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AN ASSESSMENT OF FACTORS INFLUENCING THE RECYCLING BEHAVIOR AT HOUSEHOLD WASTE LEVEL

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ABSTRACT

As the population grows, the consumption of material goods increases which results in tremendous quantities of waste. In order to reduce this amount, many policies and programs seek to integrate a standard waste management approach with preventive measures i.e. recycling. The introduction of recycling is gaining importance and attention is placed on *recycling behavior.*

Recycling behavior is understood as the act of separating waste according to its structure or material quality (e.g. paper, plastic, glass, metal, organic waste, batteries, textiles, bulky waste etc.), including further manufacture of same materials and production of new ones. Researchers have observed that recycling behavior is influenced by a number of factors (e.g. society pressure, culture, demographic issues, concern, attitude, sufficient storage space…), however, very little is known about the influence these factors have on the recycling behavior of the residents in the Federation of Bosnia and Herzegovina (FBiH).

The main focus of this thesis is to investigate factors that influence recycling behavior at the household waste level in FBiH. To this end it focuses on two cases, Novi Grad and Mostar. The two cases were chosen on the basis of two elements: a) presence of a recycling program at the household level and b) the presence of public communication campaigns (PCCs). In Novi Grad both are available while Mostar neither is available. This thesis has five developed research objectives as follows: 1) identification of motivational factors; 2) identification of concerns; 3) assessment of attitudes towards recycling behavior; 4) assessment of the influence that knowledge has on recycling behavior and 5) identification of local public communication campaigns (PCCs) that have influence on knowledge and attitude towards recycling. Results show that intrinsic and extrinsic motivational factors were identified in both cases where intrinsic were more dominated in Novi Grad than in the Mostar case. When we considered concerns, we found that respondents in Novi Grad reported a poor understanding of economic opportunities of recycling for plastic waste among local authorities. In Mostar, however, there was a poor collaboration between two existing utility companies. In terms of attitudes, respondents in Novi Grad reported a positive and dynamic role of the utility company and insufficient capacity for animal, industrial and medical waste. On the other hand, in Mostar, respondents pointed out ethnical division between utility companies and presence of few actors engaged in recycling. In both cases, results show that respondents were experienced with paper, glass and wood being recyclable materials, but very few knew that medical waste and chemical liquids are not recyclable. Among PCCs, TV was identified to be

the most influential media source by respondents in both cases while friends and family members to be the most influential social source by which respondents obtained the most information on recycling. This thesis highlights the significance of recycling behavior and its factors as well as their introduction to contextualized policy measures. It also shows some differences among municipalities left from the civil war that are now manifested in the recycling behavior as well as towards environmental protection in general.

KEYWORDS: *Federation of Bosnia and Herzegovina, qualitative and quantitative data analysis, recycling behavior*

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LIST OF ABBREVIATIONS AND SYMBOLS

BiH – Bosnia and Herzegovina

CLR Mostar – Center for local development Mostar

COOR - Center for Environmentally Sustainable Development

DB – District of Brčko

DPA - Dayton Peace Agreement

EB – European Bank

EC – European Commission

EU – European Union

FBiH – Federation of Bosnia and Herzegovina

HNK – Herzegovina – Neretva Canton

IFC – International Finance Cooperation

IMIC – International Multireligous Intercultural Centre

JP – Javno Preduzeće (Public Utility Company)

KEAP – Cantonal Environmental Action Plan

KJKP Rad – Cantonal Public Utility Company Rad

LEAP – Local Environmental Action Plan

MSW – Municipal Solid Waste

NEAP - National Environmental Action Plan

NEP - New Environmental Paradigm

NGO – Non-government organization

OGBH – Association « Education builds BiH »

OHR - Office of High Representative

PCCs – Public communication campaigns

PET – polyethylene terephthalate

PP – polypropylene

PVC – polyvinyl chloride

REC – Regional Environmental Centre

RS – Republika Srpska

SIDA – Swedish International Development Cooperation Agency

SPSS - Statistical Package for the Social Sciences

TRA - Theory of Reasoned Action

UNDP - United Nations Development Program

UNECE – United Nations Economic Commission for Europe

USAID – United States Agency for International Development

WB - World Bank

1 INTRODUCTION

As the human population continues to grow exponentially with a consumption of material goods, issues pertaining to waste generation, disposal and recycling have become paramount to the contemporary society (Seacat and Northrup, 2010). The latest published version regarding municipal waste generation per capita in Europe was 509 kg in 2008 (European Environmental Agency, 2011). Many landfills are already overloaded while new landfill sites are not easily available (Gamba and Oskamp, 1994). This vast amount of waste brings up questions on how to dispose of it properly and policies and programs seek to integrate a standard waste management approaches with preventive measures i.e. recycling. Recycling reduces the amount of waste, helps to prevent water contamination (Tietenberg, 1994), saves raw materials, reduces our impact on climate change, reduces landfill costs, creates jobs and helps toward sustainable living (Friends of the Earth, 2008). The need to systematically introduce recycling practice is becoming more and more apparent. In this, with respect to the implementation of recycling practice, it makes a substantial difference how waste is disposed, or separated by the user. Recycling is a labor intensive practice and requires community involvement (Chan, 1998) such as local residents, retailers and producers which in turn depends in part on the services available (e.g. collection and transport schemes, infrastructure) (Parliamentary Office of Science and Technology, 2005). It follows from this that there is a need to assess and understand factors which influence public participation in recycling projects (Vining et al., 1992). Public participation in recycling projects and programs is critical in order to increase recycling rates (Perrin and Barton, 2001). National governments and environmental agencies are now reorienting policy programs towards recycling and related measures that place high priority on facilitating behavioral change and are encouraging pro-environmental behavior as for instance is *recycling behavior.*

In this regard, recycling behavior is understood as the act of separating waste according to its structure or material quality (e.g. paper, plastic, glass, metal, organic waste, batteries, textiles, bulky waste etc.), including further manufacture of same materials and production of new ones. Researchers have observed that recycling behavior is influenced by a number of factors such as is society pressure, culture, demographic issues, environmental concern, environmental attitude, convenience, effort and time required for recycling, sufficient storage space, parental influence and local authority provision for good service (Li, 2003; Timlett and Williams, 2008). Although a variety of factors have been identified in influencing recycling

behavior, little is known about the influence these factors have on the recycling behavior of the residents in the Federation of Bosnia and Herzegovina (FBiH).

The Federation of Bosnia and Herzegovina along with the rest of the country has undertaken a post-conflict reconstruction process and is currently aiming for accession into the European Union (EU). There are reforms within the environmental sector which involve the adoption and transposition of the EU *acquis*. In this regard waste management after the war effort went into restoring the system to the pre-war standards. However, observers comment that waste management did not reach good operational levels and is still facing several issues: it lacks in infrastructure, has a large number of wild dumpsites, does not have a centralized database on waste fees, has policy implementation deficits, a low cost recovery collection rate, a strong urban-rural divide and difficulties in introducing new recycling practices (Shekdar 1999; European Bank, 2007; Commission of the European Communities, 2009; United Nations Economic Commission for Europe, 2011).

The main focus of this thesis is on the factors that influence recycling behavior at the household waste level in FBiH. To this end it focuses on two cases, Novi Grad and Mostar. The two cases were chosen on the basis of two elements: a) presence of a recycling program at the household level and b) the presence of public communication campaigns (PCCs). In Novi Grad both are available while Mostar neither are available. Such a difference can help in the development of an understanding if, and how the chosen influencing factors (i.e. motivational factors, concerns, attitudes, knowledge) can influence recycling behavior in the selected cases.

1.1   Research Objectives

Having suggested that research on recycling behavior may offer opportunities for the understanding of recycling practice, it is important now to specify what the specific objectives of this thesis are. Therefore, research described in this thesis has five main objectives:

1. To identify what motivational factors support recycling behavior;
2. To identify concerns that the local community has in terms of adopting the recycling behavior;
3. To assess current attitudes toward the recycling behavior;
4. To assess the influence of knowledge level, respondents have, on their recycling behavior;

5. To identify whether locally available public communication campaigns have an influence on knowledge, and on attitudes people have towards the recycling.

The *first objective* aims to identify which motivational factors support recycling behavior in the chosen empirical cases. Understanding what motivates the residents of Mostar and Novi Grad to recycle can help in designing more effective programs with good recruitment levels.

The *second objective* aims to identify concerns local communities may have in terms of adopting recycling behavior. This information can help to identify possible barriers to recycling and support when the interest is to identify workable solutions to current issues.

The *third objective* aims to assess attitudes toward recycling behavior. This information can provide input for when the interest is to strengthen desirable attitudes in order to maintain the recycling behavior; also it can inform government officials, policy makers and others about the public's preferences about recycling program planning.

The *fourth objective* aims to assess the influence of knowledge, which the residents of Mostar and Novi Grad have, on recycling behavior. This information can help in the design, implementation and organization of pubic communication campaigns.

The *fifth objective* aims to identify whether public communication campaigns which were delivered in local areas (i.e. Novi Grad) have influenced knowledge and attitudes towards recycling.

1.2   Thesis structure

This thesis is made of six chapters. In *Chapter Two* a literature review covering the main topics and concepts such as is recycling behavior, motivational factors, concerns, attitudes, knowledge and public communication campaigns is given. The objective of this chapter is to map out how these are understood in current literature that investigates recycling behavior. In *Chapter Three*, methodological aspects are introduced and the two cases (Novi Grad and Mostar) are presented. In *Chapter Four,* qualitative data are analyzed while *Chapter Five* covers quantitative data. *Chapter Six* summarizes the research findings, considers the significance and limitations of this research and gives some indications for further research.

2 A CONCEPTUAL FRAMEWORK

This chapter opens the enquiry by introducing established research that investigates recycling behavior and by providing background detail about the conceptual constructs used in this research.

2.1 Recycling behavior and related concepts

Recycling behavior is defined as the act of separating waste according to its structure or material quality (e.g. paper, plastic, glass, metal, organic waste, batteries, textiles, bulky waste etc.), including further manufacture of same materials and production of new items. According to Barr and Gilg (2006; p.917) "recycling behavior constitutes a highly structured and mechanized behavior, with individuals sorting and cleaning materials for recycling collection", while according to Menses & Palacio (2005) recycling behavior is a multidimensional activity regarding the distribution of recycling tasks and roles within the households (e.g. influencer, initiator, decision maker, vendor, persuader, enforcer and rejecter).

Scholars have often understood recycling behavior to be a specific phenomenon that has been classified in different ways. For instance, some literature within the domain of environmental psychology understands recycling behavior as *conservation behavior* (Lee et al., 1995) where recycling is seen as a repetitive practice of using and sorting the materials (e.g. paper) in a way to save the resources (e.g. timber); as *environmentally responsible behavior* (Stern et al., 1993; De Young, 2000) or as *individual waste management behavior* (Tucker, 2003). Other literature, within the field of behavioral sciences, refers to an individual's commitment or obligation to recycling practice and labels it as *altruistic behavior* (De Young, 1986). In social sciences research mostly focuses on the individual who recycles waste (e.g. sort, manufacture, produce) in the context of a waste management program and terms it *environmentally beneficial behavior* (Vining and Ebreo, 1990; 1992) where such behavior alters the structure and dynamics of ecosystem or the biosphere; and *disposal and sorting behavior* (Lindén and Carlson-Kanyama, 2003) as an act of sorting and disposing the materials in recycling practice. Various scholars have found that there is, however, a number of constraints to recycling behavior as even if people consider recycling as a "good thing to do" and express a desire to participate in recycling, they do not always act accordingly. There may be "time and space constraints" (Vining and Ebreo, 1990; Vining et al., 1992; Gamba and Oskamp, 1994;

Howenstine, 1993; Williams and Kelly, 2003; Martin et al., 2006; Nixon and Saphore, 2009), or they may feel their actions would have little effect (DEFRA, 2001; MORI, 2002). Other constraints to recycling behavior are: the long distance from where recycling centers are located (Nixon and Saphore, 2009); delays in bag delivery or poor collection service (Grodzińska-Jurczak et al., 2003); lack of incentives to recycle (Timlett and Williams, 2008); the institutional context (Refsgaard and Magnussen, 2009); absence of recycling facilities (McDonald and Ball, 1998); a recycling system that is not user friendly (Katzev et al., 1993); low level of environmental awareness (Grodzińska-Jurczak et al., 2003); as well as lethargy and disinterest from the public (Wilson and Williams, 2007).

The literature suggests that in order to develop an understanding of recycling behavior it is important to first identify and understand factors that have an influence on it (e.g. motivational factors, concerns etc.). Hopper and Nielsen (1991) stated that there is no need to convince people that recycling is a good idea; rather we need to persuade them to behave accordingly.

Motivational factors

Motivational factors are described as drivers that stimulate people or induce people in certain tasks. For example, research has found that: a) user friendliness, b) spatial location of the recycling containers and c) management support of the recycling program, are some of the factors that can motivate people to engage in a recycling behavior (Katzev et al., 1993). Other studies proved that recycling behavior is more likely to be adopted when individuals live in the proximity of containers, when there is a degree of social influence and when there are monetary rewards (Reid et al., 1976; Hopper and Nielson, 1991; Hornik et al., 1995). Hence, scholars suggest that there are two major groups of motivational factors: *intrinsic* (e.g. concern, attitude, knowledge) and *extrinsic* (e.g. rewards, sanctions, social influence, public communication campaigns).

Intrinsic motivational factors refer to those that arise from within an individual. These drive people to do things on the basis of pleasure and joy that the action gives (emotional base), or because people feel it is the right thing to do (ethical base). Scholars that have conducted research on motivation have focused on: *locus of control* defined as a person's belief about waste and what issues causes the good or bad results in his/her life (Pieters, 1991; Hornik et al., 1995); *personal satisfaction* in avoiding waste and being more self-sufficient (i.e. a feeling that actions count and are worthwhile); *general satisfaction* from participating in a program

(e.g. conservation of natural resources) where one's actions seem to help the community and the nation (De Young, 1986; Hornik et al., 1995). Also, it has been demonstrated that what motivates people to undertake recycling behavior is commitment to the well-being of others (e.g. Hopper and Nielsen, 1991; Oskamp et al., 1991; Vining and Ebreo, 1992) and concern for the preservation of natural resources (Vining and Ebreo, 1990; Vining et al., 1992). However, those who feel morally obligated to recycle will engage in the act only if they believe in the positive consequences of recycling and feel personally responsible for these consequences (Vining and Ebreo, 1992).

