusual geography – e.g., Petra – can be considered "rare" by international perspective. The Petra Region hosts at least six endemic species (Oran 2003; Flora Palaestina): *Galium petrae*, *Iris edomensis*, *Iris petrana*, *Romulea petraea*, *Scrophula nabataeorum*, *Silene Nabataea*. Further, Oran lists 29 species as rare and/or endangered, which can be consulted in the annex (Annex list 10.6.3)

Crop wild relative and medicinal species

There is economic potential in Petra Region's biodiversity. Of increasing economic significance worldwide are medicinal and aromatic herbs, an overwhelming percentage of which are native to arid ecosystems. Jordan is estimated to be home to over 220 medicinal and aromatic species with economic potential (Maxted 2008:3). There is also increasing international concentrating on the conservation and banking of germplasm for crop wild relatives (Kew 2010). Even in the absence of a comprehensive survey of the Region, it is possible to identify 35 medicinal species with known economic potential, and eight crop wild relatives of importance, as defined by the Millennium Seed Bank of Kew Gardens. It is likely that these numbers will double when a comprehensive survey is conducted. A list of plant species with medicinal value can be found in the Annex 10.6.4. Crop wild relative species are *Amygdalus communis*, *Amygdalus korschinskyi*, *Asparagus aphylla*, *Capparis spinosa*, *Ficus carica*, *Hordeum vulgare distichum*, *Nicotian rustica*, *Pistacia atlantica*.

It is worth noting that many of these medicinal species are critical to the medicinal and ritual practices protected as the cultural space of the Petra bedouin by UNESCO's Intangible Heritage Convention in 2005.

Fauna

The biodiversity report prepared by Petra National Trust in 1996 identified 332 species of insects, amphibians, reptiles, birds and mammals. Of these, however, 266 are insects and birds, which underscores the impact of damage to terrestrial habitats and the hunting of mammals.

Hunting is an important traditional pastime and an aspect of traditional culture, which has proven difficult to impact through discussions of environmental conservation. It is pervasive throughout the region. A signal impact of hunting culture is the near-absence of large predators in specific, and charismatic mega-fauna in general.

Habitat fragmentation and destruction by road construction (which allows hunters to penetrate more easily into more remote areas) and overgrazing is a growing obstacle to faunal biodiversity enhancement.

As with plant communities, critical wildlife habitat within the PDTRA has also not been mapped. As a result land use planning and zoning to protect wildlife habitat cannot be accomplished.

Ecosystem integrity

More important than species numbers is species richness, coverage and ecosystem integrity. The latter refers to the structure and wholeness of species associations, as well as their physical extent. It is typical throughout Jordan to encounter "habitats" which consist of depleted groundcover only (the arid and Mediterranean steppe), rarely forest (only .8% of Jordan is forested), and even more rarely forested habitats with intact middle- and understory. Petra Region is no exception to this rule. In three years of surveys with the Royal Botanic Garden (2007-2009) it was observed that no example of intact habitat exists in the Petra Region within one kilometer of a paved road.

The significance of the degradation of habitat integrity is at least threefold: (1) habitat thus depleted cannot provide shelter for fauna, and thus contributes to loss of biodiversity; (2) multi-structural habitats provide microclimates for broader floral diversity; (3) multi-structural plant associations are better able to bank rainfall and maintain soil quality.

Other environmental issues

Due to its degraded Mediterranean climate with cool wet winters and hot dry summers, its geology and landscape structure with high mountains and low wadis the Petra region is subject to a multitude of natural environmental threats. Other threats to the environment are human induced ones and become an increasing danger to the preservation of the natural environment of Petra due to the overall population and tourism growth in the region.

Despite a low annual precipitation of approximately 200 mm, sporadic flash floods constitute one of the major risks in the region. Several severe floods occurred in the 1990's, one of which reached a water level of 12 m above Wadi al-Matahah bed in 1996 (to which the diversion tunnel of Wadi al-Mudhlim discharges). The reasons for the floods are the concentration of the rainfalls between October and April with occasional heavy thunderstorms, the characteristics of the catchment areas (in total about 50 km²) and wadis as well as the building activities (more concrete, construction in wadis channeling and speeding up the runoffs). Related to flooding, the topography, scarce vegetation and the geology are occasional landslides of different sizes and erosion endangering roads and the PAP where washed sediments can accumulate. The steep slopes and limited infiltration capacity are the main problems. The upper parts of the catchment area have a limestone lithology with little soil and vegetation cover. The lower parts of the catchment area are mainly bare sandstone. Measures taken to counteract this risk include diversion of floods, detainment of runoffs in the upper parts, construction of dams and installation of rainfall gauging stations in the Wadi Musa watersheds (operated by the Water Authority of Jordan). Since 1973 these stations are recording annual total rainfall records and recording since 1980 daily total rainfall records.

The unstable geology of the region is another potential source of danger. Petra and its surroundings have a high earthquake risk as three tectonic plates come together in the eastern Mediterranean and Petra is located near the boundary of the Arabian plate.

Occasional snowstorms represent another environmental threat for which the Petra Region is not adequately prepared. Especially the transportation routes are not equipped and protected and therefore are dangerous to use in snowy conditions, especially also due to the slope of the roads. In winter 2008, there was an intensive snowstorm, which covered the southern regions Ma'an and Tafileh and created great distress. As the overall amount of snow, however, is relatively little, the impact is rather of short-term nature, impacting road transportation on the few days when there is snow on the road.

Several factors, mostly human induced, are contributing to the desertification in the region. Main causes are the heavy deforestation and de-vegetation process due to agricultural land gaining, overgrazing and fuel-wood consumption of the local population.

Expanding agricultural activities especially in the Wadi Musa region and the use of chemical fertilizers is a severe threat to the regional diversity of vegetation. Linked to the agricultural cultivation threat is the over-extraction of groundwater for irrigation purposes representing a further threat to the vegetation (FAO 2008). Throughout the Petra Region springs have successively gone dry or receded – in some cases as many as four meters – over the past two decades. The dropping water table is probably responsible for the die-off of *Juniperus phoenicia* forest at higher elevations.

Along with the population growth and the continuation of traditional animal husbandry of sheep and goats by the local population overgrazing is becoming a serious issue in the Petra Region. Since the 1970s, road construction enabled livestock owners to truck water and supplemental feed into increasingly remote areas, increasing grazing pressure region-wide. With the increasing settlement of most bedouin, the phenomenon of truck herding also facilitates keeping herds on the same range throughout the year, giving the vegetation no time to regenerate. In addition, since the Gulf War an increase in camel herds has been recorded resulting in an additional damage as 1.4-1.8 million head of livestock added to range with refugee families (UN Security Council Compensation Commission 2005). This is especially threatening the environment as camels are even more damaging to biodiversity than goats or sheep.

The need for firewood for subsistence cooking and heating is still a reality for Petra's fully nomadic Bedouin, mainly from the Sa'idiyyiin tribe causing severe de-vegetation and deforestation of the region. Furthermore, fuel-wood is consumed for popular local recreation grill picnicking on weekends and for international tourism, setting up tourist camps or undertaking camping excursions. In a study of deforestation conducted from 2003-2006 in a 10.69 ha study area within the Petra Region, it was concluded that there had been a 58% decline in the forest in the period from 1924-2002. From 2003-2006 the documented decline was 4.23% (Addison, 2006). However, it should be noted that fuel-wood harvesting impacts also heavily on de-vegetation, as a significant source of fuel-wood consists of shrubs such as *Retama raetam* (rattam), *Achillea fragrantissima* (gaysoum) and *Artemisia sieberi* (sheeh). The consequence of de-vegetation is a reduced organic content in soils and denuded ground surface exposing soils to both wind and water erosion. Erosion further depletes topsoils leading to a decreasing fertility of the land. However, efforts to prevent the soil erosions through planting pine and cypress trees need to be considered carefully, as they are not native to the site and could lead to changes in the flora and fauna of the region.

Unplanned development in the region has led to a fragmentation of settlements and contributes to de-vegetation. The establishment of roads, in particular, exposes forested areas to deforestation with chainsaws and pickup trucks, as well as to truck herding. Roads also change drainage patterns, diverting precious rainwater runoff from vegetation down-slope.

In addition, several sources of pollution are a strong threat to the environment of the region. First of all, the expected growth of the traffic generated by the local population and visitors in the next 20 years will increase the air pollution if no counteractive measures are taken. A growing population and more visitors will produce more garbage, which needs to be collected effectively. Another problem arises from construction, which is not connected to the sewage disposal system, which in the worst case could lead to natural water contamination.

To date there is no comprehensive archaeological survey of the entire PDTRA, making land use planning and zoning to protect archaeological resources difficult. We have found a general survey of archaeological sites from the University of Arizona but we do not know the origin or accuracy of this data. This work suggests that there are many sites outside of the Petra Archaeological Park. It is our understanding that the MEGA project of the Department of Antiquities and the Getty Institute will provide a detailed inventory of archaeological sites throughout Jordan. This will surpass the University of Arizona work, however, the MEGA project is in its early stages and data is not yet available.

7 Infrastructure and Public Services

Infrastructural issues

The ability of the region to support urban development is directly related to the availability of infrastructure – roadways and transportation systems, water, sewer, electric, and telecommunications. Much of the existing urbanized areas are already underserved by adequate infrastructure. The PDTRA must, therefore, make a policy decision whether it will continue to extend infrastructure into new areas or to invest in upgrading infrastructure in already built up areas. The details of specific infrastructure systems can be found in previous studies. General policies questions, which will effect the development of the strategic plan and future land use are described below.

Water Supply and Distribution

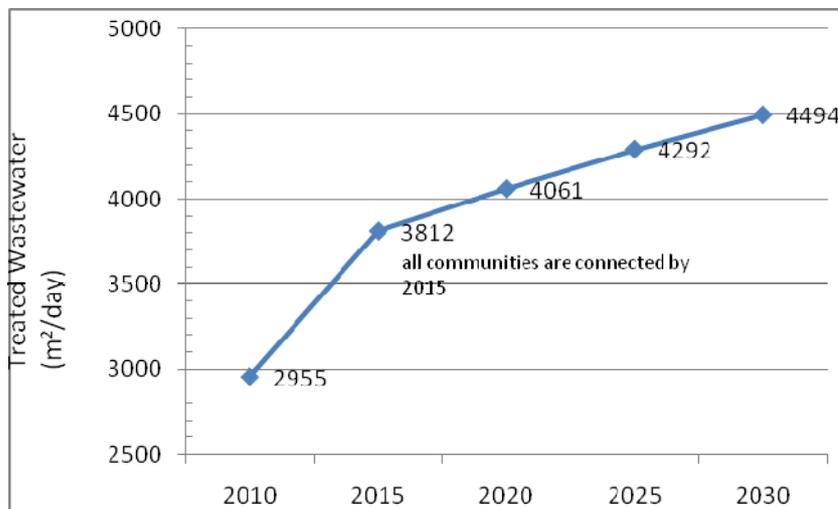
Water Supply and Distribution – The water supply in Wadi Musa Region is managed as part of the water supply system in Ma'an District. In 2007, the average per capita water supply was 214 liters/day, which is the second highest rate in the country after Aqaba (350 liters/day). The national average rate in 2007 was 144 liters/day. The per capita water supply is expected to decrease as the water demand grows in conjunction with the population growth. The national supply rate is estimated to fall about third (to 90 liters per capita per day) by the year 2025, this means that the water supply for Petra Region will fall to around 145 liters per capita per day close to the year 2030. Even though the Petra Region has more than 30 natural springs, new wells are being built and water is provided by the El Qa'a System, this will not be enough to meet the future water demands. It was therefore suggested to introduce rainwater collection systems, which could be used for irrigation, cleaning and drinking purposes. As with wastewater treatment, the availability of water supply and proximity to water distribution lines will determine the value of land for development. Another important consideration in land use planning is the protection of aquifer recharge areas. To the extent that the region's water supply comes from groundwater resources, it is important that those areas of soil and geologic condition, which are critical to replenishing groundwater supply, are to be protected from urban development. To our knowledge, there has been to date no mapping of critical aquifer recharge areas. Once mapped such areas should be protected from development by zoning to secure both the supply and quality of groundwater resources.

The Wastewater Treatment Plant (WWTP) and its associated agricultural project (called the [Wastewater] Re-Use Project) have been established on 10.69 ha. at the north end of the Region. Most of the land on the Re-Use project has been devoted to forage crops, though there are also some stone fruit orchards. This project is poised for expansion. As stated in the Dar Al Handasah report (page 2-9) serviced land is dramatically more expensive than un-served land. There do not appear to be any hard copy or digital mapping of areas currently serviced by wastewater treatment within the PDTRA region. Clearly utility extension policy will play a profound role in determining where future development will occur. In a similar way, extension policies for water and electrical service is extremely important. Again only hard copy mapping of these distribution lines appear to exist. Suggesting that PDTRA work with these utility providers to establish a clear Utility Extension Policy and determine capacity issues related to these utilities is critical to managing growth. The existing WWTP is designed for a total load of 3400 cubic meters per day, knowing that the wastewater generating rate is about 60% of the water supply (which is around 214 liters per capita per day in 2007), it means that the WWTP in its full capacity can support around 34000 person and with the population projections at growth rate of 3%, and if all the communities are connected to the sewer network, the WWTP will be overloaded by the year 2015 and needs to be expanded. The future WWTP expansion needs to support a load of about 80 liters of wastewater

per capita per day and with a population close to 55000 by the year 2030, the WWTP expansion to accommodate another load of 1500 cubic meters per day is needed.

The projected treated wastewater that could provide good water source for limited uses in development such as fodder farming and landscape and parks irrigation is shown in the following graph.

Treated wastewater prediction for the next 20 years



Electrical Supply and Distribution

Today, all settled communities are connected to the national power grid and therefore have access to electricity and telecommunications. The only exception remains small seasonal nomadic communities living around the northern and eastern parts of the Petra region. As with water and sewer service, development will follow the extension of electrical supply. Therefore, utility extension policy should insure that utilities are not extended into areas more suitable for agriculture, nature reserve, or protected archaeological sites.

Solid waste disposal

In 2000, the Cooperative Services Council estimated that the waste generation per capita was approx. 0,6 kg for the resident population and around 0,5kg for the tourists per day. Along with the rise of living standards these numbers were expected to increase. For the absolute amounts, the growth of the population and increase in the

number of visitors has to be taken into account additionally. The solid waste collection and dumping used to be outsourced to a private operator. This year, the PDTRA created a unit within its management system responsible for the solid waste management in the area where it employed staff to collect waste and bought compacting vehicles to carry the waste to the disposal site.

Roads

The supra-local accessibility from Amman, Ma'an or Aqaba via road is in a sound condition and reliable for tourists (private cars and busses) as well as for goods traffic. While the overall situation of the road to get to Petra site is rather good other roads leading to less touristic locations are often in a comparatively not so good but fair conditions. For example, urban sprawl occurs along the main road, which connects (from north to south) Baidha, Umm Sayhoun, Wadi Musa, Taybeh and Rajif (Dlagha is off the main road). The road fluctuates in carrying capacity, grade and bendiness between the northern and southern extremities of the Region. It varies from a relatively steep, acutely curved one-lane road after north of Wadi Musa to a very wide, nearly four-lane highway between Wadi Musa and Taybeh, constricting again in Taybeh. However, the main road provides a suitable transportation system to facilitate transportation demand.

In contrast, the local situation especially in Wadi Musa is to be assessed differentiated: The accessibility to all relevant localities is given basically. Nevertheless the roads are sometimes very steep and therefore neither really walkable nor suitable for driving. What is more, some municipal roads are in poor condition. Periodic occurring traffic jams are the result, mainly happening in Wadi Musa where the traffic becomes so constricted as to cause daily gridlock inside the town. This is also due to more or less lacking traffic management. Tourists trigger this congestion in the peak hours entering the park along the link road to the park and at the very center by the usual everyday business activities. Both phenomena's can be addressed by an adequate traffic management and/or by abolishing infrastructural bottlenecks. Generally it is neither a specific problem nor a big problem but should be tackled anyway.

Public services

The majority of the social facilities and amenities located in the Petra region are those related to daily needs and to tourism, including shops and bazaars, facilities related to the transportation sector, as well as, hotels and restaurants. Few leisure facilities exist in the region, only 6 youth and sports club are reported. Furthermore, 26 governmental institutions are located in region, as well as four banks and financial institutions mainly located in Wadi Musa. Post offices are located in Rajif, Dlagha, Taybeh and Wadi Musa. Police or "Civil Defense" (emergency services) stations are located in Dlagha, Tayyibeh

and Wadi Musa, and a police post is located at the north exit from the PAP, in Umm Sayhoun. (table 16)

Table 16: Civil and governmental institutions

no	Civil and Governmental Institutions	Total no.
1	Governmental institutions	26
2	Charity Associations	8
3	Cooperatives	27
4	Hotels	40
5	Sports Clubs	3
6	Youth Centers	3
7	Transportation Sectors	86
8	Banks and Financial institutions	4
9	Bazaars	60
10	Restaurants	31
11	Different Shops	654
<i>Al-Hasanat/IRADA 2009</i>		

As Table 17 indicates that a high number of charity associations and cooperatives are hosted especially in Wadi Musa. Among the 19 associations and cooperatives located there are, for example, the Nabataean Ladies Cooperative Of Wadi Musa (40 members, established in 1999) or the Petra Special Needs Society. Most of the other communities in the Petra region, such as Taybeh, Rajif, Umm Sayhoun and Dlagha, host one or two associations, which are local women's associations.

Table 17: Cooperatives in the Petra Region

No	Location	Number of cooperatives
1	Wadi Musa	19

2	Taybeh	2
3	Rajif	2
4	Umm Seyhoon	1
5	Dlagha	1
6	Baidha	2
<i>Al-Hasanat/ERADA 2009</i>		

In Petra Region, we find in total 40 schools, 11 of which are exclusively for males, 5 exclusively for females and 24 for mixed pupils. In total, 7,029 students are taught in the region (table 18).

Table 18: Number of schools and students in Petra Region

School Category	No. of Schools	No. of Students
Males	11	3495
Females	5	3534
Mixed	24	
Total	40	7029
<i>Al-Hasanat/ERADA 2009</i>		

Regarding safety and health services, Petra Region's capacity is minimal in proportion to its population and the numbers of visitors staying in the area. Until the Queen Rania Hospital was founded several years ago the region had no hospital. Still today the capacity remains very limited, with only 72 beds and its location on a mountain plateau above the scenic road between Wadi Musa and Taybeh makes it difficult to be accessed. The hospital is supported by the Wadi Musa Health Center and the Petra Medical Complex, which provide additional medical services. The number of pharmacies located in Petra is low, as only three public and five private pharmacies distribute drugs to the approximately 30,000 inhabitants of the region. Further, there are only three laboratories within the region providing medical analysis to the population.

