



The Strategic Master Plan For the Petra Region



Strategic Plan for DLAGHA and surrounding areas

June 2011

DESIGNWORKSHOP

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Steps of the Preparation of the Master Plan for Petra Region



ABOUT THE PREPARATION OF THE MASTER PLAN

Overall objective

The overall objective of the project is to provide the **Petra Development and Tourism Region Authority (PDTRA)** with a Strategic Master Plan that guides planned development of the Petra Region in an efficient, balanced and sustainable way over the next 20 years for the benefit of the local population and of Jordan in general. Special consideration is required for protecting the globally significant Petra Archaeological Park, which lies completely within the area governed by PDTRA.

Project Duration

11 months (July 2010 – June 2011)

Process

The process of developing the Strategic Master Plan for the Petra Region incorporated a diagnostic phase, including stakeholder interviews and workshops. The findings of this initial phase were the basis for the elaboration of the “detailed analysis, scenarios and strategy, including guidelines and regulations to encourage private investment while protecting the park” for the entire Petra Region. Before starting the final elaboration phase of the Strategic Master Plan workshops took place to present and discuss the intermediate results with the population of the Petra Region.

In addition to the general report for the Petra Region, individual reports for each of the six communities located within the region have been prepared presenting balanced, well focused, efficient and sustainable “Selected Strategic Area Plans” taking into account the characteristics of each of the communities.

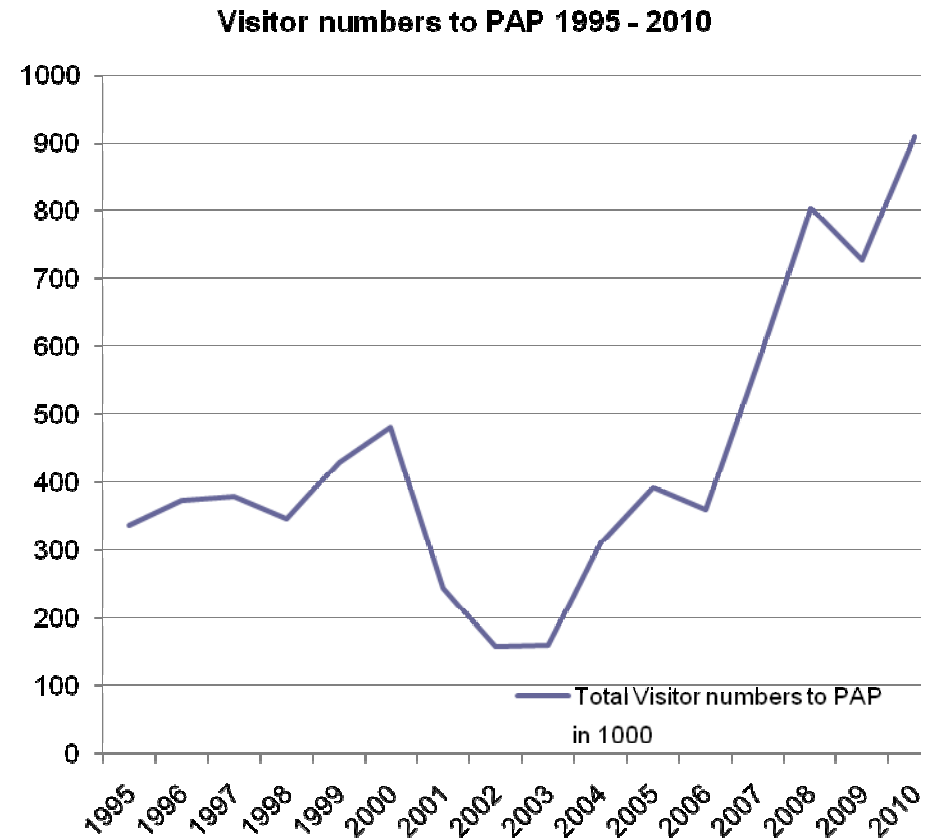




IMPORTANCE OF THE PAP FOR THE PETRA REGION

The Petra Region's most important aspect for the economic as well as the social development is the tourism sector, in which the Petra Archaeological Park (PAP), one of the world's richest and largest archaeological parks, plays a major role. The dramatic rock-cut temples and tombs as well as the water collection, distribution and storage system of the Nabataeans represent unique artistic and technical achievements. Due to its outstanding universal value, Petra became a UNESCO World Heritage site in 1985. In 2007, the world public elected Petra as one of the "Seven Wonders of the World", which is an excellent indicator for the dramatic rise in popularity of the site. The Cultural Space of the Bedu was inscribed in 2008 on the UNESCO Intangible Cultural Heritage List of Humanity.

In 2010, the total visitor number of PAP has reached more than 900,000 visitors, rapidly approaching the maximum carrying capacity of the park, which was estimated by UNESCO at 1.26 million in 1994. The dramatic rise in visitor numbers over the last 10 years has also increased the pressure on the PAP. The Petra Archaeological Park plays not only an important role for the development of the regional economy, but also for the national economy. However, its economic potential both from tourism as well as related sectors is far from being utilized to its full extent; also the protection of the PAP as well as of the other regional natural and cultural resources is insufficient. Infrastructure deficiencies of the communities further limit the economic development and aggravate environmental problems. As a result the population of the Petra Region is not benefitting as much as it would be possible considering the unique assets and opportunities of their region. Therefore, considerable infrastructure improvements are being recommended to facilitate economic growth.



MAIN CHALLENGES OF THE PETRA REGION

Improvements within the PAP as well as other tourism related products and services could - with careful planning - enhance the economic situation and living quality, reduce social disparities and tensions and protect the region's natural and cultural resources. The Strategic Master Plan addresses the most pressing socio-economic and environmental issues related to the PAP, tourism growth, efficient land-use, as well as other social and infrastructural challenges, which were expressed in the course of the numerous personal interviews, community workshops and discussions in the communities. The main challenges for the further development of the Petra Region come from

1.) a socio-economic perspective:

- Decrease disparities between the communities and tribes in Petra Region in terms of income, number and quality of jobs, education and human development in general;
- Enhance the competitiveness of sectors related to tourism so that a regional supply chain for tourism can develop;
- Provide alternative sources of employment for area residents not directly engaged in the field of tourism;
- Promote endogenous and foreign investments of the private and public sector in the local economy.

2.) the perspective of Petra Archaeological Park:

- Optimize carrying capacities and visitor flow in the interest of visitor satisfaction and protection of the World Heritage site;
- Increase service quality and variety of products offered in the PAP in order to increase visitor satisfaction and money spent while reducing its negative impact on the PAP;
- Establish an advance booking and ticketing service as well

as a visitor flow concept that will help to ensure a more even visitor distribution over the day and over the year;

- Establish a well-defined "animal policy" for PAP;
- Define PAP and the World Heritage site boundaries in a clear and logical way agreed on by all stakeholders.

3.) the perspective of Petra's tourism product:

- Consider, plan and implement tourism activities outside of PAP, which complement the services of the park;
- Package, market and organize a variety of activities and attractions in such a way that tourists stay longer in the region;
- Increase revenues and profits by offering more innovative and more valuable local products that are also marketed and merchandised in a more professional way;
- Support smaller businesses and family businesses working together in more or less formal cooperatives;
- Create personal guiding services with well-educated and well-trained local personnel that offers a large potential for the creation of numerous new jobs;
- Establish a "hop-on/hop-off" shuttle transportation service in order to increase the mobility of both tourists and locals.

4.) a land use perspective:

- Establish boundaries that conform to heavy concentrations of archaeological sites, land ownership, ecological units, or physical features like roadways;
- Provide and communicate a clear definition of existing or proposed land use zones within the Petra Region;
- Gather reliable GIS data and maps, which are urgently needed to establish a reliable basis for land use planning;
- Control and plan urban development more efficiently;
- Consider a formal policy statement on the appropriateness or

prohibition of mining in some areas of the Petra Region in order to protect the archaeological sites and resources of the PAP and the Petra Region;

- Suggest specific zoning and land use plans for regions or towns that are missing.

5.) an environmental perspective:

- Set up mechanisms to establish an accurate, reliable, and comprehensive database of information about land within the region including flora, fauna and other types of resources;
- Set up more stringent regulations to protect the natural environment of the region, especially regarding grazing and fuel-wood collection practices;
- Integrate protected areas planned by the RSCN into the regional development plan through establishing close communication and coordination between the PDTRA and RSCN.

6.) a social and infrastructural perspective:

- Balancing the lack of social services and its uneven distribution across the region;
- Strengthen the cooperation between PDTRA and regional utility providers to establish a clear Utility Extension Policy;
- Shape the institutional and stakeholder environment in a way that allows for a clear communication between the PDTRA and the ministries by avoiding an overlapping of activities;
- Allow for a better information flow and more communication between PDTRA and local residents;
- Provide a state-of-the-art local transportation system to minimize the negative ecological impact of diesel buses and increasingly congested traffic (particularly in Wadi Musa).

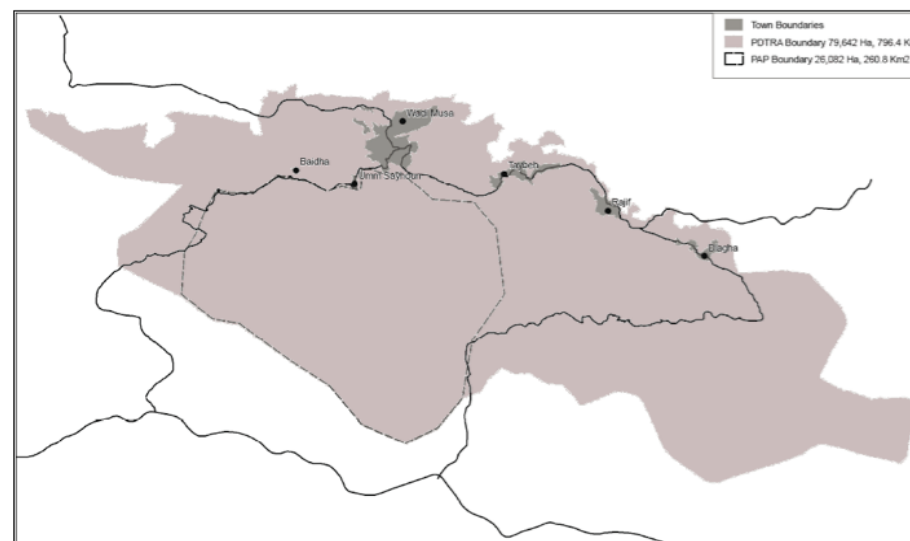
The identified main challenges for the further development of the

Petra Region need to be addressed in detail in order to make sure that both the vision and the strategic master plan fit the individual strengths, weaknesses, opportunities and threats of both the Petra Region and its six communities.