Extrinsic motivational factors, on the other hand, refer to motivation that comes from outside the individual. These drivers are present in the environment where the individual is located and can take the form of tangible rewards or social influence. For instance, social influence is manifested through social support (e.g. from family, friends or neighbors) for recycling within one's household or community (Vining and Ebreo, 1990; Oskamp et al., 1991), the presence of block leaders (Hopper and Nielsen, 1991) or trained staff (Burn and Oskamp, 1986). Social support may also occur when friends or family encourage a recycling behavior. In the study of Thomas et al. (2004), those with low recycling rates expressed that seeing others doing recycling would encourage them to recycle. Conversely, lack of support from members of one's household may induce one not to perform recycling behavior (Vining et al., 1992). Administrative measures are also extrinsic motivational factors as in the case of instructions, norms and laws combined with some type of sanctions (Lindén and Carlsson-Kanyama, 2003; Pieters, 1991). Other extrinsic motivational factors are rewards or monetary payment with information and prompts, which are proven to influence recycling behavior as well (Diamond and Loewy, 1991). However, scholars noted that although extrinsic motivational factors have an influence on recycling behavior, these are not always able to exert long lasting effects. In most empirical studies behavior returns to baseline levels after "reinforcement" come to an end or the reward was removed (De Young, 1986; Dwyer et al., 1993).

Research found that intrinsic motivational factors are an extremely strong drive in comparison to extrinsic motivational factors (Hornik et al., 1995). Vining and Ebreo (1990) reported that behavior can shift from being initiated and maintained by extrinsic motives toward being influenced by intrinsic motives. The assessment of various motivational factors is important because it can contribute to the design of communitywide strategies to promote recycling and other conservation behavior (Vining et al., 1992; McDonald and Ball, 1998).

Environmental concerns

Environmental concerns are defined as a set of feelings regarding environmental issues that are perceived to have a negative influence on health and on the environment. For instance, in the study of Baldassare and Katz (1992), individuals perceived their own health and personal well-being as directly threatened by environmental problems (e.g. waste, air, water pollution). They found that environmental concern is a significant factor in adopting environmental practices (e.g. recycling at home, conserving water). In other words, those who believe that environmental problems (e.g. full capacity or inadequate conditions of landfills) are a very serious threat to their health and well being are more likely to engage in environmental practices (e.g. recycling). Similar findings have been found in a further study that shows how individuals, who are environmentally concerned, tend to perform a set of environmentally friendly behaviors such as recycling (Lindén and Carlsson-Kanyama, 2003).

Also the research on environmental concern can be divided in two groups of literature. One concentrated on identification of the socio-demographic factors associated with environmental concern while the other focused on purely psychological determinants (i.e. values, attitudes, beliefs). The first group looked at the influence of gender, age, educational level or political ideology on environmental concern. The second group focused on psychological determinants such as attitudes or values orientation (e.g. egoistic, humanistic and biospheric defined by concerns), and their influence on concerns (e.g. Stern, 1992). These environmental concerns can be complementary, in that different orientations toward the environment are represented. Studies which measured concerns did so in two different ways. These focused on a specific attitude directly determining intentions (i.e. to act in certain way) (Vining and Ebreo, 1992; Fransson and Gärling, 1999; Berenguer et al., 2005); or to a more general attitude (Oskamp, et al. 1991; Fransson and Gärling, 1999; Minton and Rose, 1997; Berenguer et al., 2005).

Further to this research it was found that environmental concern is often a significant determinant for recycling behavior (Gonzalez-Torre and Adenso-Diaz 2005; Do Valle et al., 2004; Derksen and Gartell, 1993). Derksen and Gartell (1993) report that it could occur when respondents express concern on aspects of convenience e.g. presence of equipment and information, meaning that if recycling containers and regular pick up are provided, individuals will be less concerned and will recycle more because the effort required on their part would decrease. Hence, research suggests that recycling behavior is affected indirectly by environmental concerns.

On the other hand, inconvenience (e.g. lack of storage and time) also seems to affect recycling. Nixon and Saphores (2009) reported that in their study respondents who had difficulties in finding space to store recyclables, had safety concerns, as well as difficulties to find the time to recycle, thus were less likely to recycle.

Hadden (1991) suggests that there are three possible strategies to handle environmental concerns: to ignore them, try to change them, or work with them. In terms of recycling behavior the last one is most relevant and can be addressed by public communication campaigns (Banerjee, 2002). To this end it is important to identify who is concerned and who is not, and the type of concern involved, as this knowledge can help to design messages to inform, persuade and remind people to be more environmentally friendly (Minton and Rose, 1997).

Environmental attitudes

The literature advances a number of models for the study of environmental attitudes by using models such as is the "Theory of Reasoned Action (TRA)" developed by Fishbein and Ajzen (1975) or the "New Environmental Paradigm (NEP)" developed by Dunlap and Van Liere (1978) which are based on cognitive theories of how individuals develop their attitudes and perform a behavior. These models are largely used in environmental research (e.g. recycling) and are helpful in understanding behavioral change. However, a more detailed review of this work is beyond the scope of this thesis, since neither of the two will be used, nor it is an aim to study behavioral change. In the following we will introduce what attitudes are and how attitudes are related to recycling behavior.

Attitudes are explained as a learned, relatively stable tendency to respond towards an attitude object, in other words attitudes inform us on what people think of something and how they feel about it (e.g. people, concerns or events) (Arul, 2001). Furthermore, Fahy (2005) sees attitudes as a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor. Individuals tend to express their own attitudes based upon concerns, values, feelings or opinions raised toward an issue or an object. For instance, people who hold positive attitudes towards recycling are more likely to recycle (De Young, 1986; Oskamp et al., 1991; Gamba and Oskamp, 1994). An individual can have a positive attitude towards recycling (ethical values) but at the same time have a negative attitude towards waste separation (values about welfare and modern lifestyle) (Lindén and Carlsson-Kanyama, 2003) which according to Carrus et al., (2008) is a case of bipolar attitude toward an issue:

positive/favorable or negative/unfavorable attitudes. Similarly, attitudes have also been represented by a bipolar scale in other studies of recycling behavior (Menses and Palacio, 2005; Knussen et al., 2004). For example, with a bipolar scale which is seen as a measure of attitude strength, the results showed a positive relationship between attitudes and recycling behavior, however the relationship decreases when there is a high bipolarity of attitudes (Ojala, 2008). In this way, relationships between attitudes and behaviors have sometimes been found to be weak (Vining and Ebreo, 1990; 1992; Ebreo and Vining, 2000) depending upon whether the attitudes are conceived as being broad (e.g. environmental concern) or narrow and more specific (e.g. attitudes toward recycling). Research by Vining and Ebreo (1990; 1992) has shown that environmental concern has little practical utility in the prediction of behavior, while specific attitudes that are measured positively impact on particular behaviors (e.g. recycling behavior).

The reason why usually there is an inconsistency between attitudes and performed behaviors is that their relationship seems to be complex and interrelated but can broadly be attributed to three groups of independent (influential) variables: environmental values (e.g. environmental concerns, ecological worldview), situational variables (e.g. service provision, knowledge, socio-demographics) and psychological factors (e.g. intrinsic and extrinsic motivations) (Barr, 2007). In order to keep positive attitudes towards recycling behavior, Guagnano et al., (1995) suggested a consideration of the context within which people act and identify boundary conditions for their applicability. For instance, Derksen and Gartell (1993) examined the effect of attitudes on behavior and argued for the importance of accounting for contextual factors, which in their study was operationalized as the presence or absence of curbside recycling bins.

Many policy makers and local authorities tend to focus on positive attitudes towards recycling that might be translated into effective recycling activity (behavior) (Timlett and Williams, 2008). However, an effective strategy for an information campaign would also recognize the presence of segments of population that is bipolar, and use measures that can help this target group to become aware of their inconsistent attitudes and/or provide information about recycling which could support them to develop positive attitudes (Ojala, 2008).

Environmental knowledge

Environmental knowledge is knowledge people have on facts and conditions that concern the environment, and the use they make of this information. Environmental knowledge can be

gained through social influence, experiences, education or public communication campaigns. Research suggests that purposeful knowledge about the environmental consequences different waste management systems have, as well as knowledge about solutions, is an important influencing factor in recycling behavior (Refsgaard and Magnussen, 2009). Barr et al. (2001) argue that a main aspect influencing recycling behavior is knowledge about recycling. Even though Hungerford and Volk (1990) commented that if people are more knowledgeable they will in turn become more aware of the environment and its problems, and thus be more motivated to act toward the environment. Grob (1995) had similar thoughts in his structured model however, no effects on behavior were found. Furthermore, Oskamp et al. (1991) suggested that recycling behavior may be less related to knowledge about environmental problems in general than to knowledge of the specifics of recycling. For instance, specific knowledge about how and where to recycle increases the frequency and volume of waste recovery by citizens (Luyben and Bailey, 1979; Hornik et al., 1995; Howenstine, 1993).

In order to maintain recycling behavior over time, individuals require a considerable amount of information in order to appropriately and effectively be engaged in recycling e.g. local curbside recycling schedules, methods of appropriate preparation of recyclable products, knowledge about products that may be recycled and how collected materials are processed. Thomas et al., (2004), report on a study where they found an increase in awareness levels about recyclable materials. However, in their study, many respondents were not aware of what can be recycled and whether some materials are included in collections or not. On the other hand, incorrect information can lead to wrong beliefs that products set out for recycling are actually disposed at landfills; to recycle on wrong schedules and to mixing of non-recyclable with recyclable products in same containers. Pieters (1991) reminds us that a person who intends to participate in a waste separation program but does not have correct information will not participate properly.

Previous studies that investigated knowledge differences across recyclers and non-recyclers found that recyclers are more aware about the recycling program, are more knowledgeable about materials recyclable in the local area, and are more aware of the means for recycling compared to non-recyclers (Vining and Ebreo, 1990; Vining et al., 1992). When compared to non-recyclers, recyclers score higher on intrinsic motives and seem to be more knowledgeable about specific recycling programs available (De Young, 1986). These findings suggest that enhancing the knowledge base of citizens, through educational programs and communication campaigns, can benefit the recycling practice.

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Public communication campaigns

In everyday's life people are under the influence of various public communication campaigns (PCCs) which aim to communicate, to educate, and inform on a given topic. The type of tools usually used in PCCs include: media sources (e.g. television, radio station, newspapers, magazines, internet), other written formats of information (e.g. brochures, posters, flyers, leaflets, feedback), events (e.g. workshops, seminars, conferences), educational institutions (e.g. school, university, waste company) or even role models that can serve as a source of information (e.g. friends, family members, neighbors). The kind of information provided by PPCs can range from good examples, to highlighting negative environmental impacts with instructions on how to avoid negative consequences. There seems to be a consensus within the literature that recycling rates are positively correlated with PPCs (Martinez and Scicchitano, 1998; McDonald and Ball, 1998; Thomas, 2001). PPCs are seen to have an influence on *knowledge levels* and *attitudes* that the public has toward a given issue.

Research has shown that PCCs may influence *knowledge levels* depending on how people perceive it. For instance Smith et al. (2002) assessed the influence of different media (e.g. television, radio, print media) on the use of sun protection measures (e.g. cream, hat) and found that these campaigns had little influence on knowledge. On the other hand, McDonald and Ball (1998) found that house leafleting had an influence on knowledge on the recyclability of plastic materials. A positive and statistically significant relationship was found between communication and specific knowledge also in the study of Do Valle (2005) where consumers who were more informed about recycling and selective-collection were those who possessed more knowledge on these issues.

Sudarmadi, et al. (2001) found that mass media play a major role in shaping public opinion through radio, and the press and television, the last in particular seems to be a powerful instrument for changing *public attitudes*. On the other hand, Hopper and Nielsen (1991) demonstrated that interventions involving prompts and information increased recycling behavior i.e. number of recyclers over a seven month period; however, in their study they also found that these approaches did not affect perceptions of social norms and attitudes toward recycling.

Some of the considerations as suggested by Read (1997b) can be taken into account when designing and implementing a campaign that includes the formulation of clear messages and usage of a range of different tools. Information about recycling shall be clear, easily accessible and comprehensible.

2.2 Conclusion

Nowadays research that investigates recycling systems recognizes that recycling behavior has an important role and as a consequence it tries to further understand what elements can influence it. There is interest for the underlying processes that lead people to adopt recycling behavior and the assumption is that the factors listed above that can together offer a useful means for the investigation of recycling behavior.

These factors have a social and psychological root and were empirically investigated in several European and North American countries. However, to date no research on the social and psychological factors influencing recycling behavior has been conducted in the Federation of Bosnia and Herzegovina where waste management is still facing several issues and recycling is poorly implemented.

It is suggested that an understanding of the social and psychological factors would help to further understand recycling behavior in the Federation of Bosnia and Herzegovina. This knowledge can contribute to policy recycling programs and the design of pubic communication campaigns.

3 METHODOLOGICAL FRAMEWORK

This chapter introduces the methodology used for the empirical aspects of this research. It presents the research design (Section 3.1); the data collection methods (Section 3.2); and gives some background information about the two cases (Section 3.3).

3.1 Research design

The methodology used for this research is a case study. A case study provides adequate means of exploring the detail of the recycling practice and gives the opportunity to develop an understanding of factors that influence recycling behavior. Furthermore, it offers the opportunity to integrate qualitative and quantitative methods (Yin, 2003).

The empirical part of this study was undertaken in the FBiH where two municipalities were selected: the Novi Grad municipality and the Mostar municipality. The first case was chosen on the basis of having already introduced a recycling program at the household level inclusive of public communication campaigns. The second case was chosen for not having a recycling program or a public communication campaign.

As recommended by the literature (Yin, 2003), a Case Study Protocol was designed prior to the entry into the field. There were two phases of data collection: the first was conducted with qualitative methods (i.e. interviews) and a second with quantitative (i.e. questionnaire) methods. First, interviews were administrated in order to explore and understand the current situation regarding recycling. This was followed by a second step, where a questionnaire was used in order to assess quantitatively the chosen variables and verify relationships. Also, a combination of literature review and secondary data (e.g. legal documents, statistical databases, reports, newspapers, bulletins) was used to obtain the necessary background information to the cases.

Thus, it is relevant to point out that this thesis does not aim for a comparison of the two cases against selected criteria. These differ from one another in substantial ways for which a comparison of one against the other would be, methodologically speaking, problematic. Rather the aim here is to develop an understanding of the current situation for each case, gain insight into present issues and opportunities for recycling practice.

