Managing rangelands: learning from institutional experience in order to promote Bedouin participation in the Badia of Jordan

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MANAGING RANGELANDS: LEARNING FROM INSTITUTIONAL EXPERIENCE IN ORDER TO PROMOTE BEDOUIN PARTICIPATION IN THE BADIA OF JORDAN

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Abstract

This study investigates institutional experience in managing rangeland in order to promote Bedouin participation in the Badia of Jordan, particularly in the area of the Jordan Badia Research and Development Programme (BRDP). It also investigates the attitudes of livestock owners towards the concept of managing the rangeland and their awareness of the importance of this concept to their life.

In addition to secondary data which were available to this study, visits were made to some projects to improve the rangelands productivity and conserve nature. Discussions were held with local communities and personnel responsible.

The most significant finding of this study is that the projects and trials of managing rangeland which did not involve local communities in setting objectives and implementing activities through prior consultation and negotiation, faced major difficulties in management and, therefore, in achieving their goals. On the other hand, those projects and trials, based on effective participation from local people including prior negotiation and consultation, had less difficulties in their management and, relatively, achieved their goals.

In the light of learning from experience of a number of institutions in managing rangeland, trial demonstrations to integrate livestock owners in the BRDP area are presented in the concluding chapter.

Declaration

I, the author of this dissertation, declare that this thesis results entirely from my own work, and that none of the material here has been previously submitted by me or any other candidate for a degree in this or any other university.

Statement of copyright

Dedication

TO MY PARENTS,

who always pray and supplicate to God in order to help me.

Acknowledgements

Firstly, I would like to apologise to all those who helped in the production of this work whose names are too numerous to record or single out here.

I would like to acknowledge the contributions of the Darwin Initiative for the Survival of Species (Department of Environment, Transport and the Regions/ UK), the Centre for Overseas Research and Development (University of Durham), and the Jordan Badia Research and Development Programme without whose assistance this research would not have been possible. Also, I am grateful to the Bedouin who were generous with their time and effort and so patient as to respond to my questions.

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Last, but by no means least, I will be always thankful to all my colleagues in the Jordan Badia Research and Development Programme; I consider them to be my second family.

Abbreviations and glossary

ACSAD	Arab Centre for Studies of Arid Zones and Dry Lands
AL	Arab League
Badia	The arid-semiarid zone of the Middle-East, which receives low rainfall, and is occupied by the Bedouin
Bedouin	The people who settle in the Badia, which they depend on for raising livestock, searching for water and forage for their animals
Biodiversity	The variety of all living things such as the species, habitats, and eco-systems
BRDP	Jordan Badia Research and Development Programme (Jordan)
CARDNE	Regional Centre on Agrarian Reform and Rural Development for the Near East
CIDA	Canadian International Development Aid
CORD	Centre for Overseas Research and Development (University of Durham/ UK)
DETR	Department of Environment, Transport and the Regions
DISS	Darwin Initiative for the Survival of Species (UK)
Dunum	1 dunum = 1,000 square metres
FAO	Food and Agriculture Organisation of the United Nations
GEF	Global Environmental Facility
GOs	Governmental Organisations
GTZ	German Agency for Technical Co-operation
HCST	Higher Council for Science and Technology (Jordan)
ICARDA	International Centre for Agriculture Research in the Dry Areas
IFAD	International Fund for Agricultural Development
JAZP	Jordan Arid Zone Productivity Project (Jordan)
JCC	Jordan Co-operative Corporation (Jordan)
JD	Jordanian Dinar (JD1 = $1.45)
MoA	Ministry of Agriculture (Jordan)
NCARTT	National Centre for Agricultural Research and Technology Transfer (Jordan)
NGOs	Non Governmental Organisations

NPRRD	National Programme for Range Rehabilitation and Development (Jordan)
RGS	Royal Geographical Society (UK)
RJGC	Royal Jordanian Geographic Centre (Jordan)
RSCN	Royal Society for the Conservation of Nature (Jordan)
Tonne	1 tonne = 1,000 kilograms
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
WFP	World Food Programme

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Chapter One

Introduction

1.1 Introduction

The arid and semi-arid zones in this planet are estimated at around 50 million km^2 which cover 35% of the earth's land surface (Livingstone 1985). These zones include substantial proportions as rangelands which are defined as the lands that human beings do not plant; receive low rainfall; and are grazed by livestock (Abu-Zanat *et al*, 1993; al-Junaidi, 1996; and ash-Shourbagi, 1993). In general, these lands hold less human activities, and so they are natural places for biodiversity. Johnson (1997) defines biodiversity as a composition of flora, fauna, habitats, and eco-systems.

The Badia is the arid-semiarid zone of the Middle East, which receives low rainfall, and is occupied by the Bedouin. The rangelands or Badia constitutes large portions of Jordan and the surrounding countries of the region: around 80% of Jordan; 75% of Iraq; 90% of Saudi Arabia, and 55% of Syria (Alwelaie, 1985 and Sankari, 1993).

Within the Badia of Jordan, a multi-disciplinary, long-term research programme is underway in the north-east part of the country which aims to study the resources of the Badia as a step towards protecting and maintaining them for future generations. This programme is called the Jordan Badia Research and Development Programme (BRDP). Much research implemented in the BRDP area indicates that this part of Jordan has a number of essential resources. If these resources are managed in an appropriate way, they will be an asset to development of the area.

This study is a contribution to the BRDP efforts of managing the rangelands through learning from institutional experience in order to promote the local herders' participation in this issue. The approach of this study is to examine a number of projects being conducted in parts of Jordan (and elsewhere) with an environment similar to BRDP's. The idea is to learn from the experience of resource management, and range and biodiversity protection projects, to see if they could be shaped and developed to match the natural and human systems of the BRDP area. The points of greatest interest will be Bedouin involvement in the design and implementation of previous projects, and Bedouin attitudes towards the projects as they progressed.

1.2 Objectives of the study

The study concept was adopted from a framework set out by Nesheiwat (1991):

> "Rangeland improvement depends not only on technical, legal and economic factors but also on the active participation of the communities (Tribes) which will benefit from it" (p. 1).

Therefore the key objectives are to reveal: a) the previous and changing context in which the Bedouin manage the range resources of the Badia, and their attitudes towards those resources; b) the extent to which communities in different parts of Jordan have been involved in rangeland and biodiversity improvement projects, and how this has changed over time; c) the extent to which project success or failure is associated with community participation; and d) how previous experience in Jordan (and elsewhere) can help with biodiversity and rangeland protection projects in the BRDP area in the future.

The dissertation is divided into six chapters. This chapter outlines the study aims and

objectives, describes the study area, and discusses the importance of rangeland management and biodiversity conservation. Chapter two discusses the research methods and data collection techniques. In chapter three the emphasis is placed on past systems of using land and water and the changes which have taken place to these systems, including their impact on Bedouin life. Chapter four is a discussion of the efforts of the government and non-government institutions to solve the conflicts between the needs of pastoralists and their livestock, and the biodiversity needs of the rangeland resources. It will also address how these institutions have dealt with the local population. Chapter five focuses mainly on the BRDP area and its resources, mainly the range resources. Also in chapters four and five, the findings of the author's own fieldwork are presented and discussed. Chapter six presents the conclusion and recommends future trials and demonstrations designed to integrate the grazing interests of livestock owners with concerns for the conservation of biodiversity.

1.3 The study area

This section gives some basic information about Jordan, the Badia of the country, and BRDP in which the latter is the main concern of this study.

Jordan is located east of the Mediterranean Sea between 29° N and 33° N, and 35° E and 40° E. Syria borders it to the north, Iraq to the east, Saudi Arabia the south, and the occupied Palestine and Israel to the west. The total area of Jordan is about 90,000 km^2 and according to the national census (1994), it has a total population of around 4.1 million.

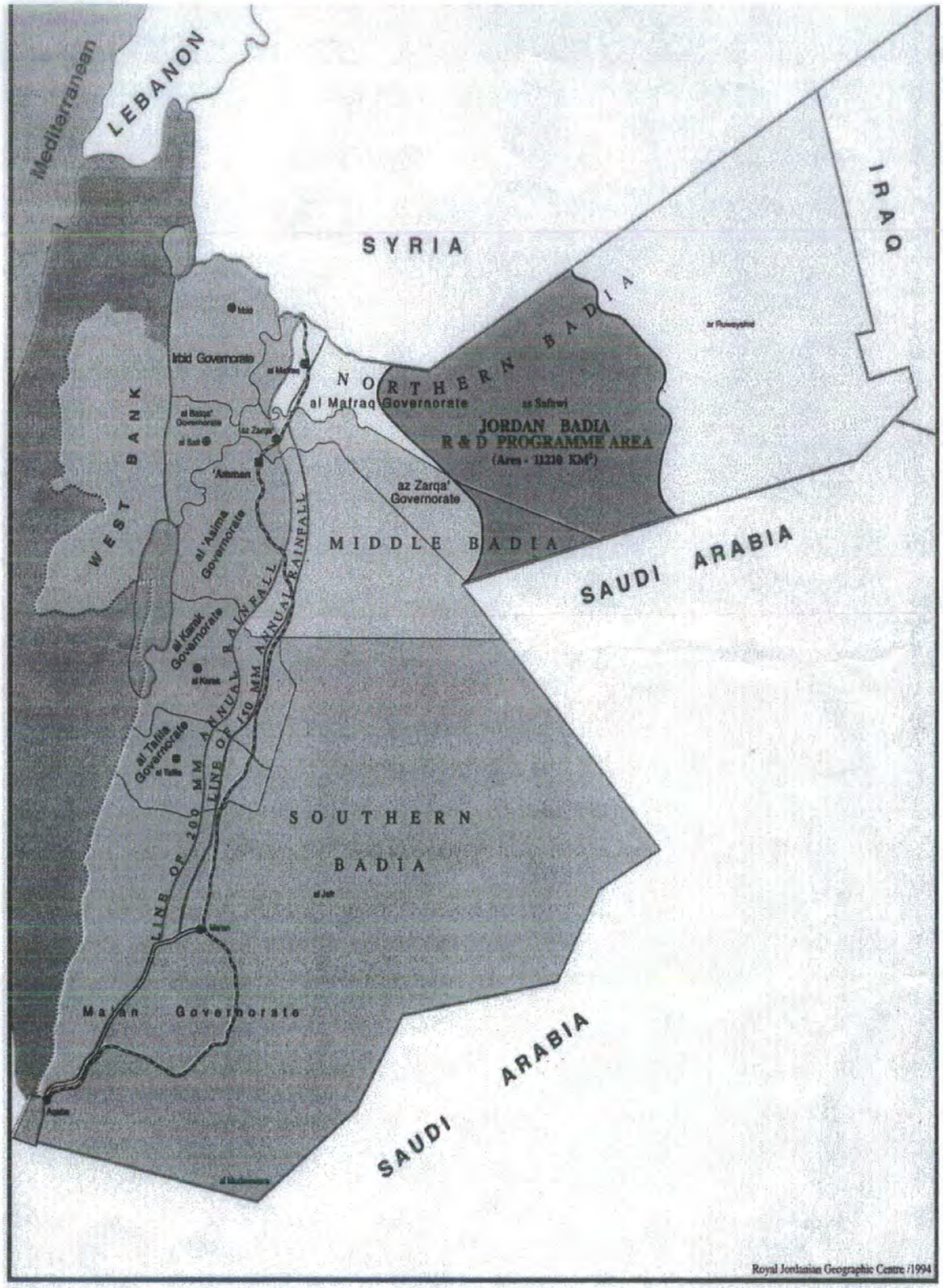
The country is comprised of three main areas distinguished by topography and climate.

These areas are: the highlands, the Jordan valley, and the Badia. The temperatures vary from one area to another and depending upon the seasons. In the east and south, the weather is hotter than in the west. Precipitation falls during the winter months (November-April). In the western highlands rainfall reaches 600 mm per year but further east, in the Badia, rainfall is less than 200 mm per year. The Jordan valley has long, hot, dry summers with temperatures rising to more than 40° C, while the highlands have a more moderate temperature range (al-Oun, 1997).

The country is divided into eight governorates: Amman (the capital), az-Zarqa, Irbid, al-Balqa, al-Mafraq, al-Karak, at-Tafila, and Ma'an.

The Jordanian Badia is divided into three parts: north, middle, and south. The north Badia comprises around 26,000 km^2; settled by the tribes of Bani Khaled, al-Masa'yeed, as-Sirhan, ash-Sharafat, al-Adhamat, as-Serdiyyah, al-I'sa, az-Zubayd, and al-Ghiath. The middle Badia comprises around 10,000 km^2; settled mainly by Bani Sakher tribe. The south Badia is settled mainly by al-Hweitat and Bani A'tiyyah; comprises around 38,000 km^2 (Map 1.1) (al-Oun, 1997).

Map 1.1: The Jordanian governorates, the Badia, and BRDP



Source: The Royal Jordanian Geographical Centre (RJGC), 1998

The BRDP study area comprises around 11,200 km^2 of the north-eastern Badia of Jordan, constituting around 15% of the total area of the Badia and 12% of the total area of Jordan (Map 1.1). The BRDP area is divided into al-Harra which is covered with black boulders and al-Hamad which is covered with pebbles of flint and chert. The location of the area is within the boundaries of al-Mafraq and az-Zarqa governorates, including 34 villages with a total population which was estimated at 16,267 in 1994, and with a high natural increase rate of 3.1% per annum (Dutton, 1998 and Maani *et al*, 1998). The field centre of the programme, which has been established at Safawi village, 156 km north-east of Amman, provides accommodation, food, transport, and many other support services for the fieldwork.

1.4 The importance of the rangelands and biodiversity

Rangelands are very significant, from an ecological and physical aspect as well as their social and economic role. According to ash-Shourbagi (1993), plant cover of the rangeland plays a central role in the prevention of soil erosion. Plant roots spread through the upper soil, causing soil particles to stick together and therefore improving their characteristics. They also allow water and air to penetrate deeply into the soil, which increases fertility. Plant cover reduces water run-off and provides wild animals and domestic livestock with food and refuge. In addition, rangeland acts as a buffer between the desert and farms, villages, and cities.

Protecting rangeland biodiversity may benefit medicine and tourism. Herbs such as *Artemisia herbalba, Thymus serpylim,* and *Trigonella foenum-graecum* are used as medicine to ameliorate or cure colic, nausea, abdominal pain, headaches, and menstrual discomfort (Brandenburg, 1998).

Omondi (1994) emphasises that wildlife is a principal attraction of tourism, which is a most valuable resource for any country, for the foreign exchange earned and the jobs provided. Munasinghe and McNeely (1992) provided the following figures to show the role of the protected areas and parks to encourage tourism in many different countries:

> "...approximately 80% of tourists come to Kenya and Zimbabwe primarily for the wildlife. In north America, some 70% of Japanese and European tourists visit national parks. In five Latin American countries, 41-75% of foreign tourists visited protected areas" (p. 6).

The protection of water catchment areas and genetic resources, cultural and natural heritage, and scientific values, are other benefits of biodiversity conservation. Omondi (1994) has summarised the following benefits of biodiversity conservation and the establishment of protected areas:

> "1) Preservation of biodiversity for humankind as well as for national and local regions. These include protection of genetic resources, conservation of renewable harvestable resources, stabilisation of hydrological functions, protection of soils, stability of climate (the global warming problem) and maintenance of high quality living environment - the natural balance of environment. 2) Aesthetic and recreational values: promotion of tourism. 3) Scientific research and monitoring opportunities - medicine and other products (for example proteins and other future values) preservation of breeding stocks, population reservoirs and biological diversity. 4) National/regional pride and heritage - preservation of traditional cultural values. 5) Sources of food and game trophies. 6) Employment opportunities - auxiliary services, tourists and general local and regional development, e.g. road improvements, etc" (p. 40).

The eco-systems provide mankind with: 1) raw materials that support human activities, such as food, fish stock, forests, and domesticated and wild animals, 2) a sink that absorbs and recycles the used-waste products with almost no cost, and 3) life support functions such as the forests' effects on stabilising the climate and hydrology (Munasinghe, 1992).

The Badia of the Middle East has no less importance. According to Assaad (1993) and

Rahma (1993), the Syrian Badia can provide feed to around ten million sheep for about 6-7 months of the year and the Sudan's rangelands are able to provide feed to 85 million sheep during the year. al-Junaidi (1996) pointed out that the Badia of Jordan is capable of producing feed, which can satisfy around 800,000 sheep for the whole year without any need for additional supplementary feed. al-Junaidi also stated that in 1990, livestock production contributed 32% of Jordan's agricultural production, 3% of the gross national product, and 40% of the national milk requirement.

Also, Jordan's Badia is considered an important source of water for the country. The water sources are both underground and surface. The underground water of Jordan's Badia is estimated at 93,000 million cubic metres; distributed as 1,680 million in al-Azraq Basin, 1,160 million in al-Mujib, 87,000 million in al-Jafr, 3,200 million in ad-Disi, and unknown quantities in al-Hamad and as-Sirhan Basins (al-Junaidi, 1996). The quantity of surface water depends mainly on annual rainfall and evaporation. The Badia receives low rainfall, and has high temperatures (around 40° C in summer) which cause rapid evaporation, thus the opportunities to use surface water are restricted. Nevertheless, surface water is estimated in the Jordan's Badia at 126 million cubic metres; 47 of which are running all the time and 79 as seasonal flow. There are some dams built to harvest the surface water for agricultural and range purposes. These dams can hold a total of 12 million cubic metres. The most important of them are dams at al-Qutrana, Sama as-Sirhan, Umm al-Jimal, and as-Sultani which can hold around one million cubic metres each. The average ground slope in the Badia of Jordan is less than 8% which could benefit water harvesting projects (Abu-Zanat *et al*, 1993 and al-Junaidi, 1996).

The question of the need to integrate conservation with development was raised after the 1982 World Parks Congress in Bali which increased the awareness of development institutions, conservation organisations, and government agencies (Munasinghe, 1992). Also, the Earth Summit in Rio de Janeiro (1992) provided the opportunity for many governments to sign an international treaty to take measures to protect biodiversity (Johnson, 1997).

However, Omondi (1994) points out that conservation of biodiversity and range resources should directly support the local community's livelihood rather than indirectly through the development of tourism:

> "Only integrating conservation needs with human development needs in the region will ensure long-term sustainable protection of wildlife and the fragile rangeland ecosystem while benefiting the local people. Instead of being an isolated island, the protected area would be an integral part of the land-use in the whole region, contributing to the socio-economic development of the area" (p. 4).

Until recent years, social and economic development took place separately from protecting the environment. It became clear later that environmental protection requires economic development and economic development needs environmental protection in order to be sustainable (Mouasher, 1997). Sustainable development is not only economic development but also incorporates environmental and social dimensions:

> "Mankind's relationship with the environment has gone through several stages... In primitive societies, human beings lived in a state of symbiosis with nature. As civilisation advanced, man increasingly sought to master nature, culminating in the industrial age. In the twentieth century, as the scale of economic activities has expanded, the adverse effects of those activities has expanded, and the adverse effects of those activities on natural resources have increasingly demanded more attention. This has led to a reactive approach to environmental damage, through increased cleanup and mitigation activities. In the past several decades, our attitude toward the environment has progressed to the point where there is a growing emphasis on proactive design of projects and policies to anticipate and avoid environmental degradation. Recently, mankind has begun to look for practical sustainable development options that will permit continued improvements in the quality of life with a lower intensity of resource use" (Munasinghe, 1992, p. 17).

The rangeland resources especially water, flora, and fauna were developed millions of years before human beings evolved. In the past, humankind lived in harmony with them, but within the last two hundred years, these resources have been under great pressure. This puts future generations at grave risk (Abu-Zanat *et al*, 1993).

Recently, developing countries in the world have been facing an increase in conflict between human needs and the biodiversity needs of rangeland resources, due to increasing human and livestock populations and changing socio-economic and land-use patterns (Omondi, 1994). Jordan, as one of these developing countries, has experienced in the Badia conflict between the needs of two interests. The first is the interest of the Bedouin and livestock, and the second is the interest of biodiversity. The Badia's resources of water, plants, and animals are being put under serious pressure as a result of increases in the population and the growth of livestock numbers.

According to Findlay and Maani (1998), Jordan's population has risen from about 680,000 in 1952 to 3.45 million in 1990, at an annual rate of 4.3% per year. Increases in the population lead to an expansion of settlement size and numbers, farming activities, and water consumption. The resources of the Badia have been used intensively to support these needs by pumping its water and farming its areas to provide water and food for consumption by the urban city population.

Besides the country's livestock, which was estimated at three million sheep and goats in 1995 (al-Oun, 1997), large numbers of sheep enter Jordan from neighbouring countries (especially Syria and Iraq) and cause over-grazing. According to Oakeley and al-Tabini (1996), in 1995, 254,984 animals entered Jordan from Iraq and 21,482 entered from

Syria. Additional to these figures, were unknown numbers of illegal crossings from both countries. This process of bringing animals (legally and illegally) from Syria and Iraq to Jordan for export to the Gulf markets puts additional pressures on the range resources of the Badia. It was mentioned earlier that the Badia of Jordan can satisfy around a maximum of 800,000 sheep for the whole year. However, if the year 1995 is taken as an example, one can imagine the pressure on the range resources of the Badia when around three million local sheep and goats in addition to around 277,000 legally imported sheep, plus unknown illegal numbers can do in one year to resources which can only tolerate a maximum of 800,000 sheep a year. Increasing the livestock numbers leads to overgrazing. The concept of overgrazing in this study includes the heavy grazing by domestic animals of the rangeland's vegetation, leaving nothing behind except unpalatable plants and shrubs.

The problem is made worse by the lack of clarity in land tenure in the Badia. According to the Agriculture Law of Jordan number 20 (1973), the government considers most of the Badia to be state lands whereas the Bedouin consider themselves the real owners of these areas. Most of the Badia lands are still state lands and not registered by individuals although parts of state land are regularly grazed by livestock owners and ploughed by settled people to produce grain (Abu-Zanat *et al*, 1993 and al-Junaidi, 1996).

These reasons together with the uprooting of shrubs by people for fire-wood which increases the likelihood of soil erosion, have caused the deterioration and reduced productivity of the Badia (al-Junaidi, 1996).

Species of palatable plants have been eliminated and instead new species of less palatable plants have spread. Sometimes, even the less palatable species have disappeared, due to the high degree of livestock hunger. Often, only the completely unpalatable species remain in the Badia. The plant cover deterioration during the second half of this century together with the decreasing amount of feed produced from the Badia will put future generations of livestock owners in a critical position. The projects for improving livestock production will be damaged, agricultural production will be badly affected, and the water and soil resources will deteriorate. All of these effects will prevent people from using the Badia as a source of food (al-Junaidi, 1996 and ash-Shourbagi, 1993).

In light of the previous discussion and due to the importance of the rangelands and biodiversity, any degradation or irreversible damage to them should be seriously reconsidered. This dissertation is concerned solely with the human factor of managing the rangeland resources. In order to create a sustainable improvement of the rangeland and protecting biodiversity, it is essential to link the local people with the strategies, objectives, and procedures of the plan.

Chapter Two

Methodology

2.1 Introduction

The overall aim of this study, as discussed in more detail in chapter one, is to investigate the human aspect of rangeland management and biodiversity conservation in Jordan (and elsewhere with similar environment). The aim is to suggest trials to promote the herders participation in improving the range resources in the BRDP area.

Mainly, this study is based on an analysis of available reports and publications about rangeland and biodiversity conservation issues. However, as the human dimension of the conservation issues has not been satisfactorily covered in Jordan (in particular, the livestock owners' attitudes and perceptions towards these concepts), it was essential in this study to obtain these data in the field, from the owners themselves. This was achieved by talking to the owners and observing their activities.