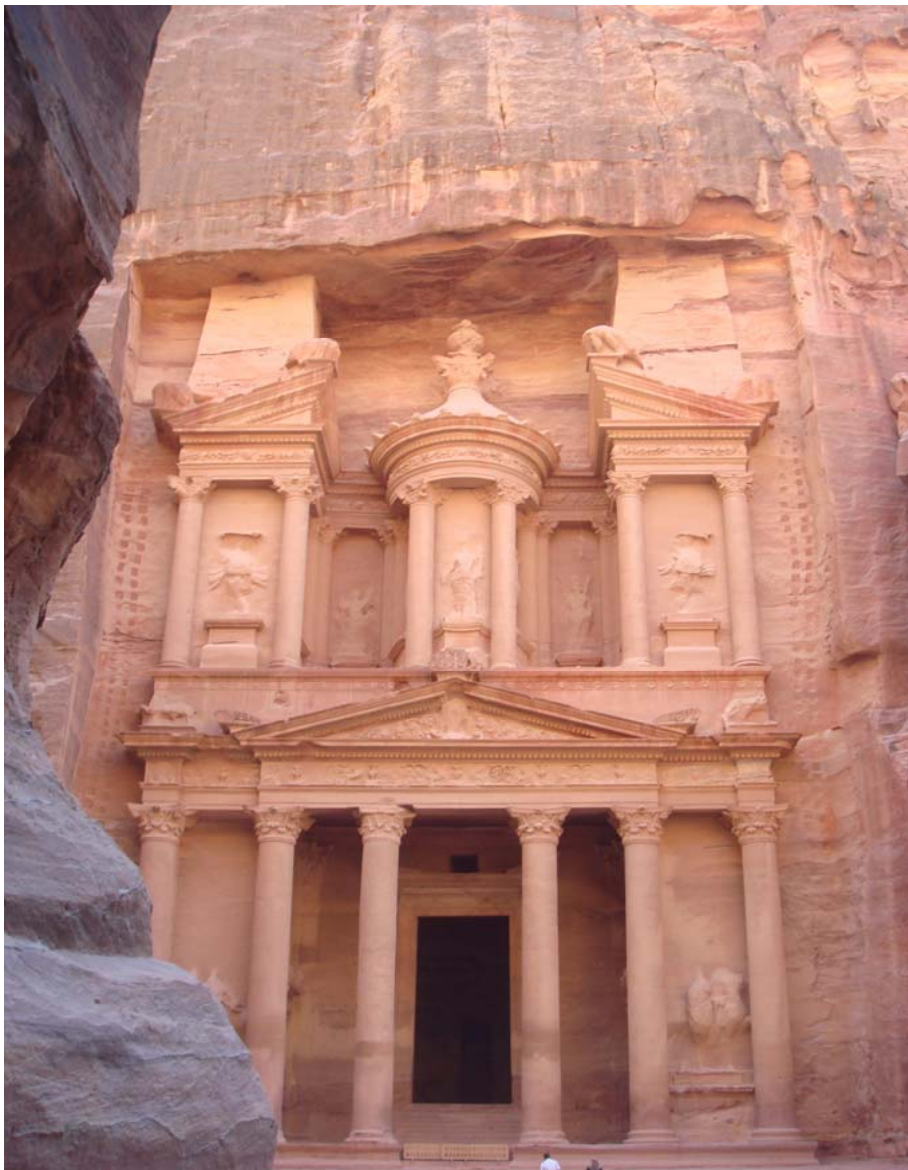
OVERVIEW OF THE PETRA REGION

The Petra Region under the administration of the Petra Development and Tourism Regional Authority (PDTRA) is a 796.41 donum semi-autonomous district including the 260.82 donum of the Petra Archaeological Park. Within the region the six communities Dlagha, Rajif, Taybeh, Wadi Musa, Umm Sayhoun and Baidha, which have a total population number of 27,944 inhabitants (DOS 2009), are situated. These communities are connected to each other through well-maintained highways: Baidha and Umm Sayhoun, located in the North of the region, are connected to Wadi Musa through the Wadi Araba highway, Wadi Musa, Taybeh and Rajif are located along the King's highway ("Scenic Road"). Dlagha, the community located at the Southern end of the region, is connected to Rajif through the Masoudha highway.



Community	Population (DOS 2009)	Area existing within town boundaries (in donum)	Tribe (qabilah)
Baidha	401	63	Amaariin
Umm Sayhoun	1,631	290	Bidoul
Wadi Musa	17,085	7,360	Layathnah
Taybeh	5,719	3,120	Layathnah
Rajif	1,674	1,880	Rawajfah
Dlagha	1,434	1,630	Saidiyyiin
Total	27,944	14,343*	

*Excluding Al Hayy, an area of Wadi Musa that is classified as residential zone but is not yet developed



OVERALL VISION FOR THE PETRA REGION

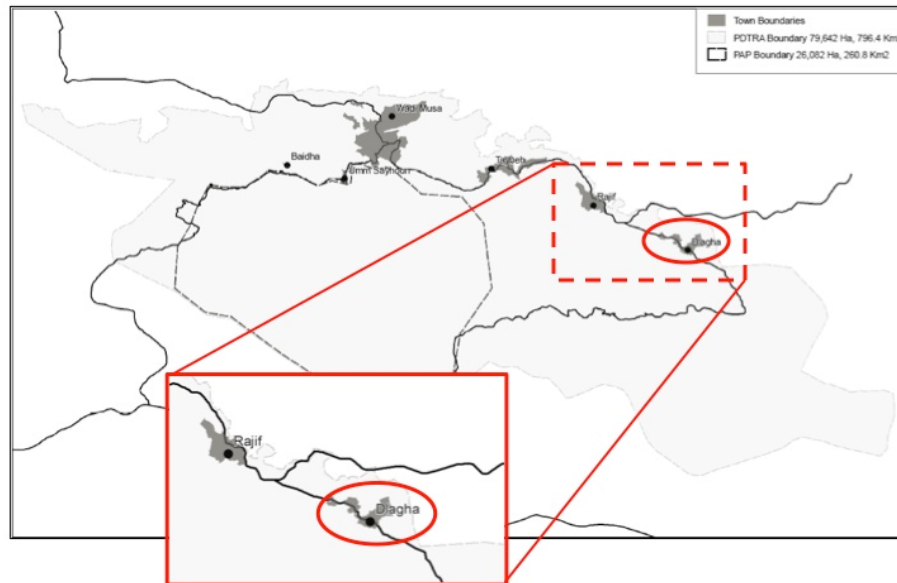
⇒ **Change from a mere Attraction to a World-Class Tourism Destination** based on its unique, well-preserved and authentic cultural and natural heritage, outstanding service quality and high environmental standards.

Strategic objectives for the Petra Region:

- Long-term protection and preservation of the unique cultural and natural values must have precedent over short-term economic benefits;
- Encouragement of entrepreneurial behavior and a market economy within a strictly enforced set of transparent and coherent rules and regulations;
- Strengthen regional value creation from economic activities and development of region-specific competitive advantages;
- Urban development in compact and delightful urban forms that can be served in an efficient way by infrastructure and public services and allow future populations to be accommodated with the minimal consumption of land;
- Provision of basic infrastructure and public services throughout the region in order to create equal opportunities.

The mission of the Petra Development and Tourism Region Authority (PDTRA) will be to act responsibly in every possible way to protect the archaeological treasures of the area and to foster and maintain development in a sustainable way. The PDTRA will act in the best interest of the people of the region and will strive for social equality and equal opportunities for all citizens of the region alike. The PDTRA will ensure to actively engage each of the six communities in the future development processes of the region.

DLAGHA IN THE CONTEXT OF THE PETRA REGION



Dlagha is located in the Southern periphery of the Petra Region at about 22km from the center of the region Wadi Musa and about 7km South from Rajif. The community is built along the road leading to the Masoudha Special Conservation Area.

Among the six communities, Dlagha is with its 1,434 inhabitants (716 males and 718 females DOS 2009) and its area of 1,630 donum (area within town boundaries) one of the smaller communities of the Petra Region. Only Baidha (401 inhabitants) located at the other end of the region has a significantly smaller number of population than Dlagha. In 2009 the population density of Dlagha (based on the area existing within town boundaries) amounted to 0.9 people per donum, which is relatively low compared to the regional average of 2 people per donum.

The Saidiyyiin population living in Dlagha belongs to one of the Bedu tribes whose cultural heritage and traditional skills was proclaimed by UNESCO as Intangible Cultural Heritage. They also have important settlements at al-Risha and Bir Mathkour in Wadi Araba. The Saidiyyiin are distinctive within the Region for having the largest proportion of fully nomadic families.