8 Authorities & Associations in Petra Region

This section briefly describes the main authorities responsible for planning, implementing and monitoring public policy as well as some of most active associations of the Petra region. These organizations are key stakeholders to be involved in the planning process in order to create ownership for the result and create momentum for the necessary measures.

Petra Development and Tourism Region Authority (PDTRA)

In September 2009, Law Number 15 for the year 2009 was enacted to define the Petra Development and Tourism Region and the inauguration of Petra Development and Tourism Region Authority that would take responsibility for the development of the Petra Region economically capitalizing on its potentials in tourism, among other areas such as local community development. It replaced the Petra Regional Authority and the Council overseeing the development of the park. The responsibilities of the PDTRA Commissioners' Council are as follows:

- Controlling and regulating all land use;
- Presenting local Arab cultural heritage to national benefit;
- Improving tourism, and its economic potential, through national and international collaborative ventures;
- Stimulating the investment environment and optimizing use of resource to enhance competitiveness;
- In partnership with the Department of Antiquities, developing strategies and controls for maintaining, protecting and conserving the archaeological and other cultural heritage resources;
- Documenting, improving and preserving items of cultural significance, and identifying areas with tourism potential;
- Improving the socio-economic conditions of the local community and initiating cultural, folklore and tourism service projects that benefit them;
- Protecting the biodiversity of the natural environment and its resources in coordination with authorities and the regulations of the Environment Protection Law;
- Develop local capacity building programs for identified areas of needs in the zone.

Petra National Trust

Petra National Trust, founded in 1989, as a non-governmental organization with the aim to promote the conservation, preservation of the archaeological, historical, and cultural heritage of Petra and its region, as well as, to support the sustainable management of PAP. In order to achieve this goal PNT partners with national bodies, local communities, and international institutions, in order to implements projects and programs to safeguard and maintain site significance and integrity Petra. PNT has for example undertaken in

coordination with the DoA, national and foreign donors preservation and consolidation works for the wall paintings in Siq al Barid (2006-2010).

Petra National Foundation

The Petra National Foundation, established in 2004, is a 501 (c)(3) non-profit corporation and is the only such organization in the United States dedicated exclusively to protecting Petra's architectural, archaeological, and cultural heritage; to maintaining the site's biological diversity; to promoting the sound management of the Petra Park; to building strong local capacity in Jordan.

Ministry of Tourism and Antiquities (MOTA)

Founded in 1953 and located in Amman, the stated mission of MOTA is to promote sustainable tourism development towards economic prosperity. The Ministry includes the Department of Antiquities, and until the establishment of the PDTRA, the Department of Antiquities was the legal "landowner" of the Petra Archaeological Park (PAP).

Department of Antiquities (DOA)

Established in 1924 the DOA's two policies are: 1) to protect antiquities, preferring conservation measures that don't need physical intervention to the remains as a choice where possible; 2) to present antiquities, including research, survey, excavation and site management. Until the establishment of PDTRA, the Petra Archaeological Park was owned and managed, at least in theory, by the Department of Antiquities. In practice the two entities – PAP and DoA – functioned separately to a large extent, and lack of clarity over institutional jurisdiction has plagued the implementation of operating plans and management strategies.

Natural Resource Authority

The Natural Resource Authority is responsible for the development of the country's mineral resources. As such it has defined three mining concessions within the Petra region, and have in the past actually issued tenders for mining activities within the Petra region. A major copper deposit has been mapped immediately adjacent to PAP to the south and conversations suggest that the NRA would still like to have these resources developed.

Local Associations

Below is a list of important associations and societies relevant for Petra Region:

- Amariin Center for Fabrics and Craft (Baidha):
 - A recently started initiative training women from Baidha in producing textile products and other, such as creating hand-bags out of recycled material.
- al-Rawahel Owners Association (Horse Owners Society):
 - This association operates a transport service for tourists on a pre-defined track. The society comprises horse owners holding registration numbers for approximately 353 horses.
- Baidha Tourism and Archaeological Cooperative Society (Amariin):
 - This 125 members society represents the Bedouin Amariin tribe that lives near the Petra Archaeological Park. It owns and operates a successful Bedouin campsite in a natural setting known close to Siq al Barid in Baidha. The cooperative offers trekking and caravan excursions in the area. The cooperative is working with the Ministry of Planning to develop its capacity to produce handicrafts.
- Beit al-Anbat Society (Wadi Musa):
 - The Beit al-Anbat Society, based in Wadi Musa, registered with the Ministry of Culture in 1997. The society is active in the field of knowledge development and issues related to Nabataean history. Beit al-Anbat comprises academics, tourism professionals, guides, journalists and individuals interested in Nabataean history. The society also aims at developing and promoting handicraft projects in order to create employment and income generation in the region. In addition, the society is working to strengthen the design, marketing and production capacity of its products in order to broaden its reach beyond Wadi Musa to the rest of Jordan. The Ministry of Culture attributed the society a grant to create embroidered apparel based on Nabataean designs and patterns.
- Nabataean Ladies Cooperative Of Wadi Musa:
 - The Nabataean Ladies Cooperative is a project co-funded by the Jordanian Ministry of Planning/Qudorat program, aiming at to improving its capacity to design, produce and market high quality products. This 40-member women's cooperative was established in 1999 and focuses on the production and sale of silver artifacts to wholesalers and tourists through their modest retail outlet on the main tourism street. Twenty women are employed in this workshop and their products reflect the rich cultural heritage of the area.
- Petra Special Needs Society (Wadi Musa):
 - This society attempts to provide social and academic support to children 16 and under with special needs. The society also arranges vocational training for children and has recently introduced a handicrafts section for the production of traditional weaving, textiles, embroidery and other

products. It is currently working to strengthen and diversify its designs, production technique, and marketing. It also aims to improve income generating opportunities from tourism for its members.

- Taybeh Women Association (Taybeh):
 - The 50-member Taybeh Women Association was established in 2005 to enhance the quality of life for women and their families in the Wadi Musa/Taybeh area through the production of handmade pottery products modeled after ancient Nabataean designs. The cooperative owns a retail outlet that is strategically located on the main road of Taybeh. A project co-funded by the Ministry of Planning/ Qudorat Program aims to expand the total number of employed persons to 16. The cooperative expects to improve its sales and marketing capacity while also enhancing its product design, production, and packaging procedures.
- Petra Local Tour Guides Cooperative Society:
 - Approximately 50 local tour guides from Wadi Musa and neighboring areas have registered a cooperative to improve income-generating opportunities for its members through the acquisition and enhancement of guiding skills, specifically in the areas of interpretation and languages. In addition, the society seeks to represent their members' interests to official tour guiding associations, tour operators, and other tourism services providers in Petra.
- Umm Sayhoun Women Tourism Cooperative (al-Khazneh):
 - The Umm Sayhoun Women Tourism Cooperative (Al-Khazneh) was founded in November 2007. It aims to bring together Bedouin women of all ages and educational backgrounds who live in the village. The organization endeavors to create alternative livelihood projects, such as handicraft production, for its 40 members.
- Umm Sayhoun Men's Tourism Cooperative (al-Khazneh):
 - The Umm Sayhoun Men's Tourism Cooperative (Al-Khazneh) seeks to locate alternative sources of income for its community and manages various tourism activities for this purpose.
- Wadi Musa Society:
 - The Wadi Musa Society was established in September 1964 and is registered with the Ministry of Social Development. It aims to provide voluntary services for the local community, alleviate poverty, and create new and sustainable job opportunities for locals. A Ministry of Planning funded project provided the society with land and infrastructure to create a Bedouin style amusement park to serve local and regional tourists.
- Bait Al-Anbat (The Arab Forum for Cultural Interaction)
- Brooke Hospital for Animals
- The Royal Society for the Conservation of Nature in Jordan
- Bidoul (Bedouin) Committee, Amareen (Bedouin) Association

- Al Anbat Ladies Association
- Al Bint Castle Tourism Association
- Al Deba'a Ladies Association
- General Eastern Antiques Tourism Association
- Military Retirees Association
- Palestine Association
- Petra Gate Tourism Association
- Voice Of Peace Cooperative Association

9 Conclusions

From the above discussion, the main challenges become clear. Petra Region currently has one resource, one product, which is distinct and globally competitive: the Petra Archaeological Park, internationally recognized as World Heritage Site. This resource already plays an important role in the Region's, but also nation's economy. However, its economic potential, both from tourism as well as related sectors, is far from being utilized to its full extent, and the protection of the PAP as well as other regional natural and cultural resources is insufficient. Infrastructure deficiencies further limit economic development and aggravate environmental problems.

The overall objective of the strategic planning efforts will be to enhance the living quality in the region through more, higher quality and increasingly diverse income opportunities, reduce social disparities and tensions and protect the Region's natural and cultural resources. This will be done by addressing socio-economic, tourism, land-use, environmental and infrastructural challenges.

From a social and economic perspective, the main challenges will be to:

- Shape the institutional environment in such a way as to promote innovations, service improvements, and entrepreneurship;
- Shape the institutional environment to open it up to new ideas, information and knowledge exchange;
- Decrease disparities between the communities and tribes in Petra Region in terms of income, jobs, education and human development in general;
- Enhance sectors related to tourism and upgrade their competitiveness so that a regional supply chain for tourism can develop;
- Provide alternative sources of employment for area residents not engaged directly in the field of tourism. The potential for such alternatives is questionable, if not linked to competitive regional sectors; in the medium- and long-term perspectives, however, diversification is possible);
- Promote endogenous and foreign investments of the private and public sector in the local economy;
- Strengthen networking between the research and development institutes, educational institutes and the business sector in the region;
- Facilitate knowledge transfer on a national and international scale by promoting interregional linkages and co-operations.

The challenges for the Petra Archaeological Park have been addressed in detail in other reports and studies and are not the main focus of this study. Thus, we refer the reader in particular to the work of UNESCO regarding the preservation and conservation of the

PAP. Obviously, however, the Strategic Master Plan must consider the impact of all proposed measures on the PAP with the aim of preserving and conserving this unique heritage. Preservation and conservation of the PAP will place natural constraints on development opportunities, which must be respected. Thus, the following challenges have to be addressed:

- To manage and control the drastic increase in the number of visitors in the interest of both visitor satisfaction and the protection World Heritage site ;
- To optimize carrying capacities and visitor flow: for example, to allow visitors to book into time-slots for entrance into PAP for a more even distribution of visitors and to reduce stress on both site and visitors;
- Develop a more diverse tourism product fostering longer stays in the region that will reduce the visitor peaks in the PAP and increase economic value without further augmenting the pressure on the park;
- Increase service quality and variety of products offered in the PAP in order to increase visitor satisfaction and money spent while at the same time reducing impact (e.g., better organization of transportation and visitor flow);
- Establish a clear 'animal policy' for PAP, accepting the positive value of the animals on the one hand and to fend off the negative effects of the animals within the boundaries of PAP;
- Raise awareness about the PAP among tourists and inhabitants about the unique and universal value of Petra and how they can contribute to preserving it (and what actions should be halted);
- Information, interpretation and entertainment in the PAP organized in such a way as to logically integrate it into the visitor experience and directing visitor flows. The location and integration of the PAP museum might be reconsidered in this respect.

In relation to Petra's tourism product, the following are important challenges:

- Consider, plan and implement tourism activities outside of PAP, interpreting and complementing the offerings of the park in such a way that the visitors will better understand and respect the unique value of Petra; this will help to extend their stays in the region without increasing the pressure on PAP;
- Package, market and organize a variety of activities and attractions in such a way that tourists will gain superior experience over a couple of days and thus be interested to stay a longer time in the region;
- Increase share of products produced locally (agriculture, handicraft, textile, music, etc.);
- Find alternative zones for animal related tourism products and programs;
- The seemingly strong tradition of smaller businesses and family businesses working together in more or less formal cooperatives is worth further support for the expansion of tourism and other businesses in the region;
- Souvenir manufacturing and sales are not reaping by far the revenues that could be obtained with more innovative and more valuable products marketed and merchandised in a more professional way;

- Personal guide services with well-educated and well-trained local personnel offers clear potential for the creation of numerous new jobs, including part-time jobs for local women and men. Guide services may range from trekking tours and animal related tours (donkey horse and camel rides, carriage rides) to a more sophisticated, intelligent and deeper interpretation of the cultural and natural treasures of PAP and its surroundings. Excellent job opportunities for young academics;
- Due to the fact that accommodation facilities are widespread, most visitors are “locked” in their hotels and lack the opportunity to roam around for evening entertainment and additional shopping. A "hop on-hop off" shuttle transportation service would help the situation.

The following challenges from a land use perspective should be considered:

- Boundaries should conform to heavy concentrations of archaeological sites, land ownership, ecological units, or physical features like roadways. The rationale for the establishment of the boundaries should be clear to all and adjustments made in the current boundaries to make them logical and legible.
- Provide and communicate a clear definition of existing or proposed land use zones within the PDTRA and/or the PAP and demarcation of park and buffer zone boundaries in a way that is clear to visitors and local residents;
- There is a lack of reliable GIS data and maps. There is an urgent need to establish a reliable basis for land use planning;
- The need to control and plan urban development throughout the region more efficiently;
- Strengthening the land planning and zoning expertise and capacities of the PDTRA administration through integrating professional trained planners in the team;
- Recommend a coordinated system of land ownership records. Such a coordinate system of land ownership would provide PDTRA with updated information on land transactions on a regular basis as a way of monitoring potential development activity;
- Consider a formal policy statement on the appropriateness of mining in some areas of the PDTRA or confirm that mining be prohibited entirely in order to protect the archaeological resources of the PAP and other archaeological sites within the PDTRA;
- Support PDTRA's active involvement in the environmental impact statement for the Red to Dead pipeline project and that the study consider its impact upon the Petra region.

From environmental and infrastructural perspective following challenges should be faced :

- Set up mechanisms to establish an accurate, reliable, and comprehensive database of information about lands within the PDTRA including flora, fauna (including rare and endangered species and plants of potential economic value), potential and existing agricultural lands, potential and existing forestry lands, soils and geologic conditions, hydrology (including watershed boundaries and floodplains), mineral resources of potential commercial value, existing and proposed water, sewer, electric lines and roadways, steep slopes (notably slopes in excess of 30%), groundwater recharge areas, etc.;

- Set up more stringent regulations to protect the natural environment of the region, especially regarding grazing and fuel-wood collection practices. In addition, future land use planning should attempt, at least in a general way, to identify areas that are suitable for grazing and make clear the management strategy surrounding this activity;
- Suggest specific zoning and land use plans for regions or towns which have not yet been considered but would need clear rules and plans;
- Integrate protected areas planned by the RSCN into the regional development plan through strengthening a close communication and coordination between the PDTRA and RSCN;
- The lack of social services and its uneven distribution across the region is crucial for the local population, especially regarding medical services. Furthermore, the lack of recreational facilities should be addressed, which would benefit the locals, but could also enrich the variety of touristic products offered in the region. Again a differentiated fee system should allow the locals to gain access at reduced prices, while visitors would have to pay more;
- Strengthen the cooperation between PDTRA and regional utility providers (electricity, water wastewater etc.) to establish a clear Utility Extension Policy and determine capacity issues related to these utilities is critical to managing growth. In the future, for example PDTRA should work with the local electrical service provider to insure that the location of these lines are included in a digital database of the region.
- Shape the institutional and stakeholder environment in a way that allows for a clear, frequent, coordinated communication between the PDTRA and the ministries in order to avoid overlapping of activities and to be more efficient;
- Allow for a better information flow and more communication between PDTRA and local residents regarding areas of concerns to the citizenry;
- Provide a state-of-the-art local transportation system that will help to minimize the negative ecological impact of diesel buses and increasingly congested traffic (particularly in Wadi Musa).

Conclusions regarding the previous projects formulated and carried out in the region:

- The studies from the mid-90s already provide very detailed analysis of the problems PAP and the Petra region are facing and will face in future. Some concrete projects have been suggested and formulated (e.g., Dar Al-Handasah Volume 2);
- However, the previous plans and projects were mainly focusing on the PAP and its immediate surrounding, taking areas located at the border of the region less into account;
- At this point, 15 years later, only few of the projects have actually been implemented. Lately, the USAID funded Siyaha I & II projects seem to be heading into a more concrete direction;
- The World Bank implementation completion report highlights “the physical interventions were more successful than those related to social, institutional, regulatory and sector strategy” (p. 15);
- The main issue remains the insufficient consideration of the institutional, social and political context and the failure to create an efficient organizational structure which includes all stakeholders in the region.

4. Consultation Process Report



A Strategic Master Plan for Petra Region

Report on the Consultation process

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1 Introduction Task 2: Community Workshops

Task 2 of the ToR foresees, to carry out public consultation meetings with the local population of the Petra region. This was in addition to **over 100 hundred individual interviews** conducted with important representatives of the six communities as well as of the various segments of the population (for the lists of persons interviewed see the biweekly reports submitted to PDTRA).

In order to reach **all relevant segments of the population** and for them to share with the consultants' team **their views and visions on the Petra region**, it was suggested to organize meetings both according to geographic dimension and professional interest in the development of tourism and related fields.

Therefore, a **total of 16 workshops have been carried out: 14 during a period of four days from the 23rd to the 26th of September and two additional ones for young people on October 16th**. The concept has been thoroughly discussed with a broad range of community and tourism industry representatives.

From several interviews with persons working in the various fields of tourism in the region, we learned that all sectors are strongly interlinked; thus it has been the **tourism industry stakeholders'** opinion to invite all of them to one meeting in Wadi Musa.

For the **community consultation meetings** it has been decided to hold separate meetings in the communities and for the consultants to pay respect to the members of the community by visiting them in their individual home communities in order to better understand and address the specific and relevant issues that will be of interest.

In recognition of the **importance of women empowerment**, it has been suggested to hold separate meetings for women and men. This idea is being widely supported by both men and women in the communities. As the consultants' team has several women in their ranks, the women were among themselves and were able to speak freely about their potential future roles in the development of the region.

We consider the **faculties of archaeology and tourism of the University in Wadi Musa** of great importance for the region and have suggested a separate workshop for staff members of the university at their college campus.

In addition, as we noticed during the community workshops held in September the interest of the Youth to express their position, but due to cultural and social issue the difficulty for them to do so in a group with older men, we decided to organize on the **16th of October two separate workshops for Young people form all six communities of the Petra region**.