This chapter considers issues related to the research methodology: the data available, field study sites, data collecting techniques, the pilot study, application of the structured questionnaires and semi-structured interviews, and the data limitations and problems faced in the fieldwork.

2.2 Data available

Three types of secondary data were available for this study: information about traditional land and water-use systems in Jordan and in other arid and semi-arid

countries with environmental conditions similar to Jordan's. Information and data about rangeland management and biodiversity conservation experience in Jordan. And, information from governmental and non-governmental organisations.

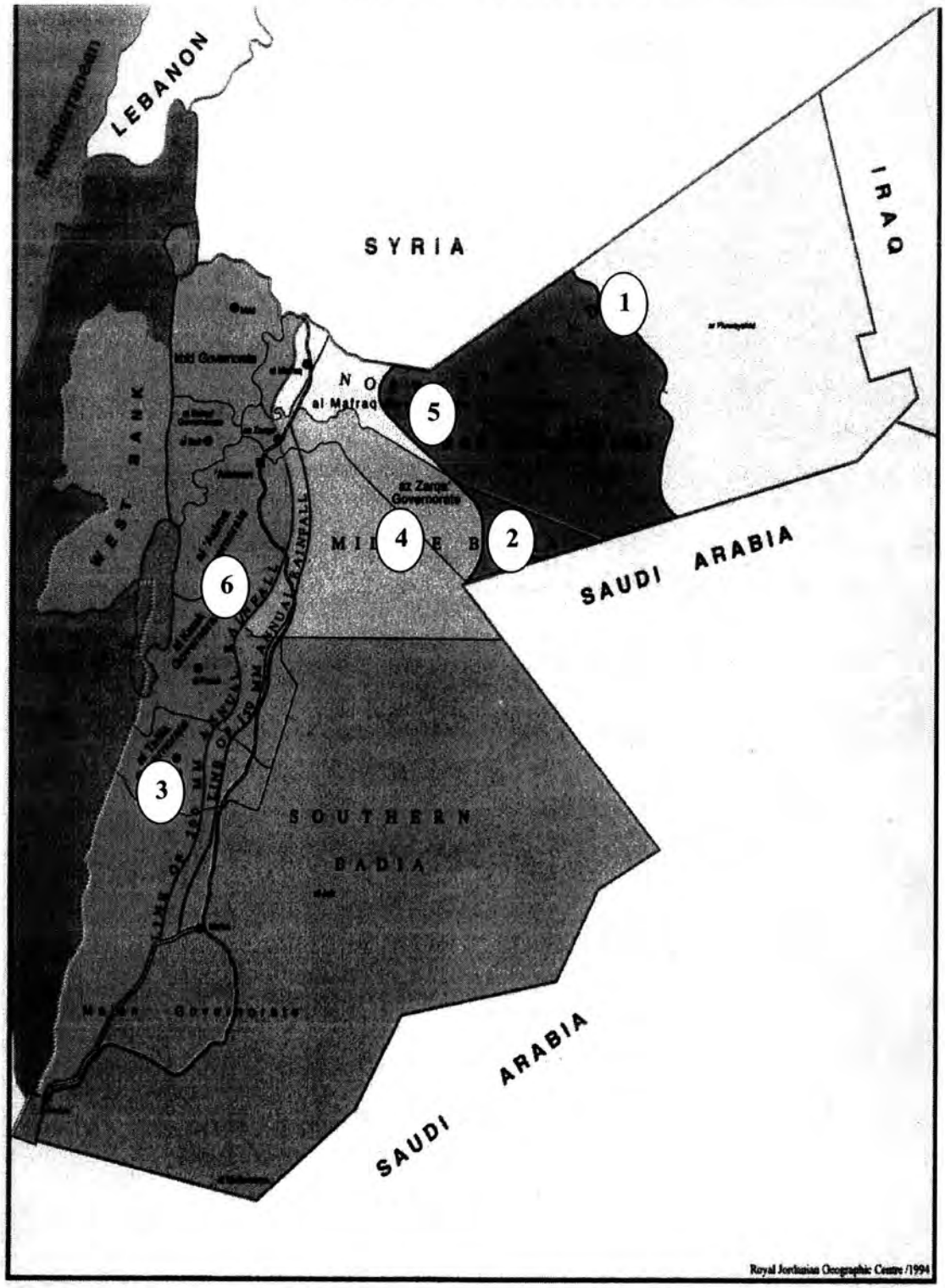
This secondary data was obtained from records, reports, and publications found in different governmental and non-governmental organisations and in the international literature. Also, discussions were held with the field teams of these organisations in Jordan.

Although these secondary data were very valuable, there was a need to complement them with primary data obtained from informants living in the field study areas. Data required included: 1) information about how the owners think, and therefore act, when dealing with range resources, 2) information about their mobility and reasons for moving from one place to another, and 3) information about the owners' dependency on the range resources.

2.3 Field study areas

The field study areas were categorised as primary, secondary, and tertiary. These areas were: Burqu, al-Ghamr, and al-Hazim (primary); Dana and ash-Shaumari (secondary); and ar-Rifa'iyyat ash-Shamaliyya and Bani Hameeda (tertiary) (Map 2.1). These areas were categorised as primary, secondary and tertiary according to their relative importance to the study, as discussed below.

Map 2.1: The fieldwork sites



Source: The Royal Jordanian Geographical Centre (RJGC), 1998

1: Burqu, 2: al-Ghamr and al-Hazim, 3: Dana, 4: ash-Shaumari, 5: ar-Rifa'iyyat, and 6: Bani Hameeda.

1) The primary sites

Burqu, al-Ghamr, and al-Hazim are located within the BRDP area and were therefore chosen to be the primary sites of the study area. They are promising areas relatively rich in water and forage making them important resources for both wild animals and domestic livestock. In the north-eastern Badia, research funded by the UK's Darwin Initiative for the Survival of Species (DISS) started in 1995 and will last until the March 1999, covering around 30 sites including Burqu, al-Ghamr, and al-Hazim (Presentation summarised in Mashaqbeh, 1998a). These sites are located within or very near the BRDP area where access to the technical and logistic facilities of the BRDP Centre was a tremendous advantage when undertaking the fieldwork.

2) The secondary sites

The secondary sites were Dana and ash-Shaumari nature reserves. The Royal Society for the Conservation of Nature (RSCN) protects Dana and ash-Shaumari; they are both the subject of major conservation area projects. The reasons for choosing both of the nature reserves were: 1) to learn about the RSCN objectives and how they are evolving, 2) to see how RSCN dealt with the local people at the time of establishing those projects and how these relationships are being conducted today, and 3) accessibility of the logistic support required to undertake the field investigations from RSCN's bases at these projects.

3) The tertiary sites

Other sites in Jordan and the organisations and people involved have been the source of valuable additional information. Discussions were held with personnel responsible for these sites as well as the local beneficiaries. Ordinary activities were observed in the

field for a few days at these sites. The researcher was able to visit two sites: ar-Rifa'iyyat ash-Shamaliyya village and Bani Hameeda grazing reserve. Working in the tertiary sites was important in order to understand aspects of improving rangeland and livestock production and ways in which the Jordan Co-operative Corporation (JCC)[1] have worked with the local population. It should be mentioned here that the livestock owners in these two sites are not nomadic or semi-nomadic but settled in houses.

2.4 Data collecting techniques used in the study

This study was based on social geographical methods, both quantitative and qualitative approaches.

2.4.1 Quantitative approach

The main method used in this approach was a survey. The advantages of a survey include economy of design and fast feedback of the data acquired about local people through small number of individuals (Creswell, 1994). The data collection technique used was a structured questionnaire. It was designed to collect basic data from a small number of people who used resources in the field sites.

According to Creswell (1994), structured questionnaires can be completed through mailed or postal questionnaires, face-to-face interviews, or telephone interviews. al-Oun (1997) reported that when the researcher chooses the face-to-face interview method, he will be able to obtain more specific answers, gain better responses, observe 'non-verbal' behaviour, and create a suitable 'discussion environment' by starting with an appropriate question.

[1] This is a new organisation, but has been created from the Jordan Co-operative Organisation (JCO) with

The survey for this dissertation was conducted by the researcher through 91 personal (face-to-face) interviews. The advantage of this technique (in addition to these noted by al-Oun) was that the researcher could read and translate the questions, since most of the informants were not able to read either English or Arabic.

The questionnaire was designed to: a) obtain information directly relevant to the aims and objectives of the research, b) get accurate information, c) avoid unnecessary or over-intrusive questions, d) be short, and e) obtain information from many people.

It contains three sections and a total of thirteen questions (see Appendix 1):

1. Section one contained three questions. Personal information, kinds and numbers of vehicles, and livestock numbers. The purpose of this section was to provide the researcher and the reader of this study with a background of the land and water users in the study areas.
2. Section two had eight questions to provide information about the Bedouin mobility and the reasons behind choosing the sites or moving from one place to another.
3. Section three contained two questions to assess dependency by livestock keepers on the natural forage, supplementary animal feed, and the water supply resources.

2.4.2 Qualitative approach

Bryman (1988, p. 46) defined the qualitative method as 'an approach to the study of the social world which seeks to describe and analyse the culture and behaviour of humans and their groups from the point of view of those being studied.' Also, Creswell (1994)

different functions and structure.

noted the following assumptions of the qualitative design:

> "1) Qualitative researchers are concerned primarily with process, rather than outcomes or products. 2) Qualitative researchers are interested in meaning-how people make sense of their lives, experiences, and their structures of the world. 3) The qualitative researcher is the primary instrument for data collection and analysis. Data are mediated through this human instrument, rather than through inventories, questionnaires, or machines. 4) Qualitative research involves fieldwork. The researcher physically goes to the people, setting, site, or institution to observe or record behaviour in its natural setting. 5) Qualitative research is descriptive in that the researcher is interested in process, meaning, and understanding gained through words or pictures. 6) The process of qualitative research is inductive in that the researcher builds abstractions, concepts, hypotheses, and theories from details" (p. 145).

Because the structured questionnaire was short and precise, it had limited value in revealing the livestock keepers' attitudes and perceptions. This kind of information cannot be obtained from precise questions. It was therefore necessary to engage in semi-structured interviews, observations, and make use of visual materials such as maps and photographs.

1) The semi-structured interview

Six discussion themes were prepared to gain in-depth information from a smaller number of people who use the resources in the study areas[1]. The themes aimed to include people who may have social or political weight and/or significant numbers of livestock or have views on the importance of co-operation between the local people and BRDP and RSCN, or some other concerned organisations.

The six discussion themes are specified below:

1. Theme number one (rangeland vegetation) was planned to identify the food resources of birds and wild animals and attitudes of the Bedouin toward the competition for the resources between those animals and their livestock.

[1] See Appendix 2 for a copy of the semi-structured interview.

2. Theme number two (water) was planned to identify the water resources of birds and wild animals and to gain an idea of how the Bedouin thought to resolve the competition between their domestic livestock and the wild animals.
3. Theme number three (livestock owners who come from outside the site) was planned to ascertain if the Jordan's Badia is still used by Bedouin from other parts of Jordan or from neighbouring countries.
4. Theme number four (protected areas in Jordan) was planned to discover Bedouin attitudes towards projects designed to improve livestock production.
5. Theme number five (biodiversity reserves in Jordan) concerned only the local people at Dana and ash-Shaumari areas and was designed to show how RSCN has dealt with the people since the establishment of the protected lands.
6. Theme number six (biodiversity reserves in the future) was the subject of discussion with the local people at Burqu, al-Ghamr, and al-Hazim. It was planned to reveal how much the RSCN's objectives and activities are known to the Bedouin in general and to determine if the Bedouin have any interest in co-operating with RSCN (or other organisations) to discover ways in which domestic livestock and wild animals can live in harmony.

2) Observation

During the eleven months spent in Jordan (April 1997 to March 1998), every opportunity was taken to observe the rangeland management, grazing methods, and systems for the protection of biodiversity at the sites included in the research project.

3) Visual materials

Some plates and maps were made to illustrate the locations as well as some features of the study areas.

2.5 The pilot study

The structured questionnaire and semi-structured interview were tested in Durham before carrying out the fieldwork in Jordan; a few interviews were made with some Jordanian students of Bedouin origin. The researcher also discussed the questionnaires with specialists in the department. Some modifications were made after these tests on the structured questionnaire. For example, question number six was split into two separate questions, one to determine the months that the owner had stayed and the other the months that the owner will stay. A modification was also made to question number twelve which listed the kinds of feed preferred by the owners. The question was modified to show the degree of dependency on the rangeland resources as many reports have already addressed the feed issue (e.g. Oakeley, 1996).

2.6 Application of the structured questionnaires and semi-structured interviews

During 52 days spent on fieldwork, the researcher was able to fill 91 structured questionnaires and have 24 semi-structured interviews in total (Table 2.1). With regard to the population of the sites, no reliable reference could show numbers of owners. This is a consequence of Bedouin mobility throughout all of the Jordanian Badia, which confuses any survey. In the tertiary sites, the situation was quite different; the owners are villagers and are settled in houses, not tents.

The population of the Badia represents about 5% of the total population of Jordan while the completely nomadic Bedouin are about 5% of those who live in the Badia (0.25% of the total population of Jordan) (Allison *et al*, 1998). With regard to the Jordan census (1994), the population reached 4.1 million and consequently the total nomadic Bedouin population could be estimated at around 10,250 (0.25% of the total population of Jordan). Findlay and Maani (1998) have found that the typical Bedouin household consists of an average of 6.5 persons and thus the total number of households of the nomadic population can be estimated at around 1580. Another source (al-Junaidi, 1996) states that the total number of nomadic households is around 500. Thus, the number of nomadic Bedouin households in Jordan could fall within the range of 500-1580. However, the researcher, from his own experience of living in the Badia, believes that the number of nomadic households is much closer to 500 than 1580. Furthermore, the number of nomadic owners of livestock is decreasing as most members of the new generation of the Bedouin tend to abandon the nomadic lifestyle.

The researcher filled questionnaires and held interviews with all the owners met in the study areas during the fieldwork except the few who did not accept the idea of an interview, or those who were not present in their tents or houses. Most of the informants were visited in their tents and so the interviews were conducted whilst sharing tea or food with them.

It should be mentioned here that the ten structured questionnaires made in the tertiary sites were removed from the analysis as the questions were not designed to obtain information from settled owners. They are not nomadic and so do not move in the Badia.

Table 2.1: The numbers of the structured questionnaires and semi-structured interviews which were done during the fieldwork

Site name	Structured questionnaires	Semi-structured interviews
Burqu	22	6
al-Ghamr and al-Hazim	19	6
Dana	30	6
ash-Shaumari	10	2
ar-Rifa'iyyat ash-Shamaliyya	8	2
Bani Hameeda	2	2
Total	**91**	**24**

Source: Field study conducted by the researcher, 1997

2.7 Data limitations and problems faced in the fieldwork

al-Oun (1997) indicates that social studies in the Badia generally face difficulties in obtaining information from the Bedouin:

> "Because of economic and cultural reasons, Bedouin hesitate to share information with others concerning affairs such as the size of their family, their income, and the number of animals they keep. Lack of accurate records leads to heavy reliance on what people choose to say, and so under-reporting or over-reporting by farmers on sensitive topics is likely to occur... The quality of the data is a crucial problem. Under and over-reporting springs from the fact that some people may appear to exaggerate events for one reason or another in the hope that they will make some gain. An example of this was respondents over-reporting the problem of shortage of feed and low prices of animals, believing that I was a government employee who would then transfer their claims to the authorities in the hope of obtaining more facilities and help. On the other hand, other respondents showed reservations in terms of the number of animals they had or the size of the family, assuming that if I were a government employee, I would cause them payment or return with further questioning. Furthermore, bias is likely to occur where false information is provided by farmers, either by not understanding the questions posed or by not being honest when answering the questions" (pp. 75-77).

During the fieldwork, some problems were faced that affected and limited the accuracy of the data. The field investigations with Bedouin in this study were affected by an

extensive survey held by the Ministry of Agriculture (MoA) at the same time in Burqu, al-Ghamr, al-Hazim, and ash-Shaumari. As a result, some responses were not very informative as most of the livestock owners were reluctant to answer yet more questions.

In Burqu, al-Ghamr, and al-Hazim, most owners had heard rumours that lands belonging to these sites were going to become future reserves. These rumours had already caused extreme opinions rejecting this idea. This affected some interviews negatively with owners not responding very well. In Burqu also, most of the Bedouin interviewed were busy collecting water for their livestock, and so were not able to give much time to the interviews.

In Dana, to minimise logistical requirements, the researcher joined a research team which was carrying out research for the RSCN's benefit. Unfortunately, it was difficult sometimes to conduct interviews for fear of disturbing the informants even more.

In ash-Shaumari, three brothers lived in five tents and were involved in a blood feud. They were reluctant to participate; fearing the information given would reach their opponents in some way. Also, two owners refused to give interviews at all.

In ar-Rifa'iyyat ash-Shamaliyya, the villagers were suspicious of the researcher, fearing he was a government employee who later would end their ownership over the village's land. As a result, some of their responses were not very helpful.

Regarding the JCC site, the plan was to visit two sites but for many reasons, only one

site was visited. The site which was not visited faced several problems such as the removal of the JCC's ownership of the lands for the benefit of one of the Jordanian universities. Also, work in JCC sites depended on weather conditions. The farm machines cannot work in a wet environment, and therefore, four months were spent waiting for convenient conditions to visit Bani Hameeda site at the time when the local people were planting the land.

In spite of these problems (which affected only a few respondents), the majority of those interviewed were helpful. Also, being a Bedouin, the researcher managed in most cases to direct the owners' attention from general issues before moving smoothly to talk about this study's themes. Furthermore, the researcher's background gave him an understanding of where he should speak and when it was appropriate to listen.

2.8 Conclusion

The secondary data available for this study was supported by primary data obtained from fieldwork carried out between April 1997 and March 1998. A mixed-data collecting technique was used by implementing quantitative and qualitative approaches. A structured questionnaires and semi-structured interviews were used in six sites categorised as primary, secondary, and tertiary according to their relative importance to the study. This resulted in the completion of 91 structured questionnaires and 24 semi-structured interviews conducted in the six study sites. Some problems were faced when conducting the survey but most of those who were interviewed responded well to the researcher's questions. Besides the data of the survey, this study is mainly based on other sources of information obtained from governmental and non-governmental organisations, and from the international literature.

Chapter Three

Bedouin systems of land and water management in the Middle East Badia, with an emphasis on Jordan

3.1 Introduction

For more than three millennia, Bedouin had a common life style in the Middle East. They moved freely throughout the Badia in the region, searching for water and forage for their livestock. But after World War I, the Ottoman empire, which had colonised most of the Middle East countries for more than five centuries, was defeated which led to the establishment of Jordan, Iraq, Saudi Arabia, and Syria. In consequence, many changes have taken place in the land and water-use systems in the region.

This chapter highlights the past and current land and water-use systems used by the Bedouin. The emphasis is centred on the patterns of these systems, their advantages and disadvantages, as well as the changes that have taken place to these systems. The effects of these changes are also discussed.

3.2 Traditional land and water-use systems

The Bedouin traditional land and water-use systems can be understood through discussion of the following terms: nomadism, pastoralism, and the traditional *hema* system, which also include additional related sub-terms and expressions.

1) Nomadism and pastoralism

Nomadism is a term which refers to human group movements while pastoralism refers to livestock husbandry activities (al-Kasasbeh, 1988). Although the two terms are related and, sometimes, mixed, Chatty (1974) provided the following argument for how they could be distinguished:

> "Too often nomadism is confused or interchanged with the term pastoralism. The first, a definition of a type of spatial organisation needs to be distinguished from the second, a definition of a type of economic organisation or mode of life. Although the two terms are often related, their interrelationship is not absolute. For example, nomadism without pastoralism characterises the spatial arrangements of the Gypsies or 'Nawwar' of the Mediterranean, as well as the Suleyyeb tribes of metal craftsmen and traders. Pastoralism without nomadism occurs when a sedentary population utilises local pastures and subsists in a suitable habitat on the products of domesticated animals as long as techniques for storage of fodder are developed" (p. 3).

As the Bedouin (the inhabitants of the Middle East Badia) used to raise livestock and move regularly in the Badia searching for water and forage for their animals, they were and are[1] nomads and pastoralists or nomadic pastoralists. The Bedouin regarded their livestock as a source of pride and a special status in the tribe. The livestock also represent wealth, producing profits, and providing meat, dairy products, wool, and skin to the household (Abu-Rabia, 1994). al-Oun (1997) added that:

> "Nomadism is a way of life based on tribal organisation. The social structure of tribes and their members and their social relations are largely determined by kinship, with family loyalty holding the strongest bond. Within the family there is a rigid hierarchy made up of the male members of the family in descending order of age. The oldest male decides what is in the best interests of the family and dictates the role each individual is to play in the group's general goal... In the past, the Bedouin household needs were minimal and they were able to meet their demand from the herds. Their cash requirements were met by transporting goods across the desert and renting or selling camels to town dwellers. Camels were thus the mainstay of Bedouin life, providing milk, meat and transport. Bedouin were completely reliant on wild natural grass for animal feed, such that the total number of animals kept at any one time depended upon the seasonal situation. Animals were kept mainly for their milk and it was rare for animals to be raised for meat. Over time, the Bedouin have survived the hostile environment by migrating vast distances to find pastures and water sources for their herds of camels, sheep, and goats in the Badia" (pp. 29-30).

[1] Nowadays, only small proportions of the Bedouin communities are still complete nomadic pastoralists while the majority have abandoned nomadism and pastoralism patterns.

Bedouin mobility is in response to the limited resources of the environment. Alwelaie (1985) indicates that:

> "Mobility is the nomadic pastoralists' best defence against the harsh conditions of the desert. The combination of seasonal and areal variability in the location of pasture and water creates a need for this kind of movement. Arid zones are always characterised by having little water and vegetation. However, in some seasons some areas tend to have a surplus of these resources which tends to create areas of surplus compared with areas of shortages. Therefore, nomads with their great skills of moving fast, move from areas of shortages to areas of surpluses to satisfy their and their herds' needs for at least one season or part of a season" (p. 62).

Before the 1940s and 1950s of this century, artesian wells and trucks were not known to the Bedouin. Water played the main factor affecting the Bedouin mobility. The rain was the main source of water. Wells were also dug and barrage dams were built across seasonal streams made by the rain. The Bedouin used to stay deep in the Badia until these wells and barrages dried up then left to the marginal parts to be close to the adjacent fertile areas which usually receive better rainfall. This mobility in the past was ideal for giving pasture-lands time to get some rest and make a comeback, which kept biodiversity in balance (Masri, 1991).

Nesheiwat (1991) described two concepts with reference to the mobility in Jordan. They are *at-tashreeq* (moving towards eastern areas) and *at-taghreeb* (moving towards western areas). *at-tashreeq* is moving, at the beginning of the winter season (in December or January), in order to graze the grass made by early rains. *at-taghreeb* is moving back from eastern to western areas, at the beginning of the summer season (in June or July) when the water dries up and plant productivity declines, in order to graze after the harvest, sell lambs, and reserve some feeds for the animals.

Besides grazing the pastures, Campbell and Rowe (1998) pointed out that the Bedouin in the northern Badia of Jordan move to the eastern al-Hamad plains in winter in order

to prevent mortality amongst new-born lambs in the western parts because of the cold. Similarly, the researcher heard from the Bedouin in Dana area that they would stay near the top of the mountains in summer and near the low wadis during winter for climatic reasons. Another example mentioned by Chatty (1974) was that the tribes of al-Fadl and al-Hassanna used to graze the northern part of Lebanon during winter and graze in the mountains in summer.