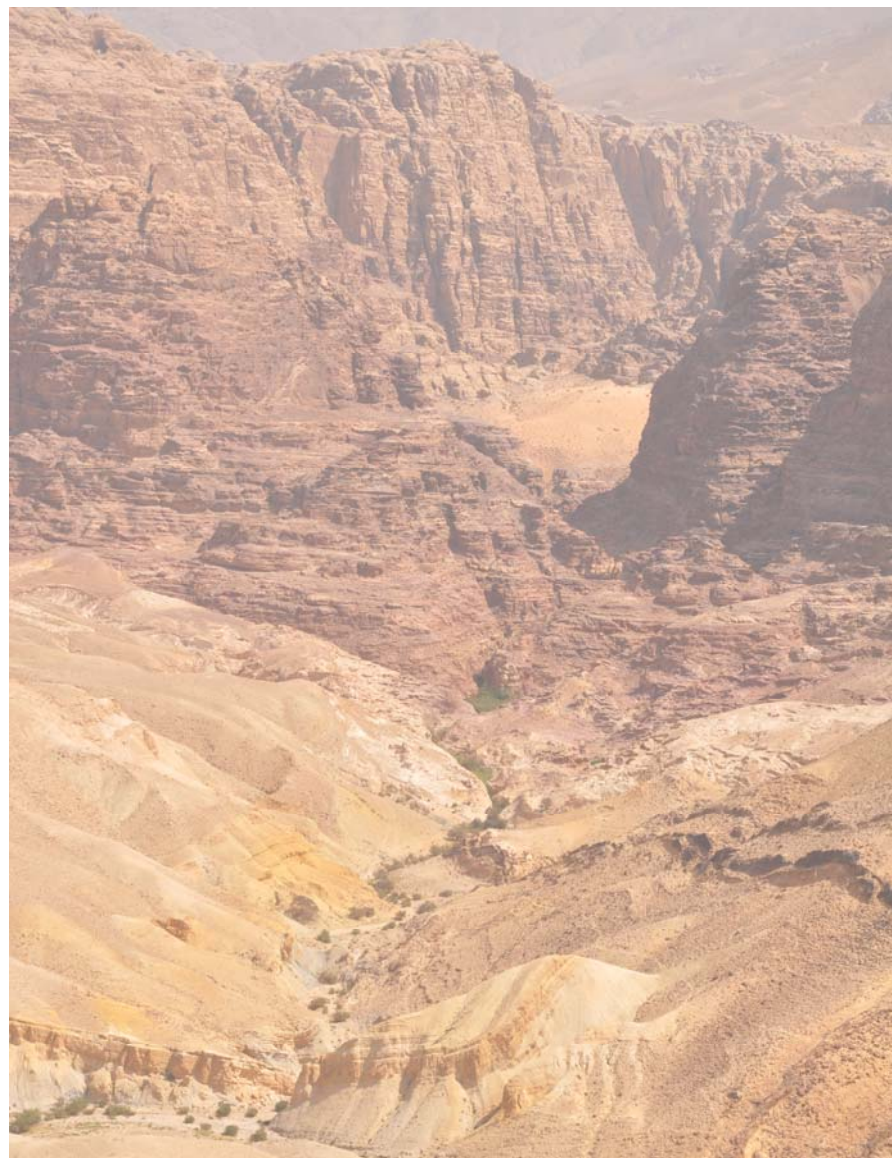
The economic base of the Dlagha population is overwhelmingly livestock husbandry and pensions from military service. They are virtually uninvolved in the tourism sector, even though some tour operators take tourists in the area of the community for camping. However, they are not asking the local population for any services or anything else that is related to tourism. As a result the population of Dlagha is not benefitting economically from this tourism.

Dlagha is located on the way to the proposed Masoudha Special Conservation Area, which is in the process of being established as special conservation zone under the RSCN. The Masoudha Special

Conservation Area will stretch over three different bio-geographical zones with an elevation ranging from 180m to 1500m and includes a rich natural bio-diversity, such as seven different types of vegetation.

Traditionally the still nomadic or semi-nomadic members of the Saidiyyiin tribe are settling within the future Masoudha Special Conservation Area and claim some of the land as “mirri” land. Undocumented or unclear land ownership is one of the main issues impeding the development of the region in general. The Saidiyyiin are presently involved in land dispute with the Bidoul over Jurf Himar.

Due to its small size the Dlagha community is the most disadvantaged community of the region in terms of public facilities (medical services, schooling, telecommunication, transportation infrastructure). According to official records one cooperative exists in Dlagha.



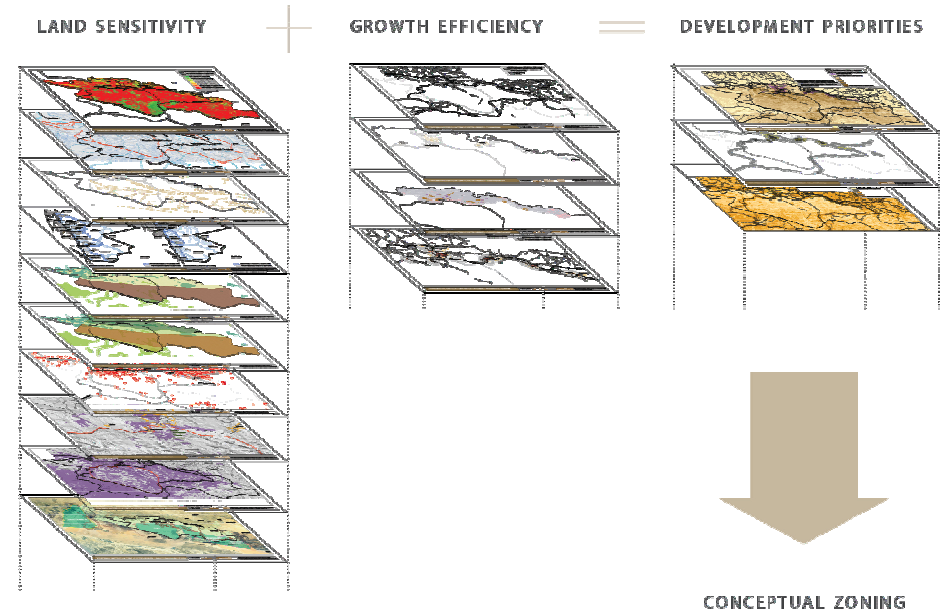
LAND SENSITIVITY ANALYSES

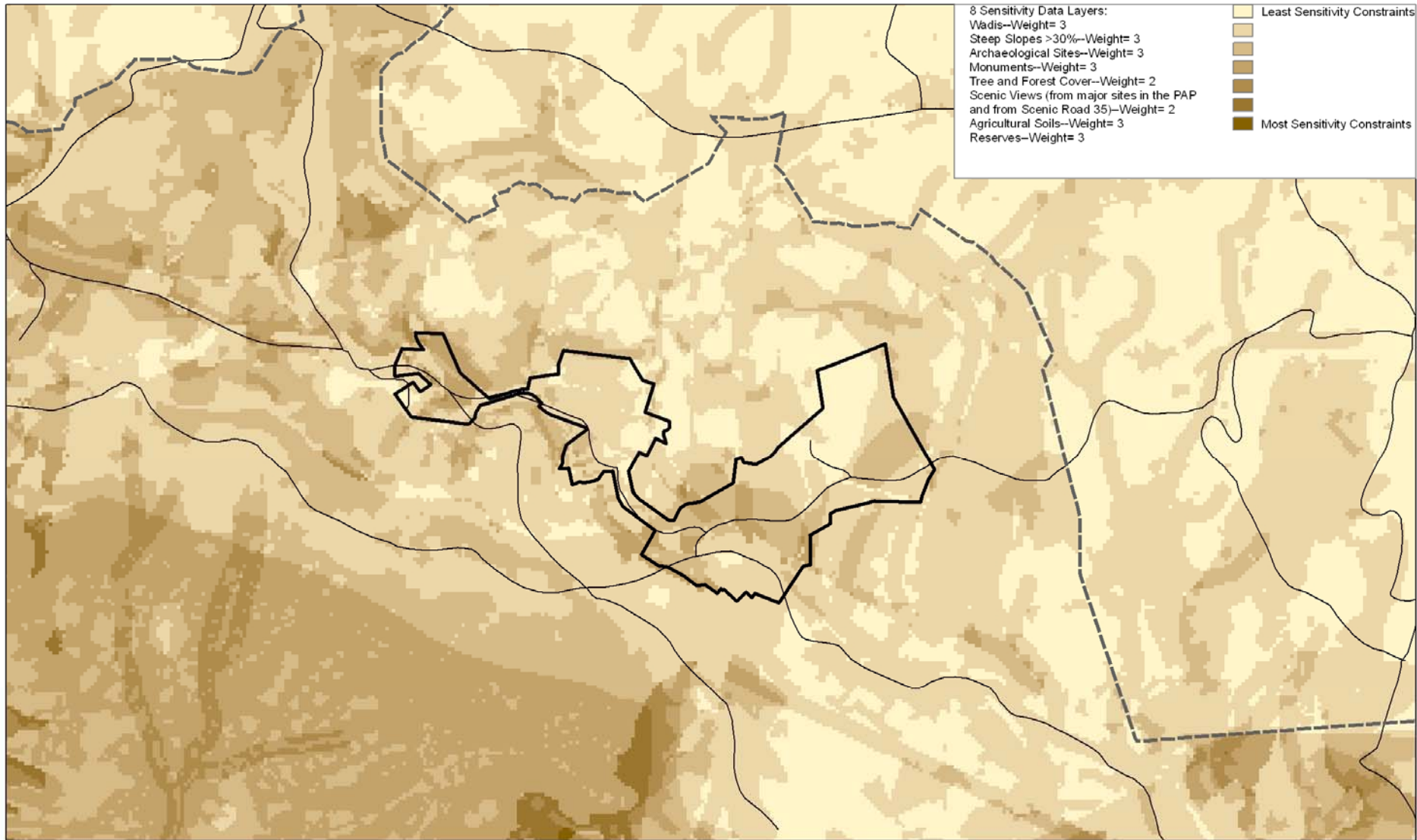
A Development Priorities Map for the region and each community was prepared by combining the Land Sensitivity Maps with the Growth Efficiency Maps. The Development Priorities Maps are used to identify land areas where development can occur with the least impact on important archaeological and natural resources and allowing for the greatest ease and efficiency of providing public services. These maps are based on several objective criteria.