3.2   Methods of data collection

Data were collected by means of qualitative methods i.e. interviews and quantitative methods i.e. questionnaire.

Interviews were semi-structured and conducted during two weeks in April 2009. Respondents were clustered in six major groups (e.g. international, national and local institutions, private companies, NGOs and residents) as indicated in Table 1. Each group consisted from 2 to 7 respondents for a total of 43 respondents. The chosen sampling method was snowballing[1] and the selection criteria included: a direct stake, interest or role in the recycling system (e.g. residents, private companies, NGOs). Semi-structured face-to-face interviews had an exploratory nature, aimed at an understanding of the local situation and institutional contexts. No incentives were used to engage respondents.

Table 1: List of respondent groups interviewed

#	GROUPS	RESPONDENTS	# OF RESPONDENTS INTERVIEWED
1	International institutions	European Commission, International Finance Cooperation, World Bank and United Nations Development Program	4 respondents
2	National Institutions	Federal Ministry of Environment and Tourism	2 respondents
3	Local institutions	Utility company KJKP Rad, Cantonal Ministry of Physical Planning and Environment in Novi Grad	3 respondents
		City Council, Utility company JP Deponija, Cantonal Ministry of Physical Planning and Environmental Protection in Mostar	3 respondents
4	Private companies	ENOVA, EuroBiro, Alem Sistem, 5D CADD in Novi Grad	4 respondents
		Eco Plan, Papir Servis, Katarina and Kamen-Dent in Mostar	4 respondents
5	NGOs	Center for Environmentally Sustainable Development, Eco Action, International Multireligous Intercultural Centre, Regional Environmental Centre and Association "Education builds FBiH" in Novi Grad	5 respondents
		Eko Jasenica, Izvor Mostar, Center for local development Mostar, Regional Environmental Centre and Club of divers "Mostari" in Mostar	5 respondents
6	Residents	Residents from Novi Grad	7 respondents
		Residents from Mostar	6 respondents

During the pre-field work period, a draft interview guide was prepared consisting of 19 questions. Piloting data collection tools is an important step that helps to improve research quality (Yin, 2003). To this end, the interview guide was tested with two native speakers,

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[1] Snowballing is a method for respondent selection used for identification of individuals whom to conduct interviews on the basis of asking the question "Would you recommend somebody who has interests or knows more about the field of recycling?" (Gray, 2004).

which led to the rephrasing of questions number 2, 8 and 11 (Appendix Ia). These two respondents were not included in the final sample used for the analysis. Questions were sorted into main categories that included attitudes, concerns, motivational factors and related issues of interest. In order to allow for more contextual information respondents were given the opportunity to raise additional issues that they considered to be important in relation to recycling practice. An adjusted set of questions was prepared for one respondent group (i.e. residents) that aims to better capture their role in the recycling system. The final version of the interview guide is given in Appendix Ia and b. After the interview, a cover letter, detailing the research objectives and acknowledging respondent's contribution to the study, was handed to the respondent. Interview data were handled according to good research practice in order to assure confidentiality and respondents' anonymity. Then, within a period of two months interviews were transcribed verbatim and analyzed by the author.

Questionnaires were administered during a three week period in July 2009 with local respondents who were not contacted for interviews. The chosen sampling method was random sampling[2] and the respondent selection criteria included: residency for more than 5 years in the study area and being at least 18 years old. The questionnaire consists of 23 close-ended questions divided into six parts: i) waste related issues, ii) concerns, iii) motivational factors, iv) knowledge, v) attitudes, vi) PCCs and vii) demographic data. Answers format involved a standard *Likert scale,* ranging from strongly disagree (1) to strongly agree (5) (Gray, 2004). Some questions involved a "yes/no/do not know" or a descriptive answer. Questionnaires entailed paper-pencil method. No incentives were used to engage respondents. The questionnaire was administrated to the 220 respondents, the 110 in each municipality. However, in the Mostar sample, 4 of our respondents reported that they "don't know" whether waste is separated or not at their home. It can be assumed this sub-group of our respondents might not be engaged in recycling and empting out garbage in the collection bins, as these may be handled by someone else within the household (e.g. parents). In noting this, we recognize that answers given by this small portion of the sample may not serve well in the later analyses. Given that it involves only 4 respondents, a decision was made to not include these respondents in part of the later analysis giving the 116 respondents in Mostar.

During the pre-field work period, a draft questionnaire was piloted with two native speakers, which led to a modification in the wording of question 11 (Appendix II). These two questionnaires were not included in the final sample. The fieldwork was carried out by a team of four volunteers coordinated and supervised by the author of this research. Volunteers were

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[2] Random sampling is a method where each respondent of the population has an equal chance of being selected at each draw (Gray, 2004).

trained how to administrate the questionnaire. After data collection, data were typed into an excel database, then analyzed with the Statistical Package for the Social Sciences (SPSS) version 18.0. The analysis included: descriptive statistics (e.g. mean values, standard deviation and standard error of mean), bivariate correlation (Pearson's correlation), independent t-tests and reliability test (e.g. Cronbach alpha). Further detail on the results is given in Chapter 5.

The above-mentioned data collection i.e. interviews and questionnaires were conducted in the Bosnian language. It is also worth to mention that site visits were made to the landfills and local communities in both municipalities.

3.3   Background to the cases

In this section, the brief background information to the cases is given. The state of BiH was part of the former Yugoslav Federation (Socijalistička Federativna Republika Jugoslavija) from which gained independence in 1992. Since then, BiH has been through civil war that lasted for 3.5 years and caused severe political, social, and economic instability. In 1995, as a result of Dayton Peace Agreement (DPA) chaired by international and domestic organizations the Constitution of BiH was formulated. In this negotiation process BiH was divided into three administrative levels: entities (Federation of FBiH (FBiH); Republika Srpska (RS)), cantons and municipalities (see: Figure 1 and Table 2).

Figure 1: Map of Bosnia and Herzegovina

Source: Regional Environmental Center of BiH, 2006

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Table 2: Current territorial division of BiH

STATE LEVEL	BOSNIA AND HERZEGOVINA		
Entity level	Federation of Bosnia and Herzegovina (FBiH)	Republika Srpska (RS)	District of Brčko (DB)
Canton level	10 cantons	No cantons	No cantons
Municipality level	84 municipalities (Case 1 - Novi Grad municipality) (Case 2 - Mostar municipality)	64 municipalities	No municipalities

Within the FBiH territory the entity is empowered to transfer responsibilities to cantons and in turn cantons to municipalities. Within the RS territory the entity is empowered to transfer responsibilities to municipalities. In 2000, the International Arbitral Tribunal ruled in decision for a new and independent territorial unit (entity) and the District of Brčko (DB) was formed (Jeffrey, 2006).

Due to the civil war, BiH inherited a destroyed infrastructure (e.g. electric energy, water supply, sewerage, transport etc.), ruined industry and collapsed economy (National Environmental Action Plan - NEAP, 2003). Since then, the process of devastation within the environment has continued (e.g. intensive exploitation of natural resources, existence of highly polluted technology). Among various environmental issues, waste management has been recognized as one of critical concern for BiH (European Bank, 2007). For instance, BiH has issues with inadequate waste management practices (e.g. illegal dumping at roadsides, rivers, lakes and parks) that might threat public health and the natural environment; treatment facilities for medical and hazardous waste do not exist; data collection, monitoring and reporting on waste largely lags behind (United Nations Economic Commission For Europe, 2011).

In FBiH, the average generation of municipal waste is 356 kg/person/year, with a total amount of 893.318 tons/year (Federal ministry of environment and tourism, 2011). The evaluation for the level of recycling in FBiH is based on the estimates of the Recycling Association of FBiH, and data of the Foreign Trade Chamber on import-export of these raw materials according to which the percentage of collected paper is 20-25 %, of plastic less than 1 %, aluminum over 60 %, and glass less than 1.5 % (Federal ministry of environment and tourism, 2010).

In FBiH the Ministry of Environment and Tourism is in charge of waste management issues, while cantonal ministries for physical planning and the environment are responsible for the development of cantonal waste management strategies, laws and regulations, issuing permits to business companies for handling waste and monitoring. Municipalities are responsible for

the development of waste management plans and the organization of waste collection through the establishment of municipal utility companies (private, public or private-public). Municipal utility companies also set the fees and charges for waste collection and the municipalities approve these rates. The average charge for waste collection for a household is €3.58 - €3.68 per month for a family living in a flat of 60 m^2 (United Nations Economic Commission For Europe, 2011). There is only one bill covering the full range of services (water supply, wastewater disposal, heating and waste collection), which may not be itemized. Most landfills operated by municipal utility companies, besides household waste, also accept old tires, waste from demolition and construction, hazardous household waste, medical and animal waste.

Over the past years significant effort went into regulatory and legal aspects. Waste management has benefited from international assistance and support e.g. the European Union (EU), United Nations Development Program (UNDP), World Bank (WB) and some individual countries. For instance, in 2003, a National Environmental Action Plan (NEAP) was developed with the support of the WB's, ministry officials, REC, scientists and NGOs that covered ten thematic areas among which the waste aspect is described (National Environmental Action Plan - NEAP, 2003) providing short and long term recommendations. Along this line, similar action plans have been prepared for the cantons (Cantonal Environmental Action Plan - KEAP) and municipalities (Local Environmental Action Plan - LEAP). Another important document is the Solid Waste Management Strategy designed and financed by the Government of FBiH and the WB in 2001. The Strategy aims to improve solid waste management especially household waste in terms of: a) rehabilitation of existing landfills; b) public awareness programs; c) introduction of waste collection into areas where it does not yet exist; d) set-up approximately 16 regional landfills serving multiple municipalities with transfer stations and e) recycling to be undertaken in the short term (3-7 years) and longer term (10-15 years). Later in 2003, the Law on Waste Management was put into force with financial and technical support from the EU (European Bank, 2007). This law gives general provisions for the management of municipal and other waste including recycling. The objective of this law is "to encourage and provide basic conditions for the prevention of production, recycling and processing of waste for re-use, extraction of secondary raw materials and possibly of energy and safe disposal". The most recent and important document at the Federal level is the Federal plan of waste management for 2011-2016 which aims to establish an integral system of waste management, increase collection of sorted waste, reuse and recycling practice, reduce amount of disposed waste, reduce negative impacts on the environment and the human health.

The Novi Grad Case

The Novi Grad municipality is located in the Sarajevo Canton (see: Figure 2) where the Smiljevići landfill is also located. This landfill is among the first five sanitary landfills in FBiH (Panjeta, 2006). It has accomplished excellent operational results; it complies with international standards and currently serves as a model to other regions (World Bank, 2008). The landfill receives financial support from several sources, as for instance international institutions, local government, fees and bank loans. The surface area of the landfill is 65 ha and it will be operational until 2030. The old part of the landfill was closed, equipped with methane gas collection pipes (providing 235 kW/h) and planted with approximately 2.500 trees (United Nations Economic Commission For Europe, 2011). For 2011, an average of 190.148 tons per year of municipal waste was disposed of at the site which refers to 449 kg/person/year (Federal ministry of environment and tourism, 2011). All construction waste is used to cover some of the waste site, including rubble from construction of access roads to the landfill.

Figure 2: Map of Sarajevo Canton

Source: Federal Office of Statistics

Waste collection services and landfill operations are managed by the public utility Kantonalno Javno Komunalno Preduzeće Rad (KJKP Rad) founded by the Canton. It has obtained ISO 9001 and 14001 certificates. In 1998 an eco inspection unit which monitors and sanctions for

illegal waste disposal was established within the KJKP Rad. Currently, there are about 35 eco-inspectors working in 2 to 3 shifts covering the entire Sarajevo Canton (Đipa, 2005a).

In 2004 KJKP Rad commenced with the introduction of household recycling with a series of recycling projects that still run. These are coordinated by the KJKP Rad and co-funded by domestic organizations, e.g. Federal and Cantonal ministries, international institutions, e.g. European Commission (EC), United States Agency for International Development (USAID), United Nations Development Program (UNDP), Swedish International Development Cooperation Agency (SIDA), and others. The first recycling projects were implemented in Ilidža municipality and later extended to other locations such as Novi Grad, Novo Sarajevo, Stari Grad, and others. There were 41 locations with 123 separated containers, with 240 liters of volume (Cantonal Environmental Action Plan - KEAP, 2010). These projects entailed the introduction of recycling infrastructure as are containers for paper and cardboard, for polyethylene terephthalate (PET) packaging and for cans, but also specialized vehicles for collecting recyclable materials and a waste sorting station for the landfill (Kantonalno ministarstvo prostornog uređenja i zaštita okoliša, 2009). The KJKP Rad chose a recycling method that involves a two step-procedure. In a first step sorting is done at the source and includes households, schools, institutions and companies who are asked to of dispose waste into different containers. Then, in a second step, further sorting is done at the landfill e.g. paper and cardboard, hard plastics (PET, HDPE - high density polyethylene) and PP (polypropylene) packaging, metals and other types of waste (Panjeta, 2006). During an interview with the head of the Smiljevići landfill we were informed that the annual amount of waste sorted within the Novi Grad and in other Sarajevo's municipalities (e.g. Novo Sarajevo, Stari Grad etc.) is approximately 1000 tons of paper and cardboard, 15 tons of PET packaging, 60 tons of polyvinyl chloride (PVC) plastic. Glass is not sorted. After sorting, bailing and pressing in cubes, sorted materials are sent to the recycling companies located within BiH (European Commission, 2004).

In Novi Grad, in addition to the recycling infrastructural projects, there were further activities as are public awareness campaigns as summarized in Table 3. These aimed to inform and to motivate residents and students to participate in the recycling activities.