The villagers who occupy the fertile areas used them for horticultural crops, cereals, forage crops, and forests (Abu-Zanat *et al*, 1993; al-Junaidi, 1996; and Nesheiwat, 1991). Those villagers used to live in surplus and good conditions compared with the harsh and difficult situation for the Bedouin. Even though the Bedouin were very dependent on their livestock to match their needs, they were not entirely self-sufficient (al-Oun, 1997 and Chatty, 1974). The Bedouin had relations of reciprocity and interdependence with sedentary communities in adjacent areas. The Bedouin always had essential needs of utensils of metal or cured leather and some agricultural products including grain and some dry fruits and vegetables. At the same time villagers were strongly dependent on the Bedouin to secure dairy products and meat, wool, hair, and skin (Chatty, 1974).

Nevertheless, on the occasions when the Ottoman empire was concerned with fighting in Europe and also during the droughts which used to hit the Badia, the tribes raided and looted each other and even the villagers. There was a brotherhood tax called *khawah* enforced by big tribes on small tribes and villagers:

> "*Khawah* or brotherhood tax was another source of wealth for Bedouins in both Jordan and Syria until the 1920s and 1930s when the mandate powers forced an end to the practice. *Khawah* was a payment extracted by powerful Bedouin tribes from settled

villagers or smaller less powerful Bedouin tribes in exchange for protection against raids by other powerful groups" (Shoup, 1990, pp. 124-125).

The *khawah* and raids (*ghazow*) in addition to some drought seasons were the main cause of devastation of the agricultural production in the region before the creation of the region's states which put an end to these practices.

2) The traditional *hema* system

Alwelaie (1985), Masri (1991), and Nesheiwat (1991), reported that another kind of land and water management, which related to the patterns of nomadism and pastoralism, called the *hema* system, was also wide-spread in the Badia of Jordan and throughout the region. *Hema* means reserve which is land held and reserved by a group, every member of which has the right to use what is held in common including the range resources. This system was not unmanaged but controlled by a number of socio-cultural mechanisms such as the tribal laws, which were devised to act as social controls.

The *hema* system in Bedouin life was successful due to the strength of group solidarity, which is called *a'sabbiyyah*. This solidarity is linked to the socio-political organisation of the Bedouin and administered by their customs and traditions (*urf* and *adat*). Tribal solidarity had to be strong in order to protect, usually, isolated small camping units. Any individual infringing this system would be punished:

> "Abuse of the system by any individual would indicate a lack of respect for tribal solidarity, honour, and alliance obligations. Punishment in the past was official negation of any affinal ties to the group by the leadership. A person thus cut off from his/her natural support/protection group would not be able to remain in the desert. The punishment could eventually involve all other matters dependent upon good name and honour such as the ability to marry or even find work" (Shoup, 1990, pp. 83-84).

The *hema* system was present before the beginning of Islam. It was practised during the expansion of the new religion. A number of *hemas* were established to be grazed by the

military animals (horses and camels) and the livestock that were obtained during the wars defending the new religion (Alwelaie, 1985 and Nesheiwat, 1991).

According to Shoup (1990), distinctions between different types and degrees of control over land and water available for Bedouin grazing within *hema* system are indicated by the following terms: *Dirah* refers to the group's grazing grounds and camping unit. *Wajihat* means all the lands claimed by a particular tribal group. Tribes may have overlapping claims to particular *wajihat* but they all admit to each tribe's *dirah*. *Madarib* is used to refer to tribal grazing lands open to use by all the tribe's members and any member from another tribe usually had to seek permission from the tribe's *shaykh* (chief) in order to graze his animals inside.

Hema can be established and controlled at any level within the tribal structure. A simplified hierarchical categorisation of which can be given as *qabilah* (tribe), *a'sheirah* (clan), *fakhed* (expanded family), then *bayt sha'ar* (tent or household), which is the smallest unit. The protected areas become more exclusive in access as the level of the control moves down the tribal structure. For example, some pastoralists recognise private rights to water sources. The wells usually belong to the family or lineage who dig and maintain them. Natural springs were always excluded from any privatisation plan as they were located within the common use area. But building, cleaning, and maintaining wells usually led to private use by individuals and lineages. In general, the traditional *hema* size for each group or unit was due to the group number and therefore strength. There was a positive relationship between the group number and the *hema* size in which a big group meant a big *hema*. Some hemas were measured as the distance a dog could be heard barking. Access to *hema* areas used to be under the

control of the tribe's *shaykh*.

According to Nesheiwat (1991), *hema* could be: 1) a reserve with no grazing but the grass could be cut during certain periods and drought seasons, 2) a reserve for grazing purposes but restricted to certain seasons of the year, 3) a reserve for grazing all the year around, 4) a reserve for bee-keeping, or 5) a reserve to protect forest trees.

Shoup (1990) summarised a number of benefits of the *hema* system including maintaining the productivity of forage plants:

> "The system limited the period of use of particular rangelands and allowed a re-growth of natural fodder plants. The flocks and herds left behind valuable fertiliser that assisted plant re-growth and, thus, range productivity was maintained. Seasonal use of *hema* ranges prevented the destruction of young plants. Management of livestock grazing allowed the re-growth of preferred plant species. Desertification, though not prevented, was retarded by the use of *hema*. Protected rangelands did not suffer the environmental damages caused by the loss of ground cover" (pp. 70-71).

Tribes, sometimes, made *hemas* by simple and strange ways like the case that was mentioned by Shoup (1990) when Sattam al-Fayiz, the *shaykh* of Bani Sakher tribe, established his claim in 1878 to lands near Umm al-A'mad south of Amman by thrusting his lance in to the ground and declaring in front of witnesses the land to be his. Once an area had been declared as *hema*, markers were set-up for identification and usually respected by other tribes.

3) Assessment of the traditional land and water-use systems

Without the Bedouin, vast areas of the Middle East would not have been used and settled. Although the Badia environment is hostile and its resources are scarce, by adopting organised movements, the Bedouin were able to satisfy their and their herds' needs. Discussing the reasons behind this unique relation between the Bedouin and the

Badia, could explain why their lifestyle had changed relatively little up to World War I. They love the Badia and it is common to find in their literature, poetry and prose stories dignifying the Badia and crowning themselves with nobility and heroism. Their population and their animals were few in number compared with the vast Badia. Furthermore, they had a high degree of social and political autonomy. They disliked to be controlled and they used the vast Badia to prevent direct control by rulers in the cities or villages.

Although the Bedouin and the villagers had some complementary relations, drought seasons, the weakness of the Ottoman empire, and Bedouin political autonomy allowed them to carry out raids between themselves and against the villagers. This negatively affected agricultural production in the region before the states created after the end of World War I, put an end to the *ghazow* and *khawah*.

But is there anything in the traditional land and water-use systems which could be used today to help improve the sustainable use of the Badia grazing resource? It is true that the slow traditional mobility (using the animals to move) is not feasible for the current generation of the nomadic Bedouin but the emphasis should be placed on the opportunity to select some areas which could be divided into two sites. One is concerned solely with summer grazing such as al-Harra of the northern Badia and the other site is concerned solely with winter grazing such as some parts of al-Hamad of the Jordanian Badia. The idea is that the Bedouin move in summer to the summer grazing areas which means leaving the winter grazing areas without grazing while moving to them after the end of summer.

Although the traditional *hema* system no longer exists, some aspects of it could be shaped and adopted to improve the range resources of the Badia. By distributing some parts of the Badia between the tribes or clans who have traditional claims on these specific areas, this would put an end to the early and over-grazing which have been devastating the range resources. As most of the Badia areas are freely grazed by any Bedouin, this causes a high degree of competition between them, which contributes to the early and over-grazing. Re-shaping then re-introducing the *hema* system could help the Bedouin to manage the range resources in a better way. This would give the users of particular areas relief from fearing the competition of other Bedouin which will help them accept ideas of a sustainable use of the range resources. This would also encourage them to protect these areas from other users. However, this will not be an easy target to achieve. Putting into account that the land tenure in the Badia is not clear yet due to the Agricultural Law number 20 (1973) which considers most of the Badia areas to be state lands. Also, most of the Badia is open for grazing by any livestock owner in Jordan which makes the situation more difficult. Therefore, in any attempt to apply such a plan, all concerned parties should be involved.

3.3 Changing land and water-use systems

Numerous changes have taken place in the Bedouin way of life, impact on their land and water-use systems. This section highlights the stages and factors of these changes and their impact on the range resources. To simplify summarising these changes, this section is divided into two sub-sections. The first is about the changes between the end of the Ottoman empire and World War II while the second is about the changes after World War II.

1) The changes in the land and water-use systems between the end of the Ottoman empire and World War II

Defeating the Ottoman empire during World War I was a significant factor for the changes which have subsequently taken place in the Bedouin way of life which have impacted upon their land and water-use systems. The Bedouin way of life had changed relatively little before and during the Ottoman empire which lasted for more than five centuries. But between the end of this empire and World War II, the region witnessed the British and French mandates and the creation of Jordan, Iraq, Saudi Arabia, and Syria as separate states.

During the Ottoman empire, the central authority did not interfere directly in Bedouin affairs, but instead the rulers approached the *shaykhs* of the Bedouin tribes through paying *al-surrah* which was a small tied bag filled with the silver *majidi* (the Ottoman currency) in order to secure their loyalty to the empire. The *shaykhs* were also given responsibility and special powers which led to a kind of domination in the Badia and neighbourhoods. This high degree of political autonomy, besides other factors, led to the *ghazow* and *khawah* which devastated the social security and agricultural production in the region (Nesheiwat, 1991).

After the end of this regime, separate countries emerged in the region which were mandated to the British and French. The British and French mandates and the governments of Jordan, Iraq, Saudi Arabia, and Syria regarded the Bedouin societies as states within the regional states. The priority made, with regard to the Bedouin, was to put an end to their political autonomy and encourage them to abandon the nomadic lifestyle (Chatty, 1990).

> "Sedentarisation of the Bedouin remained the major goal of both the Syrian and Jordanian governments under the mandate powers. In Jordan, sedentarisation was offered as an alternative to raiding, subsidies, and *khawah* payments after these were stopped in 1924. In Syria, the French tried to buy the loyalty of the Bedouin leaders after the 1925-1927 Syrian Revolt in an attempt to thwart the Syrian nationalists. Tribal elites were encouraged to register tribal grazing lands in their own names. As a result, the traditional range use systems were threatened by the increased cultivation of marginal areas and the intensified production of small stock. Government officials encouraged open, uncontrolled use of the rangelands rather than observation of tribal rights and reserves. The traditional Bedouin system began to falter in some areas. Only those tribes with a strong sense of *a'sabbiyyah* or tribal solidarity were able to defend their grazing lands from outside exploitation" (Shoup, 1990, p. 89).

Jureidini and McLaurin (1984) argue that the settlers in the early beginnings of creating Jordan had more interest in the state than did the Bedouin who were able to move to another environment if problems loomed. Dutton (1998) and Shoup (1990) mention that there were several reasons to create *quwat al-badia* (the Desert Patrol Force) in Jordan, employing Bedouin as soldiers in 1930: first, to apply the central government's policies in the Badia including putting an end to the *ghazow* and *khawah* between the Bedouin themselves and between them and the settled farmers; second, to link the Bedouin to the state body in order to define them as being Jordanian; and third, to protect Jordan's borders from the *ghazow* of the neighbouring Bedouin especially from *al-ikhwan* (the Brotherhood organisation of Saudi Arabia). The central government used *quwat al-badia* to apply its policy and programmes which impacted on the Bedouin way of life and, therefore, upon their land and water-use systems in many ways. *Quwat al-badia* strengthened the ties between the central government and the Bedouin who became the cornerstone of the government. *Quwat al-badia* was also able to put an end to the *ghazow* and *khawah* after the government promoted settled agriculture as an alternative source of income to raiding. Although the government considered most of Jordan's lands to be state lands, including the Badia, some lands were granted to the tribesmen in a desire to make settled farmers of them. According to Shoup (1990), in 1928, around 108,000 dunums in the Jordan Valley were sold to some

members of al-Adwan tribe; and there were some lands allocated to the Bani Sakher tribe near ash-Shounah village in the Jordan Valley. Furthermore, the researcher's tribe, as-Sirhan, was given eight areas in the northern Badia in order to encourage them to settle and make villages.

In addition, there were other significant impacts of establishing *quwat al-badia*. Most of the Bedouin in Jordan considered that being soldiers in *quwat al-badia*, or in other armed forces, was a very good source of monthly guaranteed income besides providing good food, clothes, and a better social position[1].

But the government's close interference was not the sole reason for the changes in the Bedouin way of life in Jordan. Dutton (1998) emphasises that as the twentieth century proceeded, successive generations of Bedouin have become more interested in village life and the services and the comforts that it provides.

Saudi Arabia was unified and its National Guard created in 1932. This reduced the instability of the society and promoted peaceful times. The *hema* system was weakened as the government considered most of the *hemas* to be state lands. This increased the livestock numbers as the Bedouin could graze freely almost everywhere inside Saudi Arabia without fearing the *ghazow* or grazing in other tribes' *hemas*. This put the range resources under high pressure (Alwelaie, 1985).

Thalen (1979), argues that fixing the Iraqi boundaries and increasing the police control

[1] The Bedouin still consider serving in the military and police forces as a very good opportunity for their sons to get jobs. As an example, the father and two uncles of the researcher, for financial reasons, tried to persuade him after high school to enter the army as corporal while the researcher's wish was to continue in higher education.

were important factors contributing to change in the traditional land and water-use systems of the Bedouin including the *khawah*, *ghazow*, and *hema*. Thalen added that the result was increasing the numbers of livestock. For example, sheep numbers increased in the state from 5,525,000 in 1938 to reach 11,040,000 in 1965.

Despite the fact that the international borders of the region had never been completely closed until the Gulf War (1990-1991), the national governments have always tried to curtail the long migration and movement patterns. In 1925, Jordan, Syria and Saudi Arabia signed a treaty, by which the Bedouin had to seek permission prior to crossing borders which increased most of the Bedouin trends towards sedentarisation as their range of movements became smaller (Shoup, 1990).

The traditional water sources in the Badia were a few hand dug-wells, some shallow wells in wadi-beds, a few springs, and rainwater, which had temporarily accumulated at the surface (Thalen, 1979). The water-use system before World War II changed relatively little as the trucks and boreholes were not known yet for most of the Bedouin in the region.

In summary, as a result of several factors which took place in this period, the mobility and *hema* system were weakened, the *ghazow* and *khawah* were ended, and a number of alternative employment opportunities were created. Ending the *ghazow* and *khawah* led to increases in the number of livestock which put a high pressure on the range resources. On the other hand, weakening the mobility and *hema* system in addition to emerging alternative employment opportunities led, as Dutton (1998) indicates, to a relative reduction in the Bedouin dependence on local environment resources and their interest

in their conservation.

2) The changes in the land and water-use systems after World War II

Dramatic changes have taken place in the traditional management systems since World War II due to a number of factors: the British and French mandates were already ended and countries of the region became independent; more governmental interference in the Bedouin way of life; the introduction of new technologies in the region including forms of communication, boreholes, and farming machines; growth of more alternative employment opportunities; and oil wealth - though not in Jordan.

Since the independence of the region's states after World War II, sedentarisation has remained a primary focus of the governments. The Bedouin and their traditional systems were seen as anachronistic and not part of the modern world. Also, nomadism was considered as a sign of backwardness and the governments tried to disguise the real numbers of nomadic groups. They believed that these groups represented an embarrassment rather than asset, and a type of life that endangered security (Alwelaie, 1985 and Chatty, 1997).

Even though the Bedouin in the region depended on the range resources of the Badia, they also used the summer grazing in the more fertile areas in the settled parts. They used to be allowed to use fields of sedentary villagers in the fallow areas, which are the fields that are left without crops. In the past, fallow areas were considered common lands and open as pasture to anyone. The owners of these areas (the settled farmers) regarded the fertiliser left behind by the flocks and the assistance that grazing provided in weed control as a form of payment for usage. Furthermore, due to the lack of fodder

in the rangelands during the summer months, the Bedouin were forced to look for other alternatives such as moving toward agricultural zones in order to graze the remaining stubble after the harvest and also to get water for herds. This situation created some positive complementary relations with the settled villagers. The villagers provided the nomads with some low cost feed and other needed commodities such as fresh and dry fruits and vegetables whilst, on the other hand, the nomads provided the villagers with dairy products, meat, animal skins, sheep's wool, and goat hair. As a result of these interactions, some nomads started to establish their own communities and to practice agricultural activities in addition to livestock raising (Nesheiwat, 1991 and Shoup, 1990).

A further factor that increased sedentarisation was the three years drought which hit Jordan and Syria at the beginning of 1958. This pushed some Bedouin to seek wage labour in the urban centres or serve in the military and police forces in both countries as large numbers of livestock died and many of the owners were financially ruined (Chatty, 1997 and Shoup, 1990).

In Jordan, as the government services have developed, there also has been the need for the Bedouin to settle in order to benefit from them:

> "In practice it was difficult for the government to deliver or the Bedouin to receive services while they retained a fully mobile lifestyle - piped water is usually delivered to permanent houses, while schools and clinics are normally associated with villages or towns" (Dutton, 1998, p. 11).

Lancaster (1981) mentioned that the growing economy outside the Bedouin society brought the tribes much closer to the money economy. The Rwala (one of the biggest tribes in the region) stopped depending on camels as the greatest source of income and

wealth. Instead, the oil companies and the National Guard in Saudi Arabia offered them new jobs:

> "Clearly there is a conflict here. In the span of one lifetime the Rwala have moved from an economy that was essentially non-monetary to an ordinary economy where wealth is measured in financial terms. To put it another way, the Rwala have moved from a community where wealth was measured in moral terms towards inclusion into a society where wealth is more materially based. In 1976 the dilemma was becoming increasingly apparent. Young men employed as guards, drivers, mechanics etc. made a decent living but never had a surplus with which to build a traditional reputation. Their elders were loud in their condemnation of the younger generation until they realised that one cannot be generous in the old way under the new economy. Later the realities of life were understood by all and attitudes changed" (Lancaster, 1981, p. 145).

After independence in Syria (1946), the government approached the tribes, aiming to settle the nomads and terminate traditional tribal administration in which some *shaykhs* were coopted by urban politicians and many areas registered in their names. Those *shaykhs* entered into agreements with entrepreneurs and city merchants which opened vast areas of the Syrian Badia to farm machinery. But this form of management system was changed when a specialist called Omar Draz recommended to the Syrian government a form of co-operative organisation as a management system in 1967 (Chatty, 1997 and Masri, 1991).

> "Economic assistance programs for the Bedouin are all linked to membership in the *hema* co-operative system. Access to low interest loans, to the national marketing system, to free or inexpensive fodder, to low-cost or free veterinary care, access to improved breeding-stock, and, indeed, even access to water sources and pastures are through membership in one of the *hema*-based co-operatives. Those who remain outside the *hema* system will find it increasingly more difficult to make use of alternate economic strategies" (Shoup, 1990, p. 232).

It was mentioned earlier that the introduction of western technologies including forms of communication, boreholes, and farming machines have effected the Bedouin land and water-use systems. Motor vehicles enabled the central governments' forces to interfere more in the inner desert with greater ease and effectiveness, and also changed the attitudes of the Bedouin towards the camels as it was the best way to move (Lancaster,

1981).

Alwelaie (1985) also indicates that the land and water-use systems were highly affected since the Bedouin started to own trucks:

> "As a matter of fact, Bedouin today are free from having to stay close to watering points. They own tank trucks for bringing water to the herds wherever they are located. Besides, they are using trucks for bringing in subsidised barley as animal feed. They can graze now everywhere trucks can reach" (p. 295).

In Jordan, increasing mechanisation has accelerated the expansion rate of farming activities. Consequently, the range resources are being heavily over-used. Also, introducing modern farm machinery such as ploughs created furrows which turned into run-off gullies which led to soil erosion and to an increase in the run-off water. The area used for field crops increased by 230% between 1980 and 1991:

> "The net effect of the expansion of crop land is that grazing is becoming more and more restricted to the poorer lands. The pastoral resource is declining. Productive grazing lands with vegetation of higher forage quality is replaced as a forage source by poor quality crop residues" (IFAD, 1993, p. 12).

The Jordanian government declared that all uncultivated land, including those in the Badia, belong to the state. In practice the government did very little to manage this land. This as Dutton (1998) outlined:

> "simply further weakened the authority which the tribes had over their traditional *dirah*, and their sense of responsibility for its resources, without any effective management system being created in its place" (p. 11).

On the other hand, irrational cropping activities are being carried out in the Badia in order to claim ownership by the Bedouin over lands:

> "Another land use factor which is probably having a greater negative impact on grazing lands is the widespread and escalating practice of pseudo-cropping within the steppe and to a lesser extent in the Badia. Cropping, or rather cultivation, is carried out so that a claim for private ownership can be made on the land. This aberrant land use is

> environmentally destructive as the cultivation and attempted cropping deplete the soil of nutrients and expose its surface to erosion. This reduces the productive potential of the land as grazing land" (IFAD, 1993, p. 12).

As the technologies of the boreholes and trucks were introduced, this affected the water-use system. The wells are often very deep and equipped with pumps and storage tanks which have made the entire desert area accessible to man and his livestock. This has led to concentration of livestock in specific rangelands that used to be rich in range resources which put a high pressure on the resources (Thalen, 1979).

Water sometimes, and in indirect ways, causes deterioration to the rangelands. For example, Alwelaie (1985) pointed out that there were many boreholes drilled in Saudi Arabia, not far from each other, which solved the water problem. On the other hand, these boreholes directed the movements of the nomads, which made them cluster around them and therefore overgrazing occurred. The company, ARAMCO, drilled some boreholes for some operational reasons in the eastern part of Saudi Arabia in the 1940s and 1950s. This led to a massive concentration of the livestock owners. In 1956, the Bedouin came from other parts of the country to the boreholes which were drilled by ARAMCO in the Ghawar area.

Shoup (1990) also argues that government programmes regarding water usually have many negative aspects:

> "Government programs to improve or increase access to water by boring new wells has also weakened control mechanism related to water. Government water development projects have often helped to cause environmental damage due to lack of social controls over nearby pastures" (p. 86).

Nesheiwat (1991) stated that 850 boreholes were drilled in the Badia of Jordan by 1991, 180 of which belong to the government and the rest are private. The government

boreholes are used to pump water to the cities and the villages, and to provide some water points for the livestock in the Badia. The private boreholes are used to irrigate farms. The owners also sell water.

In addition, there have been also other changing factors which can be referred to as population activities. Increasing population has led to increases in demands for food which was secured from both plants and animals. The food requirements for the increasing population has led to carrying out cropping activities in lands not suitable for cropping purposes.

Furthermore, the trees of the forests and the shrubs in the Badia are being subjected to a high degree of cutting due to the needs of houses, cooking and heat. On the other hand, increasing the population has led to an expansion in building activities which takes place over both the agricultural and rangelands areas.