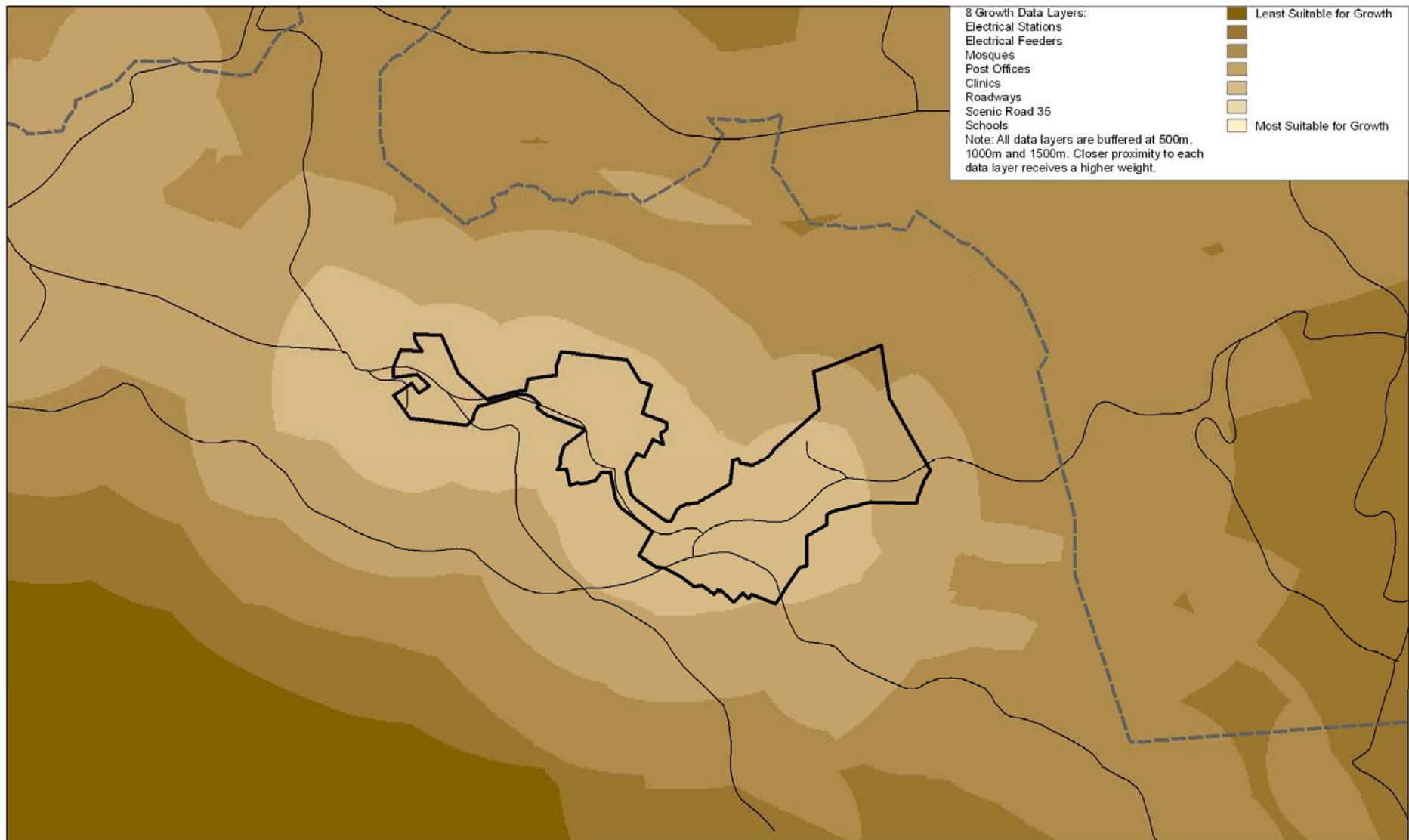
Objective criteria include:

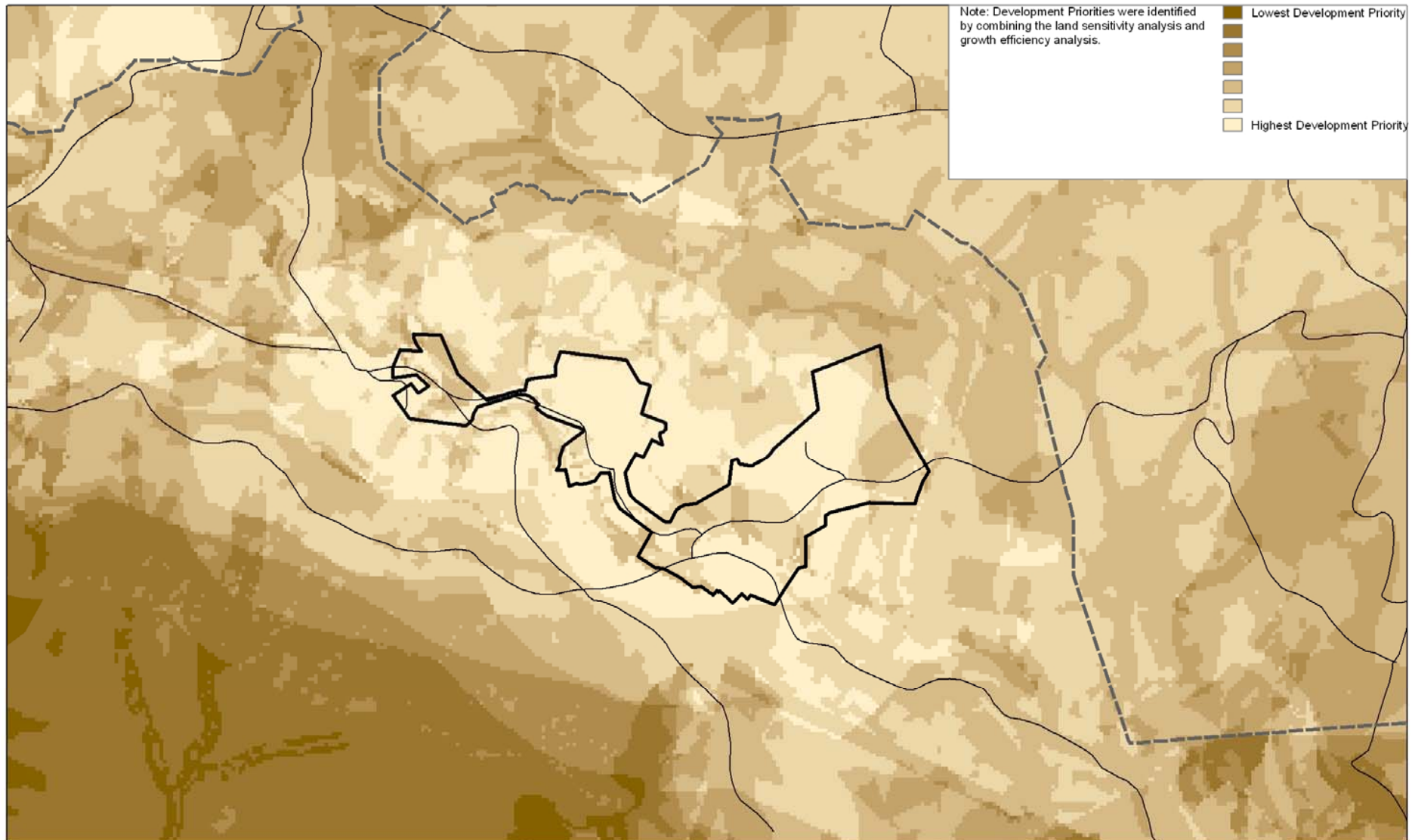
- Topography and slopes
- Hydrology and geology
- Vegetation (types, zones)
- Archaeological Sites
- Agricultural Soils
- Closed Forests
- Bare Rock
- Significant Views
- Transportation Infrastructure
- Water and Sewer Infrastructure
- Electricity Network
- Proximity to Schools
- Landmarks
- Health services
- Accommodation/tourism infrastructure
- Public space and recreation facilities

Please note: That the criteria listed is not exhaustive and that they may vary from one community to another.









STRATEGIC MASTER PLAN FOR THE PETRA REGION -
DEVELOPMENT PRIORITIES | DLAGHA AND SURROUNDING AREA

1 centimeter = 200 meters



Data Accuracy is at 1:50,000.
Current View: 1:20,000

SWOT ANALYSIS OF DLAGHA

Based on a thorough analysis, specific Strengths, Weaknesses, Opportunities and Threats were identified for Dlagha:

STRENGTHS

- Proximity to proposed Masoudha, a protected area with outstanding landscapes
- Existence of Bedu-culture that still use tents
- Relatively active and experienced in agriculture
- Large availability of developable land

WEAKNESSES

- Insufficient bus connection to other communities or to university
- Dangerous traffic on the main street due to lack of lights and pavements
- Road through the village allows for speeding, thus endangering the community
- Insufficient health services (e.g. health laboratory and nurses)
- Lack adequate schools, school facilities and kindergarten
- Lack Internet access and bad mobile phone network coverage
- Lack of water for agriculture due to drying out of springs
- During winter frequently cut-off from the world (no electricity)
- Unregistered landownership rights might result in ownership disputes impeding new constructions
- Claims on further away land that is used for camps in summer ("Mirri land tradition"), therefore fear that the establishment of Masoudha reserve takes away their land
- Lack of association providing classes or trainings
- Lack leisure and entertainment facilities or sports centre for children (Youth club), women and men
- Low skills and competences in the fields required for tourism
- No tourism facilities, products and services, hence very limited benefits from tourism development in the Petra Region
- Low educational level in general creating vulnerability and limiting future development potential
- Geographic distance to the centre reducing income and job opportunities and limiting involvement in political processes

OPPORTUNITIES

- Enhance spill-over effects through better connectivity and transport to the centre (public transport, internet)
 - Better access to labor market
 - Better access to public services such as education and health
 - Stronger involvement in decision making
- Upgrade capacities for local production of agricultural products that will be needed in the growing tourism industry of the region
- Provide access to, and interpretation of archaeological sites close to Dlagha
- Development of outdoor tourism activities (camping, trekking, horse riding, offering authentic Bedouin experience etc.)
- Development of alternative accommodation types and tourism facilities such as camp sites

THREATS

- Development potential restricted because of lacking basic infrastructure, utilities and education as well as lower levels of skills and competences
- Negative attitude towards tourism resulting from tourist traffic rushing through the community without benefitting Dlagha
- Diminishing precipitation and lack of water endangers agriculture as main source of income
- Due to the lack of tourist attractions remains outside the tourist route depending on other income sources as agriculture or army pension
- Unclearified landownership rights might impede the creation of new infrastructure (e.g. schools) and lead to disagreement among the local population



DLAGHA: A VISION FOR A BETTER FUTURE

The overall vision for Dlagha is to develop from a poor community with insufficient infrastructure into an economically, socially and institutionally well-developed community that is involved in and receives benefits from the development of tourism in the South of the Petra Region.