Table 3: List of public communication campaigns in Novi Grad

NAME OF CAMPAIGN	SPONSOR	TOOLS USED
»Reciklaža otpada – iskorak u budućnost«	Austrian Cooperation Regional Environmental Centre FBiH EkoTim organization	24 radio shows on Student's radio eFM 6 radio jingles 2 series of postcards 3 series of flyers 8 workshops with children 12 recycling activities at the street Brochures Educative computer game »Recycle city« for children
»Reci NE plastičnim kesama«	Cantonal Ministry Center for Environmentally Sustainable Development	Number of activities aimed to reduce use of plastic bags Raise awareness programs to use bags of biodegradable material
"Otpad-smanjenja i reciklaže u cilju održivosti"	International Finance Cooperation EkoTim organization Austrian Cooperation Cantonal Ministry Coca-Cola	71 workshops Competitions Posters Media sources (radio and TV)
»Za čist grad reciklirajmo otpad"	PROMO organization Eko-Pro organization KJKP Rad	Radio stations
"Nije sav otpad smeće"	KJKP Rad United Nations Development Program EkoTim organization Cantonal Ministry	Brochures Workshops
»Stavi pravu stvar na pravo mjesto«	BiHpak Association United States Agency for International Development Center for Environmentally Sustainable Development	TVs (FTV, PTPC) Brochures
»Reciklaža u Sarajevu: Koristite prave kontejnere«	European Commission Cantonal Ministry KJKP Rad	Brochures Posters School flyers Recycling drop - off station signs Recycling pictograms Media sources (radio and TV)
»Reciklaža u Kantonu Sarajevo – pilot projekt«	Cantonal Ministry KJKP Rad German Cooperation	Brochures
»Otpad smanji i recikliraj, dugoročno profitiraj«	EkoTim organization Swedish International Development Cooperation Agency KJKP Rad Regional Environmental Centre FBiH Federal Ministry	Radio station (eFM studentski radio) Brochures
»Smanjimo i reciklirajmo«	KJKP Rad Coca-Cola EkoTim organization	Presentation about recycling Rewards Recycling activities

Source: interviews, mail communication, web sites and bulletins

The Mostar Case

The second case is the Mostar municipality which is located in the Herzegovina - Neretva Canton (HNK) (see: Figure 3). Similarly to what occurred at the state level Mostar was also sliced down into territorial units, each containing an ethnic group. The DPA confirmed the Interim Statute of the City of Mostar (1996) and gave legal grounds for the establishment of public institutions, in the attempt to normalize living conditions and relationships between Croats and Bosniacs and upon ethnic criteria divided Mostar in seven city units (see: Figure 4). The Interim Statute foresees that six city units (three Bosniacs on the East side and three Croats on the West side) act solely and administer natural, economic, social and other resources serving "their own people" (Commission for Reforming the City of Mostar, 2003), while the seventh unit also known as the "Central Zone" is administration by a council with representatives from both ethnic groups (Klemencic and Schofield, 1996). The reasons for having the Central Zone are essentially economic since it is the traditional economic core of the city, where local government was located and tourism was flourishing.

Figure 3: Map of Herzegovina – Neretva Canton

Source: Federal Office for Statistics

At present the city has only one landfill which shall be upgraded to a sanitary landfill. The Uborak landfill has 20 ha and will operate for next 1 to 2 years. It receives 84.400 tons of municipal waste annually which refers to 374 kg/person/year (Federal ministry of environment and tourism, 2011). The landfill accepts different types of waste such as hospital, animal and industrial. Since the 1996, the landfill includes a disposal site, incinerators and a small sorting station (with hydraulic press) where materials are manually sorted. During an interview with the head of the Uborak landfill we were informed that the amount of collected materials is approximately 260 tons of cardboard, 13 tons of hard plastics, 8.5 tons of other plastics, 60 tons of metal, 60 tons of rubber and 360 tons of other industrial waste.

Figure 4: Map of seven units in Mostar
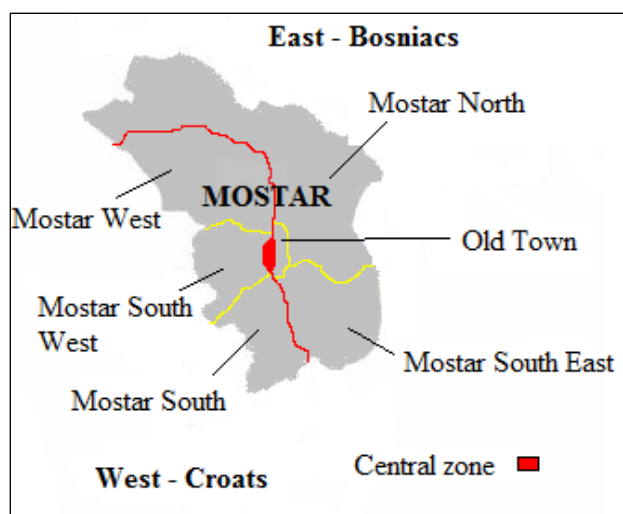
Source: Commission for Reforming the City of Mostar

Tensions that have divided the city, and the country, have implications also in regard to municipal solid waste (MSW) management. At present waste collection and transportation are managed by two utility companies (75% of Mostar): Javno Preduzeće (JP) Parkovi and Javno Preduzeće (JP) Komos. JP Parkovi covers the West – Croat side where there is no sanitary landfill. On the other hand, JP Komos, which is the owner of the Uborak landfill, operates on the East – Bosniac side (World Bank, 2008). The presence of two utility companies that run activities in parallel is ineffective and creates additional fractures. For this reason there are efforts by public authorities to form a new waste management company, JP Deponija, under which the two can be unified and work more efficiently covering the entire Mostar territory. These efforts include negotiation for access to financial support from international institutions, setting up one budget for waste service and improvement of landfill maintenance. Currently neither of the two companies is involved in an official recycling program. There are neither public communication campaigns nor efforts to educate and inform the residents about

the social and the environmental aspects of recycling. However, due to space constrains that the Uborak landfill is facing some sorting takes place on-site with the aim to reduce waste volume.

3.4   Conclusions

This chapter provides a brief review of the methodology used. It also gives a short description of our two cases needed to better understand the situations regarding waste management. These two cases are further analyzed in the following two chapters with the support of qualitative and quantitative data.

4 RESULTS AND DISCUSSION OF QUALITATIVE DATA

This chapter presents and discusses interview data collected in the two cases. The aim here is to map out opinions different respondents' groups have towards waste management in general and recycling in particular. Interview data served for the identification of motivational factors (research objective 1) and concerns (research objective 2), and for a preliminary overview of attitudes (research objective 3) that were further explored with a second quantitative step reported in Chapter 5. Information on qualitative data collection procedures was already given in Chapter 3.

In the following respondents' attitudes toward recycling are presented (Section 4.1.), then respondents' concerns with regards to recycling are introduced (Section 4.2.) followed by the motivational factors that respondents regard to be supporting their recycling practice (Section 4.3.). Section 4.4 gives concluding remarks.

4.1 Respondents' attitudes towards recycling

The Novi Grad case

Since 1995, domestic organizations (e.g. utility company, ministries) have been engaged in the reconstruction of the waste management system benefiting from technical and financial support provided by international organizations. Most of our respondents had a positive opinion about this type of joint engagement in waste management and have referred to the recycling projects implemented by the KJKP Rad. Several responders identified that these recycling projects served well and succeed in introducing recycling practices at the household level in Novi Grad. Projects were backed up by communication campaigns that informed the public and began to raise awareness about the topic. "*Within the recycling projects, campaigns were conducted as well. These included the introduction of containers for waste separation, posters and brochures with instructions to the public. Also there were several specialized vehicles with promotional labels "My clean Sarajevo" and "Separate and collect waste". Few NGOs and the utility company had done several activities achieving the good results*" (Local resident).

Respondents frequently pointed to the utility company as having a dynamic role, which was also noticeable from the detailed information on the many activities given in their annual reports (accessible in print and digital form). The KJKP Rad collaborates successfully with the canton and the municipality in the implementation of the regional and local decrees. It

provides easy access to information on waste management and recycling for the residents through the media sources. Respondents from the group *NGOs,* emphasized that KJKP Rad is involved in educational activities where children are invited to participate in competitions on recycling (Đipa, 2005b). KJKP Rad offers training to their own employees on environmental standards, on solid waste treatment, on waste recycling and other issues (Đipa, 2006a; 2006b and 2006c). For instance, they publish two to three bulletins annually and provide a free phone number (eco phone) where citizens can call eco-inspection in order to report improper waste disposal practices. *"Eco inspection intervenes quickly when somebody disposes waste inappropriately. For example, in the community where I live, someone disposed a bulky waste. One person called the eco-inspection and they came fast, found the responsible and gave him a sanction"* (Local resident).

Respondents from the group *national institutions* commented that the landfill "Smiljevići" has high technical standards and is effective in waste treatment capacity. The landfill was frequently mentioned as a good practice case to be replicated across other regions in FBiH. However, this is not shared by all of our respondents since some have pointed that it does not have sufficient capacity for managing all the different types of waste entering it, as at current is struggling with industrial (e.g. from different factories, mills, mines), medical (e.g. body parts, pharmaceuticals, chemicals, radioactive materials) and animal waste (e.g. animal manure, body parts). These respondents indicated that more expert knowledge and technical support is needed. *"Currently, all wastes are collected and disposed at the landfill by the KJKP Rad. When we find the company, location and people to manage certain waste and perform adequate treatments, it will be much easier for us"* (Local institution). There are four solutions to this: 1) to establish disposal sites for mentioned types of waste; 2) to introduce mechanisms for their adequate treatment (e.g. recycling, composting facility, and facility with incinerators); 3) to require support from the Fund of the Environmental Protection (public institution established in 2003) whose goal is to incitement and finance such activities that improve the current state of environment, but also require support from the ministries (Federal and Cantonal), the municipality, the EU and the UN funds; and 4) to develop network of all existing small and big companies/institutions that generate these types of waste and companies that can provide proper waste collection, transportation and treatment.

The Mostar case

Since the war, Mostar has been characterized by a territorial division between two ethnical groups and many of our respondents commented on the influence this division has, e.g. on the organizational structure of public institutions, inclusive of the utility company (ethnical division is detailed in: International Crisis Group, 2009). Respondents commented on the difficulties the two companies have in waste management, which hinders the possibility of introducing recycling. Both utility companies perform poorly in keeping the public areas clean and in maintaining the landfill in good condition. Respondents, from the group *residents,* commented that waste collection and transportation is irregular; areas around containers are left filthy; containers are insufficient for the current needs; and most of the public green areas are littered. This last emerged as of a particular concern as frequently there are long periods when waste is not collected (e.g. within 15 to 20 days). When this occurs in summer it generates odor and attracts animals, while when it occurs in autumn waste gets propelled across the city by the wind. Both situations have been identified as problematic since are bringing further negativity to the city image and creating a loss in the tourist sector, which was once at the core of the local economy.

One of the reasons for infrequent waste collection is a lack of financial resources needed to support the service function. Financial shortcomings are an issue for both companies which experience infrequent payments from the City Council (Gakovic, 2010; Smajkic, 2010) and irregular fee payments from residents and business. For instance, in 2001 there were 1800 cases of notification for lack of payment against households and business enterprises and only 21% of the total expected amount was paid in 2003 (Calò and Parise, 2009). Financial shortcomings have implications for waste equipment (e.g. vehicles and containers), for landfill maintenance, but also are pressing on the working conditions which resulted in protests and strikes by the employees (Medic, 2010; Becic, 2010). Respondents pointed out that the Uborak landfill does not have proper infrastructure or adequate waste management methods: it is a temporary disposal facility with poor disposal conditions (e.g. access of birds, fences full of plastic waste). The landfill has already fulfilled its space capacity and this seemed to be a source of concern to our respondents. However, respondents were mostly unaware about the current plans to develop the second landfill site Deponija. There are five possibilities in terms of improving the current situation: 1) to notify citizens about the old and new landfill through media sources in order to overcome their concerns and give them some kind of happiness; 2) to engage all stakeholders (e.g. City Council, both utility companies and

other institutions) in solving the financial shortcomings for the utility companies; 3) to provide training and workshops on proper waste management for the employees in the utility companies (e.g. waste collection and transportation); 4) to properly close landfill Uborak, when necessary, make plans for its future monitoring and maintenance and propose the end use of property after closure and 5) to clarify and make decision regarding ownership of the regional landfill.

Mostar does not have a formal recycling program; however, some tentative attempts were noticed at the landfill where waste is manually sorted by the personnel and sold. Yet, interview data revealed that there is a lively informal sector of waste collectors and waste pickers in Mostar as well as private companies placing their own paper containers. Respondents informed us that waste picking is done by the Roma people who are settled in the area but also by other local residents. In contrast to other geographical regions, where the Roma communities are engaged in the collection of metal (Stoykova, 2006), in Mostar they collect plastic waste. Also, the local residents collect plastic waste, which is brought to the recycling pay-back centers in the neighboring Croatia and redeemed for monetary compensation. Both groups have recognized the economic potential for recycling and took the advantage of being able to commute to Croatia and redeem plastic waste. *The most positive step in recycling is the engagement of Roma people, only environmentalists who collect plastic bottles and in return get some money back. They pick plastic bottles from containers and place them on their small vehicles every day. Even some individuals collect their own plastic bottles at home and take them to the pay-back centers in Croatia"* (Private company).

Wilson et al. (2009) gave an account of issues that surround the informal sector in developing countries where waste pickers are often marginalized and stigmatized despite that they contribute substantial to waste management cost reduction. This is, to a certain extent, valid also in our case. The Roma are a marginalized community with integration problems. Their contribution is not recognized and some would look with suspicion at the activities Roma undertake. Respondents complained that in searching for plastic bottles inside containers the Roma would frequently leave the area around containers filthy and might not be attentive towards the public good. Hence, the way they are currently engaged in waste collection contributes to reinforce pre-existing stereotypes about this community. It follows from this that given a lack of organized formal recycling programs the informal sector may hold some valuable potential and, under adequate guidance in how to best engage in waste-picking, could more substantially contribute to recycling in Mostar.

4.2   Current issues with recycling

The Novi Grad case

Several of our respondents indicated that an issue here is a poor understanding of the economic opportunities a recycling system could offer by the service providers. This type of awareness respondents show is the result of seeing the neighboring Croat experience with pay-back centers, as most of the respondents were aware of the Croat system and regard it as being a positive example for plastic waste management. For instance respondents from the group, *NGOs,* indicated that the KJKP Rad could form an ambient for plastic waste recycling. Secondary data inform us that in Croatia since 2005 about 90% packaging waste was collected, separated and reused (Rujnić-Sokele et al., 2008), which suggests that pay-back centers are serving their purpose well. This is a measure that works well in Croatia and could be further explored for implementation in FBiH; to integrate adequate incentives such as taxes on products purchased (e.g. plastic bags) and subsidies for customers and companies/institutions who return packages to the store (e.g. plastic bottles) or pay-back centers. To establish pay-back centers, the Fund for Environmental Protection might provide financial support together with ministries (Federal or Cantonal), several municipalities, the EU and the UN funds. Also, environmental, social and economic aspects i.e. benefits from developing such institutions, should be taken into consideration. Some respondents from the group *residents* expressed the opinion that pay-back centers could boost motivation for a more scrupulous recycling in this community. Certainly there are challenges with the introduction of this method which among others include the uncertainty of having regular public participation, but to this end collaboration with NGOs could be valuable as these are already doing information campaigns and awareness raising programs.