2 Workshop Structure

The general structure of meetings was as described below. However in some cases, such as the Dlagha men workshop, the structure had to be adapted do better fit the circumstances and participants. Further, the youth workshops had a slightly different structure described under point 3.2.

2.1 Workshops for the communities, the tourism industry and the university

Duration: The meetings lasted between 1,5 and 2,5 hours.

Moderator: An Arabic speaking member of our team acted as moderator.

Program:

1. Introductory remarks by an international member of the consultants' team, explaining the overall goal of the Strategic Master Plan for the Petra Region and the request of PDTRA to invite a broad representation of the local population and the key stakeholders to participate in the process.
2. A Power Point Presentation in Arabic guided through the key findings of the Draft Diagnostics Report.
3. The audience was invited to discuss the report in two phases:
 - Critical assessment of the present and the past ("letting off steam")
 - Invitation to submit ideas / opinion on improvements to be considered in the Master Plan – particularly with regard to their own communities
4. All participants have been handed a questionnaire with a limited number of 'closed questions' regarding their basic attitude towards development principles, as well as, a number of 'open questions' regarding their ideas for future development.
5. Outlook to their further participation in the process:
 - Possibility to meet with consultants during the next two months to submit proposals and/or expand on some of the suggestions made in the workshop.
 - Invite all participants to the next round of meetings (Task 4) in the middle of December.

Catering: Participants were served tea, juice, soft drinks and local 'finger food'

Minutes: A note taker produced detailed minutes, translated the questionnaires, guided participants through the process and collected the questionnaires.

2.2 Youth workshops

Introduction: Ice-break activity (15 minutes)

A Power Point Presentation in Arabic guided through the key findings of the Draft Diagnostic Report 2. The moderator explained the objectives of this workshop (10 minutes)

Activities: Then the group was divided into two focus groups to work on the 4 activities described below and the moderator worked with each group (1 hour).

Activity 1: What does Petra mean to you?

Activity 2: In which field would you like to work in, future (tourism, producing or selling souvenirs, agriculture)? Do you want to work in the Petra region? What kind of work experiences do you think you will /need want to learn in the future?

Activity 3: What kind of games/activities you want to exercise or have? How do you think can you support the sports activities for locals and for guests in Petra?

Activity 4: What are the negative and positive aspects of tourism in Petra?

Discussion: Each group assigned 1-2 people to discuss the results (30 minutes)

Rap up: All questions were answered and the questionnaires were distributed (10 minutes).

The decision to raise specific questions during the workshops was based on the experience from the September women workshops in Dlagha and Baidha, when a few schoolgirls joined the workshops and expressed their opinion on the current situation.

3 Workshop Schedule

Time	Community/target group	Location of the meeting	Team of experts	Actual No. of participants
Thursday 23-Sep-10				
10:30 AM	Dlagha - Women	Dlagha association	EA, SI, FD	10
4:30 PM	Baidha - Men	Amareen camp	BD, WC, GN, SA	20
4:30 PM	Baidha - Women	Association of fabric and crafts	EA, SI, FD	8
8:30 PM	Tour operators	Mövenpick Hotel (downtown)	BD, WC, GN, SA, EA, SI, LS, FD	22
Friday 24-Sep-10				
4:30 PM	Wadi Musa - Men	Youth Club - Wadi Musa	BD, WC, GN, SA, EA, SI, LS, FD	26
8:00 PM	Dlagha - Men	Abu Nayef Tent	BD, WC, GN, SA, EA, SI, LS, FD	10
Saturday 25-Sep-10				
8:30AM	Rajif - Men	Rajif Association	BD, WC, GN, SA	17
8:30AM	Rajif - Women	Rajif Association for Children with Special Needs	EA, SI, FD, LS	14
11:30AM	Taybeh - Women	Women Pottery Association	EA, SI, FD, LS	15

12:00AM	Taybeh - Men	Taybeh Youth Center	BD, WC, GN, SA	16
4:30 PM	Umm Sayhoun - Men	Shiekh Dakhil Alla house	BD, WC, GN, SA	16
4:30 PM	Umm Sayhoun - Women	Mariam's house	EA, SI, FD, LS	10
Sunday 26-Sep-10				
10:00AM	Wadi Musa - Women	Mövenpick Hotel (downtown)	EA, SI, FD, LS	20
4:30 PM	University	College Campus - Wadi Musa	BD, WC, GN, SA, EA, SI, LS, FD	6
Saturday 16-Oct-10				
10:30 AM	Female youth	Youth House - Taybeh	SI, LS, GN, MG	25
2:00 PM	Male youth	Youth House - Taybeh	SI, LS, GN, MG	22
Total				257

Including the well over 100 interviews that were conducted individually, close to 400 persons from all areas and all segments of the region were consulted.

4 Workshop organization and participation lists

4.1 Workshops for men and women in all six communities

The invitation process started by approaching the governor's office as we were recommended by the PDTRA. We were provided two different lists by the governor's office; Sheikhs of all six communities and mayors of all six communities, as well as, contacts of women leaders in their communities to be contacted. The planning of the community workshops was done together with the governors' office manager. We were advised to invite additional persons by him in addition he did many of the phone calls to community leaders. The remaining persons were invited through phone calls (mobile and land phone) done by our local team member. Moreover, we invited everyone we have personally interviewed from the local communities.

At least twice as many persons have been personally invited than actually showed up at workshops. It must be noted, that not all participants were willing to fill in their name. Thus the numbers of participants counted do not necessarily coincide with the number of names listed.

At the end of the community meetings we had the impression that in the smaller communities, particularly Dlagha and Baidha there was a very good representation from all segments of the population.

Nevertheless, we heard from several people that they would have liked to participate, but had not heard of the meeting. They were informed about the second round of meetings planned for December and have been invited to participate and express their opinion at that stage.

Invitation process and participation at the Wadi Musa Men workshop

For the Wadi Musa Men workshop for example we based our invitations to the workshop on three lists provided by governor’s office. These lists included contact details for Sheikhs, Mayors and contacts in the tourism sector in Wadi Musa. Upon our request and to the best of our knowledge the Sheikhs and Mayors lists included representatives from ALL six tribes and important families.

We were advised to invite individuals from different families working in important and influential governmental/non-governmental positions in Wadi Musa as well as persons from Tarabusli, Tora and Dehaiat families, which are not from Wadi Musa.

Moreover, we asked all or most of them to bring along interested people of their families, which some of them did. The ongoing campaign for election and introduction of candidates obviously prevented some of them to come in person and to bring others with them. Therefore, the attendance was a bit lower than we had expected, but overall still quite representative. As far as Wadi Musa is concerned, some of the families were represented at the Tourism workshop as well.

The table below shows the number of invited people to Wadi Musa Men workshop from the different respected families:

Family name	Sheikhs	Mayors	Individuals
Nasaraat	1	1	1
Falahaat	1	1	
Nawafleh	1	1	
Hasanat	1	1	4
Helali	1		
Fdoul	1	1	
Amaraat	1	1	
Hamadiin	1	1	1
Farajaat	1	1	1
Mashaa'lah	1	1	
Ghenemaat	1	1	

Masaa'dah	1	1	
Towassi	1	1	
Salamiin	1		
Shamasiin	1		
Halalat			1
Tarabulsi			1
Tora			1
Dehaiat			1
Total			38

4.2 List of participants for men and women workshops

4.2.1 Baidha Men

N°	Name
1	Ali Abdullah Al-amariin
2	Mohammad Eid Al-amariin
3	Abdullah Ibrahim Al-amariin
4	Ghesab Salman Al-amariin
5	Mousa Howemel Al-amariin
6	Mohammad Said Al-amariin
7	Abdullah Ishtayan Al-amariin
8	Ibrahim Mohammad Al-amariin
9	Abdalazeez Suliman Al-amariin
10	Abdullah Mousa Al-amariin
11	Atallah Mohammad Al-amariin
12	Salama Meteb Al-amariin
13	Omar Mousa Al-amariin
14	Habeeb Atallah Al-amariin
15	Emad Haron Al-amariin

16	Said Mohammad Al-amariin
17	Mohammad Abdullah Al-amariin
18	Suliman Abdalrahim Al-amariin
19	Ziad Hamzeh Al-amariin

4.2.2 Baidha Women

N°	Name
1	Afaf Al-amariin
2	Khatmah Al-amariin
3	Raya Al-amariin
4	Azeeza Al-amariin
5	Mariam Al-amariin
6	Nesma Al-amariin
7	Mariam Al-amariin

4.2.3 Dlagha Men

N°	Name
1	Eid Awad Salama Al-zawaydeh
2	Dakhil-allah Faraj Salama Al-saedyeen
3	Mohammad Awad Salem Al-saedyeen
4	Atallah Dakhil-allah Salama Al-saedyeen
5	Mohammad Dakhil-allah Salem Al-saedyeen
6	Dakhil-allah Afnan Mohammad Al-saedyeen
7	Dakhil-allah Ali Al-saedyeen
8	Hamood Salama Mohammad Al- saedyeen
9	Raja Dakhil-allah Salama Al-saedyeen
10	Ali Dhakil-allah Al-saedyeen
11	Hamood Salama Mohammad Al-saedyeen

Remark: The list with the names of the ten women, who participated in the Dlagha meeting that was circulated, had unfortunately disappeared at the end of the meeting.

4.2.4 Rajif Men

N°	Name
1	Salem Ali Al-rawjfi
2	Mohammad Hamd Al-rawjfi
3	Salem Faraj Al-rawjfi
4	Ahmad Hamd Al-rawjfi
5	Mohammad Eid Al-rawjfi
6	Atallah Salman Al-rawjfi
7	Ahmad Suliman Al-rawjfi
8	Khamees Salman Al-rawjfi
9	Mohammad Issa Al-rawjfi
10	Hisham Mohammad Al-rawjfi
11	Khaled Salim Al-rawjfi
12	Ghenem Eid Al-rawjfi
13	Khalaf Faraj Al-rawjfi
14	Mousa Mohammad Al-rawjfi
15	Salim Faraj Al-rawjfi
16	Mohammad Howeshel Al-rawjfi
17	Salem Suliman Al-rawjfi

4.2.5 Rajif Women

N°	Name	Contact info
1	Suhair Ismail Khamees Al-rawajfi	0776141046
2	Maliha Aeid Ali Al-rawjfi	0776430136
3	Sana Khamees Salman Al-rawajfi	0776609613
4	Samia Mohammad Al-rawajfi	0779654776
5	Sawsan Awad Al-rawajfi	0779654776
6	Tasneem Awad Al-rawajfi	0779654776

7	Khadijeh Oglah Al-rawajfih	0776823699
8	Fatmeh Mousa Al-rawajfih	0777952035
9	Awatef Salama Al-rawajgif	Awatef1987@yahoo.com/ 0777685816
10	Fatmeh Mabrook Al-rawajfih	0777685816
11	Eshaqa Mohammad Al-rawajfih	0777685816
12	Huda Nayef Al-rawajfih	Saranayef2@yahoo.com/ 0779729805
13	Athab Mahmood Al-rawajfih	

4.2.6 Taybeh Men

N°	Name
1	Isamail Salman Al-saedat
2	Saleh Bashir Al-saedat
3	Abdullah Mohammad Al-saedat
4	Mohammad Atallah Suliman Al-saedat
5	Mousa Atallah Al-saedat
6	Saleh Atyeh Mousa Al-rawadih
7	Ahmad Issa Ibrahim Al-khleifat
8	Hussien Salman Ibrahim Al-saedat
9	Mohammad Ahmad Khalil Al-khalaifeh
10	Ahmad Deif-khleifat
11	Mousa Salman Al-khleifat
12	Ahmad Hussien Odah Al-saedat
13	Aeid Ali Odah Al-khleifat
14	Oglah Ismaeil Al-khleifat

4.2.7 Taybeh Women

N°	Name	Contact info
1	Abeer Ibrahim Al-khalaifeh	077-788-7022
2	Awasef Raja Al-khalaifeh	077-735-9308
3	Etaf Raja Al-seydat	077-633-2874

4	Wafa Hassan Al-khalaifeh	077-696-4128
5	Nazha Mohammad Al-khalaifeh	077-954-5600
6	Hind Mohammad Al-khalaifeh	077-715-0937
7	Samia Mohammad Al-khalaifeh	077-754-2118
8	Najah Sa'adeh Al-khalaifeh	077-663-7699
9	Eman Mousa Al-khalaifeh	077-916-2025
10	Dana Mousa Al-khalaifeh	077-916-2025
11	Amal Mohammad Al-halalat	077-617-1383
12	May Mohammad Ahmad Al-khliefeh	077-797-6129
13	Aisha Ibrahim Al-khalaifeh	
14	Rawdah Abdullah Khalil Al-khleifat	
15	Asma Al-khalaifeh	

4.2.8 Umm Sayhoun Men

N°	Name
1	Dakhil Allah Qublan Al-faqeer
2	Salameh Eid Al-faqeer
3	Suliman Ali Al-samaheen
4	Awad Eid Al-jdelat
5	Mohammad Hamad Al-samaheen
6	Suliman Rawei Al-faqeer
7	Awad Salameh Al-jdelat
8	Lafi Eid Suliman
9	Suliman Nuwaje' Al-jameedi
10	Mousa Nasser Al-jdelat

4.2.9 Umm Sayhoun Women

N°	Name	Contact info
1	Nisreen Salem Qublan Al-faqeer	078-691-9641
2	Jamila Abdullah Al-samaheen	077-583-7717

3	Jawaher Abdullah Al-faqeer	077-603-5976
4	Esra' Abdullah Al-samaheen	
5	Wadha Hassan Al-faqeer	
6	Maram Salman Al-bedol	
7	Mariam Howemel Mohmmad Al-sheyahi	077-549-1027
8	Um Rami (Marguerite)	

4.2.10 Wadi Musa Women

N°	Name	Contact info
1	Samahi Al-nawafleh	077-639-0012
2	Bassema Yousef Al-nawafleh	077-668-0622
3	Zenab Mahmood Al-halalat	077-974-8066
4	Fawzeyeh Ahmad Al-hasanat	077-722-3084
5	Fatmeh Haroon Al-hasanat	077-717-8355
6	Zenab Deif allah Al-salameen	077-651-1941
7	Mai Mohammad Atallah Al-salameen	077-985-6867
8	Mariam Mohammad Atallah Al-salameen	077-985-6867
9	Adlah Issa Ali Al-twaissat	077-608-0759
10	Khuzaimah Ahmad Mohammad Al-hasant	077-633-2089
11	Nawal Issa Al-hasanat	077-611-0212
12	Aisha Suliman Abbas Al-Twasi	079-965-9601
13	Shaima' Nawaf Salm Al-nawafleh	077-711-2351
14	Mariam Mousa Al-nasarat	079-531-4437
15	Kawkab Ali Al-falahat	077-607-0928
16	Sajidah Mohammad Al-alaya	077-799-2854
17	Amal Abd Almahdi Al-hasanat	077-529-8805
18	Ekhlas Khalifa Al-hamadeen	079-502-8841
19	Etedal Mousa Ahmad Al-hasanat	077-799-3248

4.2.11 Wadi Musa Men

N°	Name
1	Ahmad Mousa Al-salameen
2	Farhan Abdullah Al-hasanat
3	Mohammad Haron Salem Al-masa'deh
4	Nasser Abdullah Al-hasanat
5	Mahdi Khalil Al-masa'deh
6	Jihad Mahmood Al-amarat
7	Ateyeh Ali Al-fdool
8	Eng. Majed Nasser Al-hasanat
9	Abdullah Sulima Al-hasanat
10	Ali Deif Allah Al-hasanat
11	Sheikh Wajeed Al-hasanat
12	Sheikh Haroon Al-hilali
13	Ahmad Ali Al-hasanat
14	Naji Ahmad Al-halalat
15	Hamad Ataallah Al Al-farajat

4.3 Tour and Hotel Operators

In order to invite members of the tour and hotels operators of the Petra region, we used two lists: our own project list of contacts and a list provided by the governors' office. In the invitation process a local tour operator assisted us in inviting the following heads of the different associations in the tourism sector, which then invited the members of their respective associations:

- Head of Wadi Musa Hotels association
- Head of Tour Operators association
- Head of Tour Guides association
- Head of Horse Guides association

4.3.1 List of Tour and Hotel Operator workshop participants

N°	Name
1	Suliman Ahmad Al-hasanat
2	Eid Hemed Al-nawafleh
3	Raja Odeh Al-nawafleh

4	Sami Al-hasanat
5	Mohammad Ahmad Al-twassi
6	Mahmood Abd Raboh Al-masha'leh
7	Fadi Mohammad Al-nawafleh
8	Adeeb Ahmad Al-hasanat
9	Suliman Ali Deif Allah Al-farajat
10	Ahmad Mohammad Al-halalat
11	Fawaz Al-hasanat
12	Mahmood Haroon Al-hasanat

4.4 Hussein Ben Talal University/College of archaeology and Hotel Management

We contacted directly the dean of the college and asked him to invite the local faculty members and other interested professors to join the workshop. An official letter was sent to the head of the Hussein Ben Talal University asking his permission to invite the professors and to conduct the workshop on the college campus in Wadi Musa.

4.4.1 List of University workshop participants

Name	Position	Contact info
Mousa Al-nawafleh	HBTU/ College of economics	077-617-7811
Dr. Radi Mousa Al-hamadeen	HBTU/ College of business	079-906-9744
Dr. Ziad Mahdi Al-salameen	HBTU/ College of Archaeology and hotel management	077-733-6281
Dr. Saad Ahmad Al-twassi	HBTU/ Dean of the College of Archaeology and Hotel Managmnt	077-776-5550
Sami Al-hasanat	HBTU/ College of Archaeology and hotel management	
Dr Jibreel Al-halalat	HBTU/ College of Archaeology and hotel Management	077-639-9089

4.5 Youth workshops

An official letter was sent to the educational directorate of Wadi Musa and a direct contact was established with the head of the activity and events department. All schools received an official letter from the educational directorate to choose 2-3 students and therefore a total number of 25 students from all six communities were invited to participate in the separate female and male workshops at the Youth House in Taybeh on the 16th of October.