Raising livestock was presumed a profitable livelihood for the Bedouin until August (1996) when the government removed the subsidy on livestock feeds. According to Rowe (1998), the net profit was JD13.50 per head before and JD1.62 per head after removal of the subsidy. When the subsidy existed, the more livestock the owners had, the more profit they gained. Beside the profit, which livestock had been providing the Bedouin, they considered livestock as a store of wealth and a symbol of a social weight. The introduction of the animal feed subsidy after 1971 played a major role in increasing the livestock numbers. Furthermore, with the increase of the population, the demand for animal products has grown and therefore the number of animals also increased. The increases of the livestock numbers as well as using the trucks for transferring the flocks

or bringing water, which disturbed the traditional seasonal flocks movements, caused early and over-grazing patterns. Due to these patterns of grazing, the palatable and less-palatable plants were eaten before the seed formation stage, leaving unpalatable plants (Abu-Zanat *et al*, 1993; al-Junaidi, 1996; ash-Shourbagi, 1993; and Nesheiwat, 1991).

In summary, after World War II, the Bedouin way of life changed in many ways. There have been increases in their trends to sedentarisation besides tremendous increases in the population and livestock numbers. Also, new technologies were introduced into the region including forms of communications, boreholes, and farm machinery which expanded the extent of use of the range resources. Moreover, more alternative employment opportunities have been growing besides the expansion of oil wealth.

As a result of these factors and changes, the range resources have been over-used which degrades the resources, reduces the production of plant biomass, and increases soil erosion.

3.4 Conclusion

For many years, the Bedouin way of life had changed relatively little up to the end of the Ottoman empire during World War I. Since the end of this empire, significant factors within the region, which have changed the way of life of the people, including impacting on the land and water-use systems. A summary of these changes has been given as an example by Naya (1998) in the north-east Badia of Jordan:

> "Over the centuries the Bedouin have learnt to adapt and survive the numerous adversities and pressures of 'modernisation' and 'progress', but, changes have occurred which have affected every aspect of Bedouin life. People external to the Badia have created international borders, built oil pipelines and pumping stations at which villages like as-Safawi and ar-Ruwayshid have evolved, introduced vehicles, provided livestock subsidies, initiated health and education systems and developed water resources. The

> Badia people have in turn exploited the advantages of cross-border trading, replaced their camels with trucks, taken employment in the military and civil service and acquired a taste for material goods. As a consequence there has been an increasing trend of once nomadic families now becoming permanently settled" (pp. 267).

The result of the changes which have taken place in the Bedouin way of life is placing the Badia resources of water, flora, and fauna under high pressure. Consequently, the rangelands and biodiversity in the region have deteriorated. Therefore, major conflicts have been created between the needs of the population, the livestock, and biodiversity of these resources. As the governments of the region became more aware of the problems, government ministries and their agencies tried to respond positively. Chapter four considers the type and impact of institutional interventions in Jordan.

Chapter Four

Institutional approaches to rangeland management and biodiversity conservation in Jordan

4.1 Introduction

According to ash-Shourbagi (1993) and Cope and el-Eisawi (1998), Jordan falls within four phytogeographical regions: the Mediterranean, the Irano-Turanian, the Saharo-Sindian, and the Sudano-Deccanian regions. Due to this variety of climates in addition to variety of topography, Jordan has a diversity of flora and fauna. But, as was discussed earlier and due to several factors, the traditional land and water-use systems of the Bedouin have changed. As a result, the natural biodiversity has been badly affected and the rangeland's resources have deteriorated. This situation opened the eyes of a number of national, regional, and international organisations, both governmental and non-governmental, to the need to overcome these conditions. These organisations have been working in Jordan in many fields and on many issues including rural development, improving the agriculture sector, rangeland management, and protecting biodiversity.

The emphasis in this study is placed on their efforts on rangeland management and biodiversity conservation. This chapter is a discussion of the efforts of these institutions to solve the conflicts between the local people, livestock, and biodiversity needs of the rangeland's resources and also how they have been dealing with the local population. Furthermore, this chapter includes a discussion of the findings of the fieldwork which was conducted by the researcher in the secondary and tertiary sites. The aim of the fieldwork was to obtain firsthand information about progress, to complement

information from other sources.

4.2 The institutional approaches to rangeland management

The institutional approaches to rangeland management have included: a) conducting research and studies; b) offering funds, consultations, and technical aid; and c) directly creating range improvement projects. The organisations involved are many and so are their activities. Therefore, covering all of them and their activities are beyond the scope of this study, which concentrates on some key organisations and issues. Due to availability of suitable secondary data, including a number of studies and publications, this section is divided into two sub-sections. The first is a discussion of some of these institutions while the second is a discussion to some of their activities.

4.2.1 Some key institutions involved in rangeland management in Jordan

1) The Ministry of Agriculture (MoA)

MoA plays the biggest role in rangeland management and improvement. The role of MoA is based on Agriculture Law number 20 (1973) in which the state is recognised as the owner of the rangelands. The objectives that MoA has been trying to achieve, with regard to the rangelands, are: 1) protecting the rangelands from tree cutting, inappropriate ploughing, and over-grazing; 2) conserving the soil and water; and 3) increasing the lands' productivity. These objectives are meant to be achieved through creating range reserves in order to protect, replant, and to lease them to neighbouring pastoral groups. The key aim in the reserves is to plan the grazing pattern with regard to the carrying capacities of the reserves. The perceived beneficiaries are the local herd-owners who live around these reserves (Abu-Zanat *et al*, 1993; al-Junaidi, 1996; and Masri, 1995).

Table 4.1 shows a number of the range reserves that have been established by MoA with a total area of around 760 km^2.

Table 4.1: Range reserves established by MoA

Governorate	Name of the Reserve	Year of Establishment	Area (km^2)	Rainfall (mm)
al-Mafraq	al-Khanasry	1946	4.55	250
	Sorah	1946	3.96	180-200
	Sabha	1979	10.54	150
Amman	Dab'ah	1979	3	120
	al-Adasia	1983	20	200
az-Zarqa	Wadi Botom	1986	15	75
	Desert Azraq	1987	300	65
al-Karak	South Mujib	1980	9.76	150
	al-Lajjoun	1981	11	150
	Nakhel	1983	15	180-200
	Desertification project	1989	50	120
at-Tafilah	at-Towanah	1981	20	150
Ma'an	al-Fujeej	1981	20	150
	al-Manshiyyah	1985	10	200
	al-A'ashyyah	1968	20	100
	Rass an-Naqab	1986	15	150
	al-Moudaware	-----	112	50
Irbid	Rajeb	1983	45	200
al-Balqa	Aira	1986	20	200
Madaba	Ma'in	1983	20	200
	North Mujib	1988	15	150
	al-Faisaliyyah	-----	20	150-200
Total	----------	-----	**759.81**	----------

Source: Based on Abu-Zanat *et al*, 1993 and Masri, 1995

2) The National Centre for Agricultural Research and Technology Transfer (NCARTT)

NCARTT was established in 1985 as one of MoA's institutions to organise agricultural research in Jordan and to carry out applied research and technology transfer at the national level. Later, in 1993, the centre became a semi-autonomous organisation. Its activities, with regard to rangeland management, are: 1) experiments with direct reseeding of the rangeland; 2) studying the impact of spring overgrazing on *Salsola vermiculata*; 3) using phosphorous fertilisers on herbaceous plants, and 4) comparing the best species that are relevant to the conditions of Jordan's rangelands (Masri, 1995 and Tadros, 1996).

3) The Jordan Co-operative Corporation (JCC)

The policies and arrangements of JCC are based on organising people through establishing co-operative societies. Its work on rangeland development is through co-operative members participating in all the improvement activities including land selection, land preparation, planting of shrubs, maintenance, and grazing management. These activities are based on co-operatives as NGOs for the rangeland development. The beneficiaries of the local communities are consulted from the early beginnings. JCC participates with the co-operative societies by helping them to obtain rangelands from the government for protection and planting with grazing shrubs. This type of land-use system is the new face of the traditional *hema* system, which was discussed in chapter three. The benefit of this policy is to link the local population with the projects of improvement and management of the rangelands (Abu-Zanat *et al*, 1993; al-Junaidi, 1996; Masri, 1995; and Othman & al-Qararah, 1996).

Table 4.2 shows the range reserves, which are already established by JCC. Their total

size is about 130 km^2.

Table 4.2: Range reserves established by JCC

Governorate	Name of the Reserve	Year of Establishment	Area (km^2)	Rainfall (mm)
Ma'an	al-Manshiyyah	1982	3	150
	A'il	1988	2.62	200
	al-Qureen	1982	15	120
al-Balqa	as-Sahin	1992	23	300
al-Karak	al-Lujjoun	1983	11.23	150
Madaba	Ma'in	1980	35	150
	Thaiban	1980	3.75	NI*
	Bani Hameeda	1987	15	250
	Salia	1987	15	200
	al-Mujib	1981	3.75	120
Total	-----	-----	**128.35**	----

Source: Based on Abu-Zanat *et al*, 1993 and Masri, 1995

* NI: No information.

4) Jordan Badia Research and Development Programme (BRDP)

It was mentioned earlier that the objectives of BRDP, with regard to rangeland management, are to conserve, maintain, and improve the management of the range resources in the northern Badia. BRDP's role and activities will be discussed in chapter five.

5) The Faculty of Agriculture at the University of Jordan

FoA has been conducting research and projects in rangeland improvement such as the Jordan Arid Zone Productivity Project (JAZP) which aims to improve range resources. Also, FoA teaches four courses on rangelands to under-graduate and post-graduate

students. These courses include management of natural rangelands and grazing management for under-graduates, and range animal nutrition and range evaluation for post-graduate students (Abu-Zanat, 1996 and Masri, 1995).

6) Arab Centre for Studies of Arid Zones and Dry Lands (ACSAD)

ACSAD was established in 1971 as one of the Arab League's (AL) institutions. It aims to conduct regional research and studies in the dry lands of the Arab countries concerning water and plant resources as a step towards conserving and maintaining them as well as training specialists. Its main project in Jordan is the Development of the Jordanian part of the Hamad Basin.

However, besides the list of the institutions mentioned above, there are other institutions which work on the issue of rangeland management, either directly or indirectly, through conducting research and workshops and/or providing consultations, technical aid, and funds. These institutions include the: Regional Centre on Agrarian Reform and Rural Development for the Near East (CARDNE), Canadian International Development Aid (CIDA), Food and Agriculture Organisation of the United Nations (FAO), German Agency for Technical Co-operation (GTZ), International Centre for Agriculture Research in the Dry Areas (ICARDA), International Fund for Agricultural Development (IFAD), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United States Agency for International Development (USAID), and World Food Program (WFP). Examples of activities undertaken by some of these and the previously named organisations are discussed below.

4.2.2 Selected rangeland projects and other activities being implemented in Jordan

1) Development of the Jordanian part of the Hamad basin

Initially, this project was created in 1979 in the al-Hamad area of Jordan, Iraq, Saudi Arabia, and Syria, which totals around 166,000 km^2. It was created by the Arab Centre for Studies of Arid Zone and Dry Lands (ACSAD), the Arabic Fund for the Economic Development, and the region's governments. The aim of this project is to study the range resources as well as conducting socio-economic surveys in order to set-up a framework for the development of the area (ACSAD, 1983).

Jordan has about 22% of this area (37,000 km^2) which is around 50% of the country's Badia. The climate in this part is characterised by low rainfall (less than 100 mm) and high temperatures in summer. The Hamad project in Jordan was planned to be a pilot project for the development of the remaining parts of the Hamad basin in the neighbouring countries. It started in 1988 with a budget of JD5 million loaned from the Arab Fund. The objective of this project, with regard to rangeland management, is to study the range resources of water, flora, and fauna in order to conserve them for the development of the area. In the early stages, two range reserves were established in the area covering 50 km^2 and five km^2 (Abu-Zanat *et al*, 1993 and Masri, 1995).

Although the project provided the local community with a number of useful services such as constructing some public buildings (ar-Ruwayshid secondary school, for example) and offering the herds some veterinary help, the local herd-owners were not consulted about the establishment of the reserves programme. MoA considered the area to be state lands, owned by government, and therefore there was no need to consult the local people to create these reserves. In consequence, this has caused additional high

security costs to protect these vast reserve from the Bedouin. The researcher argues that most of these costs would have been reduced if the project policy had considered the traditional claim for these lands by some of the tribes or clans. Initial negotiations and co-operation with these tribes or clans, the researcher believes, would have put them on the side of the project which would have secured more understanding and additional protection from outside users.

2) Jordan Arid Zone Productivity (JAZP)

JAZP is a multi-stage project funded by the European Commission. The first phase (1985-1989) aimed to develop appropriate practices for integrated farming and rangeland management in the low rainfall zone. The activities were focused on controlling run-off and soil erosion, improving soil conditions, improving the vegetation cover, and developing techniques for on-farm water harvesting and supplementary irrigation from storage dams. Phase two started in 1994 and is supposed to last until December 1998 with an overall objective of contributing to the sustainable development of the Badia of Jordan by providing the scientific basis for the optimal use of the range resources (Abu-Zanat, 1996).

3) The National Programme for Range Rehabilitation and Development (NPRRD)

NPRRD is a multi-stage project; funded by IFAD and MoA. It includes three phases and aims to re-establish the productive capacity of Jordan's rangelands and the historical, social, and economic contribution which was previously made from them. The overall objective is to formulate and implement policies that will protect and rehabilitate the rangelands. Phase one aims to address and correct the underlying structural causes of rangeland degradation by setting the stage for rangeland recovery:

1) generating public awareness and political support; 2) defining appropriate land-use; and 3) creating the appropriate policy and institutional environment. Phase two, resource recovery, aims to reduce livestock numbers to levels commensurate with resource carrying capacity. In phase three, resource development, the aim is efficient and effective rangeland management to allow rangeland resources to be utilised on a sustainable basis (IFAD, 1996).

In the all phases, beneficiaries of local communities play a central role in the implementation of the project. It is planned to work with and through communities of rangeland users which will test the adoption of favourable techniques and management practices in pilot areas in order to develop rangeland management plans. The cost estimated for the project is around $9.2 million, over five years. The two sites chosen to start phase one are al-Mrayghah (Ma'an governorate) and Manshiyyat al-Ghiath (al-Mafraq governorate). Another three sites will be added in phases two and three. However, adding more pilot areas depends on success in the activities undertaken during project years 1-3, a positive mid-term evaluation in year three, and the availability of sufficient funding (IFAD, 1996).

4) Plan of operations agreed upon between the Hashemite Kingdom of Jordan and the World Food Programme concerning support to participatory land improvement.

On July the 10th, 1997, the Jordanian government and the World Food Programme (WFP) signed a plan concerning support for participatory land improvement. This plan will contribute to Jordan's strategy to improve the agricultural sector and protect the environment. Within this strategy the emphasis is placed on the rural sector, emphasising agricultural development, food security, self sufficiency, community

participation (especially of women), and arresting erosion and environmental degradation. Furthermore, this plan will help the concerned institutions especially MoA and JCC to establish new reserves besides improving some reserves, which are already established. The aims are: 1) protecting and developing the farmers' resource base, through soil and water conservation, developing unused lands and converting land not well suited for the cultivation of field crops under rainfed conditions into higher value crops; 2) improving range productivity by the development of rangeland, and 3) arresting environmental decline by expanding forest plantations. The project has immediate and long-term objectives. The immediate objectives are: 1) to increase, protect, and maintain land productivity for the poorest farmers, land-holders, and herders in the poorest governorates; 2) to strengthen the operational capacity for sustainable land management at the district and community level in the poorest governorates; and 3) to build women's income-earning capacity. The long-term objectives are to contribute to the arrest of environmental degradation and to secure the livelihoods of the poorest families especially those headed by women. Environmental degradation is planned to be arrested through the systematic application of soil and water conservation techniques and productive activities (WFP and MoA, 1997).

The selection of the project's areas is based on the poverty profile of the targeted beneficiaries and their unrealised economic potential, as well as on the priority attached by the government to improving their socio-economic conditions and to protecting the environment from degradation. The project locations will be in the rural areas of the provinces of Amman, al-Mafraq, az-Zarqa, Ma'an, at-Tafila, Irbid, Madaba, as-Salt, al-Karak, as well as poverty pockets in Ajloun and Jerash. Beside the cash money, the payments for the labour force of the beneficiaries are planned to be amounts of wheat,

vegetable oil, and pulses (WFP and MoA, 1997).

5) al-Lujjoun reserve

This reserve is located within al-Karak governorate with an area of 11 km^2. In 1981, JCC and a local co-operative society, from local herd-owners, reached an agreement to plant the reserve with fodder shrubs and protect it by the co-operative members for their own benefit. The idea is that those members graze inside the reserve according to its carrying capacity. According to Tadros and Salem (1993), the implementation of the range reserve has increased range productivity by 3-4 times. This has led to an increase in milk production, which has improved farmers' incomes. On the other hand, raising livestock in the communities around the reserve is restricted to older people because younger generations do not like this job. This may indicate that in the long-term, the herd-owners' number in the area will decrease which could, in consequence, decrease the pressure on the adjacent rangelands.

6) Ma'in reserve

Ma'in range area is located within Amman governorate with an area of around 80 km^2. Water resources in the area are small wadis and springs, some of which dry up in summer. Spring water is mainly used for animal drinking and irrigation of some fruit trees and vegetables. Water harvesting plans have been implemented through: 1) water harvesting to increase the soil moisture and improve establishment of transplants, 2) harvesting the run-off water in ground cisterns, and 3) the construction of earth dams for collection of water from wadis (FAO, 1995).

The reserve was launched by JCC, WFP, and MoA under overall direct management by

the Ma'in co-operative society. Technical assistance for the project was provided by UNDP/FAO. The project strategy was to create a new system of range management and development through herders' participation in all project activities. First the institutions involved organised the beneficiaries in a co-operative and then set with them simple regulations for range-use, time and periods of grazing, carrying capacity, and stocking rates. The objectives of this project were to improve human and social development, livestock production, and land capability. The stocking rate, within the reserve, increased from 2,500 in 1983 to 20,000 in 1993 for a period of 2-4 months each year (FAO, 1995). Before the project, the area was open for grazing all year around by the locals and others from outside, which left only undesirable plants dominant in the area. The effect of protection and transplanting of fodder shrubs accompanied by a wide programme of reseeding with desirable native plants such as *Atriplex halimas, Atriplex leucoclada* and other plants, in cultivated strips, improved range carrying capacity and the diversity of vegetation.

Development of the area did not face serious obstacles or conflicts between the concerned institutions and the local communities due to several reasons. First, the institutions helped the interested local herders to organise themselves as a co-operative in order to deal formally with them. This was a good step, the researcher believes: making the herders feel that they have a big role to play in decision making as well as responsibilities to consider in range resources management. Second, the institutions made it clear from the beginning that it is the local herders who will benefit from any development, not the institutions, which will benefit by nothing more than helping them. Third, the institutions also did not implement any stage before they were sure that the herders understood and agreed to participate. In consequence, the herders trusted

these institutions and, therefore, co-operated well by showing commitment to the grazing restrictions. This impacted on their benefits including getting good and cheap feed for their livestock. Furthermore, other nomadic groups, who did not accept the project's approach initially, started to co-operate and get involved in the system under the organisation of Ma'in co-operative. The attitude of these nomadic Bedouin changed after they noted that the reserve had provided the local herders with many benefits including feed for their livestock.

4.3 Biodiversity conservation

Biodiversity conservation has a recent history in northern Arabia, including Jordan (Chatty, 1997). Since it was formed in 1966, the issue of protecting biodiversity in Jordan has been the responsibility of RSCN. It is a non-governmental organisation (NGO) created by a voluntary effort when a group of Jordanian hunters noted that many wild animals and plants had disappeared from the country because of the human misuse of the natural resources. This guided them to establish RSCN (Presentation summarised in Mashaqbeh, 1998a).

The objectives of RSCN are to: 1) conserve nature, which includes the flora and fauna, through the co-operation with the local, regional, and international institutions, 2) protect the environment and conserve it from the pollution, 3) reintroduce and increase some of the extinct species of plants and animals, 4) participate in the establishment of the national parks for scientific and tourism purposes, 5) organise and supervise game, 6) implement the laws that protect nature and the environment, 7) raise the public and school students' awareness of the importance of protecting biodiversity, and 8) participate with other related organisations to move towards sustainable development

(Abu-Zanat *et al*, 1993 and RSCN, 1996).

Any member of the public who accepts the objectives of RSCN can join. All such people are called the 'public members'. RSCN is directed by a board of 11 members. Nine are elected by the public members and two members are chosen by the elected nine members. The board of directors is re-elected every four years. RSCN has three committees: the environmental, the conservation, and the fund-raising and public relations committees. The board of directors chooses the members of these committees from the public members in addition to other persons who are experts or have political and/or social weight. The general director carries out the management issues related to conservation, fund-raising and public relations, public awareness, and administration (RSCN, 1996).

The overall achievements since the establishment of RSCN are: 1) creating a national network of nature reserves, 2) reintroducing some species which had become extinct in Jordan and the region, 3) regulating hunting and species trading in Jordan on behalf of the government, 4) developing and supporting environmental education in school and greater public awareness of nature conservation issues, 5) producing publications dealing with environmental issues in Jordan, 6) building the capability of the RSCN to meet the current and future demands, 7) developing a model for the integrated management of protected areas to meet the needs of conservation, whilst supporting the socio-economic needs of local people and developing eco-tourism, and 8) conducting research on the status of species and habitats in Jordan (RSCN, 1996).

The most important project which highly affected RSCN's work was in 1994 when

RSCN signed an agreement with the World Bank and UNDP, for a Global Environmental Facility (GEF) loan to ensure the conservation of biodiversity in Dana and Azraq areas. Besides the Dana and Azraq projects, this agreement has allowed RSCN to enhance its capacity through building up its skills and expertise as well as improving its logistic resources (Johnson, 1997).

In 1996, the overall purpose of RSCN was stated by the board of directors in the following mission statement: 'In recognition of its national and international responsibilities, RSCN will seek to conserve and enhance biodiversity and biodiversity habitats whilst actively promoting an understanding of the natural environment, its protection and its interdependence with people.' This mission was stated after the evaluation of RSCN's work since its establishment up to 1996 (RSCN, 1996). Table 4.3 summarises the analysis of this evaluation.

Table 4.3: The strengths, weaknesses, opportunities, and threats of RSCN

Strengths	Weaknesses
• Uniqueness (manages reserves). • National and international recognition (by people and organisations). • Commitment to nature conservation. • Being an NGO. • Dynamic. • Increasing levels of skills. • Experience and professionalism.	• Lack of legal framework for protected areas. • Difficulty in obtaining funds locally. • Getting the right message through to the public. • Lack of expertise in some specialist areas. • Very rapid development of the organisation. • Lack of manpower in certain areas. • Seen as semi-government.
Opportunities	**Threats**
• Completion of reserve network. • Being involved in the formulation of new legislation. • Being involved in the formulation of the school syllabus. • Ability to attract international funds. • Use of biological resources to obtain funds (e.g. organic produce). • Eco-tourism (national nature reserve management). • More consultancy services. • Development of a training centre. • Greater membership awareness. • GEF extension.	• Unsustainable development of tourism due to vested commercial interests. • Aims beyond the organisation's capabilities. • Diminishing funds. • Lack of available expertise in some areas. • Potential competition with other NGOs for limited resources.

Source: Based on RSCN, 1996

In order to demonstrate the mission, a strategic plan is being implemented for the period of 1996-1999. The processes used to produce this plan were: 1) clarification of the purpose and mission statement in order to ensure that there are shared values and a clear sense of direction, 2) information analysis to look at the current performance and future trends and influences on RSCN, 3) identification of strategic choices and evaluating them in order to set realistic priorities and agree the direction, 4) developing a plan to implement the strategic aims, and 5) checking the feasibility of the plan by checking that the financial aspects, the structure, systems, resources, and skills are in place to

implement the plan (RSCN, 1996).