A second issue that emerged from our interviews was that some respondents from the group *local residents* claimed that the utility company occasionally does inappropriate waste collection as waste, disposed in different containers, and is then collected entirely into one truck. These respondents reported of having seen it occurring and commented that this upsets them since all the effort invested in separating waste at their homes was lost when waste is mixed up again. Interview data suggest that when respondents witness inappropriate collection practices, heard about this procedure from family or friends, or suspect that this occurs, it strongly challenges their motivation to maintain the recycling practice. Also, it decreases trust levels toward the recycling system and lowers reliability of KJKP Rad in the eyes of the local inhabits. When asked about this circumstance a respondent from the group

local institutions, replied that such a practice does not occur and clarified: *"Our workers employed at the landfill are trained. They wear uniforms and work from 7am until 2pm every day and in this period separated waste is brought by the specialized vehicles to the landfill. Our employees don't mix sorted and regular wastes. We have blue, yellow and classic containers. Materials sorted in blue containers are picked once in 10 days, for yellow once in 15 days and for classic containers even more frequent. Aluminum cans, plastic bottles, bags, newspapers, cardboards and other wastes are sorted. Based on the waste amount, we decide where to transport and whom to sell it"* (Local institution).

Unfortunately, due to time and resource constrains we were not in a position to undertake triangulation with observational data and obtain additional detail on this particular aspect for which reason cannot give further comment on waste collection practices in Novi Grad. Here we can only report on the influence this has on respondents' perception of recycling and in our case respondents with such a position seem to have developed a negative perception of the recycling system. Research has already commented how negative experience/opinion influences household recycling performance and suggested that awareness raising and communication campaigns can offer some valuable help (De Feo and De Gisi, 2010). Studies that commented on similar instances highlight the importance of feedback mechanisms. Timlett and Williams (2008; p. 632) suggests that "a two way communication could do well; let people know how they are doing, where they are going wrong and ensure that their efforts are appreciated". However, for feedback to be effective it needs to be regular, incremental, well communicated, monitored and reinforced.

The Mostar case

A main issue in Mostar appears to be poor collaboration and communication between the two utility companies, which results in an ineffective and inefficient public service. This tension is of concern also to international institutions which in 1995 have documented a specific set of conditions the two utility companies need to fulfill in order to obtain a loan. One of the conditions was to merge under a third utility company, JP Komunalno which would operate across the entire municipality. However, Komos and Parkovi encountered financial difficulties due to insufficient financial support from the City Council and irregular payment of fees and were not able to fulfill the condition. Over the last six years the two companies have been under bankruptcy and operated poorly with negative implications for the local population. Respondents indicated that after this poor collaboration between the two resulted

in several "wild" disposal sites around Mostar which were recorded by local NGOs and reported in policy documents (e.g. Ecoplan, Grad Mostar, 2006; Calò and Parise, 2009). *"We thought that with the formation of a third company we could access to the money provided by the World Bank, but the capital status of this company was not approved by the World Bank. In addition, 49% was private and 51% was a public capital. World Bank supported only the public capital, so we tried to put the entire capital under public status, but speculations with money and private properties continued. Unfortunately, we could not find a solution and funds were not used to build the extended part of our landfill. Then we came up with an idea to have a new company, JP Deponija with administrative staff, 100% public capital which will have a privilege to work on the extended part of landfill Uborak and provide better conditions for waste treatment. We achieved this and currently work on the new landfill"* (Local institution).

Komos and Parkovi are not paying a fee for the waste disposed at the landfill and will not do so until sufficient funds are secured by the City Council (Medic, 2010). Recently the City Council agreed on a temporary solution and provided funds that could sustain the two companies; however it is a short-term solution. The joining of two companies into a third one is still pending (Smajkic, 2010).

A further issue in Mostar is low awareness about waste management including recycling. Respondents from the group *NGOs* commented that residents dispose waste inappropriately, in other words, they leave it lying outside the containers or across public areas. For example this refers to: "*When people go to have a picnic, they leave a lot of trash around which looks catastrophic!*" (Local resident).

"*While I was driving another day along the road, I saw a woman next to the parked car, taking a bag, full of waste and throwing it to the forest*" (Private company).

"*The public awareness is still not developed at the level where people dispose their waste at the proper places, i.e. containers that are supposed to be for waste disposal*" (Local institution).

"*People do not possess awareness, moral or spiritual, regarding environmental protection, and possess even less awareness for the waste management and recycling*" (Private company).

As already mentioned for the earlier case public awareness-raising campaigns could offer some help to this end. Campaigns are necessary not only at the beginning of operations but need to be regularly repeated in time: the public needs periodic reminders to develop and maintain a pro-environmental behavior (European Bank, 2007). Another recommendation

could be a set of sanctions for improper behavior and functional eco-inspection as was done in Novi Grad municipality.

4.3 Identification of motivational factors

The Novi Grad case

As introduced in Chapter 2, the literature recognizes intrinsic and extrinsic motivational factors. Interview data indicate for the presence of both. In this, respondents have most frequently mentioned *general satisfaction* (i.e. participating in a program that seems to help the community and the nation) and least frequently mentioned *personal satisfaction* (i.e. feeling that actions count and are worthwhile) as intrinsic factors. Respondents from the group *residents* reported that they are motivated to recycle in order to contribute to environmental protection (example: reduces the waste amount and saves natural resources). This is very much in line with the studies by Hopper and Nielson (1991) and by McDonald and Ball (1998). However, some respondents reported on inadequate practices and told to feel "betrayed" by the utility company. Respondents reported of having witnessed inappropriate waste collection practices and commented that after all, sorting waste in their homes does not make sense since it all ends up mixed. This has an influence on their personal satisfaction and also it seems to discourage them from waste separation and recycling. As mentioned previously in Section 4.2, no further observational data were undertaken however, feedback on waste collection and landfill operations from utility company should be provided to the residents in order to encourage them to continue recycling.

On the other hand, interview data suggest that in Novi Grad respondents are motivated also by several extrinsic factors, for instance:

a) PCCs; *"Watching, reading or listening about recycling motivate me to be informed, to gain a feedback and be a part of recycling practice in my community"* (Local resident). As McDonald and Ball (1998) mentioned PCCs are important in providing motivation and reinforcing positive recycling behavior.

b) Rewards and sanctions; *"If you provide people some kind of reward for what they do, they start to appreciate it more to do such thing again. On the other hand, having sanctions always help to decrease improper recycling behavior"* (Local resident).

c) Establishment of pay-back centers; *"For returning the recyclables to the pay-back centers would certainly motivates me in order to earn some cash"* (Local resident).

d) Presence of recycling containers; *"One of the motivations would be to increase number of containers for waste separation in my community and put some clear labels on them"* (Local resident).

e) Social influence (e.g. family members, friends and neighbors); interviews show elements indicating the presence of social influence as several respondents from the group *residents* reported that their recycling behavior would influence their family members and friends, but less their neighbors. *"Any kind of personal action is the first place to start, and by doing an action we always influence each other somehow"* (Local resident). The study of Thomas et al. (2004) suggests that non-recyclers could be motivated to start recycling if seeing others doing it, so the suggestion is visibility of recycling behaviors; seeing others doing it in public would encourage people to recycle.

The Mostar case

An interesting aspect that emerged from our interviews in the Mostar municipality is that very few respondents reported intrinsic motivational factors i.e. *general and personal satisfaction*. It is assumed that since recycling practice is not introduced at the household level (e.g. containers, PCCs) respondents did not express any satisfaction; not many things motivate them to engage in such a practice.

However, extrinsic motivational factors appear to be evident similarly as the case is in Novi Grad. For instance, separated containers are not noticed by the residents. The idea of establishing the pay-back centers appears to be positively received among residents. In this way, those centers would take recyclables from people (e.g. plastic bottles) as it was done in Netherlands and Portugal. Hence, it would reduce the amount of plastic waste since most public green areas are littered by plastic bags and bottles mentioned in the Section 4.2. The image of the city might perceive positive attitudes by our respondents.

"Pay-back centers are introduced in the Republic of Croatia and local residents bring collected materials there and get money back. Why would not BiH have such centers? I read once, for instance in 2003, there were around 53 million of only plastic bottles imported to BiH which can be calculated approximately the same amount in euro. Besides that, there are also domestic products produced and currently we are throwing these useable materials away!" (Local resident).

However, getting cash from the pay-back center for few residents does not mean very much and they think it is not worth to do an effort for so little compensation. The reason why they

respond in this way is that they do not seem to be aware that by recycling we reduce the amount of waste sent to the landfill that we keep the environment clean and prevent water contamination and air pollution (Tietenberg, 1994). Other people reacted differently though.

"Redemption of recyclables cannot motivate me a lot but rather seeing some kind of progress in raising the environmental awareness among people" (Local resident).

"My motivation would be a good organized recycling activity with information where people could see a positive outcome, keep clean and healthy environment. The last motivation would be a monetary compensation for me" (Local resident).

"I would like to see usage of cotton bags, rewards, containers for waste separation and organized activities in our municipality. Media can have a significant role in informing people in their daily shows and paying more attention to the recycling, its significance for the society and environment. Nowadays people make jokes about other people who are more environmentally aware" (Local resident).

In terms of social influence, only a few respondents reported that they would feel ashamed of not recycling if proper conditions were offered.

4.4   Conclusions

The qualitative data discussed here provide a picture of the current situation with regards to recycling in two municipalities of the FBiH, Novi Grad and Mostar. This chapter gives voice to different respondent's groups that are involved in, and contribute to recycling, ranging from households to state agencies. The aim was to map out different *attitudes* and *concerns* and identify current *motivational factors* within the two municipalities: in Novi Grad, where a recycling system is already introduced, and in Mostar, where there is no official recycling program but some informal activities are taking place. Each case is characterized by contextual elements, has its own local characteristics and conditions regarding waste management and recycling, which cannot be neglected.

The qualitative data helped to develop a preliminary understanding of *attitudes* respondents have toward recycling and recycling behavior and to identify *concerns* and *motivational factors*. With regards to *concerns* these were found in both cases (e.g. no pay-back centers, financial shortcomings) and some interesting differences observed for *motivational factors*. It seems that intrinsic motivation is more present in Novi Grad when compared to Mostar, this is in form of general satisfaction for contributing to environmental protection. In the following Chapter, these variables are further investigated with quantitative data.

5   RESULTS AND DISCUSSION FROM QUANTITATIVE DATA

This chapter discusses quantitative data collected with a questionnaire. First, the demographic characteristics of the sample are presented (Section 5.1.), then waste disposal and separation data are discussed (Section 5.2.), followed by data on motivational factors (Section 5.3.), on concerns (Section 5.4.), on attitudes (Section 5.5.), on knowledge (Section 5.6.), and PCCs in relation to knowledge and attitudes (Section 5.7.). The part of the questionnaire addressing questions on *concerns*, *motivations* and *attitudes,* consists of close-ended questions with answers ranging on a Likert scale (1 for 'do not agree at all' and 5 for 'agree very much') while answers for *knowledge* and *PCCs* questions were "yes", "no" and "do not know". Data analyses include descriptive analysis, Pearson's correlation, reliability and independent t-test.

5.1   Demographic data of the sample

Gender. In Mostar sample, there are 48 males (45.5%) and 58 females (54.5%) while in Novi Grad sample, there are 59 males (53.6%) and 51 females (46.4%) in the sample giving the total of 216 respondents in both cases. It is observed that Mostar sample has higher percent of females and lower percent of males than Novi Grad sample.

Age. Figure 5 shows each case with age range (18-29; 29-39; 40-50; 51-61 and 62+) expressed in percentages (%). Novi Grad has a larger percentages of respondents aged between 18 and 28 (22.73%) and those aged 62+ (20%) as compared to Mostar (18-28=20% and 62+=19.09%). However, a difference in ages between the two cases does not vary much.

Figure 5: Age range expressed in percentages
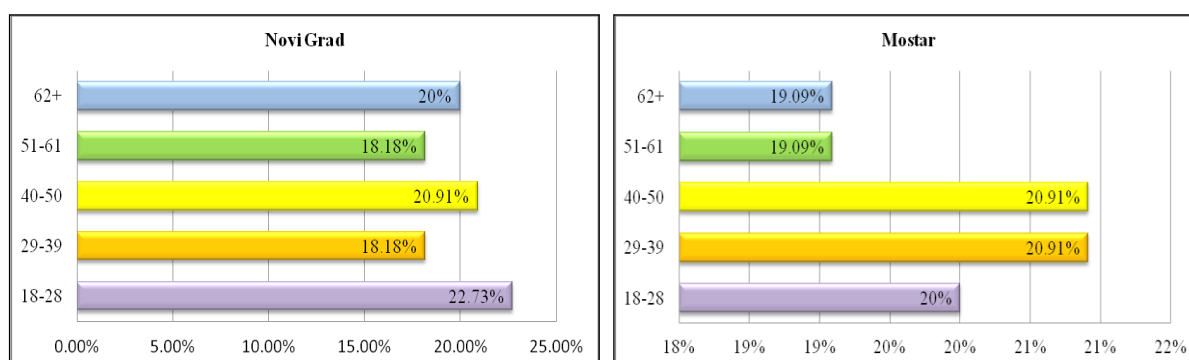
Residence. Figure 6 shows residency status. In the Mostar sample, few respondents moved from rural areas e.g. Rodoč, Selo and Domanovići to Mostar while respondents in Novi Grad did not report any. In addition, reported urban places from which respondents moved to Mostar are Gornji Vakuf, Sarajevo, Prozor, Bugojno, Tuzla, Čapljina and Jablanica while

respondents reported of moving from urban areas e.g. Foča and Visoko. Figure 6 shows that the Novi Grad sample has a double number of respondents (20%) who moved within urban areas comparing to respondents in Mostar sample (10.91%). In addition, there are more respondents who came from rural areas to Mostar (9.09%) in comparison to Novi Grad (2.73%). In both cases, most respondents (>50%) have always lived in Novi Grad and Mostar.