4.5.1 List of youth workshop participants

Female participants		
N°	Name	School
1	Khitam Bassem Al-falahat	Wadi Musa Girls Secondary school
2	Bara'a Mahmood Al-hasanat	Wadi Musa Girls Secondary school
3	Amal Ismaeil Twassi	Wadi Musa Girls Secondary school
4	Haya Hussein Al-halalat	Asama' Girls Secondary school
5	Asma Abdullah Al-halalat	Asama' Girls Secondary school
6	Tahreer Al-halalat	Asama' Girls Secondary school
7	Roa' Khaled Al-masa'dah	Somaia bent Al-khaiat Secondary school
8	Dana Ahmad Al-amaraat	Somaia bent Al-khaiat Secondary school
9	Aseel Hamed Al-hamadeen	Somaia bent Al-khaiat Secondary school
10	Ons Ali Al-hamadeen	Somaia bent Al-khaiat Secondary school
11	Toqa Wael Al-hamadeen	Somaia bent Al-khaiat Secondary school
12	Areen Ibrahim Al-saeidaat	Taybeh Secondary school
13	Omaima taleb Al-saediaat	Taybeh Secondary school
14	Sawsan Al-khlaifat	Taybeh Secondary school
15	Ghadeer Al-saeidaat	Taybeh Secondary school
16	Islam Ali Al-saedyeen	Dlagha mixed Secondary school
17	Salsabeel Salem Al-onaat	Dlagha mixed Secondary school
18	Ibtesam Dakhil Allah Al-saedyeen	Dlagha mixed Secondary school
19	Haneen Hussein Al-saedyeen	Dlagha mixed Secondary school
20	Nassayem Sabah Al-saedyeen	Dlagha mixed Secondary school
21	Kholoud Sofyan Al-rawajfih	Rajif Girls Secondary school
22	Noha Sofyan Al-rawajfih	Rajif Girls Secondary school
23	Isra Mohammad Al-saedyeen	Rajif Girls Secondary school
24	Doha Salem Al-bidool	Petra Elementary school
25	Huda Hassan Al-faqeer	Petra Elementary school

Male participants		
N°	Name	School
1	Mohammad Yousef Al-hamadeen	Wadi Musa Boys Secondary school
2	Saif Mohammad Al-masa'dah	Wadi Musa Boys Secondary school
3	Tha'er Ibrahim Al-farajat	Wadi Musa Boys Secondary school
4	Amer Ali Al-amaraat	Ja'far Al-tayar Males Secondary school
5	Hothaifa Mohammad Al-nawafleh	Ja'far Al-tayar Males Secondary school
6	Ahmad Atef Al-nawafleh	Ja'far Al-tayar Males Secondary school
7	Ahmad Mohammad Al-hasanat	Wadi Musa boys Elementary school
8	Mohammad Yeha Al-hasanat	Wadi Musa boys Elementary school
9	Jamal Mahmood Al-khlaifat	Taybeh Boys Secondary school
10	Bilal Ali Al-saedaat	Taybeh Boys Secondary school
11	Nizar Mahmmud Al-saedaat	Taybeh Boys Secondary school
12	Zaid Mohammad Al-khaliafeh	Taybeh Boys Secondary school
13	Yeha Hamed Al-khalaifeh	Taybeh Boys Secondary school
14	Ahmad Mousa Al-hamaidat	Taybeh Boys Elementary school
15	Faisal Ali Al-rawadieh	Taybeh Boys Elementary school
16	Mohammad Nader Al-saedaat	Taybeh Boys Elementary school
17	Abdullah Saleh Al-khlaifat	Taybeh Boys Elementary school
18	Abdullah Thian Al-rawajfih	Al-rajif Male Secondary school
19	Rasheed Khalaf Al-rawajfih	Al-rajif Male Secondary school
20	Sa'ed Abdullah Al-rawajfih	Al-rajif Male Secondary school
21	Atallah Mohammad Al-rawajfih	Al-rajif Male Secondary school
22	Zaid Ismaeil Al-rawajfih	Al-rajif Male Secondary school
23	Ahmad Hatem Al-samaheen	Petra Males Elementary school
24	Issa Al-samaheen	Petra Males Elementary school
25	Fadi Al-bedool	Petra Males Elementary school

5 Summary of the main issues of the workshops

This section provides an overview on the subjects, which were frequently raised during the workshops held in the Petra region. The specific opinions of the participants from each of the six communities are summarized, in order to give a more detailed picture of the situation regarding the main issue of transportation, traffic and roads, water, trash and other services, land, animals, schools, communication, employment, representation, leisure facilities, health and environment in each of the communities.

5.1 Transportation

In general, it emerges from the workshops that there are not sufficient bus-connections available in the Petra region and those, which are available, are infrequent and unreliable. The result is that the local population, especially from the smaller and poorer communities have difficulties to get to other places within the region and therefore also to connect to the inter-regional transportation system. In addition, it also prevents the regional population from sharing other communities' infrastructure, which they might lack in their own community. For the communities of Taybeh and Wadi Musa this is less of an issue as they have more private transportation means and as most of the infrastructure and services, as well as, the interregional bus connections are located in Wadi Musa.

Further issues raised:

- Taybeh and Wadi Musa participants would like to have a teleferic connecting the higher and lower end of their towns.
- Taybeh participants complained about the lack of late night transportation services.
- Umm Sayhoun participants reported an unreliable bus connection to Wadi Musa with the result that their children arrive late at school.
- Baidha, Rajif and Dlagha workshop participants complained about poor connections and inconvenient timetable of buses to other communities and universities.

5.2 Traffic and roads

Regarding the traffic and roads there is a general safety issue in the region described by the workshop participants. The traffic on the main roads is rushing through smaller communities (e.g. Umm Sayhoun and Dlagha where the lack of street lights and pavements is aggravating the risk) is putting in particular children at danger. Even in bigger communities, such as Wadi Musa, safety is an issue as many streets lack sidewalks and people are therefore forced to walk on the streets. If the condition of the main roads in the region is rather good, the conditions of smaller neighbour roads were reported as being quite poor and in need for improvements.

Further issues raised by workshop participants related to traffic and roads:

- Wadi Musa workshop participants reported huge traffic congestion problems in the city centre during business hours as f
- ,activities for locals (e.g. banks) are located on the same streets than for tourists. Further, tourist busses are generally blocking the streets and perceived as disturbing by the local population.

- Baidha participants indicated that the poor condition of neighbourhood roads to the north of their community needs improvement and that roads are lacking pavements.

5.3 Water

Water shortage for agriculture is one of the main issues raised by participants from all six communities of the region. Springs are drying out and all communities reported to lack land to build dams or other water catching systems to collect water. Another issue related to water is that there is no clean drinking water available in the region and that therefore the population needs to buy drinking water from Ma'an or other places.

Other issues related to water:

- In Rajif the private agriculture cooperative has build a well and is therefore able to provide water for some of the local population, however this is not enough for the entire community especially not to cover its future needs.
- In Dlagha participants complained about the running water coming from pipes which are old and as a result the water quality is poor, which is dangerous for the health of poor parts of the population who are drinking this water.

5.4 Trash and other services

During the community workshops participants have complained about unreliable and selective trash services. In Wadi Musa for example the population observed that areas of town, which are frequented by tourists are kept cleaner than other areas. In Umm Sayhoun an urgent need for bins with lids was reported in order to avoid that the animals populating the town can access them.

Other issues related to public services:

- In Rajif people complained about poor sewer and drainage system.
- Dlagha participants reported an unreliable trash service and a lack of bins.
- Dlagha community members complained that in wintertime they are cut-off from the rest of the region as due to the weather conditions roads are blocked and the electricity supply is interrupted often for several days.

5.5 Land

Workshop participants from all over the Petra region have repeatedly mentioned several issues related to land. The high price of land is preventing most of the local population from purchasing new land. This is one of the reasons why the population is unable to obtain more land to accommodate growing population numbers needs in housing and other services. In addition the strict building rules especially for communities located close to the PAP is further restricting the local population. Unclearified and undocumented landownership is another major reason why building activities are restrained in the region according to the workshop

participants. Especially the poor population of small communities, such as Baidha, Umm Sayhoun and Dlagha do not have the means to officially register their land due to the high registration-cost related to it.

Other issues related to land in the six communities:

- Taybeh participants reported a shortage of buildable land to allow for more investment and development, as well as, the need to expand housing areas for the growing population.
- Umm Sayhoun participants perceive the special restrictions on the land of their community declared “urban development area” constraining their economic activities e.g. impossibility to offer accommodation facilities for tourists.
- Umm Sayhoun participants complained about the of lack land to expand their village needed for the growing population due to their location next to the PAP and the impossibility for them to obtain adjacent land for development.
- Baidha and Umm Sayhoun population complained about the lack of building permissions issued in the last years, which is resulting in illegal building activities at night.
- Rajif participants reported a lack of land to build new schools for increasing number of students and to extend the village, as most of the land belongs to the government
- Dlagha participants raised claims on lands further away, used for camps in summer, linked to “Mirri land tradition”. In addition, Dlagha participants fear that the establishment of the Masoudha reserve takes away their land.

5.6 Animals

Issues related to animals were only mentioned in a few community meetings. Participants from Wadi Musa and Umm Sayhoun shared the fear that having stables for animals located close to the housing areas could potentially create hygiene problems and are spreading a bad smell in the neighbourhood. The participants from Umm Sayhoun were requesting the creation of specific places where horses, donkeys and camels would be kept at night, which would be located away from their housing and from the main street. Indeed, animals moving uncontrolled through Umm Sayhoun are another issue. At the same time the Umm Sayhoun inhabitants also asked for an animal clinic in their community.

5.7 Schools

The need to improve schools and in general facilities for children, was an issue raised in all community workshops. Besides the members from the two better-off communities Wadi Musa and Taybeh, participants from all other communities reported a poor quality of teaching at schools due to unqualified or unmotivated teachers, as well as, insufficient funds to better equip schools (e.g. computer and Internet access) and to offer extra-curricula activities. The

participants from Baidha, Umm Sayhoun and Dlagha were further highlighting their need for a kindergarten in their communities.

Further issues mentioned by the workshop participants:

- Taybeh participants reported allergy problems in some schools.
- Umm Sayhoun participants complained about the lack of high schools for boys and girls.
- Umm Sayhoun participants asked for the creation of a military school for boys in their community in order to ensure that the boys go to school instead of working in the park.
- In Dlagha, on the contrary, participants were complaining that there is only a military school for boys available and no other school.
- Baidha and Dlagha community workshop participants reported a need for more schools due to the increasing number of students.
- Taybeh and Umm Sayhoun participants feel that in general they are lacking safe places for children to play.

5.8 Communication

In general the local population, which joined the workshops reported a very unequal availability of communication means across the region. If the bigger communities have a good phone network coverage and access to Internet (even if it not extremely fast and costly), smaller communities communication access is far more restricted. Regarding the Internet access three of the six regional communities, namely Baidha, Rajif and Dlagha, reported to have no access to the Internet at all and to only have poor mobile phone network coverage.

5.9 Employment/Income generation

A general cross-regional issue is the difficulty for women to find suitable jobs. This is affecting women with high-education levels, as well as, those with only little education level. This difficulty is as they explained partly based on the “culture of shame” making it difficult to work in contact with people they don’t know as it would be case in the tourism sector for example. In general, there is a strong will to further be involved in the tourism industry and to learn the required skills, such as English, IT or marketing skills. Further, participants from communities with no tourist attraction wished to set up tourist attractions or facilities in their community to attract tourists. Women from all the communities, except Wadi Musa, showed strong interest in working in the handicraft production sector. In most of the communities except Dlagha women already have created first initiatives to produce local handicraft or other traditional products but are requesting more support to develop their business.

Further issues raised in the workshops regarding employment and income generation:

- Wadi Musa participants raised the question of securing jobs for all future graduates from the local Tourism and Antiquity college. Further they expressed their fear that the region is lacking economic diversity and is too much depending on one main income source: tourism.
- Taybeh women mentioned the need for training to better market their handicraft products, as well as, the need to raise the awareness of the local population for their products. They see as main challenges for their production the competition with cheap Chinese imports sold in the PAP and that they are not provided strategic locations to sell their products.
- Taybeh participants complained that they are only obtaining little revenue from Taibet Zaman or from the tourist traffic coming through Taybeh.
- In Umm Sayhoun participants reported a social issue linked to economic reasons, which is that the children especially the boys go to the PAP to sell souvenirs to tourists instead of going to school.
- Umm Sayhoun participants claimed the right for workmanship inside the park and for selling and buying in the Petra area as the king promised them when they were moved out of the park.
- Further, Umm Sayhoun participants complained about the lack of activity at the women's cooperation. This is linked to the lack of permission to produce the handicraft they would like to create. Other points raised were little opportunities to obtain government jobs and the limited employment opportunities in general. Therefore, they go to the PAP to earn their living illegally.
- Baidha inhabitants complained that they are not benefiting from tourism and special events in Little Petra. Further, that they would like to have more initiatives to invite tourists to stay longer in Baidha and that they need training for local guides. They also would like to have more job opportunities in the government.
- Rajif participants reported a high unemployment number and unequal job opportunities for men and women in their communities. They complained that tour operators use their land for camping without asking for permission or letting them benefit from the tourists coming into their community tour organizers are not buying any products (e.g. food) from local inhabitants.
- Other issues raised in the Rajif workshops were: the lack of ready investments projects, the lack of a marketing strategy for agricultural crops and for handicraft production, the lack in training and guidance for the farming community, the lack of a social database indicating education levels, skills, potentials of the local population and the lack of a women center to provide trainings.

5.10 Representation

A topic raised in several workshops was the political representation of the population from the six communities at the local government. Especially people from Baidha, Rajif and Dalgha complained about the lack of representation of their community. For women in particular the Rajif participants suggested they need to be a female contact persons as due to cultural norms they would not be able to address their issues to a man. Further, Baidha community participants suggested having a public meeting space (“Diwan”) for discussions. Women from Wadi Musa also expressed their need for a meeting center especially dedicated to women.

5.11 Leisure Facilities

Participants from all communities of the region, especially the poorer ones but not only, complained that they are lacking leisure facilities, especially youth centres and sports facilities, but also parks and enjoyable public spaces to gather.

Issues raised by the community participants regarding leisure facilities:

- Taybeh participants wished to have a sports centre with levelled sports grounds open to everyone, especially for girls and women.
- Umm Sayhoun participants would like to have a library and Baidha participants are complaining about the poor quality of their library.
- Umm Sayhoun participants are complaining about a lack of activity at the women’s cooperation linked to the lack of permission to produce the handicraft they would like to create.
- Baidha and Rajif participants suggested having an association providing classes or trainings in languages and other skills (e.g. sewing, IT).
- Rajif participants were suggesting to have a children centre to organise summer camps.

5.12 Health

In general participants at the workshops reported that the regional health service is not evenly distributed throughout the region and that there are not enough specialist doctors available, especially for women.

Further issues raised in the community workshops:

- Wadi Musa participants reported that the hospital is lacking in specialists and that it is in general ill equipped. Further, only limited lab facilities for medical analysis are available and public pharmacies are often closed.
- Taybeh participants reported that there is a lack of specialized doctors at the hospital, a general shortage, of dentists and that they would like to have a women clinic. Further,

they suggested to have more health awareness campaigns e.g. for family planning and a centre for children with special needs as it exists in Rajif.

- Umm Sayhoun participants reported that they are lacking a medical centre and that the doctor only visits once a week their community.
- Baidha participants request to have a more committed doctor, a functioning health laboratory and a female nurse.
- Rajif participants reported that they only have a poor medical service e.g. the person in charge of the lab only comes twice a month and the emergency room is only open till noon.

5.13 Environment

Participants of the youth workshops were those who were the most concerned about the environment, as they clearly enounced their wish to use more eco-friendly energy sources and waste recycling methods in the region. Participants from the tourism workshop also suggested that especially eco-tourism should be strengthened, in order to preserve the regional heritage and resources. The participants from the communities touched by local and external tourism especially felt a threat to the local environment. In Wadi Musa this regarded the pollution caused by tourist buses passing through the community. In Baidha solide waste pollution is caused by the remains left by locals of their weekend picnic along the main road boarding the PAP. Baidha inhabitants further reported to suffer from bad smell coming from the water-treatment plant. Another issue raised by participants related to the environment is the cessed anti-mosquito spraying in their communities (Baidha and Rajif). Rajif's inhabitants further pointed out that the lack of shrubs to protect soil erosion in some parts of the town is resulting in an increased threat of potential landslides and floods.