Table 4.4 shows the established reserves by RSCN as well as some other potential sites seen as the proposed future reserves:

1. ash-Shaumari nature reserve: It is located in the east part of Jordan with a fenced area of 22 km^2 (Section 4.4 of this chapter).
2. al-Azraq wetland nature reserve: This reserve was established in 1965 with an area of about 12 km^2; located near ash-Shaumari reserve. It contains a number of pools and puddles. It has a high value for protecting the environment and bird migration. More than 300 kinds of birds were recorded beside the mammals of *Hyena hyena, Canis lupus, Vulpus vulpus*, and *Canis aureus*. Also, other kinds of snakes and fishes were observed (Abu-Zanat *et al*, 1993).
3. Zubia nature reserve: It was named as a nature reserve in 1988 with an area of 31 km^2 located within the north-west part of Jordan. The aims of establishing the reserve were to protect the turpentine-trees and oak woodland and to reintroduce the roe deer (Abu-Zanat *et al*, 1993 and RSCN, 1996).
4. al-Mujib nature reserve: This reserve is located near the Dead Sea, in the west part of Jordan. It was created in 1988 with an area of 220 km^2. Its importance is due to some hot mineral springs and the presence of some endangered species of plants and animals such as the Ibex (Abu-Zanat *et al*, 1993 and RSCN, 1996).
5. Rum nature reserve: It was announced as a nature reserve in 1988, within the south part of Jordan with an area of 510 km^2. It has a great diversity of the desert plants and animals (Abu-Zanat *et al*, 1993).
6. Dana nature reserve: In 1993, a government decree authorised RSCN to establish Dana nature reserve with an area of 308 km^2 located within the west part of Jordan.

Moreover, a number of other sites, potentially rich in biodiversity, have been prioritised by RSCN to be future reserves. These proposed reserves which are shown in Table 4.4 are Burqu, Rajel, at-Towaneh, Abu-Rukbah, Bayer, Jabal Massadi, and Jabra.

Table 4.4: The established and proposed reserves by RSCN

Reserves	Name	Governorate	Size (km^2)
Already reserved	ash-Shaumari	az-Zarqa	22
	al-Azraq	az-Zarqa	12
	Zubia	Irbid	31
	al-Mujib	al-Karak	220
	Rum	Ma'an	510
	Dana	at-Tafila	308
Proposed reserves	Burqu	al-Mafraq	950
	Rajel	al-Mafraq	86
	at-Towaneh	at-Tafila	20
	Abu-Rukbah	al-Karak	410
	Bayer	Ma'an	440
	Jabal Massadi	Ma'an	460
	Jabra	Ma'an	40

Source: Based on Abu-Zanat *et al*, 1993

Chatty (1997) emphasises that the region's states have regarded the local populations as obstacles to biodiversity conservation instead of partners. Jordan is not an exception to this fact. It should be noted that the development of the local communities' livelihood, sought by RSCN, is not mainly to improve livestock production which is their traditional livelihood. The RSCN's personnel think that improving livestock production will lead to a conflict between the livestock and biodiversity needs. Hence, RSCN is

encouraging local people to reduce their dependency on livestock and benefit from eco-tourism projects, which were or will be created, such as those created in Dana reserve. On the other hand, it is a very difficult task to change people's attitudes. It is also a change which probably will create harsh conditions for the herd-owners, as is happening with the Bedouin in the lower part of Dana reserve (section 4.4.1 of this chapter).

The ways that RSCN has been approaching the local people inside and outside its reserved areas and the consequence of this for biodiversity conservation, are discussed in the next section.

4.4 Findings and discussion

In order to understand more about the institutional efforts related to rangeland management and biodiversity conservation and also to gain current data and information, it was essential to visit a number of sites, of which projects have been established and managed by these institutions. Dana, ash-Shaumari, Bani Hameeda grazing reserve, and ar-Rifa'iyyat ash-Shamaliyya village were visited and several methods were adopted to gain the data needed (see the methodology chapter).

1) Dana nature reserve

Dana reserve occupies 308 km^2; located within at-Tafila governorate. The name of the reserve was derived from a wadi within the area called Dana. In 1993, a government decree authorised RSCN to establish and manage the reserve (Swenne, 1995 and Zandri, 1996). Dana has special features that make it the most important reserve among those which are managed by RSCN:

> "It is the variety of landscape and geology, combined with local extremes of climate, which make Dana such a special place. From the scorching heat of desert plains in the west to the cool, moist mountain-tops in the east, the reserve is home to many specialised plants and animals which reflect all the different living conditions. There are plants and animals characteristic of true deserts, of Mediterranean scrub land and of the dry plains of Russia. Indeed, Dana is a real melting pot of species from three continents: from Europe, Asia, and Arabia. Such a combination of natural communities in a single area is unique in Jordan" (al-Reem, 1997, p. 7).

Through the Global Environmental Facility (GEF), which was a result of the Rio de Janeiro environmental summit (1992), the World Bank and UNDP supported RSCN with $3.3 million in 1994 to ensure the conservation of biodiversity of Dana nature reserve (Johnson, 1997). Since establishing the reserve, RSCN has been facing a number of difficulties in linking the local people with the conservation strategy. When the project started, the villagers around the old empty village of Dana in the upper part of the reserve hesitated and resisted the idea of the conservation plan but, a few months later, they started to participate with RSCN's operations in the area. When the reserve started to create jobs for them and when work started in the old village, they became sure that if they did not catch up with the early beginnings, they would miss many opportunities. They are now playing a big role in carrying out this project:

> "Tourists brush shoulders with farmers hauling tools and pomegranates along reopened paths, through lush trees, past cascading springs and a new nursery growing thousands of seedlings to plant in the future. Haroun and Nabeeh[1] have helped a team of village women turn the harvest of 54 farmers into tasty products. Apricots, plums and figs are turned into preservative-free low-sugar jams" (Salti, 1997, p. 17).

However, the researcher's own fieldwork revealed on-going problems. Thirty owners were interviewed in the lower part of the reserve, of whom 21 belong to the Azazme tribe and nine to the Hweitat. These owners were neglected in the early beginnings. The Azazme are not originally Jordanian as they were forced to leave Palestine for Jordan after the 1948 war with Israel. All of the Azazme interviewed are nomadic (except one owner); they do not have houses and move within the reserve area. On the

other hand, all the owners interviewed of the Hweitat tribe are semi-nomadic (except one). They have houses and lands in villages and cities distributed among the governorates of Amman, Ma'an, and at-Tafila. This means that the Hweitat have more options for finding additional resources to generate income in their villages while the Azazme find it very difficult to find other resources for generating income to replace shortages that have resulted from the grazing restrictions which have been imposed by the reserve.

Due to the topography of the area, pick-ups are the only vehicles used. Cars are not used because they are not economically viable and the area is not served by a network of asphalted roads. As the owners do not move over long distances and as water is available, the reserve users are not in need of trucks and water tankers. Around 53% of the households do not have vehicles and the condition of the only track that links this site to the rest of the world is very bad. In general, donkeys are used for many purposes including carrying the water and tents within the area. However, the nearest clinic to the tents is about 25-35 km away in Greigra village.

As the topography of the area is difficult, goats are much preferred to sheep and camels. Sheep and camels can only graze in the few flat lands of Dana whereas the mountains are more suitable for goats. Within the 30 households included in the study, only ten flocks of sheep were owned with an average of 17 head each (Table 4.5). Also, only three flocks of camels were recorded with an average of 18 head each. All of the owners have goats with an average of 141 each. It is clear that they are not big owners and could be presumed to be poor people. According to Lancaster and Lancaster

[1] Two employees of RSCN.

(1993), the net profit per head of goat in 1993 was JD10. But after the increases in the feed prices in 1996, Rowe (1997) reported that there was a loss, which amounted to around JD18.5 per head. The costs of raising these animals are much more than the revenues earned from their sale. If this situation remains, sooner or later the Bedouin will be forced to search for other ways to generate income.

Table 4.5: Ownership of livestock in Dana

Livestock	No. of owners	%	Head per owner
Sheep	10	33.3	17
Goats	30	100	141
Camels	3	10	18

Source: Field study conducted by the researcher, 1997

All of Dana's owners included in the study used the area during each of the last five years much as they used it previously. Also, they did not show any interest in moving outside the area. As they are permanently resident, it is potentially possible for RSCN, or any related institution, to draw up an agreement with them to provide the best management for the resources of the area. Although resident, they still move inside the reserve, from one mountain or wadi to another. The reasons given by the owners for not leaving the area in the past or thinking of leaving in the future are shown in Table 4.6. The main reasons that make the Bedouin in Dana insist on staying despite the difficult topography of the area, are the presence of many natural springs (water) which flow in the area. Over and above the Bedouin's domestic uses, the springs are used to water the livestock and to irrigate some watermelon farms in wadi Feinan. The most important springs in the area are Umm ad-Doud, Qseibeh, al-Fera', at-Ter'ah, al-Ghweir, al-Ghweibeh, Feidan, and az-Zraib.

The Azazme cannot leave this area easily because they do not have other tribal lands to go to, as have many other tribes in Jordan. Locally, each household has been given 1.5 dunums for building purposes.

Table 4.6: Reasons to stay longer in Dana

Reasons	Frequency	%
Rain	8	27
Water	24	80
Forage	14	47
Other*	30	100

Source: Field study conducted by the researcher, 1997

* Other could mean any or all of the followings: No other opportunities; wild and away from the farms and therefore avoid having problems with the farmers; presence of a school; and/or jobs for some owners in the reserve.

After the increases in the feed prices in 1996, falling livestock prices, and the grazing restrictions made by RSCN, the Bedouin in Dana live in hardship. In 1997, Rowe (1997) conducted a study in the area which indicated that the result of the government's decision to stop subsidising animal feed in 1996 was as follows: 'Barley, the principal feed type, rose in price from JD85 per tonne to JD110 per tonne, while wheat bran rose from JD52 per tonne to JD100 per tonne' (p. 3). Also, sale prices fell from around JD60 for an adult nanny goat in early 1996 to about JD25 in summer 1997. During the fieldwork in Dana, the researcher heard many times from the owners that they had been able to buy a tonne of feed by selling only one goat but now they need to sell 4-5 to get the same tonne. If this situation remains, sooner or later they will be forced to sell all their livestock. It was found that the average feed amount given to the livestock in the grazing months (March-June) was 1.5 tonne per month while in the non-grazing months

(the remaining months) was 3.84 tonne per month. Thus, according to these figures, grazing plays a significant role in reducing the cost of raising the livestock.

After the interviews with the owners, the researcher was able to summarise their viewpoints and then discuss them with the manager of the reserve. In most cases both the owners and the manager, show very different opinions with regard to the historical and social rights of the local people (emphasised by the owners) and the biodiversity needs (emphasised by the reserve manager) (Table 4.7). This total mutual incomprehension is an object lesson for anyone contemplating setting up a project in the Badia (or elsewhere) in which the requirements of biodiversity conservation and range use by owners' herds have to be balanced. Much more discussion and negotiation, leading to mutual comprehension and agreement, is needed before project plans are developed.

Table 4.7: The viewpoints of the Bedouin and Dana reserve's manager

Herds' owners viewpoints	The comments of the reserve manager
Wild animals inside the reserve get their food from the mountains and the rugged places where the local people and their livestock cannot reach.	Wild animals are forced to use these places due to the high pressure of grazing and hunting, while they used to use all the areas before.
There is no competition between the livestock and the wild animals. The places in which the wild animals are found are rich in forage, which is sufficient and available only for them. Furthermore, one of the Bedouin said that no wild animal has ever been known to have died from hunger before and after they created the reserve. He argued that the forage would be sufficient for all the animals (domesticated and wild) if there is good co-operation between the RSCN and the local people. Wild animals, usually, do not need much water in contrast with livestock. Because of availability of springs, there is no big competition between the animals.	Competition is there and so is high pressure, and the locals do not see the change in the wild animal's lives and behaviour over time.
Some tribes from inside Jordan (from south Badia in particular) used to come to graze in wadi Dana during the spring season because of the availability of both forage and water. The local people say that they have no objection to tribes coming from other places because God has given the resources for use by everyone. Many livestock owners who used to come to Dana no longer do because they have settled in other places.	The local people should ask themselves why other tribes are no longer coming, due to high pressure and serious levels of degradation in the area caused by the very high pressure that the local goats are putting on the land.
There is a debate among the local people regarding the importance of protecting biodiversity. Most of them do not agree with the idea that there is any importance of protecting biodiversity, and indeed some of them want to be sure that protecting biodiversity will not have any negative effect on their life.	Local people cannot ever be sure about interaction between domestic and wild animals. Nobody can, but for sure bringing back balance to the ecological system in the area will have the feedback on their livestock because predator animals will have alternative sources of food of wild herbivores instead of their livestock and organising their grazing system will also benefit them in preventing the irreversible degradation of vegetation cover.

Cont. ⇒ ⇒ ⇒

Table 4.7 (Continued)

Most of those interviewed did not want to draw up an agreement with RSCN to control the grazing because there are no other alternatives to the local grazing areas, and the livestock numbers are greater that any single part of the reserve can support. One of a minority of people who likes the idea of the agreement suggested that more research and discussions with the local people should be done beforehand.	It is very important for them to draw up the agreement with RSCN because RSCN is trying, on one hand, to sustain their presence in the reserve by preventing their degradation of the ecological system, which in the long-term they will benefit from, and on the other hand, RSCN is trying to provide alternative sources of income for them.
There are some lands in Wadi Feinan (Dana) owned or used by some families from all the tribes except the Azazme. The Azazme are excluded because they do not have sufficient social weight.	RSCN is trying to help the Azazme despite their social weight as RSCN feel that they are the most needy group in the area.
All those interviewed agreed that RSCN did not discuss any objectives or plans with them before they created the reserve, and they think that they should have done in order to avoid the conflicts which are happening now	It is true that RSCN did not discuss the establishment of the reserve with all inhabitants, but as well no modification on the management of the site was done without consulting with them and fully informing them as well.
The reserve benefits some households by offering jobs but harms the majority by driving them to buy more feed with very high prices	RSCN is not responsible for them buying feed. Low rain and the high grazing pressure is leaving nothing for them to graze, thus buying more feed is essential.
The reserve benefits the government but harms the local people who think that the project's objectives are changing every day.	Everybody has to contribute to the country's policy, RSCN is not always in good relations with the government, and RSCN is not government
They wish to graze inside the protected area during the dry seasons	70-80% of the reserve is still open for living and grazing. RSCN is not trying to stop grazing in the whole reserve, RSCN is trying to implement a grazing regime in which there are grazing areas, controlled grazing areas, and conservation areas to try to sustain the use of the resource.

Source: Field study conducted by the researcher, 1997

It was mentioned earlier that the area is a series of mountains and so the topography of the area limits the opportunities of the owners to reach some parts of the area. The owners argue that these unreachable places are sufficient for the needs of the wild

animals as they can graze without interruption from the local livestock. On the other hand, the reserve manager argues that these few places are not sufficient for the biodiversity needs and so 20-30% of the area is completely reserved. The above mentioned 20-30% part is seen by the locals as the most productive part in terms of the natural plants and therefore there are only limited benefits from grazing in the remaining 70-80%. The owners are not concerned with the importance of protecting biodiversity and also not interested in drawing up an agreement with RSCN to control the grazing for their long-term benefit, but the reserve manager is confident that if the unreserved 70-80% part of the area is managed by an appropriate grazing plan, their grazing system will benefit from the recovery of the vegetation cover.

However, the manager declares that the local community was not consulted at the early phase of creating the reserve, and so the owners will hesitate and may refuse any attempt by RSCN to benefit them with any plan or project. Most of the owners see RSCN as their biggest enemy. Also, they think that RSCN created the conditions which made their lives miserable as the grazing restrictions came into force at the same time that the government stopped the subsidy feed for the livestock. There were some misunderstandings, and even mutual hate, between the owners and some of RSCN's employees, especially the rangers.

The researcher argues that most of the problems which are facing RSCN could have been overcome if the local community had been consulted and if RSCN had provided opportunities for the owners before establishing the reserve rather than trying to do so after establishing the reserve. The Azazme inside the reserve complain that they have a low social weight because they do not have highly placed people in the government to

help them. The main challenge facing RSCN now is to reduce the effects of the grazing restrictions on the Azazme's economic cycle in the short-term and involve the people developing the reserve's strategy in the medium and long-terms.

Besides the no-grazing zone mentioned by the manager of the reserve, there is a seasonal grazing area called Wadi al-Barra. Wadi al-Barra is located within the south-east part of the reserve. Before 1973, it was freely grazed by the livestock of al-Qadisiyya's villagers. After that, the Forestry Department of MoA totally banned the grazing at that wadi. After three years, in 1976, the livestock owners were able to get a Royal permit to enable them to graze again. But, the situation was not as before 1973. The Forestry Department had imposed some limitations regarding the numbers of the livestock and its owners. When RSCN established Dana reserve in 1993, more restrictions were made and only 14 users were allowed to graze their herds. The livestock numbers are registered in order to prevent increasing the number of grazing animals every year (Abul Hawa, personal communication).

It is true that the position of the local people is very critical and the problem is difficult to solve. However, a trial project made by Rowe and Allonby (1998) proved that even though it is difficult, it is not impossible. This trial project had two objectives; first, to determine the potential growth rates of intensively managed stock and therefore the technical and commercial viability of a larger-scale fattening scheme, and second, to see whether improved stock could be effectively marketed by the trial project, securing optimal prices for livestock from the area and increasing the incentive for owners to sell surplus animals quickly. A total of 37 male goat kids (7-10 months age) were vaccinated, serum sampled, tagged, weighed, and introduced into a pen. The direct

benefit of putting the animals in a pen was surely reducing the pressure on the range resources. These animals were fed a mixed ration including berseem, barley, wheat bran, soya, and dried by-products of local tomato and olive processing. Within around two months, the total weigh of the 37 animals rose from 509.7 kg in total to 1041.5 kg, much faster than before. This project offered the owners a net total profit of JD27.2 per animal.

According to the project operators (Rowe and Allonby, 1998), by learning from this trial project and also by increasing the animals' number, the cost could be decreased and therefore the profit will increase. Furthermore, this project proved to the locals that the management, which based on intensive fattening is much more fruitful than grazing in the reserve.

> "Yet more than this, the trial has fostered excellent relations between the project and participating members of the local community. Formerly Wadi Dana pastoralists regarded the RSCN's interest in their livestock with nothing but suspicion. Today, two households within the community have already entrusted a large part of their entire annual livestock income into the management of an RSCN project and many more are eager to follow. Perhaps this new spirit of trust is one of the most valuable outputs of the trial. Even if the fattening project is not developed further, the trial will have demonstrated very clearly, (for the first time to the Bedouin of the lower Dana area) that collaboration with the Reserve can bring them substantial benefits. Cultivating a culture of participation among pastoralists and encouraging them to perceive the Reserve as an ally, not an enemy, will be an integral step in harmonising the long term interests of all groups" (pp. 9-10).

In fact, the fattening project is, in 1998-1999, being repeated and expanded. The local herders have confidently placed about 500 kid goats - some from most households - into the new scheme (Allonby, personal communication). They will profit from the fattening scheme, and biodiversity in the reserve is benefiting greatly by taking the kids off the range. The secret of success has been: a) proper initial and on-going discussion, and b) perceived practical benefit to the livestock owners.

These trials could be used to good effect in the BRDP area, in the Badia. With regard to the long distances between the lower part of Dana reserve and the big cities, reducing the costs of this project, especially the travel costs, could be feasible in the BRDP area which is much closer to the big cities of al-Mafraq, Irbid, az-Zarqa, and Amman.

2) ash-Shaumari nature reserve

ash-Shaumari reserve is located in the east part of Jordan. The name was derived from a wadi located within its area, Wadi ash-Shaumari. It is the first wildlife reserve in Jordan, administered by RSCN. The fenced reserve area occupies 22 km^2 67% of which is composed of wadi spreads while the rest is limestone hammada (Clarke, 1979). MoA created the reserve in 1958 as an experimental agricultural station to investigate methods of farming and irrigation in the Badia. Because of the presence of some wild animals and the plant biodiversity in the area, the responsibility was transferred from MoA to RSCN in 1975. Initially, it was prepared as a breeding programme; designed to reintroduce endangered or locally extinct animals to the wild. The objectives of the reserve are to: 1) gain new initial experiences to create other reserves, to cover all the eco-systems in Jordan, 2) reintroduce and increase the numbers of the endangered species, and 3) show the importance of biodiversity and how to conserve it. The wild animals reintroduced into the reserve are 165 heads of the Arabian oryx *(Oryx peucoryx)*, 15 heads of Ostrich *(Struthio camelus)*, and seven heads of the Syrian wild ass *(Equus hemionus)*. Also, 130 species of natural plants have been recorded, 134 kinds of birds (most of them are migrant), and 11 different kinds of mammals (Abu-Zanat *et al*, 1993 and Mirza, 1997).

Around the fenced reserve, ten households were interviewed. All of them are semi-

nomadic; having lands and houses in different villages and settlements. Table 4.8 shows five owners from al-Masa'yeed tribe, 50% of the total. The others are from the tribes of as-Serdiyyah, Bani Sakher, ash-Sharafat, and al-Mashaqbeh. Eight owners are from villages or cities located in al-Mafraq governorate. The other two are, respectively, from Amman and az-Zarqa governorates. The significance of this is that grazing around the reserve is not restricted to one clan or one tribe. This is an example of the mobility and the free status of grazing in the area which puts more pressure on the resources and limits any sense of group responsibility for maintaining it.

Table 4.8: The tribes and settlements of the sample in ash-Shaumari

Tribe	Village or city	Governorate
al-Masa'yeed	Hamra as-Suhaym	al-Mafraq
	Hamra as-Suhaym	al-Mafraq
	Hamra as-Suhaym	al-Mafraq
	Hamra as-Suhaym	al-Mafraq
	Hamra as-Suhaym	al-Mafraq
as-Serdiyyah	Sabha	al-Mafraq
	Sabha	al-Mafraq
Bani Sakher	al-Muwaqer	Amman
ash-Sharafat	al-Mukayfita	al-Mafraq
al-Mashaqbeh	az-Zarqa	az-Zarqa

Source: Field study conducted by the researcher, 1997

Up to 1997, the Jordanian livestock owners of the Bedouin did not pay any taxes to the government of Jordan to bring cheap vehicles from Saudi Arabia. In 1997, the government of Jordan announced that anyone who wants to bring cars from anywhere, even he is a Bedouin and has livestock, should register them in the Department of Registration and therefore pay taxes. Before this decision, this situation allowed the

livestock owners of the Bedouin in Jordan to own very cheap vehicles. In addition: the topography of ash-Shaumari area which is hammada and therefore flat; the big size of the flocks; the needs to bring water and feed; and the need for mobility over long distances, meant that all the owners interviewed have trucks. The ownership of cars and pick-ups is restricted to one owner who has one pick-up and one car in addition to two trucks. This owner is thought to be one of the wealthiest traders in al-Mafraq. It is rare that the herd-owners own cars. They are not as practical as the pick-up and truck to serve them in their daily needs.

By looking at Table 4.9, one can observe that the Bedouin in the flat al-Hamad desert tend to raise sheep more than goats.

> "Environmental and economic conditions are usually the main forces to adopt one type of herd rather than another. Sheep are widely owned throughout the region because they are considered to be the right type of animal for the conditions and so are the dominant domestic species... Other types of animals such as goats are often maintained in small numbers along with sheep... The main reason for maintaining goats along with sheep is that their milk is used for domestic households purposes, and that they milk for longer. However, goat products are generally less marketable" (al-Oun, 1997, pp. 130-131).