Figure 6: Residence area expressed in percentages
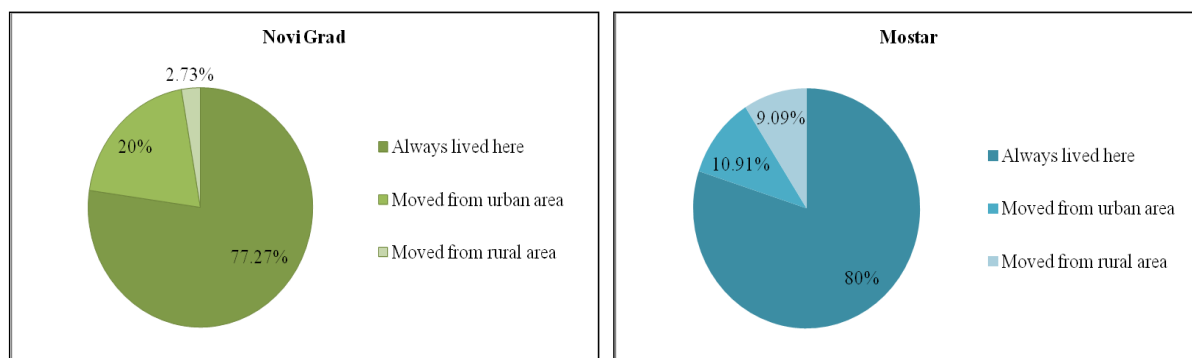
Household size. Figure 7 shows that the household size of our sample consists of a minimum of 1 to maximum of 7 members. The cases of 2, 3, 4 or 5 members per household are the most common. Mostar sample has more households, with one (11.82%), six (3.64%) or seven (0.91%) members, compared to the Novi Grad sample, where these are respectively 3.64%, 1.82% and has no households with seven members.

Figure 7: Household size expressed in percentages
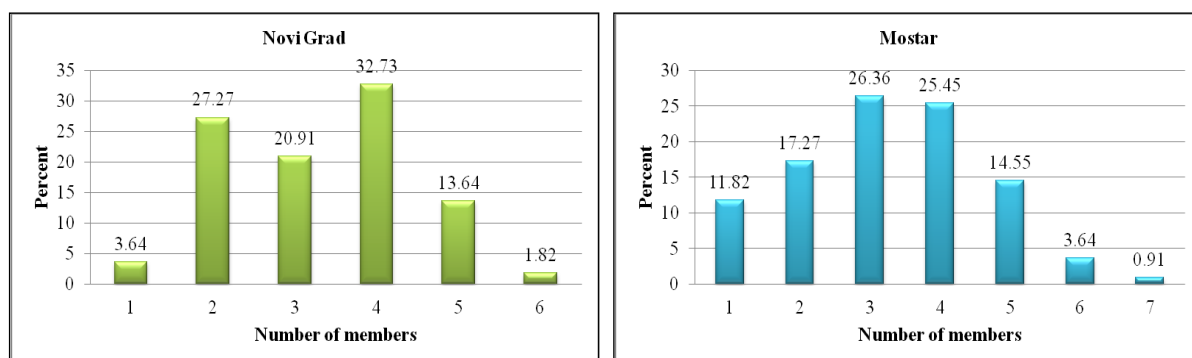
Education. The Novi Grad sample has a higher percentage of respondents with a university degree (56.26%) or more (M.Sc. or D.Ph.) (6.26%) as compared to Mostar (university = 53.64%; M.Sc. or D.Ph. = 0.91%). In Mostar sample, there are more respondents with high school diploma (45.45%) than in Novi Grad (37.27%). In both municipalities respondents with a university degree are above 50%.

Figure 8: Educational levels expressed in percentages
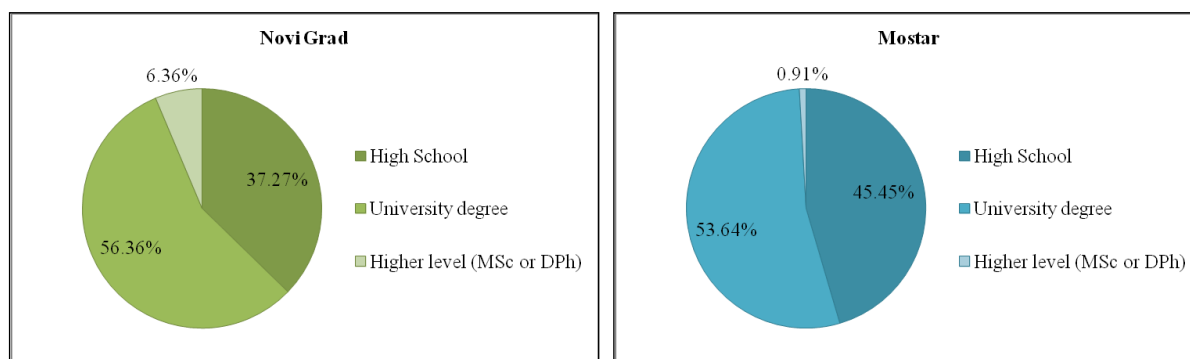
Employment. In both municipalities, respondents stated to be employed in small and large enterprises. Under "other" (Figure 9) the following is included: housewives, students, retired and unemployed. In Novi Grad, 8.18% of our respondents are working for public organizations, while in Mostar this equates to 0.91%. In Mostar 3.64% of our respondents are employed by NGOs, 9.09% by private companies. In Novi Grad 1.82% are employed by NGOs and 5.45% by private companies.

Figure 9: Employment expressed in percentages

5.2 Waste disposal and separation

Waste disposal. Respondents were asked about the frequency with which they were disposing their waste (Figure 10). In both cases, more than 60% of respondents dispose waste on a daily basis while 10% of respondents dispose their waste once a week. In Mostar 26.36% of the sample disposes more than twice per week while in Novi Grad 22.73% disposes more than twice per week. The data suggests that there are no major differences in the number of times per week that household waste is disposed.

Figure 10: Frequency of waste disposal expressed in percentages
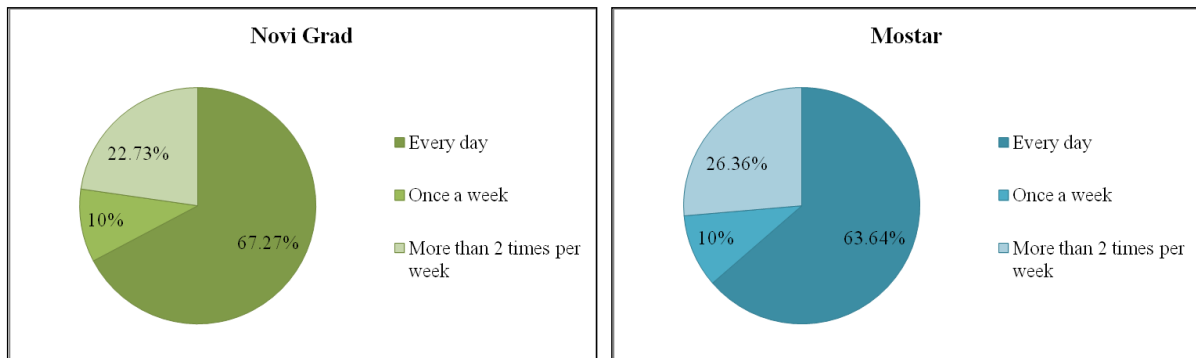
Waste separation. The terminology "recyclers" and "non recyclers" is used in order to indicate "recyclers" as those respondents who stated to be engaged in waste separation at their home. On the other hand, "non recyclers" are identified as those respondents who stated that they are not engaged in waste separation. Figure 11 shows that Novi Grad 31.82% of respondents stated do be engaged in recycling while in Mostar these are 13.64%. Both rates are low when compared to rates found by other research. For instance in the studies of Vining & Ebreo (1990), MORI (2002) and McDonald and Oates (2003), waste separation rate was more than 50%.

Figure 11: Waste separation rates expressed in percentages
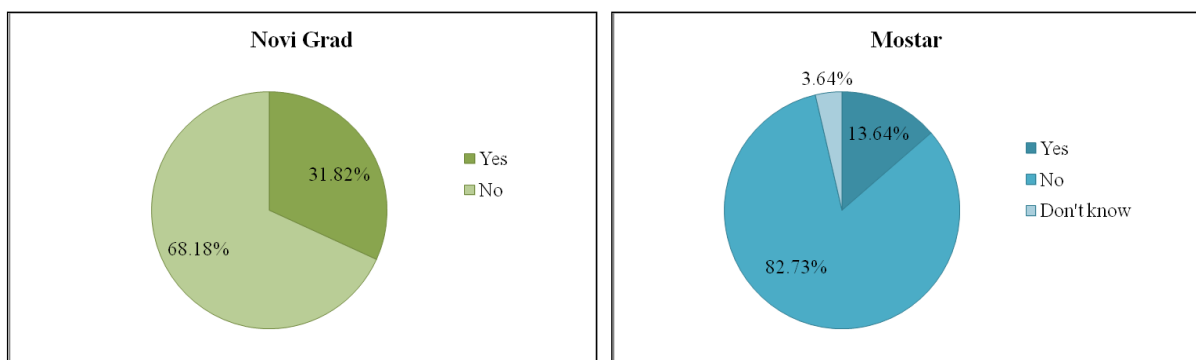
As mentioned, in Novi Grad there is a formal recycling program and related measures for its implementation for which reason the low rate this study finds comes as a surprise and might suggest the presence of some alternative issues. As we were interested in reasons for not recycling a question was included on this and respondents were asked to identify perceived motives for not recycling. Answers were recorded in a descriptive form and analyzed. A total of 57 descriptive answers were obtained for Novi Grad and 72 for Mostar; these were clustered in groups reassembling homogenous categories as reported in Figure 12.

Figure 12: Stated reasons for non-separation in Novi Grad and Mostar
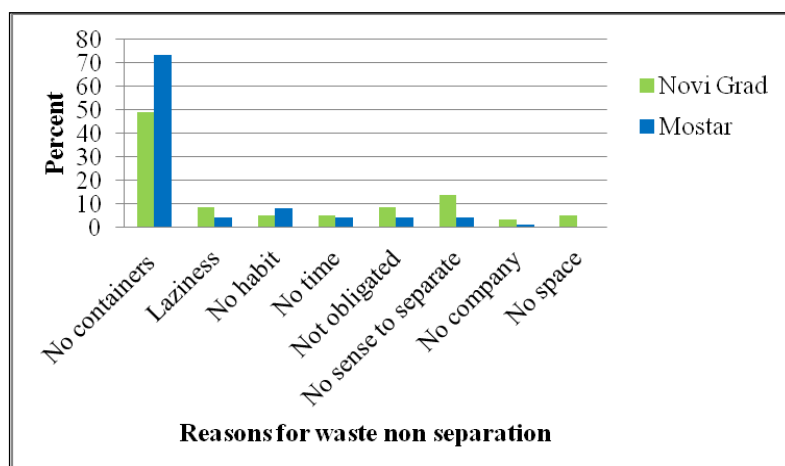
The answers respondents provided can help to understand low recycling rates and the motives for not being engaged in waste separation at the household level. The literature has already highlighted that usually a main reason for non separation is the absence of containers. In Mostar 73.61% respondents indicated this as a reason for not recycling, while in Novi Grad 49.12% agreed. This suggests that residents' needs might not be fully covered by current services and the local authorities could consider the introduction of additional services offering householders a variety of recycling containers to suit their circumstances. Other reasons for non-separation were also recorded i.e. no time, no space, it is not obligatory. As stated by authors (Vining and Ebreo, 1990; Grodzinska-Jurczak et al., 2003; Martin et al., 2006), recycling is an activity that demands time, space and resources of the family member who undertakes it.

"Having no time" to recycle was expressed in both cases (5.26% in Novi Grad and 4.16% in Mostar). Recycling is connected with a large amount of practical nuisance (e.g. to rinse out and sort the waste), respondents in the study by Ojala (2008) perceived recycling to be time-consuming. Similarly, this is reported by Fahy (2005) and identified as a key constraint on action which is "imposed by the everyday world" and dynamic lifestyle. Many respondents claimed that that they were in a stage of life where they had a lot to do, they stated they do not have space in their house to sort in an efficient manner. To rinse out and sort waste is perceived as time consuming (Ojala, 2008).

In terms of "having no space" was only reported by respondents from Novi Grad (5.26%) and this has been found also in other studies (Grodzinska-Jurczak et al., 2003; Martin et al, 2006). This might suggest that a commingled system (in which several materials are collected in the same container) could be a way to address some of the raised issues. Also using stacking bins,

compacting devices, closet organizers and so on could be helpful. We need to be aware, as noted by Howenstine (1993), that the space problem may be overestimated by respondents; recycling does nothing to increase the volume of materials that have to be discarded anyway.

In both cases (8.77% in Novi Grad and 4.16% in Mostar), respondents believed that they should not separate waste since it is not obligatory. In this it is interesting to notice that in Novi Grad, data suggest for a small percentage of respondents who indicate resistance to recycling. Refsgaard and Magnussen (2009) reported that rules, norms and obligations setup by authorities can be a guarantee for an efficient process to promote recycling and suppress those barriers which can be a hindrance to such a change of behavior.

"No sense to separate waste" was also reported by respondents (14.04% in Novi Grad and 4.16% in Mostar). This statement indicates that respondents might feel that recycling practice is negligible and not well organized by the local authorities. It also might be that respondents do not understand why they, rather than the local authority, should separate their waste. Similar responses are found in the studies by Martin et al. (2006) and Grodzinska-Jurczak et al. (2003). In order to confront this aspect local authorities should explain the purpose of the recycling process and the benefits of having uncontaminated recycled materials as well as providing regular publicity about waste-related services, and regular feedback on recycling performance.

5.3   Assessment of perceived motivational factors

Interview data, as described in Section 4.3, allowed for the emergence of contextual information and helped to identify perceived motivational factors (intrinsic and extrinsic) that seem to facilitate recycling behavior in the two cases. These data served as a starting point for which a variable, motivation (list of seven items) was developed and tested with a questionnaire. The seven motivational items are: 1) establishment of pay-back centers, 2) presence of containers for separation and information labels, 3) presence of PCCs (brochures), 4) presence of eco inspection, 5) presence of financial rewards, 6) presence of non-financial rewards (discount in food shopping) and 7) monetary penalty. Respondents were asked to which degree, on a scale from 1 to 5, they were motivated to separate waste at home and to which degree non recyclers *would* be motivated to separate waste. No case of missing data on the above variable was found.