6 Questionnaires

6.1 Questionnaires for the Community Workshops

7 QUESTIONNAIRE – DIAGNOSTIC STAKEHOLDER WORKSHOP – PETRA STRATEGIC MASTER PLAN
8 استبيان: تجميع المعلومات - مشروع مخطط البتراء الشمولي الاستراتيجي

What Public Facilities and Services is the Greatest Need of Your Village? في رأيكم الشخصي، ما هي أهم الخدمات العامة اللازمة لمنطقتكم؟	Please tick the five most important choices الرجاء وضع الرقم المناسب لأهم خمسة نقاط (أقل أهمية 1- الأهم 5)
Schools مدارس	()
Cultural facilities (Library, Cinema, Music Hall etc.) مراكز ثقافية (مكتبة، دار للموسيقى، دور سينما، مسارح)	()
Sports & Recreation facilities مراكز شبابية رياضية وترفيهية	()
Medical Facilities or Hospital مراكز صحية و/أو مستشفيات	()
Improved Water Supply تطوير مصادر المياه	()
Improved Sanitary Supply تطوير خدمات الصرف الصحي	()
Drainage Improvements تحسين تصريف الأمطار	()
Improved Electrical Service تحسين خدمات الكهرباء	()

Improved Communication Infrastructure (Telephone, Internet, Cable Television) تحسين البنية التحتية للاتصالات (الهاتف، خدمة الانترنت،...الخ)	()
Improved Waste Management (garbage collection) تحسين ادارة النفايات	()
Improved Police and Fire Protection تحسين خدمات الشرطة و الدفاع المدني	()

In order to strengthen the economy of the Petra region, I would focus on:	Please rank choices from 1-4
لأجل انتعاش الاقتصاد في منطقة الإقليم أوصي أن يتم التركيز على النشاطات التالية:	الرجاء رتب النشاطات من 1-4 حسب الأهمية (1 أقل أهمية 4 أكثر أهمية)
Agriculture الزراعة	()
Tourism السياحة	()
Craft- manufacturing- or production facilities الصناعات الحرفية	()
High tech- / knowledge intensive sectors صناعات عالية التقنية / ذات معرفة عالية (صناعة أجهزة كهربائية ، ميكانيكية ، تكنولوجية...الخ)	()
Other:	أخرى:

Do you want your children to work in ... هل تريد لأبنائك العمل في ...	very much أرغب كثيرا	rather yes أرغب	rather not لأ افضل	not at all لا أرغب اطلاقا
Hotel الفنادق	()	()	()	()
Tour Guide / Outdoor activities كأدلاء سياحيين / نشاطات التخييم	()	()	()	()
Travel Agency/Tour Operator في الشركات السياحية	()	()	()	()
Restaurant المطاعم	()	()	()	()
Retail Shops/Selling Souvenirs محلات بيع الزوار / التحف والهدايا	()	()	()	()
Craft/Manufacturing/Production الصناعات الحرفية	()	()	()	()
Agriculture الزراعة	()	()	()	()
Public Service/Military القطاع العام / الأمن العام / الجيش	()	()	()	()

9

How does tourism affect ... كيف تؤثر السياحة في ..؟	very positive ايجابي جدا	rather positive ايجابي	rather negative سلي	very negative سلي جدا
Your family income دخل العائلة	()	()	()	()

Your local traditions and customs العادات و التقاليد	()	()	()	()
Infrastructure (roads, water, electricity etc.) in your community البنية التحتية (الشوارع، المياه، الكهرباء،... إلخ) في منطقتكم	()	()	()	()
Public Services (education, health etc.) الخدمات العامة (التعليم، الصحة،... إلخ)	()	()	()	()
Security & safety situation الوضع الأمني	()	()	()	()
Environment in your community البيئة والطبيعة في منطقتكم	()	()	()	()

10

	very much نعم بشدة	rather yes نعم	rather not لا	not at all لا بشدة
Does it make you proud that Petra is world famous and visited by guests from all the world? هل تشعر بالفخر لأهمية البتراء العالمية وأنها مقصد سياحي لمختلف الجنسيات العالمية	()	()	()	()
Do you gain knowledge and experience from dialogue with visitors? هل تزداد معرفتك ومعلوماتك عند التحدث مع الزوار	()	()	()	()
Would you like to meet tourists and				

introduce them to your culture and traditions? هل ترغب في مقابلة السواح وتعريفهم بثقافتك وعاداتك	()	()	()	()
Do you feel that the recent tourist boom is putting the Petra Region in danger? هل تعتقد أن ازدياد عدد السواح يشكل خطر لمنطقة اقليم البتراء؟	()	()	()	()
Would you like to have (more) tourism attractions in your community? هل ترغب في وجود (المزيد من) أماكن استقطاب السواح في منطقتكم	()	()	()	()
Would you like to have (more) tourism accommodations in your community? هل ترغب في وجود (المزيد من) أماكن مبيت السواح في منطقتكم	()	()	()	()

In which community do you live? في أي منطقة تسكن؟	Please tick الرجاء وضع إشارة (✓)	What is your age? ما هو عمرك؟	Please tick الرجاء وضع إشارة (✓)
Beida البيضا	()	under 20 أقل من 20	()
Dlagha دلاغة	()	20-40 بين 20 – 40	()
Rajif الراجف	()	40-60 بين 40 – 60	()

Taybeh الطيبة	()	over 60 فوق ال 60	()
Umm Sayhoun أم صيخون	()	What is your gender الجنس؟	
Wadi Musa وادي موسى	()	Male ذكر ()	Female أنثى ()

Your present occupation:

مهنتك الحالية :

Thank you very much for your cooperation!

شكرا لك حسن التعاون

10.1 Questionnaires for the Youth Workshops

QUESTIONNAIRE – DIAGNOSTIC STAKEHOLDER WORKSHOP – PETRA STRATEGIC MASTER PLAN

استبيان: تجميع المعلومات - مشروع خطط البتراء الشمولي
الاستراتيجي

What Public Facilities and Services is the Greatest Need of Your Village? في رأيكم/ رأيكن الشخصي، ما هي أهم الخدمات العامة اللازمة لمنطقتكم؟	Please rank from 1-5 choices الرجاء رتب/ي الخدمات من 1-5 حسب الأهمية (1 أقل أهمية 5 أكثر أهمية)
Schools مدارس	()
Cultural facilities (Library, Cinema, Music Hall, theater, etc.) مراكز ثقافية (مكتبة، دار للموسيقى، دور سينما، مسارح)	()
Youth Sports & Recreation facilities مراكز شبابية رياضية وترفيهية	()
Medical Facilities or Hospital مراكز صحية و/أو مستشفيات	()
Improved Water Supply تطوير مصادر المياه	()
Improved Sanitary Supply تطوير خدمات الصرف الصحي	()
Drainage Improvements تحسين تصريف الأمطار	()
Improved Electrical Service تحسين خدمات الكهرباء	()
Improved Communication Infrastructure (Telephone,	

Internet, Cable Television) تحسين البنية التحتية للاتصالات (الهاتف، خدمة الانترنت،...الخ)	()
Improved Waste Management (garbage collection) تحسين ادارة النفايات	()
Improved Police and Fire Protection تحسين خدمات الشرطة و الدفاع المدني	()

In order to strengthen the economy of the Petra region, I would focus on:	Please rank choices from 1-4
لأجل انتعاش الاقتصاد في منطقة الإقليم أوصي أن يتم التركيز على النشاطات التالية:	الرجاء رتب/ي النشاطات من 1-4 حسب الأهمية (1 أقل أهمية 4 أكثر أهمية)
Agriculture and environment الزراعة و البيئة	()
Tourism السياحة	()
Craft- manufacturing- or production facilities الصناعات الحرفية	()
High tech- / knowledge intensive sectors صناعات عالية التقنية / ذات معرفة عالية (صناعة أجهزة كهربائية ، ميكانيكية ، تكنولوجية...الخ)	()
Other:	أخرى:

Where do you find yourself to work in the following fields ... أين تجد/تجدي نفسك للعمل في كل من المجالات الآتية؟	very much أرغب كثيرا	rather yes أرغب	rather not لأ افضل	not at all لا أرغب اطلاقا
Various field work (medicine, engineering, art, education, sports, journalism...etc) مختلف ميادين العمل التالية (طب ، الهندسة ، الفن ، التعليم ، الرياضة ، الصحافة...الخ)	()	()	()	()
Tourism sector (hotels, tour guides and camping activities, tour agencies, restaurants and visitors centers) مجال السياحة (الفنادق ، كأدلاء سياحين / نشاطات التخييم ، في الشركات السياحية ، المطاعم ، محلات بيع الزوار)	()	()	()	()
Handcrafts الأعمال اليدوية / التحف والهدايا	()	()	()	()
Manufacturing/Production/industrial feild مجال الصناعة	()	()	()	()
Agriculture and environment الزراعة والبيئة	()	()	()	()
Public Service/Military القطاع العام / الأمن	()	()	()	()

العام / الجيش				
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How does tourism affect ... كيف تؤثر السياحة في...؟	very positive ايجابي جدا	rather positive ايجابي	rather negative سلي	very negative سلي جدا
Your family income دخل العائلة	()	()	()	()
Your local traditions and customs العادات و التقاليد	()	()	()	()
Infrastructure (roads, water, electricity etc.) in your community البنية التحتية (الشوارع، المياه، الكهرباء،... إلخ) في منطقتكم	()	()	()	()
Public Services (education, health etc.) الخدمات العامة (التعليم، الصحة،... إلخ)	()	()	()	()
Security & safety situation الوضع الأمني	()	()	()	()
Environment in your community البيئة والطبيعة في منطقتكم	()	()	()	()

	very much نعم بشدة	rather yes نعم	rather not لا	not at all لا بشدة
Does it make you proud that Petra is world famous and visited by guests from the entire world? هل تشعر بالفخر لأهمية البتراء العالمية وأنها	()	()	()	()

مقصد سياحي لمختلف الجنسيات العالمية				
Do you gain knowledge and experience from dialogue with visitors? هل تزداد معرفتك ومعلوماتك عند التحدث مع الزوار	()	()	()	()
Would you like to meet tourists and introduce them to your culture and traditions? هل ترغب في مقابلة السواح وتعريفهم بثقافتك وعاداتك	()	()	()	()
Do you feel that the recent tourist boom is putting the Petra Region in danger? هل تعتقد أن ازدياد عدد السواح يشكل خطر لمنطقة اقليم البتراء؟	()	()	()	()
Would you like to have (more) tourism attractions in your community? هل ترغب في وجود (المزيد من) أماكن استقطاب السواح في منطقتكم	()	()	()	()
Would you like to have (more) tourism accommodations in your community? هل ترغب في وجود (المزيد من) أماكن مبيت السواح في منطقتكم	()	()	()	()

In which community do you live? في أي منطقة	Please tick الرجاء وضع إشارة (✓)	What is your age? ما هو عمرك؟ _____	Please tick الرجاء وضع إشارة (✓)
---	---	--	---

تسكن؟			
Beida البيضا	()	under 20 أقل من 20	()
Dlagha دلاغة	()	Between 20-30 بين 20 – 30	()
Rajif الراجف	()	What is your gender الجنس؟	
Taybeh الطيبة	()	Male ذكر ()	Female أنثى ()
Umm Sayhoun أم صيحون	()		
Wadi Musa وادي موسى	()		

Thank you very much for your cooperation!

شكرا لك لحسن التعاون

5. Analysis of Workshops Questionnaires



A Strategic Master Plan for Petra Region

Workshop Questionnaire Evaluation

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Introduction

The questionnaires were distributed to all participants at the end of each workshop hold in the Petra region in September and October 2010. The only exception was the Dlagha men workshop, where it was judged as not appropriate or beneficial to distribute the questionnaires. For the two youth workshops the content of the questionnaires was slightly adapted, however keeping the main content in order to obtain comparable answers.

In total 208 persons answered the questionnaires out of the 257 people who attended the workshops. Most of the interviewees came for Wadi Musa (32 %), followed by Taybeh (20%) and Baidha (16 %). ,Most of the interviewed persons were between 20 and 40 years old, closely followed by the interviewees that were younger than 20 years. The high representation of under 20 year old interviewees can be explained by the two separate meetings hold for the young people of the region. The age category of persons older than 60 years is clearly underrepresented in this survey. Since at the male community workshops meetings there were visibly a few more than 60 years old men attending and as the number of questionnaires filled out was lower than the number of attendees, it can be assumed, that many of the older men did not want to or were not able to fill out the questionnaires. Regarding the gender of the interviewed persons it can be stated that about as many men as women answered the questionnaires.

Table 1 Interviewees data

Total number of interviews		208			
Community of interviewees	%	Age of interviewees	%	Gender of interviewees	%
Baidha	16	Under 20	36	Male	51
Dlagha	9	20-40	39	Female	49
Rajif	13	40-60	21	Total	100
Taybeh	20	Over 60	4		
Umm Sayhoun	10	Total	100		
Wadi Musa	32				
Total	100				

Question 1: Necessities of Public facilities

As can be seen in Table 2 schools, sports & recreation facilities and medical facilities or hospitals are the public facilities and services that are in greatest need in Petra. Of least importance to the respondent are, improvements in the police and fire protection, the electrical service and the sanitary supply. However, there differences can be found in the perceived needs of men and women. Whereas women give more importance to services like cultural facilities, medical facilities and an improved communication infrastructure, men focus more on the development of practical and basic public facilities and services, such as improving the water supply, the drainage system and waste management.

Table 2 necessity of public facilities and services (in %) - Total and gender

What Public Facilities and Services is the Greatest Need of Your Village?	% Total	% Men	% Women
Schools	67 %	69 %	67 %
Cultural facilities (Library, Cinema, Music Hall etc.)	48 %	31 %	59 %
Sports & Recreation facilities	63 %	62 %	63 %
Medical Facilities or Hospital	65 %	53 %	73 %
Improved Water Supply	55 %	63 %	50 %
Improved Sanitary Supply	28 %	33 %	24 %
Drainage Improvements	43 %	55 %	36 %
Improved Electrical Service	25 %	28 %	23 %
Improved Communication Infrastructure (Telephone, Internet, Cable Television)	45 %	37 %	50 %
Improved Waste Management (garbage collection)	34 %	45 %	27 %
Improved Police and Fire Protection	19 %	20 %	18 %

Multiple responses - 5 most important choices

The age of the interviewed person seems to have an impact on the perceived necessity of certain public facilities and services (see table 3). An interesting observation is that younger people (under 20) put more focus on the development of schools as older people. This is especially important; as this age category is the one that can best evaluate the current situation of the schools in their communities in the Petra region. Another interesting observation is that the perceived importance in the development of cultural facilities and medical services/hospitals tends to decrease with age. It is exactly the other way round with the improvement of the water supply, which seems to be together with the drainage improvements an important issue for the persons that are older than 40 years. The priority of having enough water for the older people could be explained by their focus on agriculture as mean to earn a living. In general complaints about the lack of water for agriculture have been commonly expressed.

Table 3 Necessity of public facilities and services (in %) – Age

What Public Facilities and Services is the Greatest Need of Your Village?	Under 20	20 - 40	Over 40
Schools	73	64	64
Cultural facilities (Library, Cinema, Music Hall etc.)	68	54	36
Sports & Recreation facilities	64	64	63
Medical Facilities or Hospital	86	70	36
Improved Water Supply	36	56	71
Improved Sanitary Supply	23	22	39
Drainage Improvements	23	37	61
Improved Electrical Service	14	19	29
Improved Communication Infrastructure (Telephone, Internet, Cable Television)	55	59	25
Improved Waste Management (garbage collection)	27	30	43
Improved Police and Fire Protection	27	15	25

Multiple responses - 5 most important choices

When looking at the need for different public facilities and services in the different regions, several interesting observations can be found. In general, it can be stated that communities like Baidha that lack schools, medical facilities/hospital, a good sanitary supply and communication infrastructure or Dlagha (lacking strongly schools, medical facilities and communication infrastructure) seem to lack the most basic public facilities and services the strongest. This can be explained by their location at the periphery of the Petra region and the small number of their population. In Umm Sayhoun the water and sanitary supply systems seems to be functioning, however the waste management system requires massive improvements according to the population of the community. This matches the opinion of the population expressed during the workshops.

Table 4 Necessity of public facilities and services (in %) - Communities

What Public Facilities and Services is the Greatest Need of Your Village?	Baidha (N=5)	Dlagha (N=16)	Rajif (N=20)	Taybeh (N=29)	Umm Sayhoun (N=15)	Wadi Musa (N=39)
Schools	100	88	65	76	80	46
Cultural facilities (Library, Cinema, Music Hall etc.)	0	63	30	52	47	56
Sports & Recreation facilities	0	50	55	72	73	74
Medical Facilities or Hospital	100	94	40	69	67	59
Improved Water Supply	20	31	75	79	0	62
Improved Sanitary Supply	80	6	50	14	13	33
Drainage Improvements	20	38	35	48	13	56
Improved Electrical Service	20	13	35	17	13	33
Improved Communication Infrastructure (Telephone, Internet, Cable Television)	80	75	60	31	60	31
Improved Waste Management (garbage)	0	13	20	24	93	39

collection)						
Improved Police and Fire Protection	60	19	10	21	40	5

Multiple responses - 5 most important choices

Question 2: Fields to strengthen the economy

Most of the interviewed persons do not seem to have strong opinions (shown in the low percentage of very important or not at all important responses) on the importance of craft manufacturing- or production facilities in order to strengthen the economy of the Petra region. The situation is quite different when it comes to high tech-/knowledge intensive sector. The majority of people do have a strong opinion about these industry sectors. However, the number of people that believes that it is very important to focus on high tech sectors is only slightly higher than the number of people that answered that these sectors are not at all important for the further development of the economy in the Petra region. Regarding the other two fields, agriculture and tourism, the results are not showing any clear pattern.

Table 5 Fields for strengthening the economy - Total

In order to strengthen the economy of the Petra region, I would focus on:	Very important	Important	Not very important	Not at all important	Total
Agriculture	25	19	33	23	100
Tourism	26	22	16	35	100
Craft- manufacturing- or production facilities	12	42	38	8	100
High tech- / knowledge intensive sectors	37	17	13	33	100
Other areas which were indicated: Transportation (2x), archaeology, cultural activities, health center, organizing the land and better agricultural roads, public libraries, sports activities, the main agricultural road and ICT services					

Considering the opinion of men a similar pattern to the general distribution of answers given can be found. Men are only more bipolar when it comes to tourism. They also regard craft manufacturing neither as a very important nor a not at all as important topic for the further economic development of the Petra region. It is interesting to note that women are more negative when it comes to agriculture as a focus of the economic development than men. They also tend to see high tech/knowledge intensive sector as a very important field in the future. It is interesting to note that men view Agriculture with 59% as the most important (very important and important) occupation to strengthen the economy over high tech (48%), crafts (47%) and tourism (46%), whereas with women High-tech and crafts (60% each) range over tourism (50%) and agriculture (30%). An obvious explanation for this result is that for women tourism and agriculture are not representing suitable sectors to find job opportunities, while the crafts sector could potentially provide desirable jobs to them.

Table 6 Fields for strengthening the economy - Gender

In order to strengthen the economy of the Petra region, I would focus on:	Very important	Important	Not very important	Not at all important	Total
Men					
Agriculture	33	26	27	14	100
Tourism	30	16	11	43	100
Craft- manufacturing- or production facilities	7	40	49	4	100
High tech- / knowledge intensive sectors	30	18	12	40	100
Women					
Agriculture	18	12	38	32	100
Tourism	23	27	21	29	100
Craft- manufacturing- or production facilities	16	44	28	12	100
High tech- / knowledge intensive sectors	43	17	13	27	100

For the population aged under 20 years tourism represents a sector on which the local economy should intensely focus. Only 15% of this age category regards tourism as not at all important for the strength of the economy in the Petra region. The age category between 20-30 years however clearly favours the high tech- / knowledge intensive sectors over the tourism sector with 65% of the participants judging the high tech- / knowledge intensive sectors as important or very important. For the over 40 years old population the preference for one of the sectors is far less clear, as for each of the sectors, tourism or high tech- / knowledge intensive sectors, half of the participants judges that they as very important or important, while the other half judges that these two sectors are not very important or not at all important. The only common opinion of the different age categories is that the agricultural sector is perceived as less important. Craft-manufacturing- or production facilities are in general not seen as very important to strengthen the economy, but is perceived by the majority of all three categories as important.

Table 7 Fields for strengthening the economy – Age

In order to strengthen the economy of the Petra region, I would focus on:	Very important	Important	Not very important	Not at all important	Total
Under 20 years					
Agriculture	26	15	28	31	100
Tourism	39	26	21	15	100
Craft- manufacturing- or production facilities	8	41	36	15	100
High tech- / knowledge intensive sectors	28	18	15	39	100
20-40 years					
Agriculture	25	13	41	21	100
Tourism	16	20	18	46	100
Craft- manufacturing- or production facilities	18	42	31	8	100
High tech- / knowledge intensive	41	25	10	25	100

sectors					
Over 40 years					
Agriculture	16	24	38	22	100
Tourism	30	22	8	41	100
Craft- manufacturing- or production facilities	3	54	41	3	100
High tech- / knowledge intensive sectors	51	0	14	35	100

Regarding the variation of the answers according to the community to which the participant belonged, it can be observed that the situation in Baidha and Wadi Musa is very similar to the general assessment. One difference, which can be highlighted, is that in Dlagha people see agriculture as less important and high tech sectors as more important for the economic development than in the other evaluated communities. Interesting is the fact that 50 % of all interviewed people in this community see tourism as not all important for strengthening the economy of Petra. This can be explained by Dlagha's location far away from the tourist attractions of the region. In comparison, the people in Rajif regard tourism as an important factor for the economic development of Petra. Similarly to the respondents from Dlagha, a very high percentage of people in Taybeh would focus on high tech and knowledge intensive sectors. Quite different is the situation in Umm Sayhoun where only 12 % of the people regard these sectors as very important, but nearly half the people would focus on agriculture to strengthen the economy.