The main potential for Dlagha's future is to manage the development of Masoudha Conservation area and of tourism products linked to the traditional Bedu culture in a quality way, which would allow its population to be more involved in tourism and - most importantly - benefit from increasing job opportunities.

The village of Dlagha is greatly in need of improved facilities and services to improve their standard of living. Soil conditions in the area suggest that agriculture in marginal and alternatives to traditional pastoralism is needed to provide incomes to the people. Investment by PDTRA in Dlagha would be focused on the immediate facilities and services requested by the villagers (central sewer system, water supply for agriculture, land for agriculture, internet, sanitary service, bus transportation to/from Dlagha).

Another very important issue is educating people to become a well-trained work force (women and young people) for some of the new products that may come about (trekking guides, animal park labor, hotel staff etc.).

It will also be important to provide alternative job opportunities to the local population (especially for women). In this regard raising the education level of the population will be of great importance. In order to achieve this goal it is urgent to improve the local infrastructure of

Dlagha, especially regarding schools, telecommunications and public transportation. Basic infrastructure issues are still occurring within the community, such as the lacking connection to the regional sewer network, which urgently needs to be overcome.

In order to create such a vision for Dlagha and allow for its realization, initiatives in the following fields are recommended:

- Tourism Activity
- Petra Camel Entertainment and Trekking Center
- "Escort Services" for Masoudha
- Desert Lifestyle Camp
- Accommodation Facilities
- Other Economic Activities
- Medicinal and Aromatic Herbs Production
- Development of Residential Zone
- Developable Land and Land Use
- Public Transportation
- Public Facilities and Services
- Social Issues
- Water – Wastewater Treatment and Rainfall Floods
- Energy Management
- Environment

TOURISM ACTIVITIES

From a touristic point of view Dlagha is presently not at all developed and only has little to offer. Because of its location within a small valley, Dlagha lacks the spectacular views of Baidha, Wadi Musa, Taybeh, and Rajif, making the construction of tourism facilities directly within the town unlikely. Furthermore, no major archaeological or natural sites are located in the immediate surrounding of Dlagha.

In this regard, the creation of the proposed Masoudha Special Conservation Area could be of great benefit to the people, particularly if a five star eco-lodge will be built as proposed. Potentially employment opportunities could be created within the lodge, as rangers for the reserve, or in various “outfitter” activities, such as horse or camel caravans connected to visitors coming to the Masoudha area. However, in order to achieve a greater involvement of the local population in the tourism business it will crucial to drastically build up their capacity and to build up a well-educated workforce for tourism products and services in the region. Basic skills needed for the tourism sector such as foreign languages are even more needed in Dlagha than in any of the other communities in the region. Furthermore, it is obviously crucial that some initiatives and ideas for new businesses are emerging from within the community as otherwise they will not succeed.

The Masoudha Reserve was been approved by the government several years ago, but has since encountered some opposition from the Saidiyyiin population, the local community whose tribal lands would be encompassed within the boundaries of the reserve. Thus Masoudha's precise delineation is still a matter of debate. In its original configuration Masoudha would have occupied over a third of the Petra Region's area; in its revised form it is close to one-fifth.





PETRA CAMEL ENTERTAINMENT AND TREKKING CENTER

Dlagha, located on the road from the center of the Petra Region to the Masoudha Special Conservation Area, is a logical starting point for camel, horse, hiking, mountain bike, or four wheel drive treks or tented excursions into the Masoudha area and the adjacent conservation zones. Specific trails should be developed and improved or repaired including 4x4 tracks which would connect Dlagha to Masoudha Special Conservation Area and the larger system of the proposed camps and eco-lodges. Furthermore, trekking guides, eco-guides, geology guides, Neolithic trail guides could be trained to serve the network of camps/trails described above in order to provide high-quality and specialized guiding-services to tourists coming to the region. The proposed tracks could likewise connect beyond the Region to Rahma, Humeima, Thughra/King's Highway (al-Rasif), Wadi Rum. Rahma's local association has already developed eco-camps in cooperation with RSCN within the Qatar Special Conservation Area, and might perhaps be willing to participate in a capacity building exercise with the Dlagha association.

The idea behind the Petra Camel Park and Trekking center is to provide visitors coming to the Petra Region and Jordan in general the opportunity to learn more about one of the most important animals for the traditional Bedouin culture. The Saidiyyiin from Dlagha are still living in a traditional semi-nomadic way and are possessing camels and have the knowledge and capacity to work with camels. For tourists camels are the most attractive and typical animals, which can be found in the Middle East. Therefore offering a dedicated camel park where they can learn more about the singularities of the animals through entertaining explanations and personal experience

is a new tourism product, which provides an adventure for the whole family. Children would be able to feed and touch the camels.

The offer would go beyond just briefly riding the animal, as through a well-conceived exhibition including pictures, personal testimonials and objects related to the life and uses of camels an interesting background will be provided. Furthermore the local population will also perform shows, tricks and camel races in the desert to demonstrate the great art of riding camels. Of course the park should be the starting point for excursions on camel backs into the breathtaking landscape of the Southern-Petra Region and beyond, depending on the length of the trip the visitors would like to book. Some camel excursions could last even for several days including camping in traditional tents. Of course skilled locals who know the animals and the region will guide all rides and trips. For the camels and their owners the park is a safe place to keep the animals and to provide medicinal care for the animals.

A preliminary investment budget as well as a prognosis of annual revenues and a potential job creation effect is shown below.

DLAGHA Petra Camel Entertainment and Trekking Center	Estimated space requirement in m2	Estimated Cost Construction / Landscaping JOD per m2	Estimated Construction Cost Total in JOD	Estimated Cost Furnishing JOD per m2	Estimated Furnishing Cost Total in JOD
Land Needed (with parking)	10.000	5	50.000	0	0
40 Stables at 20 m2	800	200	160.000	50	40.000
Training Institute	150	500	75.000	400	60.000
Shop & Cafeteria	120	500	60.000	600	72.000
Administration	100	500	50.000	300	30.000
Total indoor space	370		395.000		202.000
Planning & Unforeseen(20%)					119.400
Estimated Total					716.400

Estimated Ratio of Public/Private Stake in the Project	60:40
Estimated Annual Revenue Prognosis (1% of Petra Visitors à JOD 80.--)	640.000
Estimated Number of Jobs Created	30

“ESCORT SERVICES” FOR MASOUDHA

These “escorts” – both women and men of varying age groups –, suitable to serve various target groups in various languages may act as escort for walking tours or riding tours in the surroundings of Dlagha including the way to Masoudha Special Conservation Area or for the Wadi Araba. Besides providing guiding services to the visitors the aim of the escorts would not be to give academic explanations (such as do the fully trained national guides), but rather to entertain the visitors and let them feel welcome by sharing their own culture with them.

The escorts would provide the visitors insights in their way of life and the one of their ancestors through telling true personal stories. It is suggested that the tourism faculty of the local university (AHU) will develop a two semester training program for such escorting services. Obviously the graduates of the courses will not receive the same license as the longer and more intensively fully trained official Jordanian Tour Guides; rather, they would receive a “light” version of a tour guide license. In order not to be mixed up, it may be suggested to give them a different name, like for instance “Masoudha Tour Escorts”. For all of the escorts an excellent knowledge of the local geography and terrain as well as First Aid and safety measures will be mandatory.



DESERT LIFESTYLE CAMP

The area around Dlagha and its still traditional community is a good location to set a Desert Life Style Camp, where visitors could experience how Bedouins live in the desert. The Saidiyyiin could demonstrate in this camp how they set up a tent, what objects they use for their daily life and in general how they are able to survive in the desert. The camp would include a small exhibition with objects related to the daily-life in the desert. The plants and animals, which can be found in the desert, are also introduced in order to demonstrate how much life can be found in these "harsh" surroundings. The focus will, however, be on providing visitors a unique experience of sleeping in the desert hosted by authentic Bedouins.

The Desert Life Style camp would further include a kitchen, which would serve typical Bedouin dishes such as Mansaf. As entertainment program in the evening Bedouins can share their culture heritage through singing songs for example. The Desert Life Style Camp would - in contrast to the Bedouin camps - be located in the Baidha area. The camp will be far away from the next town and will only be surrounded by the exciting and fascinating landscape of the desert.

A preliminary calculation with an estimate of space and construction requirements and with an indicative investment budget is shown in the table in the next column. An estimation of possible annual revenues is indicated, together with a potential number of jobs created. A Public Private Partnership model is likely to bring the best results.