All of the owners interviewed in ash-Shaumari have flocks of sheep with an average of around 390 sheep per owner while only three owners have flocks of goats with an average of 26 head per owner, and no owner has camels.

Table 4.9: Ownership of livestock in ash-Shaumari

Livestock	No. of owners	%	Head per owner
Sheep	10	100	390
Goats	3	30	26
Camels	0	0	0

Source: Field study conducted by the researcher, 1997

It should be mentioned that within those included in the survey, one owner was considered to be one of the biggest traders in al-Mafraq (as mentioned above) who was also preparing around 60,000 sheep to be exported to Saudi Arabia; ash-Shaumari is located beside the highway that links Jordan to Saudi Arabia. This flock was excluded from the calculation because it distorted the ownership figures, however it will have had a big impact on rangeland degradation even they were given supplementary feed. Plate 4.1 shows how such a large number of sheep, together with the other flocks, can participate to the deterioration of the plant cover in a small area like ash-Shaumari. This plate shows the difference between the plant cover inside and outside the fenced reserve. No livestock graze inside the reserve.

Plate 4.1: Plant cover inside and outside the fence of ash-Shaumari reserve

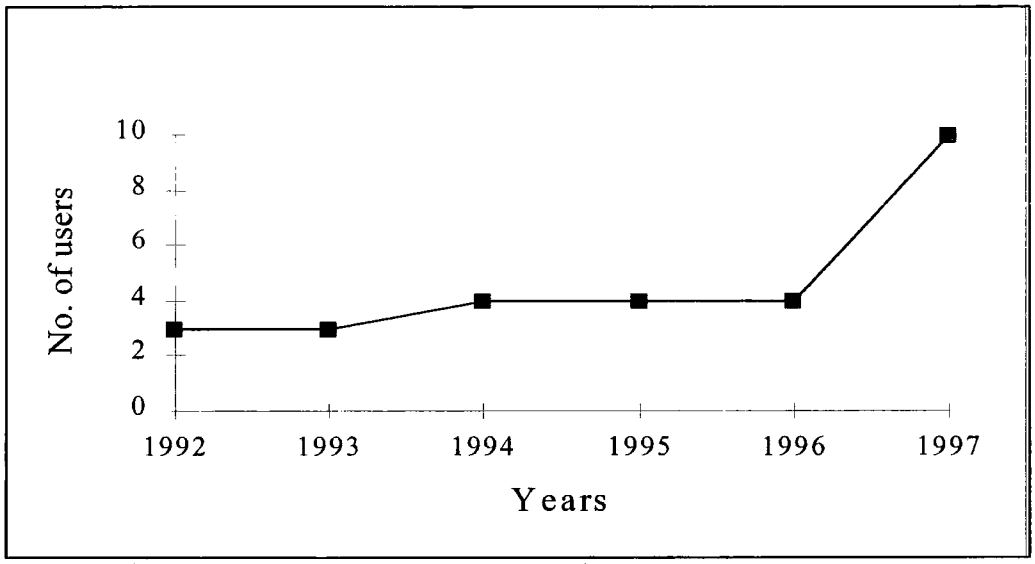
Source: Field study conducted by the researcher, 1997

The average quantity of feed bought during the grazing months is 6.2 tonne per month for each owner while in the remaining months (non-grazing months) is 9.7 tonne per month. This could lead to the conclusion that these owners do not benefit much from the natural forage as the area is small and as the forage is not given time to grow enough before the grazing.

With regard to the status of using the area, Figure 4.1 shows that not all the ten owners interviewed used the area continuously for the last five years. From the ten livestock owners present in 1997, only three owners came in 1992 and 1993 while four owners only came in the years of 1994, 1995, and 1996. This significantly indicates that this site does not attract the owners to use it regularly as it is small and does not provide enough feed for the livestock despite the presence of a few shrubs. Two of the ten interviewed were certain of moving to other sites whereas the rest were not sure about their plans. One was moving to ar-Reishat (north-east of the Badia) because he thought there was much forage and shrubs on that site. The other one was the trader who wanted to export his flock to Saudi Arabia.

The main reason attracting some owners to stay longer in the site is the presence of a few plants and shrubs in wadi ash-Shaumari, even though there is not enough to supply the total requirement even in the spring. Despite the fact that water was not mentioned by anyone of those interviewed as an attractive reason to stay at ash-Shaumari, it still plays a fundamental role in their decisions. In general, they prefer the rain-water that collects in ponds and dikes. When these ponds and dikes empty, they obtain free water from an artesian well made by the government in the area or buying it from private wells within al-Azraq area.

Figure 4.1: Coming to ash-Shaumari by year



Source: Field study conducted by the researcher, 1997

The reserve manager said that because of the limitation of the reserve's area, it has been facing several ecological pressures, in particular exceeding the carrying capacity leading to competition on the resources between the reserve animals. Bedouin livestock are totally excluded from grazing inside the reserve. Also RSCN is preparing a plan to increase the reserve size to cover 320 km^2, but he mentioned nothing about any consultation with livestock owners in the area which could lead to conflicts with them in the long-term.

The manager of the reserve also said that the livestock owners used to concentrate around the reserve only during winter seasons when wadi ash-Shaumari flows. Those owners, according to the manager, caused pollution when they left the empty plastic sacks of the feed behind the livestock, which were then blown inside the reserve by the wind. He added that there were very few cases of aggression from the owners by grazing inside the reserve. He even sometimes allows them to collect firewood inside.

He had been thinking about letting the local livestock graze inside the reserve after the seed formation stage, however, research conducted in the area by RSCN shows that it would be better not to let the sheep and goats get inside the reserve; most of them have some diseases that could be transferred to the wild animals inside the reserve. However, there may be a possibility to letting camels graze inside as long they are clear of communicable diseases. He has been given a permit, if camels' owners come, to allow a specified number to graze in some parts of the reserve during next summer for a limited time.

The manager does not know the numbers of the carnivores in the area; it would be difficult to count them. These animals do not settle inside the reserve for a long time but use it to hide from the hunters and the local people. Digging holes under the reserve fence is the way that these animals get inside the reserve. They attack the young of the herbivores in the reserve. A bulldozer is used to block their holes once or twice a week, however this creates more costs managing the reserve. An alternative is being considered, which is to keep the young animals inside a very well built fence on a cement foundation. However, range and wildlife reserves which are based on expensive fencing rather than commitment and participation from the local communities would face more difficulties besides security costs.

The owners think the reserve is good but not suitable for grazing purposes because its area is small, and because of the presence of the snakes and some carnivores. The reserve does not harm the grazing interests of the owners because of its small size. Also, they do not know how the wild animals get their food and water. They agree that the livestock affect the ability of the wild animals to get food from the rangelands, but

God, who provides the living, takes care of both wild and domestic animals and does not leave them without anything to survive on. Also, when God created the world, he gave roles and objectives for every living thing in order to complement each other. Every living thing has a purpose in this life. Nevertheless, conservation negatively affects livestock. There is no benefit from protecting biodiversity, according to the livestock owners, except encouraging tourism. They also think that the old herders cannot give up raising livestock because they do not have other resources to generate income. No doubt that there was a lack of awareness among the owners with regard to the benefit of protecting biodiversity.

It could be concluded from the discussion above about ash-Shaumari that RSCN is not in a good position to co-operate with the livestock owners to determine the best methods to use the resources. The reasons for that are: 1) the size of the fenced reserve is small (only 22 km^2), 2) the mobility of the owners which confuses the manager's efforts to help them in creating a sustainable plan to use the resources, and 3) the free status of using the area outside the reserve by all the livestock owners in Jordan.

3) Bani Hameeda grazing reserve

In 1978 and through the efforts of JCC, the local people of Bani Hameeda villages created a co-operative society to serve the villagers with some agricultural services. The members of this co-operative total 297, and own around 5,000 sheep and 5,000 goats. In 1998, JCC assisted this co-operative to benefit from the Jordanian government-WFP agreement, which was mentioned in section 4.2.2.4 of this chapter, in order to establish a grazing reserve in an area of 25 km^2. The idea is to grow 900,000 bushes of *Atriplex halimas* within five years at the rate of 180,000 every year. These bushes will be grazed

by domestic livestock, within 3-4 years of starting the project.

The Bani Hameeda grazing reserve provides a good example of how good organisation can help in the management of the resources. The researcher argues that as there are many families and clans who either own or claim to own lands in the BRDP area, a similar approach to Bani Hameeda's could be adopted in a number of these lands mentioned above in the BRDP area (Ch.6).

4) ar-Rifa'iyyat ash-Shamaliyya village

The village of ar-Rifa'iyyat ash-Shamaliyya is located within the north-west part of the BRDP area. A traditional management regime is used in this village similar to the traditional *hema* system. The reserved area is the rougher/marginal land, which is not easy to plough and farm. Within this difficult land, some spots are able to be ploughed by donkeys and therefore planted with some crops. The annual rainfall is about 100-150 mm. Although low, the rainfall is sufficient to grow some good forage, which usually lasts for about 4-5 months under normal grazing activities. The reserved area totals some 1.5-2 km^2.

The importance of the area is that the local people keep the livestock away from the reserved lands from November to March every year in order not to damage the spots planted with wheat and barley by the livestock, and also to allow the natural forage to grow enough before grazing. In normal seasons they stop buying feed for their animals from March to July every year, and instead they let the livestock graze in the reserve.

The informants pointed out that a few years ago some hunters used to come during the

weekends, but do not come these days. Also, no owner is allowed to come to graze here from outside the village unless he rents it from its owner. Furthermore, the numbers of the herds are not big as the local people depend on other resources to generate income.

The lesson that can be learned from this case is that as the villagers of ar-Rifa'iyyat are from the same clan and therefore relatives, they do not have problems between themselves in terms of land ownership. This makes them potentially able to organise themselves as a co-operative society. It was mentioned earlier that working with an organised group would be much better in terms of range resource management than working with an unorganised group. The researcher re-emphasises that the earlier mentioned approach of Bani Hameeda's could be shaped and adopted in ar-Rifa'iyyat village.

4.5 Conclusion

This chapter discussed the rangeland and biodiversity conservation situation in Jordan. It also discussed the efforts of the local, regional, and international organisations in improving them. To understand more how these institutions have dealt with the local communities who use the areas for a long time, it was planned to go to the field to get data and information by conducting interviews and discussions with a number of livestock owners in the secondary and tertiary sites. The main goal of these discussions was to study the owners' attitudes toward the issues of improving the rangelands and protecting biodiversity and to learn information of relevance to future projects in the BRDP area, and to the management of rangelands and biodiversity in order to ensure sustainable usage.

Chapter Five

Rangeland and biodiversity in the BRDP area

5.1 Introduction

In 1992, a plan was signed between Jordan's Higher Council for Science and Technology (HCST) and the UK's Royal Geographical Society (RGS) to establish the Jordan Badia Research and Development Programme (BRDP). The purpose of this programme is to study the resources of the Badia, in part of the north Badia, in a multi-phase programme which, eventually, will cover the whole of the Jordanian Badia (BRDP, 1994).

In this chapter the emphasis is placed on the efforts of BRDP to study the range and biodiversity resources (and their management) in the BRDP study area, within the wider context of other aspects of BRDP's work. In order to supplement this information, the researcher also obtained new data from two sites thus giving him firsthand information about local range and biodiversity management issues.

5.2 Review of studies conducted on the resources of the area

According to Dutton (1998), the growing power of urban communities during the twentieth century has affected the local communities and the physical environment of arid lands in which they live in Jordan. The key arid land resources, such as water and minerals, have been exploited mainly for the urban population's benefit. New services and products generated by the urban communities, have become integrated into the lifestyle of the arid land population. This reduces the arid land population's sense of

responsibility for their physical environment. In consequence, this has led to the depletion and degradation of those resources which creates flash floods, increased erosion, and squandering of the scarce resources. It also creates alienation of the local people towards the central national authority. Dutton also indicates that creating BRDP is a step towards doing something to improve the situation in the Badia of Jordan.

The general objective of BRDP is the 'sustainable development of the desertified Badia environment and the improvement of the standards of living of the inhabitants' (BRDP, 1994). It is planned to achieve this by: 1) conserving the natural resources through appropriate management systems, so that production levels will be sustainable in the long-term, 2) optimising returns from investment already made by people in the region, 3) enhancing the returns on future investments in the region through the optimal allocation of resources, 4) transferring appropriate technologies required in the different fields of development, 5) training of personnel at the highest levels in order to provide specialised research and development staff for the Badia region, and to train the people of the region, and 6) enhancing team work amongst the inhabitants and creating self-reliant communities.

The phase-I (1993-1996) was mainly an establishment phase of the programme. In addition to establishing the field centre, a number of studies and pieces of research were conducted including a base line socio-economic survey, and research on livestock, water, soil, flora, and other resources. In phase-II (1996-2000) and according to the needs of the area, the kinds of research and studies needed have been prioritised under seven themes: human resources, water resources, ecology, energy and geology, livestock, land resources, and information technology and management (GIS). In this

phase, the aim is to give less emphasis to research and more to development. The research is to assist the development process, seeking to ensure that development is appropriate, beneficial, and sustainable. Development is envisaged under three broad headings: beneficial economic change, conservation of the environment, and improved delivery of services. Economic change may involve improvements to the traditional industries or the introduction of new economic activities such as eco-tourism. The key environmental issues are shortage of water, and degradation of the rangelands. The services most needed by the people include education and health as well as utilities (Dutton, 1994). It is recognised that development will involve management of local resources by members of the local communities and that this can only happen if they are centrally involved in the decision-making processes leading to change. Chatty (1997) has shown how failure to involve the local communities in projects in the Middle East can undermine their sustainability.

A number of research studies have been completed since the establishment of the programme. They indicate that this part of Jordan has resources of potential value to the area and the country, if they are managed and used in an appropriate and sustainable manner. The following is a brief discussion of some of these studies, focusing on those which have a bearing on the objectives of this dissertation. They are divided into three sub-sections: climate and water, biodiversity, and human resources and livestock:

1) Climate and water

According to Kirk (1998), the BRDP area mostly falls within the arid climate zone, with an annual rainfall of less than 100 mm. All of this sparse rainfall is concentrated in the winter months. Although, temperatures rarely rise above 40° C in summer and seldom

dip below 0° C in winter, the minimum and maximum temperatures lie in the range of -5° C and 46° C. The daily potential evaporation rates in summer months are commonly above 7.5 mm per day and below five mm per day in winter months and so the water balance is negative with regard to the rainfall and evaporation. These dry-hot conditions control plant production and therefore, severely limit the provision of sufficient feed for domestic and wild animals.

Development in the Jordanian Badia has been traditionally restricted by scarcity of water, which will remain a major limiting factor in the future. Groundwater resources are substantial in parts of the programme area and provide the most widespread and reliable source of water. According to Dottridge (1998), groundwater in the BRDP area is found in three aquifers: upper, middle, and lower. However, an over-abstraction is taking place from the good quality water in the upper aquifer which has decreased the water level beyond its safe yield. Without rational use of this source, as Dottridge indicates, this will cause depletion and salination in the long-term. In 1994, the total abstraction rate in the area was estimated at around 62 million m^3 per year, which is at least two or three times the quantity replenished. The groundwater uses in the BRDP area, as summarised by Dottridge and Gibbs (1998), are: 1) large scale public water supply to the Amman area, and on a smaller scale to al-Mafraq, 2) local small supplies for domestic use and livestock, 3) industrial users, with low water demands of only 56,000 m^3 per year at present, 4) intensive irrigation concentrated around al-Azraq, and 5) scattered smaller scale irrigation in the north of the project area.

The surface water is another resource in the BRDP area. Before construction of a net-work of dams on the upper reaches of the wadis in Syria, some parts of the BRDP area

used to receive large volumes of surface water, flowing in wadis draining the Jabal al-Arab in Syria. A lot of the water was lost due to the high degree of evaporation from the *qa'as*. The *qa'as* are low mudflat basins which collect water after the rain and tend to be covered with fine deposits of very limited permeability; sometimes saline. In contrast to the *qa'as*, the BRDP area includes the so-called *marabs*. The *marabs* are also low points which have small distinct gradients allowing the water to flow through them and leaving coarser grained non-saline deposits which are more permeable. They are natural rainwater harvesting systems and are fertile and support both range plants and biodiversity (Dutton, 1998).

However, the construction of the Syrian dams reduced the water flow in the area which has affected the recharge of the groundwater and also reduced the rangelands productivity. On the other hand, the pastoralists in the area no longer control the water resources which are now mainly under the control of the central government and rich private well owners. This has caused over-abstraction and increased the farming activities which have reduced both the domestic and wild animals' opportunities of getting sufficient feed from the rangelands.

The area has many existing pools, dams, and water ponds which are used for water harvesting such as Mathnat Rajel, al-Jad'a, Dayr al-Qinn, Tall ar-Rimah, Dayr al-Kahf, al-Jubaya, Uraynibat an-Nua'ymat, ar-Rifa'iyyat, Qasim, ath-Thilaj, al-Munaysa, Manshiyyat al-Qinu, Abu al-Farth, Mukayfita, and Umm al-Quttayn (Hmoud *et al*, 1998). In addition, BRDP has been carrying out a plan to construct water ponds and small earth dams for water harvesting. Fifteen locations are identified with regard to groupings of Bedouin and the network of roads in the area. The following

specifications will also be considered for future pond construction: compaction, reinforcement, canal pavement, pipe sizes, conveyance dams, settlement ponds, main pond, drainage well, the line from the main pond to the drainage well, and the main water drain (Sallaq and Farah, 1998).

The main reasons to maintain the existing pools and dams as well as constructing new ones are to harvest the surface water in order for it to be used by the Bedouin and their livestock. This is a priority often expressed by the Bedouin. These pools are not restricted to specific tribes or clans but open to use by anyone. On the other hand, because of the high rate of evaporation in the area, and also because the Bedouin prefer this water to the boreholes' water, benefits from these pools and dams is restricted. It is either over-pumped by the Bedouin or dries up not long after the end of the rainy season.

2) Biodiversity

Studying biodiversity in the BRDP area has been led by a number of researchers who have been working on the Badia Darwin project which is funded by the Darwin Initiative for the Survival of Species (DISS)[1]. In 1995, Durham University's CORD

[1] DISS was launched during the 1992 Earth Summit in Rio de Janeiro, which was designed to help safeguard the world's biodiversity, by drawing on British strengths in this area to assist those countries that are rich in biodiversity but poor in financial resources. It is directed and funded by the Department of Environment, Transport and the Regions (DETR) (UK) which seeks applications from British institutions, organisations, and individuals to conduct research aimed at protecting and improving biodiversity. The principal aims and objectives of DISS are: 1) the establishment of collaborative projects, in countries poor in resources and rich in biodiversity, which should be based on establishing links between British institutions and institutions in those countries and could include the improvement of access to data held in British institutions, 2) the provision of assistance to institutions concerned with biodiversity and to scientists working in the biodiversity field in need of support particularly as a consequence of the breakdown of political and economic systems, 3) support for short courses in Britain on conservation and sustainable use of resources within a scheme by which Darwin Scholars and Fellows would be brought to Britain, 4) a few research projects covering neglected or undervalued aspects of work on biodiversity and particularly carried out in co-operation with local people which should be outside Britain, and 5) work on helping developing countries to give effect to the provisions of the biodiversity convention which would concentrate on the production of national strategies,

submitted a proposal concerning an environmental management plan in Jordan, for three years (1995-1998) and recently extended to March 1999. It aims to assess biodiversity of the BRDP area for the conservation and/or reintroduction of indigenous species in collaboration with the pastoral communities (DISS, 1996).

As noted by Cope and el-Eisawi (1998), three plant collecting trips were taken in the BRDP area between 1992 and 1996. They indicate that the area contains, so far, 322 plant species in addition to 200 species recorded by other researchers. Forty nine species of the plants are newly recorded for Jordan and one possibly new to science. Recent studies have identified over 130 species of birds including numbers of raptors and other migrating birds of international significance and also a type of partridge which may not previously have been recorded in the world (Thomas, 1997 and Armstrong *et al*, 1998). Also, there are more than 30 species of mammals recorded so far in the area including the proven discovery of the very rare sand cat (Scott, personal communication). Four species of bats were also identified in the area (Hinchcliffe *et al*, 1997 and Quatrameez, 1996). Additional studies underway are now investigating other kinds of flora and fauna.

The Darwin project also aims, by the end of the project in March 1999, to help develop an environmental management plan between the community representatives, BRDP, and RSCN. The plan should be beneficial to the environment and to their way of life. Around 30 sites in the area have been surveyed by Darwin's researchers to study biodiversity of the Badia, with the result as outlined above. The research is also examining the interaction between the people and their environment in order to see how

sustainable use, benefit-sharing arrangements, and the rights of indigenous people over biological resources. Up to 1996, more than 120 projects have been carried out in more than 85 countries

much impact the people have caused and how they obtain benefits from the natural resources of the Badia, and to learn what these wild plants and wild animals mean to them.

Besides this research, two workshops have been held this year (1998). The objectives and aims of the first workshop were: 1) to enhance the efforts of preparing a long term environmental management plan for the north-east Badia, 2) to ensure that the proposed strategies will be developed in partnership with the local livestock owners in the Badia, 3) to recognise that any proposed change in status or access to the Badia would have to take heed of the livestock owners and meet with their approval, and 4) to raise awareness of the special characteristics of the Jordanian Badia's biodiversity. This workshop was held in May 1998 with participation from more than 30 people, representing the livestock owners, MoA, Badia police, BRDP, RSCN, and the Darwin project in Jordan (Presentation summarised in Mashaqbeh, 1998a).

There were many discussions and suggestions made by the participants, including a request to BRDP and MoA to organise a workshop about the management of rangeland reserves with regard to background, techniques, benefits, and how the livestock owners can be involved. Also, all agreed that overgrazing is the major obstacle facing rangeland improvement. However, an additional important question was how to overcome the effects caused by the government's removal of feed subsidies. In order to solve this problem, some suggestions were made by some owners, which caused considerable debate among themselves. One owner suggested exchanging grazing rights with Syria, Iraq, and Saudi Arabia in the dry seasons, but this was considered

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including Jordan.

beyond the responsibility of the participants. Another suggestion was to organise the grazing seasonally by grazing one year in al-Harrah and next year in al-Hamad. This suggestion was discussed but not accepted because it would need full agreement between all of the livestock owners in the Badia. Also, the Badia police cannot protect the areas, apart from those close to the borders because they do not have the authority and the resources to do so in these wide areas. The director of BRDP suggested establishing reserves in areas are being traditionally claimed by tribes, similar to the traditional *hema* system. BRDP has offered to provide basic infrastructure, scientific advice, and health care services to the livestock. This suggestion was accepted by some owners and refused by others because of the unclear ownership of the rangelands in the area. The police confirmed that they are protecting the so-called 'no-go zones' near the Syrian border from any human activity like grazing, hunting, and wood collecting in the area though the reason is to prevent smuggling or the illegal passage of people rather than to conserve biodiversity. At the end of the workshop, several recommendations were made by the participants for the next workshop such as: 1) conducting an environmental awareness training course for the Badia police and members of the armed forces who are in charge of the protection of the 'no-go zones', 2) more participants from the local community should be invited to the next meeting, 3) MoA is required to facilitate and prioritise the application of the livestock owners for long-term credit, 4) BRDP will approach MoA about the establishment of an Agricultural Credit Corporation (ACC) office in the northern Badia, and 5) MoA is required to give more details and information about the ideal use of the lands in the Badia in the next workshop (Presentation summarised in Mashaqbeh, 1998a). All the responses indicate that this workshop was relatively successful in meeting its objectives.