Table 8 Fields for strengthening the economy – Communities

In order to strengthen the economy of the Petra region, I would focus on:	Very important	Important	Not very important	Not at all important	Total
Baidha (N=26)					
Agriculture	23	27	31	19	100
Tourism	31	19	12	39	100

Craft- manufacturing- or production facilities	8	38	53	0	100
High tech- / knowledge intensive sectors	39	15	4	42	100
Dlagha (N=16)					
Agriculture	6	0	50	44	100
Tourism	19	31	0	50	100
Craft- manufacturing- or production facilities	6	56	31	6	100
High tech- / knowledge intensive sectors	69	12	19	0	100
Rajif (N=16)					
Agriculture	12	25	19	44	100
Tourism	31	25	31	13	100
Craft- manufacturing- or production facilities	19	37	31	13	100
High tech- / knowledge intensive sectors	37	13	19	31	100
Taybeh (N=28)					
Agriculture	29	21	29	21	100
Tourism	11	32	25	32	100
Craft- manufacturing- or production facilities	7	43	39	11	100
High tech- / knowledge intensive sectors	53	4	7	37	100
Umm Sayhoun (N=17)					
Agriculture	47	0	29	24	100
Tourism	35	12	12	41	100

Craft- manufacturing- or production facilities	6	35	53	6	100
High tech- / knowledge intensive sectors	12	53	6	29	100
Wadi Musa (N=48)					
Agriculture	23	23	39	15	100
Tourism	31	15	17	37	100
Craft- manufacturing- or production facilities	19	44	25	12	100
High tech- / knowledge intensive sectors	27	19	19	35	100

Question 4: Preferred work areas for children

In general people would be happy if their children would work in any of the mentioned areas, especially as tour guides or in outdoor activities, travel agencies and so on. The least popular fields to have their children working in are hotels and restaurant. As can be seen in the tables 9, 10 and 11 there does not seem to exist a gender and age difference in the replies.

Table 9 Preferred work areas for their children - Total

Do you want your children to work in ...	Very much	Rather yes	Rather not	Not at all	Total
Hotel	23	44	18	15	100
Tour Guide / Outdoor activities	52	38	6	4	100
Travel Agency/Tour Operator	46	45	6	3	100
Restaurant	22	41	26	11	100
Retail Shops/Selling Souvenirs	43	40	13	4	100
Craft/Manufacturing/Production	45	45	6	4	100
Agriculture	41	40	12	7	100

Public Service/Military	46	34	13	7	100
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Table 10 Preferred work areas for their children - Gender

Do you want your children to work in ...	Very much	Rather yes	Rather not	Not at all	Total
Men					
Hotel	28	43	10	19	100
Tour Guide / Outdoor activities	53	34	7	6	100
Travel Agency/Tour Operator	43	51	3	3	100
Restaurant	26	37	21	16	100
Retail Shops/Selling Souvenirs	41	45	10	4	100
Craft/Manufacturing/Production	39	53	6	3	100
Agriculture	41	42	6	11	100
Public Service/Military	44	35	12	10	100
Women					
Hotel	17	45	27	11	100
Tour Guide / Outdoor activities	51	43	5	2	100
Travel Agency/Tour Operator	48	38	11	3	100
Restaurant	17	46	31	6	100
Retail Shops/Selling Souvenirs	46	35	16	3	100
Craft/Manufacturing/Production	52	36	8	5	100
Agriculture	42	37	18	3	100
Public Service/Military	49	34	14	3	100

Table 11 Preferred work areas for their children – Age

Do you want your children to work in ...	Very much	Rather yes	Rather not	Not at all	Total
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20-40 years					
Hotel	15	54	21	10	100
Tour Guide / Outdoor activities	45	46	6	3	100
Travel Agency/Tour Operator	44	45	9	2	100
Restaurant	13	57	24	6	100
Retail Shops/Selling Souvenirs	32	46	19	3	100
Craft/Manufacturing/Production	44	46	8	2	100
Agriculture	40	38	14	8	100
Public Service/Military	36	43	16	5	100
Over 40 years					
Hotel	27	36	15	22	100
Tour Guide / Outdoor activities	53	33	7	7	100
Travel Agency/Tour Operator	40	50	5	5	100
Restaurant	24	31	24	21	100
Retail Shops/Selling Souvenirs	46	39	7	7	100
Craft/Manufacturing/Production	42	45	8	5	100
Agriculture	45	40	8	8	100
Public Service/Military	57	15	13	15	100

In general, the answers of the population are revealing the relatively difficult economic situation of the region. In the smallest community where only few employment opportunities exist, Baidha, the answers of the respondents show that people would welcome if their children worked in any of the mentioned fields except hotels and restaurants. Once again the answers reveal that the population of most communities would prefer their children not to work in hotels or restaurants, which can be explained on one hand by the socio-cultural context in which it is perceived as unsuitable for women to work in contact with strangers and on the other hand by the general opinion repeatedly mentioned in the workshops, that the salary of locals working in hotels or restaurants are much

lower than the one of non-locals. Overall, the people in Wadi Musa are the most selective when it comes to choosing the preferred work areas for their children. This can easily be explained by the fact that Wadi Musa is with no doubt the most developed and well-off community of the region, allowing people to have a greater choice regarding their preferred field of professional activity.

Table 12 Preferred work areas for their children – Communities

Do you want your children to work in ...	Very much	Rather yes	Rather not	Not at all	Total
Baidha (N=26-29)					
Hotel	23	53	12	12	100
Tour Guide / Outdoor activities	89	11	0	0	100
Travel Agency/Tour Operator	69	24	7	0	100
Restaurant	36	28	25	11	100
Retail Shops/Selling Souvenirs	76	21	0	3	100
Craft/Manufacturing/Production	68	25	0	7	100
Agriculture	66	24	7	3	100
Public Service/Military	75	18	7	0	100
Dlagha (N=6-10)					
Hotel	17	33	50	0	100
Tour Guide / Outdoor activities	60	20	20	0	100
Travel Agency/Tour Operator	50	25	25	0	100
Restaurant	0	83	17	0	100
Retail Shops/Selling Souvenirs	14	86	0	0	100
Craft/Manufacturing/Production	86	14	0	0	100
Agriculture	71	29	0	0	100
Public Service/Military	50	25	13	13	100
Rajif (N=19-20)					

Hotel	15	45	25	15	100
Tour Guide / Outdoor activities	45	55	0	0	100
Travel Agency/Tour Operator	25	70	5	0	100
Restaurant	16	32	32	21	100
Retail Shops/Selling Souvenirs	58	37	5	0	100
Craft/Manufacturing/Production	21	68	11	0	100
Agriculture	32	42	11	16	100
Public Service/Military	47	32	16	5	100
Taybeh (N=22-27)					
Hotel	33	41	15	11	100
Tour Guide / Outdoor activities	30	61	4	4	100
Travel Agency/Tour Operator	42	50	8	0	100
Restaurant	25	50	17	8	100
Retail Shops/Selling Souvenirs	57	35	9	0	100
Craft/Manufacturing/Production	71	25	4	0	100
Agriculture	44	35	22	0	100
Public Service/Military	41	46	14	0	100
Umm Sayhoun (N=12-16)					
Hotel	33	67	0	0	100
Tour Guide / Outdoor activities	60	40	0	0	100
Travel Agency/Tour Operator	42	58	0	0	100
Restaurant	19	75	6	0	100
Retail Shops/Selling Souvenirs	44	56	0	0	100
Craft/Manufacturing/Production	21	79	0	0	100
Agriculture	14	50	7	29	100

Public Service/Military	43	36	21	0	100
Wadi Musa (N=39-41)					
Hotel	18	35	23	25	100
Tour Guide / Outdoor activities	39	41	10	10	100
Travel Agency/Tour Operator	42	44	5	10	100
Restaurant	19	30	38	15	100
Retail Shops/Selling Souvenirs	13	45	33	10	100
Craft/Manufacturing/Production	27	51	15	7	100
Agriculture	30	50	15	5	100
Public Service/Military	32	42	12	15	100

Question 5: Effects of Tourism

The population of the entire region shares a generally positive view on how tourism affects their family income, the regional infrastructure, public services, the security & safety situation and the environment in their community. The only slightly negative effect of tourism is seen on the local traditions and customs. In general, there are no big differences in the perception of men and women or of the different age categories regarding the effect of tourism (see tables 14 and 15). Interestingly, only few participants judged that tourism had a bad effect on their environment.

Table 13 Effects of tourism (in %) - Total

How does tourism affect ...	Very positive	Rather positive	Rather negative	Very negative	Total
Your family income	38	48	7	7	100
Your local traditions and customs	9	37	48	13	100
Infrastructure (roads, water, electricity etc.) in your community	38	41	14	7	100

Public Services (education, health etc.)	30	45	19	5	100
Security & safety situation	38	47	14	2	100
Environment in your community	30	46	18	6	100

Table 14 Effects of tourism (in %) - Gender

How does tourism affect ...	Very positive	Rather positive	Rather negative	Very negative	Total
Men					
Your family income	35	51	5	9	100
Your local traditions and customs	14	23	50	13	100
Infrastructure (roads, water, electricity etc.) in your community	36	45	13	6	100
Public Services (education, health etc.)	31	48	18	3	100
Security & safety situation	43	42	13	1	100
Environment in your community	29	42	22	8	100
Women					
Your family income	40	46	9	4	100
Your local traditions and customs	3	37	46	14	100
Infrastructure (roads, water, electricity etc.) in your community	40	38	15	7	100
Public Services (education, health etc.)	30	43	21	6	100
Security & safety situation	33	51	14	2	100

Environment in your community	32	50	14	5	100
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Table 15 Effects of tourism (in %) – Age

How does tourism affect ...	Very positive	Rather positive	Rather negative	Very negative	Total
Under 20 years					
Your family income	32	54	7	7	100
Your local traditions and customs	11	35	37	17	100
Infrastructure (roads, water, electricity etc.) in your community	38	49	10	3	100
Public Services (education, health etc.)	30	50	18	2	100
Security & safety situation	38	49	13	0	100
Environment in your community	36	49	10	5	100
20-40 years					
Your family income	41	46	10	3	100
Your local traditions and customs	5	32	55	8	100
Infrastructure (roads, water, electricity etc.) in your community	40	33	16	10	100
Public Services (education, health etc.)	31	38	24	7	100
Security & safety situation	34	55	8	3	100
Environment in your community	31	41	24	4	100

Over 40 years					
Your family income	40	38	7	15	100
Your local traditions and customs	7	19	57	17	100
Infrastructure (roads, water, electricity etc.) in your community	40	30	21	9	100
Public Services (education, health etc.)	31	41	21	7	100
Security & safety situation	42	27	29	2	100
Environment in your community	25	42	19	14	100

Compared to the total results, people in Baidha seem to evaluate the effect of tourism on public services like education and health and the security & safety situation more negatively. The people in Rajif and Dlagha are more positive (Rajif slightly and Dlagha strongly) than the rest on all other areas except the impact on their local traditions and customs where they are in line with the average results. This could be explained by the fact that they are less exposed to tourism and therefore less likely to experience negative effects of tourism. People in Baidha however are living close to a tourist site (Siq al Barid) and are therefore suffering from some of the negative tourism side effects.

Table 16 Effects of tourism (in %) – Communities

How does tourism affect ...	Very positive	Rather positive	Rather negative	Very negative	Total
Baidha (N=30-31)					
Your family income	42	29	7	23	100
Your local traditions and customs	13	36	42	10	100
Infrastructure (roads, water, electricity etc.) in your	37	30	23	10	100

community					
Public Services (education, health etc.)	16	45	32	7	100
Security & safety situation	19	52	23	7	100
Environment in your community	42	29	23	7	100
Dlagha (N=13-17)					
Your family income	73	20	0	7	100
Your local traditions and customs	15	39	39	8	100
Infrastructure (roads, water, electricity etc.) in your community	82	12	6	0	100
Public Services (education, health etc.)	87	13	0	0	100
Security & safety situation	59	41	0	0	100
Environment in your community	53	40	7	0	100
Rajif (N=25-26)					
Your family income	36	60	4	0	100
Your local traditions and customs	4	40	40	16	100
Infrastructure (roads, water, electricity etc.) in your community	62	27	4	8	100
Public Services (education, health etc.)	58	27	12	4	100
Security & safety situation	52	40	8	0	100
Environment in your community	50	39	12	0	100

Taybeh (N=32-36)					
Your family income	42	58	0	0	100
Your local traditions and customs	13	25	56	6	100
Infrastructure (roads, water, electricity etc.) in your community	44	44	11	0	100
Public Services (education, health etc.)	27	55	18	0	100
Security & safety situation	52	33	15	2	100
Environment in your community	40	49	9	3	100
Umm Sayhoun (N=18-21)					
Your family income	29	67	5	0	100
Your local traditions and customs	6	28	56	11	100
Infrastructure (roads, water, electricity etc.) in your community	17	72	6	6	100
Public Services (education, health etc.)	5	62	24	10	100
Security & safety situation	6	72	17	6	100
Environment in your community	11	56	28	6	100
Wadi Musa (N=53-59)					
Your family income	31	48	15	7	100
Your local traditions and customs	5	26	50	19	100
Infrastructure (roads, water, electricity etc.) in your community	17	52	21	10	100

Public Services (education, health etc.)	22	48	22	7	100
Security & safety situation	38	47	15	0	100
Environment in your community	9	54	25	12	100

Question 6: Advantages & Dangers of Tourism

The people in the Petra region are in general very positive about tourism and tourists as shows the data on their answers compiled in table 17. The great majority of the local population indicated that they are very proud of Petra being famous and attracting so many visitors. Most of the population further appears to be interested in exchanging with the tourists, through learning from them and sharing their heritage, as to both questions more than 50% of the answers were “very much”. Further, most of the population does not feel that the recent tourist boom is putting the Petra region in danger. This is very interesting to notice, as the answers to the previous questions (compare table 13) show that the most of the people feel that tourism has a negative effect on their local traditions. There are no important differences in the perception of men and women. Regarding the different age categories, the only major difference to highlight is that people over 40 tend to perceive the recent tourist boom as a greater danger to the Petra region than other age categories.

Table 17 Advantages and dangers of tourism - Total

	Very much	Rather yes	Rather not	Not at all	Total
Does it make you proud that Petra is world famous and visited by guests from all over the world?	81	18	1	0	100
Do you gain knowledge and experience from dialogue with visitors?	57	40	2	1	100
Would you like to meet tourists and introduce them to your culture and traditions?	63	34	2	1	100

Do you feel that the recent tourist boom is putting the Petra Region in danger?	12	28	44	16	100
Would you like to have (more) tourism attractions in your community?	63	33	4	0	100
Would you like to have (more) tourism accommodations in your community?	54	33	10	3	100

Table 18 Advantages and dangers of tourism - Gender

	Very much	Rather yes	Rather not	Not at all	Total
Men					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	83	16	1	0	100
Do you gain knowledge and experience from dialogue with visitors?	57	40	3	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	61	36	2	1	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	13	28	38	22	100
Would you like to have (more) tourism attractions in your community?	60	33	7	0	100
Would you like to have (more) tourism accommodations in your	60	28	8	4	100

community?					
Women					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	79	19	2	0	100
Do you gain knowledge and experience from dialogue with visitors?	58	40	1	1	100
Would you like to meet tourists and introduce them to your culture and traditions?	65	32	2	1	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	12	28	51	9	100
Would you like to have (more) tourism attractions in your community?	65	34	1	0	100
Would you like to have (more) tourism accommodations in your community?	49	37	12	2	100

Table 19 Advantages and dangers of tourism – Age

	Very much	Rather yes	Rather not	Not at all	Total
Under 20 years					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	79	21	0	0	100

Do you gain knowledge and experience from dialogue with visitors?	61	36	3	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	78	19	3	0	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	19	23	47	11	100
Would you like to have (more) tourism attractions in your community?	65	33	2	0	100
Would you like to have (more) tourism accommodations in your community?	44	38	18	0	100
20-40 years					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	81	18	2	0	100
Do you gain knowledge and experience from dialogue with visitors?	53	44	2	1	100
Would you like to meet tourists and introduce them to your culture and traditions?	56	41	2	1	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	4	29	50	17	100
Would you like to have (more) tourism attractions in your community?	60	36	4	0	100

Would you like to have (more) tourism accommodations in your community?	57	35	7	1	100
Over 40 years					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	83	13	4	0	100
Do you gain knowledge and experience from dialogue with visitors?	54	44	2	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	55	43	2	0	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	46	35	35	14	100
Would you like to have (more) tourism attractions in your community?	63	30	7	0	100
Would you like to have (more) tourism accommodations in your community?	59	25	9	7	100

Regarding the answers by the participants from the different community of the Petra region it is interesting to notice that regardless of their location in the region, and the impact of tourism on their communities, mostly reveal the same opinions. For example participants from nearly all communities indicate, with over 60% of very much answers, that they wish to have more tourism attractions in their communities (Baidha 69%, Dlagha 63%, Rajif 64%, Taybeh 65%, Wadi Musa 66%). The only significant different answers with only 45% of very much chosen are coming from the Umm Sayhoun participants, however as another 45% of participants answered “rather yes”, the total percentage of positive answers is about the same as for the other communities. The slightly more

critical attitude to tourism attractions might be explained by the particular history of the Umm Sayhoun inhabitants who had to move out of the PAP. Interesting is further to highlight that the attitude of the Umm Sayhoun population towards exchange with tourism is with nearly 80% of very much far more positive than the attitude of other communities. Again this can be explained by their long-standing involvement in tourism. Baidha's workshops participants are showing a similarly positive attitude to exchange with tourists while Dlagha interestingly indicates a stronger interest in learning from tourists (75% of very much) but a more limited interest in showing their own culture (44% of very much) and not any negative answers to that question.