Table 4 summarizes mean values for answers given by recyclers and non recyclers in Novi Grad and differences between the two are very small. Recyclers reported that they would be

most motivated by pay-back centers (M=4.31; SD=0.963). They see the Croat experience with pay-back centers for the plastic waste but also the unstable economic situation might be a contributing factor. On the other hand, non recyclers reported that containers and labels (M=4.36; SD=0.981) would motivate them the most. Providing more containers might increase the rate of recycling, similar results was found by Reid et al. (1976) and Nixon and Saphore (2009). Overall, it can be concluded that both recyclers and non recyclers perceive to be motivated by the provision of good infrastructure (pay-back centers, containers). Recycling infrastructure has a significant role in motivating both groups to continue or start with recycling.

Table 4: Values for questions on motivation for recyclers and non-recyclers in Novi Grad

MOTIVATIONAL FACTROS (EXTRINSIC)	RECYCLERS				NON-RECYCLERS			
	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Pay-back centers (would be motivated by)	35	4.31	0.963	0.163	75	4.16	1.220	0.141
Containers & labels	35	4.17	1.175	0.199	75	4.36	0.981	0.113
Brochure	35	4.20	1.106	0.187	75	3.84	1.139	0.132
Eco inspection	35	4.09	1.095	0.185	75	4.05	1.229	0.142
Financial reward	35	4.00	1.372	0.232	75	4.04	1.224	0.141
Non-financial reward	35	3.91	1.422	0.240	75	4.01	1.180	0.136
Monetary penalty	35	4.20	1.279	0.216	75	4.23	1.110	0.128

*Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers
**PCCs – public communication campaigns

In the Mostar case, recyclers (M=4.67; SD=0.617) and non recyclers (M=4.47; SD=0.976) reported that they were/would be motivated the most by having containers and labels (Table 5). Similar to Novi Grad, more containers might encourage those currently already recycling and might increase participation of those not recycling. On this specific aspect Thomas et al. (2004) comment that in their study an improvement of the facilities was the main reason for an increase in recycling rates. Their study suggests for a link between improved recycling infrastructure and reported recycling behavior. Similar results have been found by Katzev et al., (1993) who report that containers, visibility and appearance of system, information labels are important determinants of recycling behavior.

It is also interesting to point that even though recycling is not formally introduced in this city, as described in the Chapter 4, there is a lively informal sector of waste collectors and waste pickers i.e. the Roma people as well as private companies who situate their own containers. This suggests that there is some good potential for the introduction of recycling practice.

Table 5: Values for questions on motivation for recyclers and non-recyclers in Mostar

MOTIVATIONAL FACTORS (EXTRINSIC)	RECYCLERS				NON-RECYCLERS			
	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Pay-back centers (would be motivated by)	15	4.27	0.799	0.206	91	4.20	1.123	0.125
Containers & labels	15	4.67	0.617	0.187	91	4.47	0.976	0.108
Brochure	15	4.20	0.862	0.223	91	4.01	1.031	0.115
Eco inspection	15	4.53	0.834	0.215	91	3.97	1.303	0.137
Financial reward	15	4.13	1.187	0.307	91	3.89	1.387	0.154
Non-financial reward	15	4.20	0.862	0.223	91	3.89	1.313	0.146
Monetary penalty	15	4.67	0.724	0.159	91	4.12	1.218	0.135

*Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers
**PCCs – public communication campaigns

To conclude, respondents (recyclers and non-recyclers) in the Novi Grad and Mostar were/would be motivated the most by having better recycling infrastructure (pay-back centers and containers). Linking back to the Section 4.3, it can be noted here that it is important to account for intrinsic as well as extrinsic motivational factors, since both, as suggested by Ebreo and Vining (2000), can help to increase the acceptability of recycling programs. Policy-makers are aware that extrinsic factors are visible to people and these influence recycling practices, but usually less attention is paid to the intrinsic factors. Intrinsic and extrinsic factors are strongly linked, these shall be activated simultaneously. For instance, intrinsic motives (e.g. keeping environment clean, conserve natural resources) could be activated by information campaigns and recycling practices and reinforced by an extrinsic factor e.g., rewards, community recognitions.

5.4   Assessment of concerns

Interview data, as discussed in Section 4.2, allowed the identification of some of the current issues with recycling practice and of the concerns that the local community has in terms of adopting recycling behavior. These data served as a base for which a variable concern (list of seven items) was developed and tested with a questionnaire. The seven items are: a) full containers for waste separation, b) presence of odor, birds and insects, c) no containers, d) no labels and information on containers, e) no space in the kitchen, f) no eco inspection and g) no monetary penalty. Respondents were asked to which degree, on a Likert scale from 1 to 5, they are concerned with these. No cases of missing data on the above were found. The goal of this section is to identify what locals are most concerned with.

Table 6 gives results for recyclers and non recyclers for the Novi Grad sample. Both recyclers (M=4.17; SD=1.224) and non recyclers (M=4.16; SD=1.220) reported to be most concerned about the lack of containers for waste separation. This is consistent with the results reported in Section 4.3 and in Section 5.2 where it is mentioned that one of the reasons for not separating waste is the absence of containers. The second concern which respondents reported on is not having a monetary penalty.

It has to be noted above, even though KJKP Rad has around 35 inspectors, the capacity of inspectors is limited and these might not be able to cover the whole area 24 hours a day. For this reason, the improper actions respondents reported might not always get fined. During interviews this aspect came forward frequently and respondents insisted that it is the only measure for people to become responsible for their own actions.

Table 6: Values for questions on concerns for recyclers and non-recyclers in Novi Grad

CONCERNS	RECYCLERS				NON-RECYCLERS			
	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Full containers	35	3.60	1.397	0.236	75	2.99	1.428	0.173
Presence of odor	35	3.94	1.211	0.205	75	3.92	1.205	0.139
No containers	35	4.17	1.224	0.207	75	4.16	1.220	0.141
No labels and info	35	3.94	1.305	0.221	75	3.80	1.263	0.146
No space in kitchen	35	3.03	1.465	0.248	75	2.95	1.497	0.165
No eco inspection	35	3.71	1.202	0.203	75	4.00	1.185	0.137
No monetary penalty	35	4.03	1.248	0.211	75	4.15	1.171	0.135

Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers

In Mostar, recyclers reported of being most concerned with not having labels and information (M=4.60; SD=0.828). Recycling is not formally introduced into this city and the fact there are no labels on containers and information comes with no surprise. There are a few containers placed by private companies but these might not have adequate information i.e. which recyclables are disposed in which container and in which way. On the other hand, non recyclers are most concerned about not having containers (M=4.28; SD=1.277) which has been already commented in Section 4.3 and 5.2.

Table 7: Values for questions on concerns for recyclers and non-recyclers in Mostar

CONCERNS	RECYCLERS				NON-RECYCLERS			
	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Full containers	15	4.20	1.320	0.341	91	3.56	1.549	0.172
Presence of odor	15	4.33	0.816	0.211	91	4.19	1.314	0.146
No containers	15	4.53	0.743	0.192	91	4.28	1.277	0.142
No labels and info	15	4.60	0.828	0.214	91	3.93	1.473	0.164
No space in kitchen	15	3.27	1.580	0.408	91	2.86	1.481	0.165
No eco inspection	15	4.53	0.834	0.215	91	4.11	1.332	0.148
No monetary penalty	15	4.40	0.910	0.235	91	4.04	1.355	0.151

Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers

To conclude, this section reports on the scores regarding the concern scale. Most of our respondents reported to be concerned the most about not having containers, and not having labels and information. These results can offer some useful information to utility companies and local authorities i.e. ministries in drafting recycling programs within the two cases. For instance, local authorities could provide additional training for utility companies on collection and transportation of recyclables. Also, it is important to plan the number of containers and identify a suitable place for the location of containers. PCCs could contribute to this and help to increase environmental awareness among people. While the financial shortcomings for recycling infrastructure (vehicles, containers) and organizing campaigns might be overcome with the support of funds from UN and EU programs and regional Environmental Fund in FBiH.

5.5 Assessment of attitudes toward recycling behavior

Interview data discussed in Section 4.1, offered insight on the respondents' perception toward the recycling system and helped in the identification of attitudes (toward recycling behavior) in both cases. These data provided background information used for the development of a variable, list of four statements, meant to further appraise respondent's attitudes. This variable was used in a questionnaire in order to collect quantitative data. These four statements cover question 6 (see: Appendix I). Question 6 was not directed to the non-recyclers since they are not engaged in waste separation and current statements cannot be evaluated properly. Respondents answered how much they agree or disagree on a Likert scale from 1 to 5. No cases of missing data on the above variable were found. The goal of this section is to report on the results for attitudes recyclers and non recyclers reported towards recycling behavior.

In Table 8, results are given for Novi Grad and Mostar. Recyclers agree the most that they separate waste because it keeps the environment clean (Novi Grad - M=4.43; SD=1.008; Mostar - M=4.80; SD=0.561). The results can be linked to the intrinsic motivational factors mentioned in Section 4.3, where respondents expressed that they are involved in separation because of feelings of satisfaction in terms for contributing towards environmental protection. It needs to be noted that in the Mostar sample, the number of recyclers is small (only 15 recyclers out of 106 respondents) and formal recycling practice is not introduced at the household level, yet they have expressed an interest for environmental protection. A Pearson's correlation was used for the investigation of relationships between a dependent variable (recycling behavior) and an independent variable, attitude *(statement: "I separate waste*

because it keeps the environment clean"). We found a low positive correlation between these two variables (r=0.205; N=106; p=0.031). The result is aligned with the findings found in other studies (Ojala, 2008; Lindén and Carlsson-Kanyama, 2003; Sidique et al., 2010).

Scores for statements *"I separate waste because it makes me feel good"* and *"I separate waste because it reduces the amount of waste"* have a mean values above 3.5. The relationship between the dependent variable (recycling behavior) and the independent variable, attitude (*statement: "I separate waste because it reduces the amount of waste"*) shows a low positive correlation using the Pearson's correlation test in both cases (r=0.238, N=110; p=0.012 in Novi Grad; r=0.238; N=106; p=0.012 in Mostar). It might be assumed that there is a tendency to recycling because respondents think it contributes to the environment.

Table 8: Values for question on attitudes towards recycling behavior

ATTITUDES TOWARD RECYCLING BEHAVIOR	NOVI GRAD				MOSTAR			
I separate waste because…	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Makes me feel good	35	3.94	1.235	0.209	15	4.47	0.743	0.192
Keeps environment clean	35	4.43	1.008	0.170	15	4.80	0.561	0.145
Everybody does it	35	2.97	1.403	0.237	15	3.73	1.486	0.384
Reduces waste amount	35	3.71	1.405	0.238	15	4.40	0.828	0.214

*Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers

To conclude, results indicated that in Mostar respondents are interested to separate waste even though there is not a formal recycling system.

5.6   Evaluation of knowledge

The fourth research objective of this study is to assess the influence of knowledge. The knowledge level was studied using seven questions (composed of total 26 items): 8, 9, 10, 11, 12, 14 and 15 (see: Appendix II). Respondents in both cases were asked how much they knew about the mentioned items. The answers "don't know", "yes" and "no" responses were available on the questionnaire, but the results with "don't know" answer were not considered. No cases of missing data on the above variables were found. The results are reported in tables. A reliability test is used to verify the reliability of our compound index using the Cronbach Alpha values for both samples.

Table 9 shows answers for the question *"Which of the following materials are recyclable?"* The correct answers include: paper, glass, batteries and wood, while medical waste and

chemical liquids are not recyclable. High level of knowledge was found about the disposal of paper (100% for recyclers and 96% for non recyclers) in Novi Grad followed by the glass and wood. On the other hand, a low level of knowledge was found about the disposal of batteries and medical waste especially for chemical liquids (11.43% for recyclers and 8% for non recyclers). In this recyclers seem to score higher regarding which materials are recyclable as compared to non recyclers which are explained by their daily engagement with recycling practice and the presence of PCCs.

Table 9: Answers for question on recyclable materials in Novi Grad

QUESTION #8 (APPENDIX II) WHICH ARE THE FOLLOWING MATERIALS RECYCLABLE?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Paper	100	0	0	96	2.67	1.34
Glass	91.43	2.86	5.71	80	10.67	9.34
Batteries	31.43	34.28	34.28	29.34	36	34.67
Medical waste	14.28	54.28	14.67	12	56	32
Wood	68.57	11.43	20	74.67	8	17.34
Chemical liquids	11.43	57.14	31.43	8	48	44

A similar situation is found in Mostar (Table 10). High levels of knowledge were found about the disposal of paper (recyclers 80% and non recyclers 97.8%) followed by glass and wood. Similarly to the earlier case, a low level of knowledge was found about the disposal of batteries and chemical liquids. The lowest scores refer to medical waste (recyclers 13.34% and non recyclers 7.69%).

Table 10: Answers for question on recyclable materials in Mostar

QUESTION #8 (APPENDIX II) WHICH ARE THE FOLLOWING MATERIALS RECYCLABLE?	RECYCLERS			NON RECYCLERS		
	Number of answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Paper	80	0	20	97.8	1.09	1.09
Glass	73.34	6.67	20	83.52	5.49	10.99
Batteries	20	26.67	53.34	29.67	41.76	28.57
Medical waste	13.34	46.67	40	7.69	63.74	28.57
Wood	73.34	6.67	20	80.22	10.99	8.79
Chemical liquids	46.67	13.34	40	12.09	48.35	39.56

The next question considers knowledge about composting. Similarly, as reported by Aberg (1996), our respondents know this aspect very well (Table 11 and Table 12). Even though results do not vary very much, it is interesting to note that in Mostar non recyclers scored higher (92.21%) than recyclers (73.34%). This can be explained by the demographic characteristics of the Mostar sample, since this sample is characterized by 9.09% of respondents who moved to Mostar from a rural area. Rural migrants in Novi Grad are only

2.73%. These, we assume, are familiar with composting practice well established in rural areas, where organic materials are used to improve land fertility.

Table 11: Answers for question on compost in Novi Grad

QUESTION #9 (APPENDIX II)	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Separation of organic waste from waste can be used as compost	91.43	0	8.57	89.34	1.34	9.34

Table 12: Answers for question on compost in Mostar

QUESTION #9 (APPENDIX II)	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Separation of organic waste from waste can be used as compost	73.34	0	26.67	91.21	1.1	7.69

When separating waste one needs to know how to dispose the waste in containers. The activities needed to be done before disposal include: labels and lids should be removed; only clean paper should be disposed etc. A question on this aspect was included in the questionnaire and results indicate that knowledge regarding this aspect is very low (Table 13 and Table 14). For instance, in Novi Grad while respondents scored low on the question about how paper should be disposed (5.71% for recyclers and 14.67% for non recyclers). Regarding the disposal of plastic waste scores seems to improve in both samples.