DLAGHA Desert Life Style Camp	Estimated space requirement in m2	Estimated Cost Construction / Landscaping JOD per m2	Estimated Construction Cost Total in JOD	Estimated Cost Furnishing JOD per m2	Estimated Furnishing Cost Total in JOD
Land Needed (with parking)	5.000	5	25.000	0	0
150 beds à 10	1.500	200	300.000	100	150.000
Desert Kitchen & Restaurant	150	300	45.000	200	30.000
Total indoor space	150		370.000		180.000
Planning & Unforeseen(20%)					110.000
Estimated Total					660.000

Estimated Ratio of Public/Private Stake in the Project	50:50
Estimated Annual Revenue Prognosis (30% Occu-pancy à JOD 35.--revenue/room)	574.875
Estimated Number of Jobs Created	40

ACCOMMODATION FACILITIES

Dlagha is considered to be too far away from the park entry for major tourism development. With the exception of some eco-lodge(s) in the newly designated Masoudha Special Conservation Area no additional hotel development is anticipated in this community.

Masoudha Special Conservation Area Eco-Lodge

The escarpment of the Wadi Araba and the spectacular geology of this region should become a continuous protected area from the Dana Reserve on the North (and perhaps beyond) to the Rahmeh Reserve on the South (and perhaps beyond). Along this corridor a trail network can be developed linking the Feynan eco-lodge with the Masoudha Special Conservation Area, to other encampments or eco-lodges. The creation of a five star eco-lodge within the newly created Masoudha Special Conservation Area is an excellent way to provide economic opportunities for the residents of Dlagha and the surrounding area.

Masoudha Overlook Youth Camp or Eco-Lodge

As there are isolated expansion parcels in the North of the Petra Region near the Hisheh forest, there are similar parcels South of Dlagha. While extensive development of these parcels is not recommended due to the remoteness of this land and the need to extend infrastructure and transportation services, there may be potential for the development of a youth camp or eco-lodge in this area as well.

The picture shows the presently existing eco-lodge in Wadi Feynan.



OTHER ECONOMIC ACTIVITIES

In addition to income opportunities directly related to tourism there are several possibilities of no or only indirect involvement with the tourism sector, allowing for more economic diversification.

Small-Scale Agriculture

Another option for economic diversification is to revitalize the local agriculture on which the economy of the Petra Region has traditionally relied in the past. The importance of agriculture has diminished compared to tourism because of the higher income possibilities in tourism and the increasingly difficult climatic conditions for agriculture.

Although the soil and water conditions in Dlagha are not the most suitable for agriculture, certain types of small-scale agriculture to grow local products can be introduced. The goal of growing these plants would be to sell them as raw products. A regional center could be created were raw products would obtain added value, this would mean for example to process olives into high-quality olive oil. In addition, Dlagha has delicious white truffles, which are found growing underground on the stony hillsides in the early spring. Develop these and/or other mushroom species as a high-value cash crop.

However, agriculture and pastoral farming also have an important tourism - and social - dimension since they preserve the indigenous local cultures. Introducing small-scale agriculture to grow local products could augment income through the sale of farm and garden products.



MEDICINAL AND AROMATIC HERBS PRODUCTION

The local female population showed both interest in and knowledge of the uses of medical and aromatic herbs and plants, which they could apply if they would get involved in M&A plant cultivation as well as product development. From a scientific point of view it is estimated (by the World Bank) that 17-22% of the plant population of the Petra Region has medicinal value. This would mean that about 67 plant species (17% of the documented 388) would have economic potential for the pharmaceutical industry. The establishment of this industry within the region is however a long-term project as it would require a careful analysis to choose the plants, which should be cultivated. Furthermore, in order to enable the local population to gain significant benefit from this activity in the long-run it would be necessary to move on from just providing raw materials to export finished plant products produced within the region.

A preliminary calculation with an estimate of space and construction requirements and with an indicative investment budget is shown in the table below. An estimation of possible annual revenues is indicated, together with a potential number of jobs created. A Public Private Partnership model is likely to bring the best results.

DLAGHA Medicinal & Aromatic Herb Production	Estimated space requirement in m2	Estimated Cost of			
		Estimated			
		Estimated Ratio of Public/Private Stake in the Project		50:50	
		Estimated Annual Revenue Prognosis		350.000	
		Estimated Number of Jobs Created		25	
Land Needed for Green Houses	3.000				
12 Green Houses Houses at 22X6 m2	1.584	20	31.680	50	79.200
Admin & Storage	300	500	150.000	150	45.000
Total indoor space	1.884		301.680		124.200
Planning & Unforseen(20%)					85.176
Estimated Total					511.056





DEVELOPMENT OF RESIDENTIAL NEIGHBORHOOD

The existing municipal center of Dlagha is envisioned as a combination of residential, service and commercial areas, supplemented by adequate amounts of open space. In this way, a mix of uses shall be achieved to keep the center vital. Although Dlagha is quite a small community, it is aimed that people identify with their hometown. This can be achieved by creating an attractive city center where locals but also tourists that are passing by like to stop for a while, do groceries and meet friends. Therefore, attractive public space is essential to ensure a pleasant atmosphere in the city center.

However, community services will need a serious upgrading of infrastructure – water, energy supply, sewage, and traffic. The creation of a Communal Center that will warrant the delivery of minimal services is an absolute must as well.

Neighborhood centers will be located in between the residential expansion areas and will offer the most important communal central functions. The quality of life of area residents will be greatly enhanced by locally serving facilities within walking distance of their homes. These services would include a mosque, elementary and middle schools, a neighborhood park and playground, as well as local shops. It is anticipated that these neighborhood centers will require approximately forty donum each. The precise location and configuration of the smaller local centers should be determined at the time the residential areas they serve are developed. The Land Use Plan presented on the following page only shows diagrammatically where these neighborhood centers could possibly be located.

The neighborhood centers must not compete against, but rather supplement the main city center of Dlagha. They shall cover the expanded community area in a way that all newly built residences will be located within a five minutes walking radius to a local center. Thus, a network of local centers connected through attractive walkways shall be established for Dlagha.



PUBLIC TRANSPORTATION

Regarding the future development of public transport in Dlagha, the aim is to serve all residences with a bus station within 500-meter walking distance. Under present conditions and in the short run (three or seven years) a state-of-the-art bus system is recommended to ease the obvious problems with public transport in the region. The Petra bus system should be established as quickly as possible and should integrate the concept of a new Regional Transportation Facility (Interception Lot) at the main access road to Wadi Musa from Amman, Maan and Aqaba; the planned bus from the back exit of PAP near Umm Sayhoun should be linked with the new system, which would completely replace the current public transportation system.

It is proposed as a system for the local population and for tourists alike:

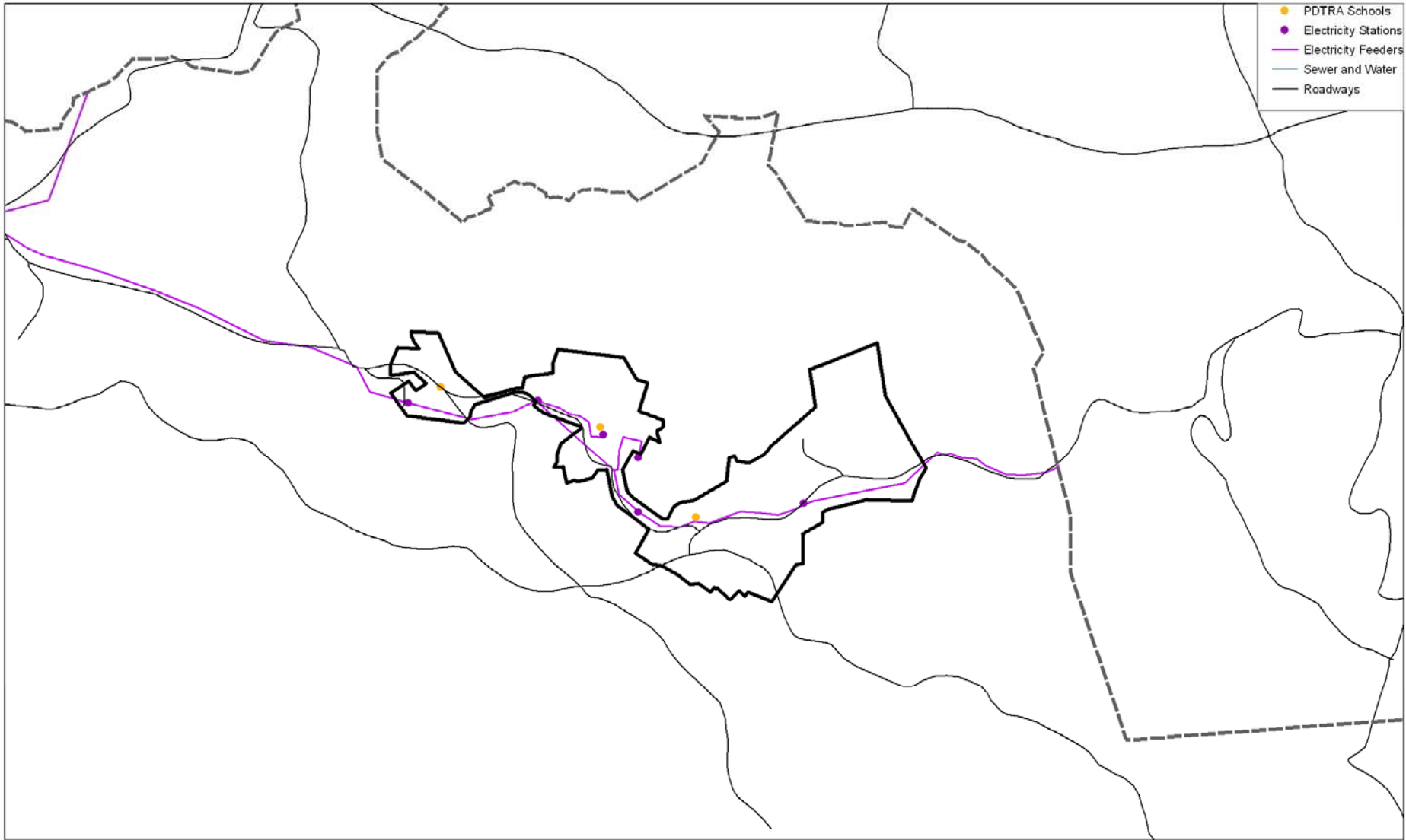
- For the local population it is recommended to offer a ticket for protected parking at the Regional Transport Facility with a bus ticket for maximum user comfort. This should motivate local residents who do not use their cars for commercial purposes to use public transportation instead.
- For tourists, the price for using the buses ought to be included in their PAP Entrance ticket, so they can use the busses of all lines in a hop-on/hop-off way that will motivate them to visit other tourism attractions and installations in all parts of the Petra Region, which in turn will be of great benefit to the local business community.