Nevertheless, one of the most important organisations in Jordan, the Jordan Co-operative Corporation (JCC), was not invited to this vital workshop. An important problem facing rangeland improvement is the lack of organisation of the livestock owners to help themselves. But JCC has built up a tremendous experience of helping pastoralists to organise themselves through establishing co-operatives. In consequence, JCC can play an essential role in promoting a management plan in the area for the range resources.

The second workshop was held in September 1998 with participation from more than 20 people, representing the Jordanian Armed Forces, the Badia Police, MoA, RSCN, and BRDP. The aim of this workshop was to invite the security organisations responsible in the BRDP area, the Armed Forces and Badia Police, in order to discuss with them the proposed management plan of the range resources in the area and their central role in this issue. The idea is to raise the awareness of these organisations' members regarding the importance of protecting and maintaining biodiversity. These organisation can play a central role of helping BRDP and RSCN to manage and maintain the resources in the area. The main outputs of this workshop were to: 1) organise seminars and lectures for the Armed Forces' members in the area in order to raise their awareness towards the importance of biodiversity and 2) to carry out a study in order to determine the historical tribal lands in the area and draw a map from them which will be a great help when approaching specific clans or tribes (in term of their historical rights) when starting to implement the management plan (Presentation summarised in Mashaqbeh, 1998b).

A third workshop is planned for this winter to focus discussions with a tribal group with a tribal group in Tel ar-Rimah.

3) Human resources and livestock

According to Findlay & Maani (1998) and Maani *et al* (1998), the population of the BRDP area was 16,267 in 1994, distributed among 2,398 households at an average of over 6.5 person per household. Some 48.5% were less than 15 years. There was a strong indicator of very high fertility that 16.7% of the people were less than five years of age. Thus the BRDP area has a very high annual population growth of 3.1%. If the population in the BRDP area continues to increase as rapidly, it can be expected that increasing parts of rangelands will be used for both, constructing settlements and carrying out agricultural activities.

As is mentioned in many places, the Bedouin households' needs were minimal in the past and they were able to meet their demand from their livestock. Their cash requirements were met by transporting goods across the desert and selling their animals' production to town dwellers. Livestock were thus the sole resource for the Bedouin to generate income. This fact was true up to the creation of *quwat al-badia* in Jordan during the 1930s which provided an additional source of income besides raising livestock. A job in *quwat al-badia* secured food, clothes, and a good monthly salary, which were not always secured from raising livestock. This was the beginning for many Bedouin of giving up raising livestock and searching for monthly waged jobs (Dutton, 1998). In more recent times, serving in the army has not been the only way to secure income but other sectors such as civil service and irrigation agriculture also provide opportunities to generate income. According to Findlay and Maani (1998), the 1993 baseline survey in the BRDP area showed that waged employment had the highest level among income sources at 38.4%, while livestock production was in the second position,

at 22.3%.

With regard to settlement and land ownership, Rowe (1998) mentioned that other than the H4 and H5 pumping stations of the Iraq Petroleum Company (IPC), only the village of Umm al-Quttayn within the BRDP area has been settled for more than forty years. Rowe added that the process of settlement within the study area has occurred over the last 20 years while this steady expansion of settled and cultivated areas is still underway. Despite the fact that the government, with regard to the Agriculture Law number 20 (1973), presumes most of the BRDP area as state lands, but as Rowe also outlined:

> "... amongst local pastoralists, a second system of land rights with no legal basis is apparently observed. Specific key areas developed through long-standing or significant inputs of capital investment, labour or other resources give the developer(s) prior (and in some cases exclusive) rights of access. Perhaps the most common manifestation of such traditional land rights is the long-standing cultivation and subsequent acquisition of informal (but widely recognised) rights to various spread wadis (*marabs*) around the Badia" (pp. 25-26).

In addition, Brandenburg (1998) mentioned that land ownership is the focus of attention by both government and tribes. Rock piles have been used in the area to indicate and distinguish the lands:

> "These rock piles seem to be the first step in securing land for oneself by publicly communicating one's perceived rights to the particular land. A further step is to build houses on at least part of this same land in which the owner's wife and children may live while the husband tends livestock elsewhere. Further steps are for the husband to remain on the land as well and to bring relatives to settle in the area. Settlement equals rights of ownership in the eyes of the inhabitants; the greater the number of settlement indicators, the stronger the rights are to the settlement. Distribution then becomes an approval process by the government for land settlement and a government recognition of rights the inhabitants already perceive are theirs" (p. 254).

However, land tenure in the area is still not clear which limits the local communities sense of responsibility towards the resources of the area.

It has been mentioned on many occasions that livestock have played a central role in Bedouin life. Campbell and Rowe (1998), estimated the livestock number in the BRDP area in 1995 between 215,000 and 326,000. Also, around 22% of the households in the area depended mainly on livestock for their livelihood while 35% mentioned that livestock production was a major activity. Sixty one per cent of the herders moved with their flocks for some period of the year both inside and outside the BRDP area while the remaining 39% were sedentary and only moved their animals a day's walk from their village. The nomadic herders owned an average of 528 animals each while the sedentary herders owned an average of 169 animals each. As the nomadic herders' number is decreasing, this could be a significance indicator that the livestock number will decrease in the future which could make managing the range resources relatively easier. Campbell and Rowe found that there was no significant difference in the amount of bought feeds used by the two groups. The average amount of feed that each head of livestock consumes in the BRDP area is 1.22 kg per day. The feeds used were whole barley grain and wheat bran plus other sources such as tomatoes, tomato waste, cabbages, and Egyptian clover. Grazing is another source of feed for the animals but this only has a significant role in a wet season. This indicates that due to the deterioration which has been taking place in the range resource, itself related to the huge numbers of livestock which use the area, the rangelands have not been providing significant feed for the livestock.

Rowe (1998) argues that:

> "It is annuals rather than perennials which constitute the most significant grazing resource to sheep herders in the Badia. The principal season of growth is in spring following the winter rains. However, grazing availability fluctuates across the area owing to rainfall distribution, timing, soil types, and other factors which may result in 'islands' of vegetation in the midst of less productive areas. In any given area, annuals may appear and quickly attract livestock before being grazed or surpassed by the

availability of better grazing (annual or perennial) elsewhere. In this way, pastoral households move disparately around the Badia directed by the individual judgements and indigenous knowledge of their heads. While grazing migrations of households appear to the outside observer erratic, unpredictable and sometimes contradictory, this simply reflects the complex way in which resources are distributed throughout the area and the way individual decision-makers interpret and exploit distribution" (p. 22).

al-Oun (1997) reported that 38.9% of 200 herders of the BRDP area, interviewed in 1995, moved from one area to another for two reasons. Either to escape the cold in winter in the western parts of the BRDP area (and therefore potential loss of new-born lambs) by moving to the eastern Badia and/or because of the importance of fresh pastures for young lambs to grow better.

According to Rowe (1998), the gross margin profit per head was JD13.5 before the removal of the subsidy on feed by the government in 1996 and has become JD1.62 per head after. He mentioned that after around one year of the feed subsidy removal, 36.2% of livestock, belonged to 25 owners interviewed by him during various times in 1996 and 1997, were sold. This indicates that it is, likely that there will be a future continuing trend for the herders to decrease the number of their livestock which will in turn decrease the grazing pressure on the range resources. If the removal of the subsidy makes the herders more dependent of the range, it may put more pressure on the resources in the short-term while in the long-term they may be more protective of it.

5.3 Findings and Discussion

In addition to the secondary data obtained from the BRDP studies and documents, above, the researcher visited some sites in the BRDP area in order to obtain firsthand information and, therefore, to understand more about the current position of the rangelands and biodiversity in the area. The sites visited are relatively rich in biodiversity and it is potentially possible to make nature reserves from them. Burqu, al-

Ghamr, and al-Hazim were thus visited to gain data including the information about the attitudes of the herd owners toward rangeland management and biodiversity conservation.

1) Burqu

A Roman-Omayad antiquity on the northern-eastern part of the BRDP area called Qasr Burqu gave the site this name. The site is important due to the presence of an old dam, which holds winter rain used by the Bedouin for their livestock needs over and above their own daily requirement. The water held in the dam usually lasts around the year.

The area of the site is about 950 km^2 divided between al-Harrah and al-Hamad areas. Burqu is a priority site at which RSCN wants to establish a new protected area in Jordan (Budieri, 1995). The main problems that face Burqu are overgrazing by sheep, soil erosion caused by the vehicles in the flat al-Hamad, hunting pressure, and the over pumping of the dam's water by the Bedouins' tankers (Budieri, 1995 and Clarke, 1979). Budieri (1995) categorised the Bedouin in Burqu site into three groups: 1) nomads who are totally dependent on the area under study and only move within it throughout the year, 2) nomads who move in different areas and use the productivity of the areas in an opportunistic way, and 3) semi-nomads who have settled in the villages near by and use the area only once a year.

There were 22 owners interviewed around Burqu dam half of whom belong to the al-Ghiath tribe, four to al-Masa'yeed, and the rest to az-Zubayd, Bani Sakher, ash-Sharafat, al-Adhamat, ar-Rwala, and al-A'mri (Table 5.1). The al-Ghiath formed the majority because ar-Ruwayshid and Manshiyyat al-Ghiath villages are close to the site and

contain many families of the al-Ghiath tribe. Within the sample, only eight had tents in the area whereas the rest came to fill water in their water tankers from the dam.

Table 5.1: The tribes and settlements of the sample in Burqu

Tribe	Village or city	Governorate
al-Ghiath	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	Manshiyyat al-Ghiath	al-Mafraq
	Manshiyyat al-Ghiath	al-Mafraq
	Manshiyyat al-Ghiath	al-Mafraq
	Manshiyyat al-Ghiath	al-Mafraq
al-Masa'yeed	Hamra as-Suhaym	al-Mafraq
	Hamra as-Suhaym	al-Mafraq
	ar-Ruwayshid	al-Mafraq
	ar-Ruwayshid	al-Mafraq
az-Zubayd	az-Zubaydiyyah	al-Mafraq
	az-Zubaydiyyah	al-Mafraq
Bani Sakher	al-Muwaqer	Amman
ash-Sharafat	al-Mukayfita	al-Mafraq
al-Adhamat	Nayifa	al-Mafraq
ar-Rwala	ar-Reishah	al-Mafraq
al-A'mri	ar-Reishah	al-Mafraq

Source: Field study conducted by the researcher, 1997

As discussed in the previous chapter, the livestock owners tend to own trucks and pick-ups but rarely own cars. Table 5.2 reinforces this point as no one interviewed owned a

car. On the other hand, four owned pick-ups and 19 (a remarkable 86%) owned trucks. The researcher was told that the livestock owners who own pick-ups in addition to trucks always have other sources of income or they have families in the villages. It seems that pick-ups are more practical when visiting the families inside the villages. However, using water tankers allows many herd owners to come from far distances such as ar-Reishah (more than 40 km away from Burqu) in order to collect water. This puts high pressure on the dam's water and disturbs the wild animals in the area. In addition, using both pick-ups and trucks (notably the trucks) causes soil erosion. As no asphalted roads serve the area (except the Amman-Baghdad highway), the livestock owners use numerous numbers of tracks which allow the wind to erode the soil.

Table 5.2: Ownership of vehicles in Burqu

Type of Vehicles	No. of vehicles' owners	%
Car	0	0
Pick-up	4	18
Truck	19	86

Source: Field study conducted by the researcher, 1997

Table 5.3 supports the information quoted from al-Oun (1997) in the previous chapter which shows that the Bedouin in the Badia tend to keep sheep more than goats and camels. All those interviewed had flocks of sheep, at an average of over 600 each, but only 64% of them had flocks of goats an average of around 50 each and only one owner had a flock of 30 camels.

One of the owners in this site said that when he has cash money, he can get a tonne of barley for JD120 from the distribution centres but when he does not have cash, the feed

price will be JD170; it is a sale on credit and that happens in ar-Ruwayshid. This is another indicator of the critical position that the owners face these days. However, increasing the feed prices could effect the rangelands in two ways: in the short-term, it will put high pressure on the range resources as the herders will try to benefit from any single plant in order to reduce the feed costs and in the long-term, as the herders lose more money, they will sell more of their herds which will reduce the pressure on the range resources.

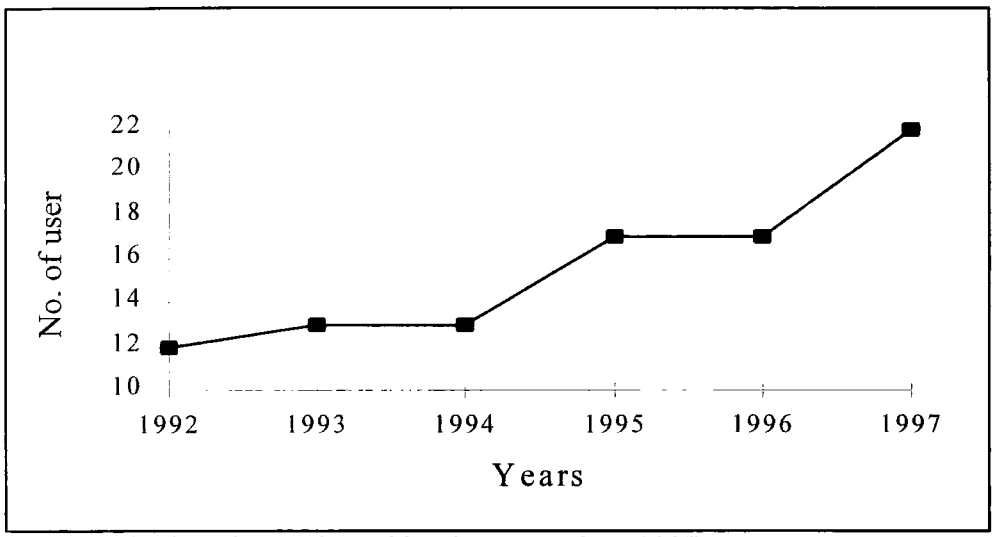
Table 5.3: Ownership of livestock in Burqu

Livestock	No. of owners	%	head per owner
Sheep	22	100	626.4
Goats	14	64	51
Camels	1	4.5	30

Source: Field study conducted by the researcher, 1997

Figure 5.1 shows that the owners did not use the site constantly. Only around 55% of those interviewed in 1997 came to the site in 1992, 60% in 1993 and 1994, while 77% of them came in 1995 and 1996. In addition, only two of 22 seemed sure to move out of the area while the rest were not sure about their plans. Again, this fact of mobility is the most significant role which makes a conservation of biodiversity project more difficult. Any project will rely on local management by the people who use the resources in the area, but if there people move to other sites (and are replaced by other groups of people) the potential for active local management is reduced.

Figure 5.1: Coming to Burqu by year



Source: Field study conducted by the researcher, 1997

Table 5.4 shows that water availability was the most significant reason why owners are attracted to Burqu (63.6% of the owners). Only four mentioned the forage as a reason for them coming. Besides the dam, the sources of water in the area are the rain water, the well of Muteirah, and some other government wells in ar-Ruwayshid. In the first field visit in July, 100-150 tankers were seen every day filling up with water from the dam whereas only two tankers were seen filling up with water during the second field visit in November as a result of the rainy season in the Badia. It should be mentioned here that any future management plan for the range resources in the area should consider the herders' high degree of dependency on the dam's water.

Table 5.4: Reasons to come to Burqu

Reasons	Frequency	%
Rain	0	0
Water	14	63.6
Forage	4	18.2
Other*	10	45.5

Source: Field study conducted by the researcher, 1997

* Other means here: the habit; tribal lands; no other opportunities; there are no close farms (which may lead to conflicts with its owners); close to their villages (ar-Ruwayshid and Manshiyyat al-Ghiath); and close the highway.

Almost all of the owners interviewed in Burqu do not think that their herds affect the wild animals' opportunities to obtain food. They think that the wild animals need only a little amount of forage and so there is no need to create reserves in the area. With regard to water, they think that the quantity in the dam is sufficient for both the livestock and the wild animals. Some owners do not know if there is any benefit from protecting biodiversity, and others believe that there are no benefits. Furthermore, they think that drawing up an agreement between them and BRDP and RSCN to control the grazing would not be possible because of the huge number of the Bedouin who use the site including the fact that it can be used by any Bedouin in Jordan. They heard rumours that the government wants to create a reserve in Burqu. They are strongly against the idea of protecting the area in this way because they think this will reduce their access to the dam's water which is considered the best in the area. Unfortunately there are no good alternatives because the water of the government's wells is not healthy for drinking and cooking purposes. Many people are suffering now in the area with kidney problems.

The Bedouin said if a reserve is proposed, all the users of Burqu would reject it. They

said that God makes the forage grow but not the reserve. Also, it is very difficult to make the mobile Bedouin remain in one site for grazing purposes. They will keep moving and searching for water and forage and it would be very difficult for them to keep other herders out of the area. In addition, they would find it difficult to do any work other than raising livestock. It is too late for the old owners to learn new jobs. In order to improve feed availability, some of them see the idea of creating a co-operative to plant grazing shrubs as being good. But the idea of reducing the feed prices sounds much better. Also, they think that the proposed reserve in the area should be on the international borders because they are 'no-go zones' in any case.

However, in this area, a possible way in which to resolve the problem of over-grazing and biodiversity degradation might be to plant some grazing shrubs as in the JCC project areas previously described. This could reduce the pressure on the range resources after offering the livestock another source of feed and this also could lead to direct control of the hunting activities as the users will be curious about any activity close to the planted shrubs of the expected reserve. On the other hand, in September/October (1998), four specialists from Bird Life International, counted numbers of raptors of international significance (Armstrong *et al*, 1988 and Armstrong & Leavett, 1998). Also, they may have discovered a type of partridge not previously recorded anywhere in the world. After finishing the specialist work and publishing their studies, this will be attractive to bird specialists and also may create an opportunity for eco-tourism. If eco-tourism emerged in the future, it should benefit the local users in the area financially which may make them more interested in conserving biodiversity.

It should be mentioned here that although it may be too late for the old herders to

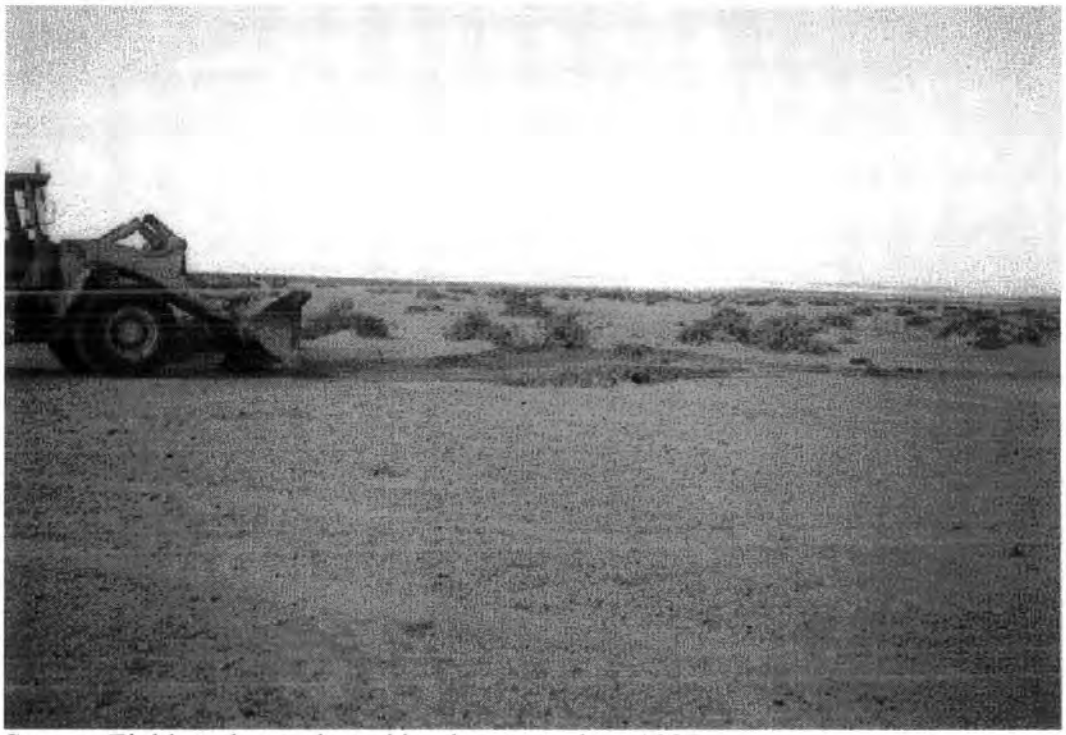
practice new jobs perhaps their children are a good target for any jobs that the expected eco-tourism could offer. But, without previous discussion and acceptance from the herders, any plans or project, the researcher believes, will not be successful.

2) al-Ghamr and al-Hazim

The area around al-Ghamr (81 km^2) and al-Hazim (59 km^2), on which there is no literature, are located within the south-western part of the BRDP area. Neither of the sites is regarded by RSCN as being an urgent priority conservation area but they are rich in biodiversity. It must also be stated that the researcher has a personal interest since most of the areas of those sites belong to as-Sirhan tribe from which the researcher comes. It was hoped that this would facilitate obtaining the information needed.

Most of the as-Sirhan do not exploit their land themselves but rent it to other farmers who usually come from az-Zarqa. These farmers only care about maximising their profit without paying any attention to the conservation of biodiversity. Plate 5.1 shows a bulldozer removing the plant cover in order to make seasonal farms. This causes damage to the ecological balance in the area, and minimises opportunities for wild animals to find food. Melons, watermelons, and tomatoes are the crops planted in summer, whereas potatoes and cauliflowers are planted in winter.

Plate 5.1: Bulldozer in al-Ghamr and al-Hazim area



Source: Field study conducted by the researcher, 1997

A number of sheep owners from the A'nezeh tribe present in Jordan and its neighbouring countries, used to move between these countries, especially Saudi Arabia and Iraq. After the Gulf crisis (1990-1991) between Iraq and the Gulf countries, the Saudi government expelled the Bedouin of Iraqi descent including the A'nezeh. In Jordan now many members of this tribe have lived in al-Azraq, al-Ghamr, and al-Hazim since 1990. They are not allowed to return to Saudi Arabia. Jordan hosts them as long as they do not have other alternatives. This will put additional pressure on the range resources as long the problem of this group has not been solved between Jordan, Iraq, and Saudi Arabia.

In al-Ghamr and al-Hazim, 19 owners were interviewed. Six belong to the Hweitat tribe, six to A'nezeh, four to Bani Sakher and the rest were from the tribes of ash-Shararat, al-Masa'yeed, and ar-Rwala (Table 5.5). As was mentioned earlier, most of the as-Sirhan do not exploit their land themselves but rent it to other farmers who usually come from az-Zarqa. Moreover, because most of the lands' owners from as-Sirhan do not have livestock, no livestock owner of this tribe was met by the researcher. The livestock owners, which were met by the researcher in the area, have homes in different villages located in the governorates of Ma'an, az-Zarqa, Amman, and al-Mafraq. Once again, this shows that rangelands are common-use lands and open for use by any herd-owner in Jordan which creates more difficulties in any range management and improvement plan.