Attention should also be paid to the answers of the communities' population to the question regarding the increase of the amount of tourist accommodation in their communities. Once again the inhabitants of Umm Sayhoun give the most remarkable answers to this question as 91 % of the respondent indicate that they are very much interested in having more accommodation for tourists in their communities. This can be explained by the fact that the population of Umm Sayhoun has compared to the population of other communities fewer inhibitions to share their living space with tourists as they are already used to be in close contact with tourists and, furthermore, they are currently not allowed to open any kind of tourist accommodations in their community. The other communities' participants are also giving dominantly positive answer with however about 15-20% of the participants judging the increase of accommodation in a negative way. Only Taybeh is in this regard an exception as only 6% of the respondent from this community see more accommodation as rather negative. This can be explained by the proximity of Taybeh to the Scenic road where most of the hotels are located and therefore the population being used to have visitors staying close to their living space, while the communities of Dlagha, Rajif and Baidha have only very limited tourist accommodations in their communities if they have any at all.

As mentioned earlier on, the threat of tourism on the Petra region is not perceived as strong as nearly all communities' respondents replied with more than 50% that the tourism boom is "rather not" or "not at all" putting into danger the region. It is not surprising, that especially communities not involved in tourism, such as Dlagha and Rajif are not seeing tourism as a threat. While the slight majority of participants from Umm Sayhoun see tourism as a danger (55%) to the region which again can be related to their personal experience.

Table 20 Advantages and dangers of tourism – Communities

	Very much	Rather yes	Rather not	Not at all	Total
Baidha (N=30-32)					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	67	33	0	0	100
Do you gain knowledge and experience from dialogue with visitors?	70	23	3	3	100
Would you like to meet tourists and introduce them to your culture and traditions?	77	16	3	3	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	19	22	38	22	100
Would you like to have (more) tourism attractions in your community?	69	28	3	0	100
Would you like to have (more) tourism accommodations in your community?	47	38	13	3	100
Dlgha (N=16-17)					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	71	18	12	0	100
Do you gain knowledge and experience from dialogue with visitors?	75	25	0	0	100
Would you like to meet tourists and introduce them to your culture and	44	56	0	0	100

traditions?					
Do you feel that the recent tourist boom is putting the Petra Region in danger?	13	13	56	19	100
Would you like to have (more) tourism attractions in your community?	63	38	0	0	100
Would you like to have (more) tourism accommodations in your community?	38	44	19	0	100
Rajif (N=25-27)					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	74	26	0	0	100
Do you gain knowledge and experience from dialogue with visitors?	42	58	0	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	58	39	4	0	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	0	12	68	20	100
Would you like to have (more) tourism attractions in your community?	64	36	0	0	100
Would you like to have (more) tourism accommodations in your community?	48	36	16	0	100
Taybeh (N=34-36)					
Does it make you proud	86	14	0	0	100

that Petra is world famous and visited by guests from all over the world?					
Do you gain knowledge and experience from dialogue with visitors?	44	56	0	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	64	31	6	0	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	23	26	46	6	100
Would you like to have (more) tourism attractions in your community?	65	32	3	0	100
Would you like to have (more) tourism accommodations in your community?	51	43	6	0	100
Umm Sayhoun (N=19-21)					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	85	15	0	0	100
Do you gain knowledge and experience from dialogue with visitors?	79	21	0	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	79	21	0	0	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	10	45	40	5	100

Would you like to have (more) tourism attractions in your community?	45	45	10	5	100
Would you like to have (more) tourism accommodations in your community?	91	10	0	0	100
Wadi Musa (N=59-62)					
Does it make you proud that Petra is world famous and visited by guests from all over the world?	88	10	2	0	100
Do you gain knowledge and experience from dialogue with visitors?	53	43	3	0	100
Would you like to meet tourists and introduce them to your culture and traditions?	61	37	0	2	100
Do you feel that the recent tourist boom is putting the Petra Region in danger?	10	38	34	18	100
Would you like to have (more) tourism attractions in your community?	66	30	5	0	100
Would you like to have (more) tourism accommodations in your community?	54	27	12	7	100

Conclusion

The evaluation of the questionnaires is in general confirming the information obtained from the research on the current situation of the Petra region for the Initial Diagnostics report and the opinions of the local population expressed during the workshops. Even if, the sample of people from the region who

answered the questionnaire is compared to the overall population of the region relatively small, some main tendencies and indications can be found.

People from communities located at the periphery of the region far away from its center, Wadi Musa, revealed the need for the most basic public facilities and services, such as schools, medical facilities and communication infrastructure. For the other communities the improvement of sports and recreation facilities or of cultural facilities is of greater importance. However, nearly all of the communities perceive improved water supply, medical and schools services as an urgent need for the region.

The field of work in which the respondents from the regional communities would see their children be active is less relevant for the poorer communities of the region, which can be interpreted as revealing the difficulty of finding any job at all. The wealthier communities are on the contrary more selective regarding the kind of work their children should be involved in. Interesting is to note that regarding the work in hotels and restaurants respondents to the questionnaire from all the communities are indicating little enthusiasm, which can to some extent be explained by the socio-cultural norms of the population.

Especially the under 20 years old would put a strong focus on tourism as mean to strengthen the regional economy. However, this desire to further increase tourism does not mean that the population wants the economy of the Petra region to entirely depend on this sector. Other sectors on which the local population would like to focus, in order to strengthen the local economy, would be the high tech- and knowledge intensive sectors, as well as, the craft-manufacturing or production facilities. In general, except by the older population, the agricultural sector is judged as less relevant to strengthening the local economy.

Overall, it is important to highlight that tourism is perceived as beneficial to the each community of the region. Further, that every community is interested in having more tourist attractions in their community, as well as, having more tourist accommodations in their communities. The only slight fear existing in this regard is that tourism is potentially threatening the local traditions and customs.

Regional discrepancies in the answers of the respondents can be explained by the location of the communities and their current impact by tourism.

6. Biodiversity Section

6.1 Plant species recorded in Petra Region since 2003

(alphabetical by species name)

<i>Aaronsohnia factorovskyi</i>	COMPOSITAE
<i>Acacia raddiana</i>	MIMOSACEAE
<i>Acacia tortilis</i>	MIMOSACEAE
<i>Achillea biebersteinii</i>	COMPOSITAE
<i>Achillea santolina</i>	COMPOSITAE
<i>Achillea fragrantissima</i>	COMPOSITAE
<i>Adiantum capillus-veneris</i> L.	ADIANTACEAE
<i>Adonis dentata</i> Del.	RANUNCULACEAE
<i>Aegilops bicornis</i>	POACEAE
<i>Aegilops geniculata</i> L.	POACEAE
<i>Aegilops kotschyi</i>	POACEAE
<i>Aegilops peregrina</i> (Hackel) Maire & Weiller	POACEAE
<i>Aegilops searsii</i>	POACEAE
<i>Aegilops triuncialis</i>	POACEAE
<i>Aegilops vavilovii</i>	POACEAE
<i>Aerva javanica</i>	AMARANTHACEAE
<i>Aethionema corneum</i> (Banks & Sol.) Fedtsch	BRASSICACEAE
<i>Aizoon canariense</i> L.	CRASSULACEAE
<i>Ajuga chia</i> (Poir.) Schreb	LABIATAE
<i>Alhaji maurorum</i> Medikus	FABACEAE
<i>Alkanna strigosa</i> Boiss. & Hohen.	BORAGINACEAE
<i>Allium erdelii</i> Zucc.	LILIACEAE
<i>Allium neapolitanum</i> Cyrill.	LILIACEAE
<i>Aloe vera</i> (L.) Burm. Fil.	LILIACEAE
<i>Alyssum damascenum</i> Boiss. & Gaill.	BRASSICACEAE
<i>Alyssum minus</i> (L.) Rothm	BRASSICACEAE

<i>Alyssum marginatum</i> Steud.	BRASSICACEAE
<i>Amaranthus albus</i> L.	AMARANTHACEAE
<i>Amaranthus blitoides</i>	AMARANTHACEAE
<i>Amygdalus communis</i>	ROSACEAE
<i>Amygdalus korschinskyi</i> (Hand-Mazzetti) Bornm.	ROSACEAE
<i>Anagallis arvensis</i> L.	PRIMULACEAE
<i>Anchusa aegyptiaca</i> (L.) DC	BORAGINACEAE
<i>Anchusa strigosa</i> Labill	BORAGINACEAE
<i>Anchusa tinctoria</i> (L.) Tausch	BORAGINACEAE
<i>Androsace maxima</i>	PRIMULACEAE
<i>Androcymbium palaestinum</i>	LILIACEAE
<i>Anemone coronaria</i>	RANUNCULACEAE
<i>Anthemis pseudocotula</i> Boiss.	COMPOSITAE
<i>Argyrolobium crotalarioides</i> Jaub. et Spach	FABACEAE
<i>Artemisia herba-alba</i> Asso	COMPOSITAE
<i>Artemisia leysii</i> (Desf.) Rothm	COMPOSITAE
<i>Artemisia sieberi</i> (= <i>herba-alba</i>)	COMPOSITAE
<i>Arthrocnemum machrostachum</i>	CHENOPODACEAE
<i>Arum elongatum</i>	ARACEAE
<i>Arum hygrophilum</i> Boiss.	ARACEAE
<i>Arum palaestinum</i> Boiss.	ARACEAE
<i>Asparagus acutifolius</i>	LILIACEAE
<i>Asparagus aphyllus</i>	LILIACEAE
<i>Asparagus aphyllus</i> L.	LILIACEAE
<i>Asperugo orientalis</i> (Schenk) Johnston	BORAGINACEAE
<i>Asperugo procumbens</i> L.	BORAGINACEAE
<i>Asperula arvensis</i>	RUBIACEAE
<i>Asperula libanotica</i> Boiss.	RUBIACEAE
<i>Asphodeline lutea</i> (L.) Reichenb.	LILIACEAE
<i>Asphodelus ramosus</i>	LILIACEAE
<i>Asteriscus spinosus</i>	COMPOSITAE

<i>Astragalus ancistocarpus</i> Boiss. et Hausskn	FABACEAE
<i>Astragalus bethlehemiticus</i>	FABACEAE
<i>Astragalus hamosus</i> L	FABACEAE
<i>Astragalus platyraphis</i> Fisch	FABACEAE
<i>Astragalus tribuloides</i> Delile	FABACEAE
<i>Astragalus spinosus</i> (Forssk.) Muschler	FABACEAE
<i>Atractylis cancellata</i>	COMPOSITAE
<i>Atractylis carduus</i> (Forssk.) C. Christ	COMPOSITAE
<i>Atriplex halimus</i>	CHENOPODIACEAE
<i>Atriplex stylosa</i>	CHENOPODIACEAE
<i>Avena sterilis</i>	POACEAE
<i>Ballota undulata</i> (Sieber ex Fresen.) Benth	LABIATAE
<i>Ballota saxatilis</i> Sieber ex C. Presl	LABIATAE
<i>Bellevalia desertorum</i> Eig & Feinbr.	LILIACEAE
<i>Bellevalia mosheovii</i>	LILIACEAE
<i>Biscutella didyma</i> L.	BRASSICACEAE
<i>Blepharus ciliaris</i>	ACANTHACEAE
<i>Bromus tectorum</i> L.	POACEAE
<i>Brunnera orientalis</i>	BORAGINACEAE
<i>Bryonia cretica</i> L.	CUCURBITACEAE
<i>Buglossioides tenuiflora</i> (L.fil) Johnston	BORAGINACEAE
<i>Bupleurum lancifolium</i>	UMBELLIFERAE
<i>Calotropis procera</i>	ASCLEPIADACEAE
<i>Campanula stellaris</i>	CAMPANULACEAE
<i>Capparis cartilagina</i> Decne CAPPARACEAE	
<i>Capparis ovata</i>	CAPPARACEAE
<i>Capparis spinosa</i> L.	CAPPARACEAE
<i>Capella bursa-pastoris</i>	BRASSICACEAE

<i>Carex divulsa</i> Stokes	CYPERACEAE
<i>Calendula arvensis</i> L.	COMPOSITAE
<i>Calendula micrantha</i> Tin. et Guss	COMPOSITAE
<i>Camelina hispida</i> Boiss.	BRASSICACEAE
<i>Caralluma europaea</i>	ASCLEPIADACEAE
<i>Cardaria draba</i> (L.) Desu	BRASSICACEAE
<i>Carduus picnocephalus</i> L.	COMPOSITAE
<i>Carlina curetum</i>	COMPOSITAE
<i>Carlina hispanica</i> Lam.	COMPOSITAE
<i>Carrichterra annua</i> (L.) DC.	BORAGINACEAE
<i>Carthamus tenuis</i> (Boiss.& Blanche) Bornm.	COMPOSITAE
<i>Caylusea hexagyna</i> (Forsk.) M. Green	RESEDACEAE
<i>Ceratocephalus falcatus</i> (L.) Pers.	RANUNCULACEAE
<i>Cerintho palaestina</i> Eig & Sam	BORAGINACEAE
<i>Centaurea aegyptiaca</i> L.	COMPOSITAE
<i>Centaurea ammocyanus</i>	COMPOSITAE
<i>Centaurea eryngoides</i> Lam.	COMPOSITAE
<i>Centaurea iberica</i> Trev. ex Sprengel	COMPOSITAE
<i>Centaurea pallescens</i> Delile	COMPOSITAE
<i>Cerantonia siliqua</i> L.	CAESALPINIACEAE
<i>Chaetoschidium trichospermum</i>	APIACEAE
<i>Chardinia orientalis</i>	COMPOSITAE
<i>Chenopodium tatarica</i> L.	CHENOPODIACEAE
<i>Chorispora purpurescens</i> (Banks & Sol.) Eig	BRASSICACEAE
<i>Chrozophora tinctoria</i>	EUPHORBIACEAE
<i>Cistanche tubulosa</i>	OROBANCHACEAE
<i>Citrullus colocynthis</i>	CUCURBITACEAE
<i>Clypeola aspera</i> (Grauer) Thrill	BORAGINACEAE
<i>Clypeola jonthalaspic</i> (L.)	BORAGINACEAE
<i>Colchicum ritchii</i> R. Br.	LILIACEAE
<i>Colchicum tunicatum</i>	LILIACEAE

<i>Colutea istria</i>	FABACEAE
<i>Consolida scleroclada</i>	RANUNCULACEAE
<i>Convolvulus siculus</i>	CONVOLVULACEAE
<i>Cousinia dayi</i>	COMPOSITAE
<i>Crassula alata</i> (Niv.) Berger	CRASSULACEAE
<i>Crataegus aronia</i>	ROSACEA
<i>Crepis aspera</i> L.	COMPOSITAE
<i>Crepis palaestina</i> (Boiss.) Borum	COMPOSITAE
<i>Crocus pallasii</i> Goldb.	IRIDACEAE
<i>Crupina crupinastrum</i> (Moris) Vis.	COMPOSITAE
<i>Crucianella ciliata</i>	RUBIACEAE
<i>Crucianella cucularis</i>	RUBIACEAE
<i>Crucianella herbacea</i> Forskal	RUBIACEAE
<i>Cymbolaena griffithii</i>	COMPOSITAE
<i>Cynodon dactylon</i> (L.) Pers.	POACEAE
<i>Dactylis glomerata</i> L.	POACEAE
<i>Daphne linearifolia</i> Hart	THYMELAEACEAE
<i>Datura stramonium</i>	SOLANACEAE
<i>Daucus subsessilis</i> Boiss.	UMBELLIFERAE
<i>Dianthus strictus</i> Banks et Sol.	CARYOPHYLLACEAE
<i>Descurainia sophia</i> (L.) Webb	BRASSICACEAE
<i>Diplotaxis harra</i> (Forssk) Boiss.	BRASSICACEAE
<i>Dittrichia viscosa</i> (L.) Grueter	COMPOSITAE
<i>Ecballium elaterium</i>	CUCURBITACEAE
<i>Echinops polyceras</i> Boiss.	COMPOSITAE
<i>Echinops spinosissimus</i> Turra	COMPOSITAE
<i>Echium judaeum</i>	BORAGINACEAE
<i>Emex spinosa</i> (L.) Campd.	POLYGONACEAE
<i>Eminium spiculatum</i> (Blime)	ARACEAE

<i>Ephedra aphylla</i> Forskal	EPHEDRACEAE
<i>Ephedra foemina</i> Forssk.	EPHEDRACEAE
<i>Eremobium aegyptiacum</i> var. <i>Lineare</i>	CRUCIFERAE
<i>Eremopyrum bonaepartis</i> var. <i>bonaepartis</i>	POACEAE
<i>Erodium glaucophyllum</i> (L.) L'Hér.	GERANIACEAE
<i>Erodium gruinum</i>	GERANIACEAE
<i>Erodium hirtum</i>	GERANIACEAE
<i>Erodium laciniatum</i>	GERANIACEAE
<i>Erodium touchyanum</i>	GERANIACEAE
<i>Erophila minima</i> C.A. May	BRASSICACEAE
<i>Eruca sativa</i>	BRASSICACEAE
<i>Erucaria boveana</i> Cosson	BRASSICACEAE
<i>Erucaria hispanica</i> (L.) Druce	BRASSICACEAE
<i>Eryngium creticum</i> Lam.	UMBELLIFERAE
<i>Eryngium glomeratum</i>	UMBELLIFERAE
<i>Erysimum oleifolium</i> J. Gay	BRASSICACEAE
<i>Erysimum repandum</i> L.	BRASSICACEAE
<i>Euphorbia peplus</i>	EUPHORBIACEAE
<i>Fagonia mollis</i> Del.	ZYGOPHYLLACEAE
<i>Fagonia mollis</i> Del. var. <i>mollis</i>	ZYGOPHYLLACEAE
<i>Farsetia aegyptiaca</i>	BRASSICACEAE
<i>Ferula communis</i>	UMBELLIFERAE
<i>Ferula sinaica</i> Boiss.	UMBELLIFERAE
<i>Ficus carica</i>	MORACEAE
<i>Ficus sycomonus</i> L.	MORACEAE
<i>Filago pyramidata</i> L.	COMPOSITAE
<i>Foeniculum vulgare</i>	APIACEAE
<i>Fritillaria libanotica</i> (Boiss.) Baker	LILIACEAE
<i>Fumaria densiflora</i>	FUMARIACEAE