Proposed new Bus system



For the Dlagha community, only the Blue Line will be of direct relevance (the other lines only when changing busses). The Blue Line leads from Baidha to Dlagha (about 40km) and serves as the regional line to meet the needs of both the local population and the tourists who are accommodated outside of the very center (i.e. along the Scenic Road or in the villages or camps in the vicinity).

The blue bus line is anticipated to have an average turnaround time of about 96 minutes (Baidha-Dlagha-Baidha, incl. stops) and a capacity of 50 persons per bus, causing an average needed number of busses of 10 and a frequency of 6 busses per hour and direction.



PUBLIC FACILITIES AND SERVICES

Parks

Workshop discussions with the residents of the region suggest that there is a substantial shortfall of developed recreation areas within the communities. Land for active recreation - where it does exist - is comprised primarily of school grounds. While these areas do provide some room for active recreation for children, there is little ground for active recreation for adults. However, even the dimension and quality of sports fields at schools are often inadequate.

For the community of Dlagha, a lack of leisure and recreation facilities in general is noticed. In Dlagha, there currently is an existing park area of 12 donum and one sports field located. Until the year 2030, calculations project a need for 33 donum new park areas and three more sports fields.

Police, Fire Protection and Post Office

A Police or "Civil Defense" (emergency service) station is located in Dlagha. Nevertheless, as the community is located furthest from the major population center of the region, Dlagha currently has poor response times for police and fire protection. One might reason that as tourism development in the region increases it is logical that a police/fire station will be needed in Dlagha as well. Furthermore, a post office currently is located in Dlagha.

Places of Worship

Generally, places of worship are financed by the private sector. However, additional worship places will need to be created over time. By calculating the ratio of the current population to places of worship, the future needs of the region can be estimated. Dlagha currently is well served by one mosque. Until 2030 one more place of worship could be needed.

Location of Public Facilities and Services

Ideally, the sites for all these service providers will be clustered in each neighborhood with schools, parks, medical facilities, and retail facilities in order to create cohesive community centers for each neighborhood.

By placing housing within easy walking distance of all services, the transportation needs of the community can be reduced. As the development within the Petra Region expands into new areas, sufficient public space needs to be set aside for such new all-round service centers to serve the new residents.

Information and Communication Technology (ICT)

Public services and Information & Communication Technology (ICT) networks are lacking in parts of the Petra Region, resulting in unequal opportunities for business and tourism. Dlagha is one of the communities that lack basic ICT infrastructure and utilities.

The Internet plays a fundamental role in education, not only as a source of information, but also to enroll in universities, identifying education and job opportunities as well as to participate in courses and classes that are supported by online tools. Therefore, it is a common objective to ensure the equal provision of basic Information and Communication Technology (ICT) networks in general and especially for Dlagha. In a second step, educating people in terms of new technologies is important to have well-trained work force in the community.

SOCIAL ISSUES

Education

Currently Dlagha has three schools, which are all located within a 500-meter walking distance from all residences. The only high-school that is located in Dlagha is a military school, which means that for girls there is no high-school available in the community and that boys are forced to go to the military high-school, if they do not want to commute to another community to go to a high-school. Furthermore, for most of the population it is impossible to afford the costs of universities as study-scholarships are missing. It is estimated that Dlagha will require about three additional schools until the year 2030 (based on an analysis of existing ratios of schools to population in the Petra Region and an assumed growth rate of 3.5%). However, the actual need may be higher as separate schools for girls and boys as well as separate schools for different education levels may cause a higher actual need.

In Dlagha the schools are missing basic equipment like for instance computer labs with Internet connection, sports equipments, science labs, and libraries. Providing Internet access at least in the schools of Dlagha, is urgently recommended, in order to enable students to register for university, which has to be done online. Furthermore, it is suggested that specific funding is made available for extra-curricular school activities or summer activities. Along with the improvement of teaching equipments teaching methods shall be updated in order to create a better learning environment.

Recommendations:

- Develop specific educational, training and awareness raising materials and curricula to promote education skills, which serve

to reinforce culture and promote the value of Petra communities and solve the social issues.

- Better equip schools with computers with Internet connection, sports equipments, a library, and science facilities.
- Support the existing educational and training programs to help local youths achieve better results at school and obtain study-scholarships.
- Establish sports and learning centers for young people and women to provide training in additional skills, leisure time activities, as well as a space for them to gather.
- Collaborate with schools to develop initiatives to keep children in school, which will include awareness raising of parents.

Health & Medicinal Infrastructure

Although, a clinic/health care center (providing services for ambulatory patients) is located in Dlagha, the community suffers from inadequate medical services. The existing health center only provides primary care and does not provide specialized medical services for reproductive health patients or for people with special needs, or other health-related problems like physically or mentally challenged children, which can be linked to the lacking awareness on the risks of repeated intermarriage. Overall, it can be stated that not enough psycho-social and health related services are available in Dlagha,

However, when analyzing the number of clinics in the community, a need for 0.3 more clinics is calculated until 2030 (based on an analysis of existing ratios of medical facilities to population), so there will actually be no need to build another clinic in Dlagha. A more detailed assessment of the health care needs of the Petra Region in general and Dlagha in particular is needed but beyond the scope of this study.

Recommendations:

- Increase the awareness on women's reproductive health, especially regarding the potentially negative effects of early marriages on female health. This could be done through specific programs run in the health clinics of each community.
- Provide awareness-raising programs on family planning.
- Carry out awareness-raising programs for men and women on the disadvantages of intermarriage.
- Provide couples, who intend to get married with a free medical test in the local clinic in order to check for the possibility of having mentally challenged children. This test is being provided in Amman and published through special programs done by religious leaders (Muslim & Christian) and the Ministry of Health.

Discrimination

Most of the male population of Dlagha is enrolling in the military services because there are no job opportunities available within the community. However, this is not a possibility for women and they have therefore even less chances than the male population to earn money. Traditional agricultural activities are an ever-decreasing source of income due to the lack of water. However, specialized agricultural activities (described in the section "Other economic activities") would offer job opportunities for men and women.

Recommendations:

- Create more job opportunities in general through involving the local population in the development of the Masoudha Special Conservation Area and provide them with necessary training.
- Explore other potential fields of employment not related to tourism such as specialized forms of agriculture.
- Initiate a specific program for (and run by) women, which would provide targeted help for women from the region to find suitable

jobs. In addition, the PDTRA should consider policies to motivate firms to employ women.

- Initiate a regional scheme of "women teach women", allowing better-educated women to teach those who are lacking specific skills. Besides sharing skills this would allow to create greater solidarity among women across the region.

Potential Influence of Tourism on Traditions and Culture

Dlagha is the area, which benefited the least from tourism in the Petra Region. However, there is a strong desire within the community to benefit from and be involved in the tourism sector. Yet especially women are very much concerned about the effects of tourism on their culture and traditions. For this reason, it is important to create job opportunities suitable for women in sectors that are only indirectly related to tourism. Thus, suggestions to increase the tourism related activities were focusing on providing jobs for men in restaurants and tour agencies, while women could be trained in the production of souvenirs.

Recommendations:

- Raise the awareness of the Dlagha inhabitants on issues, which might arise from increased influence from foreign cultures brought in by tourists.
- Involve the Dlagha population actively in the plans for the further development of their community and consider their wishes regarding the degree of their involvement in tourism.

WATER - WASTEWATER TREATMENT & RAINFALL FLOODS

Water Supply

Water supply within Jordan is regulated by the national government. The per-capita water allotment in Maan Governorate for the year 2007 was 214 liter per day. Due to water scarcity in Jordan this rate may well be lowered.

The water is currently supplied using ground water from the well fields in the region such as Qaa Well Field. In order to satisfy the growing demand for water, other sources need to be explored. The following options have been studied or are under construction:

- The Disi Conveyer: The work on this project started at the beginning of 2010 and will likely be completed by the year 2012. The new conveyer that is built will supply Amman with groundwater from the Disi-Mudawarra groundwater aquifer in the South of Jordan. The route of this project will pass along the desert highway about 30km to the East of Petra Region and building intake from the conveyer to PDTR may supply water to the region.
- Red-Dead Canal: This project foresees a canal from the Red Sea in Aqaba to the Dead Sea that will utilize gravity flow over most of the route. The hydropower will be used to generate electricity where part of that power will be used to desalinate seawater or brackish water from Wadi Araba ground water aquifer. This project is still in the study phase.
- Developing existing or new ground water well fields.

Overall, a lack of basic infrastructure and utilities in terms of water supply is noticed in Dlagha.

Wastewater Treatment

Dlagha is not connected to the sewer system. The current Waste Water Treatment Plant (WWTP) is designed to treat 3,400 cubic meters per day and with the projected generated wastewater rate of 7,190 m³/d by the year 2030, this WWTP needs expansion to accommodate another 3,800 m³/d.