Table 5.5: The tribes and settlements of the sample in al-Ghamr and al-Hazim

Tribe	Village or city	Governorate
Hweitat	al-Hashmiyyah	Ma'an
	al-Hashmiyyah	Ma'an
	al-Hashmiyyah	Ma'an
	al-Hashmiyyah	Ma'an
	al-Hashmiyyah	Ma'an
	al-Hashmiyyah	Ma'an
A'nezeh	al-Azraq	az-Zarqa
	al-Azraq	az-Zarqa
	al-Azraq	az-Zarqa
	al-Azraq	az-Zarqa
	al-Azraq	az-Zarqa
	al-Azraq	az-Zarqa
Bani Sakher	Zizia	Amman
	Zizia	Amman
	Rojm ash-Shami	Amman
	al-Manshiyyah	Amman
ash-Shararat	al-Ghamr and al-Hazim	az-Zarqa
al-Masa'yeed	al-Jubaya	al-Mafraq
ar-Rwala	al-Ghamr and al-Hazim	az-Zarqa

Source: Field study conducted by the researcher, 1997

Almost all the interviewees in the area owned trucks (94.7%), and most also owned pick-ups (68%) whereas only one herder had a car (Table 5.6). Because the sites are located near the border with Saudi Arabia, having pick-ups in addition to truck could increase the opportunity to obtain additional income from trading between the two countries or smuggling activities. However, as discussed earlier, use of trucks and pick-ups by the Bedouin has made the entire Badia accessible for their herds in a very short time which has caused the deterioration of biodiversity and also has caused soil erosion.

On the other hand, bringing water to the livestock has made the herders tend to concentrate in specific places which causes overgrazing.

Table 5.6: Ownership of vehicles in al-Ghamr and al-Hazim

Type of Vehicles	No. of vehicles' owners	%
Car	1	5.2
Pick-up	13	68.4
Truck	18	94.7

Source: Field study conducted by the researcher, 1997

As in Burqu, the interviewees owned an average of about 600 sheep. But more people (around 85%) owned goats, and many more (around 37% instead of around 5%) owned camels (Table 5.7). Seven of the 19 interviewees owned flocks of camels at a mean of 39 camels per owner. The area is rich in some shrubs which are palatable to camels. The forage and shrubs in the area allow the owners to buy slightly less feed during the grazing months; 11.5 tonnes per month per owner comparing with 16.6 tonnes per month during the non-grazing months.

Table 5.7: Ownership of livestock in al-Ghamr and al-Hazim

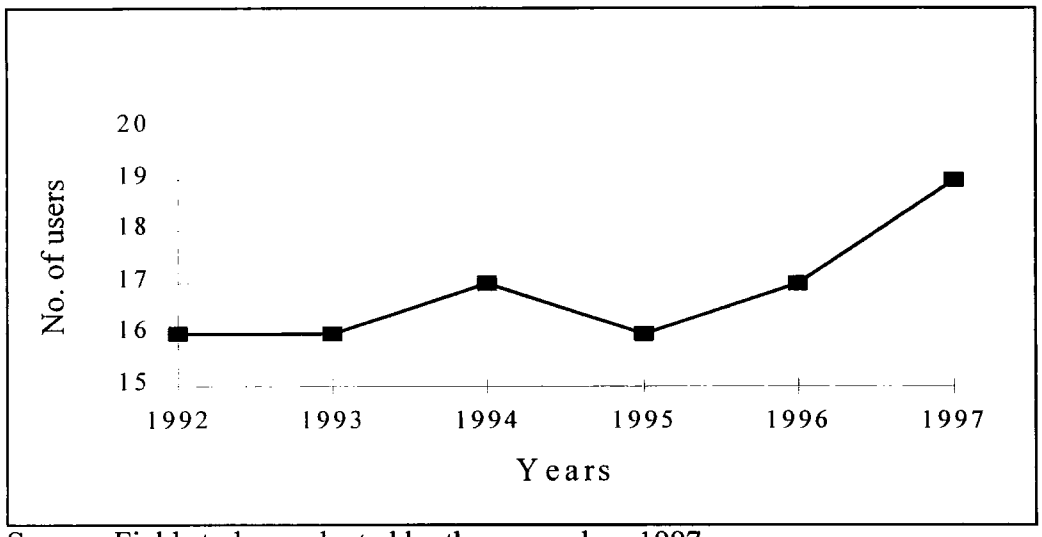
Livestock	No. of owners	%	head per owner
Sheep	19	100	574.7
Goats	16	84.2	52.8
Camels	7	36.8	39.1

Source: Field study conducted by the researcher, 1997

Figure 5.2 shows that around 85% of the owners interviewed in 1997, used the area regularly during the previous five years. But most of them stay for only 1-2 months,

when they pass through the area moving from north to south or from south to north which may cause a confusion for any proposed plan to manage the range resources of the area in the future. The reason that makes the owners prefer not to come to this site, or when they come not to stay longer, is the large number of farms created and the digging of many wells. Such farms can lead to conflicts with livestock owners. Ten of the interviewees were sure they would leave the area to go south or north, though most of the rest were not sure about their plans for moving.

Figure 5.2: Coming to al-Ghamr and al-Hazim by year



Source: Field study conducted by the researcher, 1997

The presence of the forage and the shrubs was the main reason attracting pastoralists to the area (Table 5.8). Water and other different reasons were important but lesser reasons to choose the area. But, if the land-owners maintain their activities of removing the plant cover in addition to over-abstracting the water, this could reduce the herders' interest in the area. The water sources for the livestock in the area are the al-Hazim government well and some other private wells.

Table 5.8: Reasons to stay longer in al-Ghamr and al-Hazim

Reasons	Frequency	%
Rain	0	0
Water	7	41
Forage	14	82
Other*	9	53

Source: Field study conducted by the researcher, 1997

* Other means here: 1) a temporary place, 2) close to the subsidy distributing centre in al-Azraq, and 3) for the Saudi owner, he comes here because of the huge numbers of the reserves in his country.

The livestock owners in the area do not think that there is competition between wild animals and their livestock for the natural vegetation as the wild animals consume small amount of forage, and in any case there are no big herbivores. Also, they think that wild animals need only a little amount of water. One owner said that he was not aware of any presence of wild animals which, as he thought, referred to the hunting pressures, except some wolfs and hyenas which attack the livestock from time to time.

Most of the livestock owners do not think that protecting biodiversity is of any importance and also do not like this idea because it will decrease the opportunities to get free forage. Furthermore, they think that only the rain makes the forage grow; not creating reserves in the area.

Some Bedouin come from Saudi Arabia, and most of the camels in the area belong to them. They come for most of the year because of the availability of shrubs which are palatable to camels. The Jordanian owners do not mind that they come here to graze but they want the same opportunity to go to Saudi Arabia as well, which became very difficult during the 1980s and remains so in the 1990s. One of the Saudi owners said

that Saudi Arabia had received a lot of rain in recent years and therefore many nature reserves were created along the international borders of the state. It is possible for the Saudi owners to graze inside these reserves but with some conditions regarding the capacity of the forage and water. He added that the Saudi owners are treated very well by the government of Jordan and sometimes better than in Saudi Arabia. Also, he thinks that one of the reasons why Saudi Arabia does not allow livestock owners of neighbouring countries to enter their rangelands is to prevent drug smuggling. They are afraid of drugs entering with these livestock because drugs are causing many social problems in Saudi Arabia.

5.4 Conclusion

In 1992, a memorandum of understanding was signed between Jordan and UK in order to study the resources of the Jordanian Badia as a step to manage them in a sustainable manner, which led to the creation of BRDP. BRDP has conducted several kinds of research but in this chapter, the emphasis is placed on discussing the studies that relate to rangeland management and conservation of biodiversity.

In order to obtain firsthand information from the users of the rangelands in the BRDP area, three sites were visited which are seen by BRDP and RSCN as future potential reserves. Several techniques were used in these sites to collect data including the attitudes of the herd-owners about the proposed conservation plans.

The fieldwork indicates that most of the herders do not use the rangelands in a constant manner. The reason is their mobility which should be taken into account before applying any future management plan for the range resources. Also, there is lack of

awareness among the herders in term of the importance of protecting biodiversity, and a fear that conservation and reserves will restrict their traditional rights. This supports the argument that any development for rangeland without an appropriate participation from understanding local users (the herders), cannot be considered sustainable. However, the underlying situation may be changing. As a result of a set of changes in the social and political-economic context in which the Bedouin live, the number of livestock is falling - and may continue to fall. The removal of the grain subsidy in 1996 has been a major contribution to a reduction in livestock numbers. This trend is likely to be strengthened as a result of generational attitude shifts - the younger people (and the women) are not as interested in keeping livestock as their parents (Oughton, personal communication). If so, it may be easier, through proper discussion with the livestock owners, to reach agreements about the local management of resources, especially in biodiversity sensitive areas such as Burqu where eco-tourism may provide alternative sources of income and an incentive to maintain biodiversity intact.

Chapter Six

Conclusion and recommendations, with special reference to the BRDP area

It was mentioned earlier that the overall objective of this study is to use what was learnt from the discussions in the previous chapters in order to promote Bedouin participation in managing the rangelands. Hence, this chapter will provide the conclusion from these discussions as a step to better design and implementation of trials in the BRDP area. These trials are intended to be living examples, designed and implemented with the active participation of the Bedouin, to show the local communities the best ways to use their limited resources.

6.1 Conclusion

Before presenting any future trial/demonstration, the following findings should be carefully considered:

1) Land tenure

It was found that most of the Badia lands, including the BRDP area, are freely grazed by most of the Bedouin of Jordan. This is a problem typical of resource use when no-one feels responsible; 'the tragedy of the commons'. This might be the first obstacle which will face managing the rangelands in the future trials' sites. It will be difficult to determine who best to approach of the users to start any management plan. However, the first step towards resolving this problem could be redefining the lands that the tribes have traditional claims for. In other word, the idea is to make use of the traditional *hema* system that was mentioned earlier, which will increase the Bedouin sense of

responsibility for their resources and could make benefiting from them sustainable. However, the social and economic conditions under which *hema* lands were established has changed radically in recent decades. Thus although the principle may remain, it would not be realistic to assume that previous *hema* system could provide a blue print for the future.

2) The trends of livestock ownership

It was found that the rangelands in the study sites do not provide significant amounts of feed for the livestock and this is associated with the deterioration that has been taking place in the range resources. Also, removing the subsidy of the livestock feed from the government in 1996 has hit the herders hard - which is resulting in a reduction in the number of sheep. Moreover, it was found that the settled herders tend to own fewer livestock than the nomadic herders and that in any case the number of the nomadic herders is decreasing due to sedentarisation. Furthermore, the new generation of Bedouin seems to be losing interest in raising livestock. These findings indicate that in the long-term, the livestock numbers will decrease, which will reduce the difficulties that are facing the management of the rangelands.

3) Tribal organisation

Although the Bedouin traditional organisation is still strong, it is not as strong as a few decades ago. It used to be the case that when a *shaykh* of a tribe took a decision, the rest of the members of the tribe respected and committed themselves to his 'word'. For many reasons, the power of the *shaykhs* today is not as strong as before. New generations, in addition to educated people and senior Bedouin army and airforce officers, although they still recognise the *shaykhs*, they have been showing, relatively,

different degrees of resistance to the *shaykhs* traditional role. This should be put into account when dealing with the local societies. Approaching the local communities should not be only through the *shaykhs*; the other members also should be consulted and actively involved in discussion about priority and approaches. By discussing some cases in the previous chapters, it was concluded that working with an organised group is much preferred to working with unorganised individuals. JCC, through implementing a number of successful projects, has tremendous experience of helping local communities organise themselves before starting working with them. JCC's idea is to encourage and help the people to create a co-operative for the targeted community. After creating this co-operative, both JCC and the local people will be able to fix the objectives and the methodology to achieve these objectives. JCC has an agreement with WFP, which could help provide the people in the area with many benefits associated with making a co-operative and range reserve.

It should be mentioned here that the idea is not enforcing a specific kind or type of people's organisation on them. Any kind or type of people's organisation (either formal or informal) would be sufficient as far it secures full commitment from all the sections of the community which are involved in implementing the improvement project. It happened once that BRDP and the University of Jordan approached a tribal *shaykh* in the area in order to carry out an agricultural research project. There were prior discussions between the project's staff which led to the setting of the objectives and methodology to implement the project. BRDP and the University of Jordan relied on the *shaykh's* 'word' in order to secure full commitments from him to the objectives and methodology. However, as there was no sort of organisation, they could not tie that *shaykh* to his commitments. He cancelled the deal unilaterally, from one side without

any understandable reason, which put a lot of money and effort to waste.

4) The Bedouin attitudes

The Bedouin, particularly in the BRDP area, are disillusioned because they have been subject to many surveys but they have not seen practical projects. Also, almost all of those interviewed in the study sites did not show any interest in biodiversity and also they agree with each other that there is no benefit from conservation. They showed fear that conservation of biodiversity will reduce their opportunity to use their traditional lands. In the light of the herders' priorities, set beside the difficulties that they have been facing, protecting biodiversity in their view is considered to be a luxury. It is categorised last in their priorities. It also seems that there is a lack in their awareness of how conservation may help them. This makes creating successful pioneer projects increasingly vital. Rather than discussing theories and concepts with the Bedouin, the researcher believes that the time has come to design and implement with them an example of a project which shows the real benefits of managing the rangelands and its impact on their life. Also, another issue needs to be tackled in order to overcome their doubts and resistance. The herders should feel that they are an essential and vital element in the whole process, which is very difficult task but not impossible. This task needs patience and flexibility. Prior discussions are essential, considering them as partners not only receivers. The team, which is supposed to work directly with them, should include some members who are originally Bedouin. These may be experts and/or educated persons who have relevant experience from elsewhere. The experts and educated persons who are originally Bedouin are much more able to understand and deal with them.

6.2 Future trials and demonstrations to integrate livestock owners in managing rangelands in the BRDP area

MoA, JCC, BRDP, and RSCN, in addition to other related institutions, have provided some good examples of integrating the local communities with conservation projects. A number of these projects could be implemented in the BRDP area. Two examples are Tel ar-Rimah and Burqu.

1) Tel ar-Rimah

It was mentioned earlier that the overall objective of the Jordan Badia Darwin project is to help the local communities, BRDP, and RSCN to devise a plan which will benefit the herders while protecting biodiversity. In consequence, two workshops were held in the BRDP Centre (Safawi) for this purpose in addition to a third one, which will be organised within this winter (1998-1999). A group of herders who belong to a clan from the ash-Sharafat tribe has offered an area, close to the village of Tell ar-Rimah, in order to start a trial as an activity for the above-mentioned conservation plan. The third workshop, mentioned above, will be an initial discussion with those herders for general principles and objectives. It should be mentioned here that the researcher, as an employee of BRDP, will play a major role in the future to implement this proposed trial in Tel ar-Rimah.

The group has a small area, potentially rich in range resources and could be put under short and long-term plans. To give additional encouragement to the herders, it is planned for the third workshop to discuss with the local communities the benefits of managing the rangelands. As this workshop may take place while writing this dissertation, the researcher has suggested, to the people who are in charge of organising

these workshops, to link JCC with the whole process in order to enhance the opportunities to organise the local people into a co-operative which could be assisted by JCC. In order to show the people an example of a successful project, the researcher took a group of them to see the fattening trial in Dana which was discussed in chapter four. They had a discussion with the people, who were benefiting from this trial in the lower part of Dana, about its value. The visitors commented to the researcher that they could not see any reason preventing them from applying this trial in their area in Tell ar-Rimah. The approach used in Dana, if the people from Tel ar-Rimah adopt it, will be in additional help to the general project of managing the rangelands in their area. It will provide additional benefits for the local herders and for biodiversity. The herders will obtain a higher profit at the same time as fattening some of the young livestock away from the rangelands, which will help protect the range.

2) Burqu

Burqu could be a good place to implement another trial. As mentioned earlier, numbers of raptors of international significance have been discovered in Burqu in addition to a type of partridge may not previously have been recorded anywhere in the world. This will be attractive to bird specialists and also may create an opportunity for eco-tourism. If eco-tourism emerged in the future, it should benefit the local users in the area financially which may make them more interested in conserving biodiversity. But the fieldwork indicates that the livestock owners in Burqu are completely opposed to the idea of protecting Burqu. Therefore, creating a conservation project by BRDP and RSCN (or any other concerned institution) would be very difficult. The first thing to be considered is how to secure a good source of water for the dozens of water tankers, which come to fill up with water from the dam every day. It should be mentioned here

that the groundwater in the area is seen by the locals to be of bad quality, causing kidney diseases. However, even though the livestock owners around Burqu did not show any interest in the potential of eco-tourism, helping them to benefit from this is still possible. It should be also mentioned that although it may be too late for the old herders to practice new jobs perhaps their children are a good target for any jobs that the expected eco-tourism to offer. But, without previous discussion and acceptance from the herders, any plans or project, the researcher believes, will not be successful.

However, in this area, another possible way in which to resolve the problem of over-grazing and biodiversity degradation might be to plant some grazing shrubs as in the JCC project areas previously described. This could reduce the pressure on the range resources by offering the livestock another source of feed and this also could lead to direct control of the hunting activities as the users will be curious about any activity close to the planted shrubs of the expected reserve.

In addition to the above-mentioned proposed trials and as a result of the researcher's discussions with Bedouin in the Badia and the points presented at the Darwin meetings, it is clear that there is a need for additional research. For example, there is a need for a better understanding of the current land tenure problems and how they may be overcome. Also, there is a need for an in-depth study of the current situation of Bedouin mobility and whether this will reduce pressure on the rangelands and biodiversity as people settle. Furthermore, there is a need to study the attitudes of the future generations with regard to livestock ownership, and whether this also will ease the problem of biodiversity management because of leading to a reduced number of livestock. Having a better understanding of how the future generations will deal with

livestock, could help the institutions mentioned in this study to plan for the future in partnership with those people who retain an interest in rearing livestock.

In the case of the proposed site at Burqu, a technical study of alternative water resources would help reduce the pressure on the dam's water. Also, in al-Ghamr and al-Hazim, there is a need to study the legal position of many wells and seasonal farms as well as their impact on the water quality and plant cover.

In summary, although the problems of balancing the needs of the livestock for access to rangelands with the need for biodiversity conservation are great, there is some reason for optimism. On the one hand, the number of livestock may be declining, and on the other hand, there is some good experience from other projects in Jordan which - in full discussion with the Bedouin in the BRDP area - could be the basis of improved rangeland management which would at the same time enhance both plant and animal biodiversity.

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Appendix 1: The structured questionnaire

Reference	
Date	
Location	
Name	

First Section: Basic information.

1) Personal information.

Family	
Tribe	
Village/ Settlement	
Governorate	
Country of origin	

2) Do you have a vehicle?

Type	**No.**	
Car		
Pick up		
Truck		
		Other

3) How many head of livestock have you got?

Kind	**No.**
Sheep	
Goats	
Camels	

Second Section: Mobility and reasons to choose the sites.

4) In which of the past five years have you brought your livestock to this site?

Years	**Tick**
1992	
1993	
1994	
1995	
1996	

5) Did your livestock graze here before then?

	Yes		**No**

6) Which month/s have you stayed and will you stay here with your livestock this year?

Month	Have stayed	will stay
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		

7) Why have you stayed here with your livestock during this/these month/s?

Because	Tick
The rain	
The water	
The Forage	
Other	

8) Are you thinking about moving from this area? *** If yes, Q11 is excluded.**

☐ **Yes** ☐ **No** *** In no, Q9+10 are excluded.**

9) Where will you go next with your livestock?

10) Why will you leave this area?

Because	Tick
There is no rain in this site	
There is no water in this site	
There is no forage in this site	
There is rain in that site	
There is water in that site	
There is forage in that site	
Other	

11) Why are you intending to stay longer at this site?

Because	Tick
There is rain	
There is water	
There is forage	
Other	

Third Section: Depending on the grazing and water.

12) How much do you buy feed for the livestock?

Feed	Quantity.
The grazing months	
The rest months	

13) While you are in this area, where do you get the water from?

Source

Appendix 2: The semi-structured interview

Reference in the structured questionnaire	
Name	
Date	

1. Rangeland vegetation.

1.1. Where do you think the birds and wild animals get their food?

1.2. Do you think there is a competition between the livestock and the wild animals for the rangeland's vegetation?

If yes: 1.2.1. Do you think the competition is unfair?

If yes: 1.2.1.1. Which side is suffering from it?

1.2.1.2. How do you think it could be resolved?

If no: 1.2.2. Why?

2. Water.

2.1. Where do you think the birds and wild animals get their water?

2.2. Do you think the livestock consume from the same sources as wild animals?

If yes: 2.2.1. If your livestock reduce the opportunity wild animals have for the water, do you think other alternatives should be found to provide a balance between them?

If yes: 2.2.1.1. Have you got any idea about how a balance might be found?

If No: 2.2.2. Why?

3. Livestock owners who come from outside the site.

3.1. Do you know of any other livestock owners who come here from other countries or from other parts of Jordan?

If yes: 3.1.1. When do they usually come during the year?

3.1.2. Why do they come?

3.1.3. What do you think of that?

3.2. Do you know of livestock owners who used to come here from neighbouring countries or other parts of Jordan but do not come any more?

If yes: 3.2.1. Why do they not come here now?

4. Protected areas in Jordan.

4.1. What do you think of the importance of protecting biodiversity?

4.2. In some places there are projects to protect the biodiversity or the livestock like in as-Salt and Madaba projects where formal agreements have been made between its leaders and the local people about the use of the rangelands. This still allows the people to graze their livestock but within specially agreed conditions in order to reduce the negative impact of the grazing.

4.2.1. Do you think this would be a good idea here and why?

If yes: 4.2.1.1. What would you want to see in such an agreement?

4.2.2. Can you tell me if you know of any other projects like that?

4.3. Can you tell me a little bit about the traditional *hema* system?

4.4. Does it still exist in some places in Jordan?

If yes: 4.4.1. Can you tell me where it still exists?

4.5. Would parts of the traditional hema system be useful in a protected area management system, like Burqu for example?

4.6. There are some rangelands used or owned by either individuals or families. Do you know such lands like that?

If yes: 4.6.1 Can you tell me where the lands are, who uses or owns them, and exactly what rights they have over them?

4.6.2. How did this form of ownership or access rights come about?

4.6.3. Would this be a helpful model within a protected area, like Burqu for example?

5. Biodiversity reserves in Jordan.

5.1. Did the RSCN group discuss any objectives and strategy with you before creating the protected area?

If yes: 5.1.1. Can you remember some of the things which you discussed?

If no: 5.1.2. Do you think they should have discussed them with you and why?

5.2. Do you know what the original RSCN's objectives in creating Dana and ash-Shaumari were?

If yes: 5.2.1. Did these objectives benefit or harm you and in what ways?

5.2.2. Do you think it is different today and how?

5.3. Have your livestock got access to the protected area?

If yes: 5.3.1. Should your livestock have more access to them and under what conditions?

If no: 5.3.2. Should your livestock have access to them and under what conditions?

6. Biodiversity reserves in the future.

6.1. Have you heard about RSCN?

6.2. Do you know what the RSCN's objectives are?

If yes: 6.2.1. Can you tell me what they are?

6.3. If RSCN wants to create a protected area here, would it be a good or a bad idea?

If good: 6.3.1. Can you tell me why and if you can think of any benefits which might be created?

If bad: 6.3.2. Can you tell me why and what harm it will cause to you?

6.4. What would you think of the protected area issue if the following took place?

6.4.1. If the protected area was for your livestock's use only at certain times of the year and the livestock of the people not belonging to the region will be kept out.

6.4.2. If there is an increase in tourism because protecting the rangelands increases biodiversity. Perhaps this will give you or your sons an opportunity to obtain may be a job or to earn money from small enterprises such as those run by Bedouin in Petra and Wadi Rum.

6.5. Can you think now of any other benefits?