<i>Gagea reticulata</i> (Pall.) A. & H. Schult	LILIACEAE
<i>Gagea tunicatum</i> R. Br.	LILIACEAE
<i>Galium adhaerens</i> Boiss.	RUBIACEAE
<i>Galium aparine</i>	RUBIACEAE
<i>Galium canum</i> Req.	RUBIACEAE
<i>Galium humifusum</i> Bieb.	RUBIACEAE
<i>Galium incanum</i> Smith.	RUBIACEAE
<i>Galium petrae</i> Hart	RUBIACEAE
<i>Galium rivale</i> (Sm.) Griseb.	RUBIACEAE
<i>Galium spurrium</i> L.	RUBIACEAE
<i>Gastrocotyle hispida</i> (Forskal) Clarke	BORAGINACEAE
<i>Geranium molle</i>	GERANACEAE
<i>Glaucium grandiflorum</i> Boiss. et Huet	PAPAVERACEAE
<i>Globularia arabica</i> Jaub. & Spach	GLOBULARIACEAE
<i>Gomphocarpus sinaicus</i> Boiss.	ASCLEPIADACEAE
<i>Gymnarhena micrantha</i>	COMPOSITAE
<i>Gymnocarpus decandrum</i> Forskal	CARYOPHYLLACEAE
<i>Gynandrus sisyrinchium</i> (L.) Parl.	IRIDACEAE
<i>Gypsophila arabica</i>	CARYOPHYLLACEAE
<i>Gypsophila pilosa</i> Husdon	CARYOPHYLLACEAE
<i>Haloxylon persicum</i>	CHENOPODACIAE
<i>Haplophylum tuberculatum</i>	RUTACEAE
<i>Helianthemum lippii</i> (L.) Dum.-Courset	CISTACEAE
<i>Helianthemum sancti-antonii</i> Schweinf. ex Boiss	CISTACEAE
<i>Helianthemum vesicarium</i>	CISTACEAE
<i>Heliotropium europeum</i>	BORAGINACEAE
<i>Heliotropium rotundifolium</i>	BORAGINACEAE
<i>Hippocrepis unisilquosa</i>	FABACEAE
<i>Hirschfeldia incana</i> (L.) Lagre'ze-Fossat	BRASSICACEAE
<i>Holosteum umbellatum</i> L.	CARYOPHYLLACEAE

<i>Hordeum bulbosum</i>	POACEAE
<i>Hordeum glaucum</i>	POACEAE
<i>Hordeum spontaneum</i>	POACEAE
<i>Hordeum vulgare distichum</i>	POACEAE
<i>Hyacinthella nervosa</i>	LILACEAE
<i>Hyoscyamus aureus</i> L.	SOLANACEAE
<i>Hyoscyamus reticulatus</i>	SOLANACEAE
<i>Ifloga spicata</i>	COMPOSITAE
<i>Iris edomensis</i> Sealy	IRIDACEAE
<i>Iris petrana</i> Dinsm.	IRIDACEAE
<i>Ixiolirion tataricum</i> (Pall.) Herb.	AMARANTHACEAE
<i>Juncus articulatus</i>	JUNCACEAE
<i>Juncus fontanesi</i> J. Gay	JUNCACEAE
<i>Juncus subulatus</i> Cyrill.	JUNCACEAE
<i>Juniperus phoenicia</i> L.	CUPRESSACEAE
<i>Kickxia floribunda</i>	SCROPHULARIACEAE
<i>Koelipinia linearis</i>	COMPOSITAE
<i>Lactuca orientalis</i>	COMPOSITAE
<i>Lactuca serriola</i> L.	COMPOSITAE
<i>Lamarckia aurea</i>	POACEAE
<i>Lamium amplexicaule</i> L.	LABIATAE
<i>Lamium moshatum</i> (Mill)	LABIATAE
<i>Lappula spinocarpus</i> (Forssk.)	BORAGINACEAE
<i>Lasiopogon muscoides</i>	COMPOSITAE
<i>Lathyrus cicera</i> L.	FABACEAE
<i>Launea capitata</i>	COMPOSITAE
<i>Launea mucronata</i>	COMPOSITAE

<i>Lavandula dentata</i>	LABIATAE
<i>Lenotice leontopetalum</i>	BERBERIDACEAE
<i>Leopoldia comosa</i>	LILIACEAE
<i>Leopoldia deserticola</i> Rech.	LILIACEAE
<i>Leyserra capillifolia</i> (Willd.) Spreng	COMPOSITAE
<i>Leysera leyseroides</i>	COMPOSITAE
<i>Limonium lobatum</i> (L.) O. Kuntze	PLUMBAGINACEAE
<i>Linaria tenuis</i>	SCROPHULARIACEAE
<i>Lonicera etrusca</i> Santi	CAPRIFOLIACEAE
<i>Lorentus acaciae</i>	LORANTHACEAE
<i>Lycopersicon esculentum</i>	SOLANACEAE
<i>Malabaila secacul</i>	UMBELLIFERAE
<i>Malva neglecta</i> Wallr.	MALVACEAE
<i>Malva nicaeensis</i> All.	MALVACEAE
<i>Malva sylvestris</i> L.	MALVACEAE
<i>Marrubium cuneatum</i> Banks & Sol.	LABIATAE
<i>Marrubium undulatum</i> Sieb. ex Fresen	LABIATAE
<i>Marrubium vulgare</i> L.	LABIATAE
<i>Matthiola longipetala</i>	BRASSICACEAE
<i>Medicago lupulina</i> L.	FABACEAE
<i>Medicago radiata</i>	FABACEAE
<i>Medicago sativa</i> L.	FABACEAE
<i>Mentha longifolia</i>	LABIATAE
<i>Mercurialis annua</i>	EUPHORBIACEAE
<i>Mesembyanthemum nodiflorum</i>	AIZOACEAE
<i>Micromeria nervosa</i> (Desf.) Bentham	LABIATAE
<i>Minuartia picta</i>	CARYOPHYLLACEAE
<i>Moringa peregrina</i>	MORINGACEAE
<i>Morus alba</i>	MORACEAE
<i>Muscari commutatum</i>	LILIACEAE

<i>Muscari inconstictum</i> Rech. Fil	LILIACEAE
<i>Muscari neglectum</i> Guss	LILIACEAE
<i>Nerium oleander</i>	APOCYNACEAE
<i>Neslia apiculata</i>	BRASSICACEAE
<i>Nicotiana rustica</i>	SOLANACEAE
<i>Noaea mucronata</i> (Forsk.) Aschers & Schweinf.	CHENOPODIACEAE
<i>Ochradenus baccatus</i>	RESEDACEAE
<i>Onobrychis wettsteinii</i>	FABACEAE
<i>Ononis antiquorum</i>	FABACEAE
<i>Ononis natrix</i>	FABACEAE
<i>Ononis spinosa</i> L.	FABACEAE
<i>Onopordon anisacanthum</i>	COMPOSITAE
<i>Ornithogatum umbellatum</i>	LILIACEAE
<i>Orobanche aegyptiaca</i>	OROBANCHACEAE
<i>Orobanche cernua</i>	OROBANCHACEAE
<i>Orobanche nana</i> Noe	OROBANCHACEAE
<i>Osyris alba</i> L.	SANTALACEAE
<i>Papaver argemone</i>	PAPAVERACEAE
<i>Papaver humile</i>	PAPAVERACEAE
<i>Papaver polytrichum</i> Boiss. & Ky.	PAPAVERACEAE
<i>Paracaryum rugulosum</i>	BORAGNICACEAE
<i>Paronychia arabica</i> (L.) DC.	CARYOPHYLLACEAE
<i>Paronychia argentea</i> Lam.	CARYOPHYLLACEAE
<i>Paronychia palestina</i> Eig	CARYOPHYLLACEAE
<i>Peganum harmala</i> L.	ZYGOPHYLLACEAE
<i>Phagnalon rupestre</i> (L.) DC.	COMPOSITAE
<i>Phlomis viscosa</i>	LABIATAE
<i>Phlomis sp.</i>	LABIATAE

<i>Phoenix dactylifera</i>	ARECACEAE
<i>Phragmites australis</i>	POACEAE
<i>Picnomon acarna</i>	COMPOSITAE
<i>Picris damscena</i>	COMPOSITAE
<i>Pistacia atlantica</i>	ANACARDIACEAE
<i>Pistacia khinjuk</i> stocks	ANACARDIACEAE
<i>Pistacia palaestina</i>	ANACARDIACEAE
<i>Pituranthus dicotomus</i> Forskal	CARYOPHYLLACEAE
<i>Plantago afra</i> L.	PLANTAGINACEAE
<i>Plantago albicans</i> L.	PLANTAGINACEAE
<i>Plantago ciliata</i> Desf.	PLANTAGINACEAE
<i>Plantago cylindrica</i> Forskal	PLANTAGINACEAE
<i>Plantago haussknechtii</i> Vatke	PLANTAGINACEAE
<i>Plantago lanceolata</i> L.	PLANTAGINACEAE
<i>Plantago notata</i>	PLANTAGINACEAE
<i>Plantago psyllium</i> L.	PLANTAGINACEAE
<i>Plantago pumila</i> Wild.	PLANTAGINACEAE
<i>Poa sinaica</i>	POACEAE
<i>Polygana hohenhackeriana</i>	POLYGALACEAE
<i>Polygonum equisetiforme</i> Sibth & Sm.	BORAGINACEAE
<i>Populus euphratica</i>	SALICACEAE
<i>Psoralea bitumenosa</i> L.	FABACEAE
<i>Psoralea flaccida</i>	FABACEAE
<i>Pulicaria incisa</i>	COMPOSITAE
<i>Quercus coccifera</i> (=calliprinos)	FAGACEAE
<i>Ranunculus asiaticus</i>	RANUNCULACEAE
<i>Reichardia orientalis</i> (L.) Hochr	COMPOSITAE
<i>Reichardia tingitana</i>	COMPOSITAE
<i>Reseda lutea</i>	RESEDACEAE

<i>Retama raetam</i> (Forsk.) Webb et Berth	FABACEAE
<i>Rhagadiolus stellatus</i> (L.) Willd.	COMPOSITAE
<i>Rhamnus dispermus</i>	RHAMNACEAE
<i>Rhamnus palaestinus</i>	RHAMNACEAE
<i>Rhamnus punctatus</i> Boiss.	RHAMNACEAE
<i>Roemeria hybrida</i> (L.) DC.	PAPAVERACEAE
<i>Romulea bulbocoidium</i> (L.) Seb. & Mauri	IRIDACEAE
<i>Romulea petraea</i>	IRIDACEAE
<i>Rubia danaensis</i>	RUBIACEAE
<i>Rubia tenuifolia</i> D'Urv.	RUBIACEAE
<i>Rumex cyprius</i> Murb. emend Sam.	POLYGONACEAE
<i>Ruta chalepensis</i>	RUTACEAE
<i>Salix acmophylla</i>	SALICACEAE
<i>Salix alba</i>	SALICACEAE
<i>Salsola vermiculata</i>	CHENOPODIACEAE
<i>Salvia longigera</i>	LABIATAE
<i>Salvia palaestina</i>	LABIATAE
<i>Salvia hierosolymitana</i> Boiss.	LABIATAE
<i>Salvia verbenaca</i> L.	LABIATAE
<i>Sarcopoterium spinosum</i>	ROSACEAE
<i>Scabiosa porphyroneura</i>	DIPSACEAE
<i>Scandix pecten-veneris</i>	UMBELLIFERAE
<i>Schismus barbatus</i> (L.) Thell.	POACEAE
<i>Scolymus maculatus</i>	COMPOSITAE
<i>Scorzonera judaica</i> Eig	COMPOSITAE
<i>Scrophularia nabataeorum</i>	SCROPHULARIACEAE
<i>Seidlitzia rosmarinus</i>	CHENOPODACIAE
<i>Senecio cornifolius</i> Desf.	COMPOSITAE
<i>Senecio desfontanei</i> Druce	COMPOSITAE
<i>Senecio vernalis</i> Wladst & Kit	COMPOSITAE

<i>Seriola orientalis</i> (Boiss.) Boiss.	COMPOSITAE
<i>Silene aegyptiaca</i> (L.) L. fil	CARYOPHYLLACEAE
<i>Silene conoidea</i> L.	CARYOPHYLLACEAE
<i>Silene italica</i> (L.) Pers .	CARYOPHYLLACEAE
<i>Silene coniflora</i>	CARYOPHYLLACEAE
<i>Silene nabataea</i>	CARYOPHYLLACEAE
<i>Silybum marianum</i> (L.) Gaertn.	COMPOSITAE
<i>Sinapis alba</i>	BRASSICACEAE
<i>Solanum luteum</i> Miller	SOLANACEAE
<i>Sisymbrium erysimoides</i>	BRASSICACEAE
<i>Sonchus maritimus</i>	COMPOSITAE
<i>Sonchus terrimus</i> L.	COMPOSITAE
<i>Stachys cretica</i>	LABIATAE
<i>Stellaria media</i> (L.) vill.	CARYOPHYLLACEAE
<i>Sternbergia clusiana</i>	AMARYLLIDACEAE
<i>Stipa capensis</i> Thunb.	POACEAE
<i>Stipagrostis ciliata</i> (Desf.) de Winter	POACEAE
<i>Tagetes minuta</i>	COMPOSITAE
<i>Tamarix aphylla</i>	TAMARICACEAE
<i>Teucrium pollium</i> L.	LABIATAE
<i>Thymelaea hirsuta</i> (L.) Endl.	THYMELAEACEAE
<i>Torilis leptophylla</i>	UMBELLIFERAE
<i>Tragopogon collinus</i>	COMPOSITAE
<i>Trigonella arabica</i> Delile	FABACEAE
<i>Trigonella stellata</i> Forskal	FABACEAE
<i>Tripteris vaillantii</i>	COMPOSITAE
<i>Tulipa systola</i>	LILIACEAE
<i>Umbilicus intermedius</i> Boiss.	CRACULACEAE
<i>Urginea maritima</i> (L.) Baker	LILIACEAE

<i>Urospermum picroides</i> (L.) F.W. Schmidt	COMPOSITAE
<i>Urtica urens</i> L.	URTICACEAE
<i>Urtica pilulifera</i>	URTICACEAE
<i>Vaccaria pyramidata</i> Medikus	CARYOPHYLLACEAE
<i>Valantia hispida</i>	RUBIACEAE
<i>Varthemia iphionoides</i> Boiss.	COMPOSITAE
<i>Verbascum sinaiticum</i>	SCROPHULARIACEAE
<i>Veronica anagallis-aqnatica</i>	
<i>Zilla spinosa</i>	BRASSICACEAE
<i>Ziziphora hispanica</i> L.	LABIATAE
<i>Ziziphora tenuiou</i> (L.)	LABIATAE
<i>Ziziphus lotus</i>	RHAMNACEAE
<i>Ziziphus spina-christi</i>	RHAMNACEAE

Total number of species: 388

Total number of families: 59

6.2 Plant families recorded in Petra Region

ADIANTACEAE

AIZOACEAE

AMARANTHACEAE

AMARYLLIDACEAE

ANACARDIACEAE

APOCYNACEAE

ARACEAE

ASCLEPIADACEAE

BERBERIDACEAE

BORAGINACEAE

BRASSICACEAE

CAMPANULACEAE

CAPPARACEAE

CAPRIFOLIACEAE

CARYOPHYLLACEAE

CHENOPODACEAE

CISTACEAE

COMPOSITAE

CONVOLVULACEAE

CRASSULACEAE

CUCURBITACEAE

CUPRESSACEAE

DIPSACEAE
EPHEDRACEAE
EUPHORBIACEAE
FABACEAE
FUMARIACEAE
GERANIACEAE
GLOBULARIACEAE
IRIDACEAE
JUNCACEAE
LABIATAE
LILIACEAE
LORANTHACEAE
MALVACEAE
MIMOSACEAE
MORACEAE
MORINGACEAE
OROBANCHAECEAE
PAPAVERACEAE
PLANTAGINACEAE
PLUMBAGINACEAE
POACEAE
POLYGONACEAE
POLYGALACEAE
PRIMULACEAE
RANUNCULACEAE

RESEDACEAE
 RHAMNACEAE
 ROSACEAE
 RUBIACEAE
 RUTACEAE
 SALICACEAE
 SCROPHULARIACEAE
 SOLANACEAE
 THYMELAEACEAE
 UMBELLIFERAE
 URTICACEAE
 ZYGOPHYLLACEAE

6.3 Oran lists of as rare and/or endangered species

(2003:10; endangered in red)

<i>Alkanna strigosa</i>	<i>Erodium touchyanum</i>	<i>Pistacia atlantica</i>
<i>Amygdalus korschinskyi</i>	<i>Eryngium creticum</i>	<i>Plantago ovata</i>
<i>Asparagus aphylla</i>	<i>Fagonia mollis</i>	<i>Quercus coccifera</i>
<i>Caylusea hexagyna</i>	<i>Ficus sycomorus</i>	<i>Romula bulbocoides</i>
<i>Citrullus colocynthus</i>	<i>Galium canum</i>	<i>Salvia aegyptiaca</i>
<i>Consolida sclerosclada</i>	<i>Glaucium arabicum</i>	<i>Trichodesma africanum</i>
<i>Crucianella ciliata</i>	<i>Haplophyllum tuberculatum</i>	<i>Varthemia iphionoides</i>
<i>Crucianella cucularis</i>	<i>Iris petrana</i>	<i>Xanthium spinosum</i>
<i>Echium judaicum</i>	<i>Juniperus phoenicia</i>	
<i>Erodium deserti</i>	<i>Nicotiana rustica</i>	

9.1.1.1.1.1 8.5.4 Plant species with medicinal value
(Oran 2003 11ff; endangered in red)

<i>Achillea fragrantissima</i>	<i>Haplophyllum tuberculatum</i>	<i>Pistacia atlantica</i>
<i>Achillea santolina</i>	<i>Hyoscamus aureus</i>	<i>Plantago ovata</i>
<i>Anagallis arvensis</i>	<i>Iris petrana</i>	<i>Polygonum equisetiforme</i>
<i>Ajuga chia</i>	<i>Juniperus phoenicia</i>	<i>Quercus coccifera</i>
<i>Alkanna strigosa</i>	<i>Marrubium vulgare</i>	<i>Retama raetam</i>
<i>Anchusa strigosa</i>	<i>Mentha longifolia</i>	<i>Salvia aegyptiaca</i>
<i>Artemisia sieberi</i>	<i>Mercurialis annua</i>	<i>Solanum luteum</i>
<i>Chrozophora tinctoria</i>	<i>Nicotiana rustica</i>	<i>Teucrium pollium</i>
<i>Citrullus colocynthis</i>	<i>Ononis antiquorum</i>	<i>Urginea maritima</i>
<i>Ephedra aphylla</i>	<i>Ononis natrix</i>	<i>Varthemia iphionoides</i>
<i>Glaucium arabicum</i>	<i>Paronychia argentea</i>	<i>Xanthium spinosum</i>
<i>Globularia arabica</i>	<i>Peganum harmala</i>	