In addition, the main conveyer serving wastewater from Wadi Musa and the other communities to the WWTP needs to be redesigned to accommodate the growing wastewater volumes.

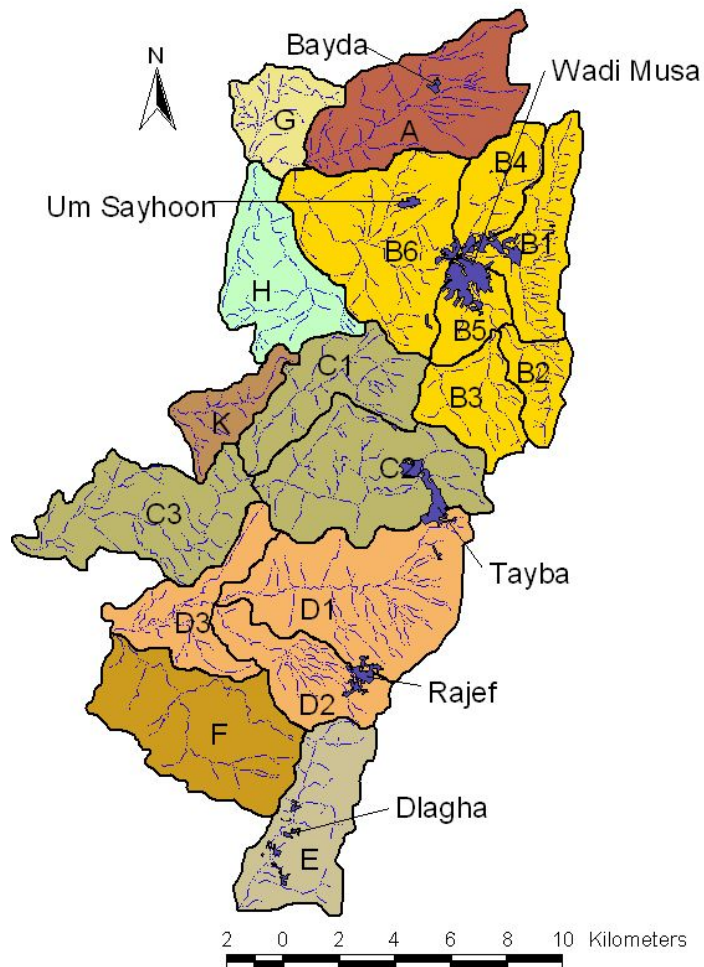
Rainfall Floods

From an environmental perspective it does not make sense to look at the Region's communities simply as municipalities (*tanzimat*) isolated from their natural (and particularly hydrological) context.

The map on the next page shows the water catchments A, C, D, E, F, G, H and K lying within the Petra Region. These catchments can be used for water harvesting (i.e. to collect and store water for agriculture uses such as limited vegetable farming and animal watering).

The estimated volumes total runoff water from these catchments and their sub-catchments is about 2.9 million cubic meters. This water can be collected and stored using simple water systems such as small earth dams and ponds.

Water Catchments in the Petra Region



The Dlagha area is defined as according to the Watersheds E – F as shown on the graph overleaf. Catchment area E extends over about 19,820 donum. The runoff volume is based on an average annual rainfall of 150 mm and a runoff coefficient of 8% results in about 0.24 million m³. Catchment area F extends over 28,160 donum with a runoff volume of 0.34 million m³.

A flood protection and drainage system will become of great importance as the community of Dlagha grows. More open areas and fewer built areas would help to retain the runoff and increase water storage in the soil profiles.

ENERGY MANAGEMENT

Energy use data with the PDTRA is not readily accessible. The Annual Report of the Ministry of Energy and Mineral Resources indicates that the average per capita use of electricity in Jordan is 1,999 kilowatt hours per year, or roughly one fourth of energy usage in the United States or Western Europe. This average figure does not, however, take into account the considerable demand placed upon the system by hotels and other tourism facilities.

Dlagha is connected to the regional electricity network; there are five electricity stations, predominantly in the North of the municipal area. Nevertheless, a lack of basic infrastructure and utilities in terms of electricity supply is noticed in Dlagha.

In the future, alternative energy sources shall be strongly focused on as a contribution to turn Dlagha into an eco-friendly community.

The implementation of “green” buildings standards for all structures within Dlagha will place an emphasis on energy conservation and help to reduce peak demand. Consideration should be given to the creation of solar arrays and/or wind turbine energy generation to provide green energy to Dlagha.

The Master Strategy for the Energy Sector in Jordan (2007 to 2020) includes some recommendations on the rational use of energy and the utilization of renewable energies, which are also valid for Dlagha and the whole Petra Region and whose application is highly recommended.



ENVIRONMENT

For environment considerations the Dlagha area is defined according to the Watersheds E – F shown in the graph on page 41.

Soil Conservation/Erosion Control

Soil conservation, erosion control and the effective banking of rain-water are accomplished by exactly the same measures. Terracing along the contour lines (i.e., perpendicular to runoff flow) achieves all of these desirable results. Such terracing, intensified within walking distance of Dlagha community, actually creates a context for small-scale agriculture to develop organic/regional products for local boutique restaurants and to develop small-scale farming of medicinal and aromatic plants.

Recommendations:

- Broad scale terracing to contour upslope from communities for flood control and slope stabilization.
- Intensive terracing for small-scale agricultural plots within 500m of settled areas.

Rehabilitation and Re-Introduction of Historic Water Systems

Throughout the region Nabataean and other historic water systems (often including terracing) still exist and many remain partially effective today even in their current state of disrepair. The existing remains of dams, check-dams, cisterns, wells, channels and terraces are strong clues to local hydrology and present basic infrastructure, which can be inexpensively rehabilitated for effective water conservation. These measures supply high-quality water for small-scale agriculture and animal husbandry – water, which is now largely a wasted resource due to runoff.

The historic remains are plain evidence of sustainability: they still exist, and they are still working, despite the virtual absence of maintenance or inputs for decades in some cases, for centuries in most. Adapting their design for use today is an obvious measure. Furthermore, both the historic remains and the modern adaptations and innovations should be interpreted for the public.

There is no point in building huge protective structures designed for catastrophic events which are generally useless for most of the time and which then turn out to be insufficient when an exceptional flood does occur. It would be more appropriate to introduce a policy of small-scale hydraulic works, repairing banks and barrages, protecting the soil, preventing the formation of big floods by separately controlling the numerous tributaries and by holding back the water on the slopes.

Policy ought to be developed to manage water harvesting in such a way that downstream landowners are not deprived by upstream catchment. Likewise management of springs should be regulated so that springs on government lands may be exploited cooperatively, as are the waters of Ain Musa in Wadi Musa. The use of water from springs on private lands must also be regulated so that some water is released into the wadi systems to sustain the ecosystem and rangelands downslope.

Recommendations:

- Upper watershed (above 550m asl): simple, low-intervention.
- Lower watershed (from 550m asl): larger dams for animals.
- Rehabilitate systems associated with Dlagha spring, Bir Hamad and other springs/wells.

- Monitor the use of all springs, allowing a percentage of the water to return to the ecosystem.
- Make roof and hardscape water catchment a building code requirement in Dlagha municipality (as in other municipalities).

Re-Vegetation and Range Management

Reforestation/re-vegetation stabilizes slopes, creates shade, banks rainwater, and creates contexts for tourism use while promoting biodiversity for a generally healthy ecosystem. The PAPOP guidelines already exist and are excellent, balancing the realities of conservation and environmental change. In order to halt the continuing existing damage to the remaining forest and to protect reforestation efforts, rangers must be hired and empowered to enforce existing forestry laws. The penalties especially for damage to old-growth trees needs to be intensified so that the penalty exceeds the value of the firewood thus obtained.

Managed grazing regimes protect sensitive ecosystem areas and sustainably exploit less sensitive areas. Zoning for tourism (intensive, medium, light use areas, designated and managed picnic areas) will create a more efficient context for trash and services management, will protect sensitive ecosystem areas and will exploit less sensitive areas in a sustainable way. Within the context of tourism zoning, the development of trails creates infrastructure for extended stay activities, e.g., hikes, rides, camps and lodges and defines where horses, pack animals, hikers and vehicles respectively, will be allowed or disallowed. In addition, road construction and unregulated off-road driving should be strictly prohibited to avoid further negative impact on soils and vegetation.

Recommendations:

- At a broad scale, allow steppe vegetation to rejuvenate naturally.
- Evaluate a seedbank. If necessary seed the watershed with native seed collected from local plants.
- Where broad-scale, low-intervention terracing is implemented (not including agricultural land), vegetation should be allowed to recover naturally.
- Where local/intensive terracing and plot development is implemented, appropriate M&A species should be cultivated.
- Relieve pressure from steppe/range by implementing broad scale range management measures.
- Implement locally appropriate grazing and range management regime based on biomass and herd assessments. This should likely be done in cooperation with RSCN, since Masoudha Special Conservation Area makes up a large portion of the Saidiyyiin range.



LIST OF ABBREVIATIONS

AHU	Al-Hussein Bin Talal University
asl	Above Sea Level
CBRR	Community-Based Rangeland Rehabilitation
DOS	Department of Statistics of the Hashemite Kingdom of Jordan
GIS	Geological Information System
ICT	Information and Communication Technology
IT	Information Technology
JOD	Jordanian Dinar
M&A	Medical & Aromatic
NGO	Non-Governmental Organization
PAP	Petra Archaeological Park
PAPOP	Petra Archaeological Park Operational Plan
PDTR	Petra Development and Tourism Region
PDTRA	Petra Development and Tourism Region Agency
PNT	Petra National Trust
R&D	Research and Development
RSCN	Royal Society for Conservation of Nature
RTF	Regional Transportation Facility
SWOT	Strengths, Weaknesses, Opportunities and Threats
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWTP	Waste Water Treatment Plant