Table 13: Answers for question on disposal of recyclable materials in Novi Grad

QUESTION #10 (APPENDIX II) WHICH OF THE FOLLOWING NEEDS TO BE DONE BEFORE DISPOSING WASTE INTO CONTAINERS FOR SEPARATION?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Labels on plastic or glass containers should be removed	31.43	45.71	22.86	38.67	28	33.34
Plastic or glass containers should be washed	17.14	68.57	14.28	26.67	48	25.34
Lids from plastic or glass containers should be removed	28.57	48.57	22.86	37.34	34.67	28
Cartons should be pressed/made flat	57.14	28.57	14.28	62.67	25.34	12
Only clean paper should be disposed	5.71	85.71	8.57	14.67	70.67	14.67

Table 14: Answers for question on disposal of recyclable materials in Mostar

QUESTION #10 (APPENDIX II) WHICH OF THE FOLLOWING NEEDS TO BE DONE BEFORE DISPOSING WASTE INTO CONTAINERS FOR SEPARATION?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Labels on plastic or glass containers should be removed	40	33.34	26.67	42.86	28.57	28.57
Plastic or glass containers should be washed	33.34	26.67	40	60.44	21.98	17.58
Lids from plastic or glass containers should be removed	60	6.67	33.34	40.66	34.06	25.27
Cartons should be pressed/made flat	80	6.67	13.34	63.74	20.88	15.38
Only clean paper should be disposed	26.67	60	13.34	15.38	70.33	14.28

Within the recycling system there are several places where waste separation takes place and steps needed for the recycling of waste materials are undertaken. Respondents seem to have a good knowledge about the recycling system; in Novi Grad answers above 62% and in Mostar above 70%. However, in Mostar, non recyclers know less (23.08%) that waste separation at home is part of the recycling system. Respondents did not consider that households have a significant role within the recycling system and it seems they do not feel to have an important role in recycling but rather seem to shift the responsibility to others.

Table 15: Answers for question on processes of recycling system in Novi Grad

QUESTION #11 (APPENDIX II) THE RECYCLING SYSTEM INCLUDES:	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Waste separation at home	74.28	5.71	20	80	12	8
Waste separation at landfill	80	0	20	93.34	1.34	5.34
Manufacturing and producing new materials	62.86	14.28	22.86	68	17.34	14.67
Reusing and producing new materials	82.86	5.71	11.43	78.67	5.34	16

Table 16: Answers for question on processes of recycling system in Mostar

QUESTION #11 (APPENDIX II) THE RECYCLING SYSTEM INCLUDES:	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Waste separation at home	73.34	13.34	13.34	23.08	67.03	9.89
Waste separation at landfill	80	6.67	13.34	83.52	3.3	13.19
Manufacturing and producing new materials	80	6.67	13.34	70.33	16.48	13.19
Reusing and producing new materials	80	0	20	86.81	4.39	8.79

We asked our respondents whether they know what the benefits of the recycling system for the environment are. The scores for these questions are summarized in Table 17 and Table 18. In both cases, respondents gave positive answers: above 77% in Novi Grad and above 84% in Mostar. In both cases, non recyclers seem to know more than recyclers. This will be investigated closely in Section 5.7.

Table 17: Answers for question on benefits of the recycling system in Novi Grad

QUESTION #12 (APPENDIX II) THE RECYCLING SYSTEM HELPS TO:	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Conserve natural resources	97.14	0	2.86	93.34	1.34	5.34
Reduce waste	85.71	0	14.28	92	2.67	5.34
Save energy	77.14	8.57	14.28	89.34	2.67	8
Reduce use of landfill	77.14	5.71	17.14	89.34	2.67	8

Table 18: Answers for question on benefits of the recycling system in Mostar

QUESTION #12 (APPENDIX II) THE RECYCLING SYSTEM HELPS TO:	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Conserve natural resources	100	0	0	93.41	1.1	4.39
Reduce waste	93.34	0	6.67	96.7	3.3	0
Save energy	86.67	0	13.34	84.61	3.3	1.1
Reduce use of landfill	80	0	20	92.31	1.1	6.59

Since respondents scored high about paper recycling, we were interested to look at this more closely. Table 19 and Table 20 summarize answers for a number of questions. Respondents are most aware that recycling helps to save natural timber resources (above 85%), while know less that recycling paper saves gasoline, electricity and water.

Table 19: Answers for question on benefits of the recycling paper in Novi Grad

QUESTION #14 (APPENDIX II) RECYCLING PAPER HELPS TO:	RECYLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Pollute less water and air	68.57	2.86	28.57	75.34	6.67	20
Save natural timber resources	97.14	0	2.86	97.34	0	2.67
Save gasoline, electricity and water	48.57	5.71	45.71	57.34	16	26.67

Table 20: Answers for question on benefits of the recycling paper in Mostar

QUESTION #14 (APPENDIX II) RECYCLING PAPER HELPS TO:	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Pollute less water and air	80	6.67	13.34	79.12	7.69	13.19
Save natural timber resources	86.67	0	13.34	97.8	2.2	0
Save gasoline, electricity and water	40	13.34	46.67	59.34	7.69	32.97

We were also interested to ask respondents whether they know how long it takes for aluminum cans and plastic bags to degrade, and whether glass is degradable or not. Results are summarized in Table 21 and Table 22. In both cases, degradation of plastic bags and aluminum cans is relatively well known (above 48%). However, it is less well known (less than 54%) that glass is not a degradable material.

Table 21: Answers for question on degradation of materials in Novi Grad

QUESTION #15 (APPENDIX II) WHICH OF THE FOLLOWING IS TRUE?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
It takes about 100 years for aluminum cans to degrade	48.57	8.57	42.86	60	8	32
It takes about 1000 years for plastic bag to degrade	74.28	8.59	17.14	62.67	4	33.34
Glass bottles are not degradable	48.57	20	31.43	49.34	14.67	36

Table 22: Answers for question on degradation of materials in Mostar

QUESTION #15 (APPENDIX II) WHICH OF THE FOLLOWING IS TRUE?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
It takes about 100 years for aluminum cans to degrade	73.34	0	26.67	60.44	5.49	39.56
It takes about 1000 years for plastic bag to degrade	66.67	6.67	26.67	68.13	5.49	26.37
Glass bottles are not degradable	53.34	26.67	20	48.35	19.78	31.87

In the following figures (Figure 13 and Figure 14), we took all 27 items summarizing respondents knowledge and clustered these into 7 major groups (e.g. recyclable materials, compost, disposal of recyclable materials, processes in recycling systems, benefits of a recycling system, benefits of recycling paper and degradation of materials). This gives a visual summary of the knowledge level between recyclers and non recyclers in both cases. In

some instances, as mentioned previously, it can be seen that non recyclers possess better knowledge than recyclers.

Figure 13: Knowledge level between recyclers and non recyclers in Novi Grad
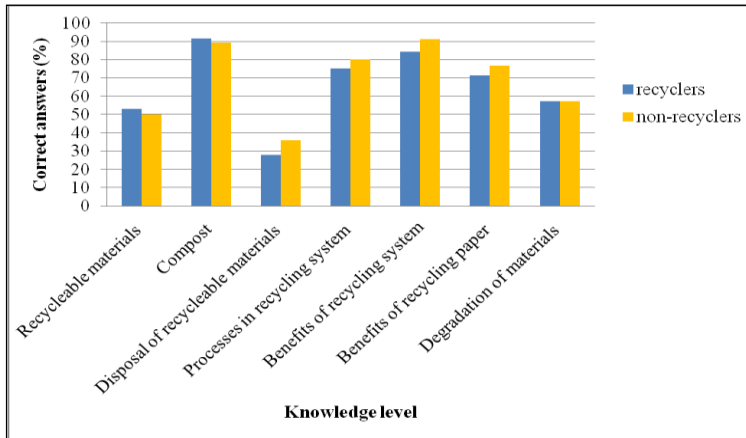
Figure 14: Knowledge level between recyclers and non recyclers in Mostar
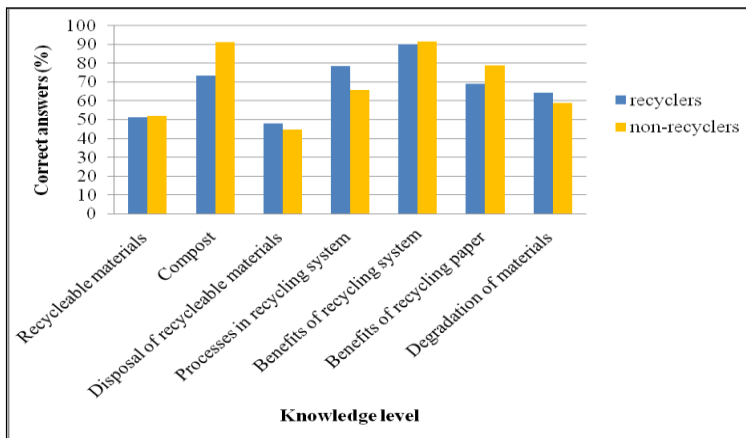
Further to this, we wanted to determine how many correct answers were reported by recyclers and non recyclers in both cases.

Table 23 shows answers regarding the question on recyclable materials; there were 5 to 4 correct answers in Novi Grad whose number gradually decreases along with those who reported 6 correct answers and those who did not answer any. In Mostar, the distribution of answers is different, and most respondents scored 5 and 3 correct answers. Generally speaking, it can be said that respondents in Novi Grad possess better knowledge about recyclable materials than in Mostar which can be explained by the fact that recycling practice is formally introduced and there are several PCCs.

Table 23: Number of corrected answers on question regarding recyclable materials

RECYCLABLE MATERIALS	NOVI GRAD		MOSTAR	
	Recyclers	Non recyclers	Recyclers	Non recyclers
6 corrected	8.57	4	6.67	3.3
5 corrected	40	32	26.67	37.36
4 corrected	22.86	33.34	6.67	28
3 corrected	17.14	17.34	33.34	30.77
2 corrected	8.57	9.34	13.34	7.69
1 corrected	2.86	2.67	0	1.1
0 corrected	0	1.34	13.34	1.1

The following table shows correct answers on the question regarding the activities conducted prior disposal of recyclable materials. Answers are clustered with 2, 1 or none correct answers in both cases.

Table 24: Number of corrected answers on question regarding disposal of recyclable materials

DISPOSAL OF RECYCLABLE MATERIALS	NOVI GRAD		MOSTAR	
	Recyclers	Non recyclers	Recyclers	Non recyclers
5 corrected	2.86	5.34	6.67	6.59
4 corrected	5.71	6.67	20	8.79
3 corrected	2.86	17.34	26.67	15.38
2 corrected	31.43	25.34	26.67	17.58
1 corrected	31.43	25.34	13.34	36.26
0 corrected	25.71	20	6.67	15.38

For the rest e.g. processes of the recycling system, benefits of the recycling system and recycling paper, degradation of materials, respondents in both cases scored relatively high. In a next step, we used a reliability test (Cronbach alpha) in order to perform the compound index of the knowledge level for both cases as shown in Table 25. Pallant (2005) suggests that the Cronbach alpha coefficient of a scale should be above 0.7; however Cronbach Alpha values are quite sensitive to the number of items in the scale. With small scales (less than 10) it is common to find quite low Cronbach value (e.g.0.5). Also for small scales, Pallant (2005) recommends verifying the Mean Inter-item Correlation value, which should be between 0.2 and 0.4. Accounting for the seven variables in the Novi Grad sample, the reliability score on values is α=0.709 (n=110) with the mean inter-item correlation value of 0.265. Results suggest that for the Mostar sample the reliability of the seven-item scale is α=0.677 (n=106) with the mean inter-item correlation value of 0.205. In both of cases, these values fall within the suggested range. Hence, reliability results for both samples indicate that the suggested compound index for knowledge level has good reliability i.e. internal consistency. A similar

finding was reported in the study by Oom do Valle et al. (2005) where the Cronbach's alpha exceeds 0.641.

Table 25: Reliability of the knowledge compound index

GROUPS OF KNOWLEDGE LEVEL	SCALE MEAN IF ITEM DELETED	SCALE VARIANCE IF ITEM DELETED	CORRECTED ITEM-TOTAL CORRELATION	CRONBACH'S ALPHA IF ITEM DELETED
NOVI GRAD				
Recyclable materials	8.73	3.997	0.269	0.708
Compost	8.57	3.675	0.369	0.689
Disposal of materials	9.25	3.506	0.331	0.704
Processes in recycling system	9.08	3.575	0.476	0.665
Benefits of recycling system	9.25	3.351	0.604	0.633
Benefits of recycling paper	9.09	3.547	0.460	0.667
Degradation of materials	8.69	2.975	0.488	0.662
Alpha = 0.709 Inter-Item Correlations =0.265				
MOSTAR				
Recyclable materials	8.63	3.251	0.367	0.649
Compost	9.15	2.999	0.259	0.690
Disposal of materials	8.53	2.997	0.433	0.629
Processes in recycling system	9.00	2.804	0.582	0.587
Benefits of recycling system	9.18	3.363	0.339	0.656
Benefits of recycling paper	9.07	2.952	0.574	0.598
Degradation of materials	8.59	2.840	0.304	0.680
Alpha = 0.677 Inter-Item Correlations =0.205				

Since our objective was to see weather knowledge levels have an influence on recycling behavior we used the Pearson's correlation test. It helped us to identify possible relationships between a dependent variable (recycling behavior) and the independent variable (knowledge level). However, no significant results were found.

To conclude, the set of questions for testing the knowledge level showed good reliability. Generally speaking, this study finds a low knowledge level for both recyclers and non recyclers in the two cases. Respondents know very little about what materials are recyclable and also know little about disposal activities. This finding can be triangulated with interview data, discussed in Section 5.5, and an assumption advanced that current awareness campaigns might not reach across the entire community. Barr et al. (2001) reported that knowledge of what can be recycled and how to do is has to be included in communication campaigns. A

further finding is that knowledge about the recyclability of paper waste was found to be higher when compared to other materials (100% in Novi Grad and 96% in Mostar). Yet, again respondents obtained low scores regarding its disposal (e.g. only clean paper is disposed) and its benefits (e.g. it saves gasoline, water and electricity). From this we can conclude that respondents tend to have very shallow knowledge i.e. the lack of specific or detailed knowledge about recyclable materials. In terms of plastic waste, qualitative data from Chapter 4 indicates for the presence of several issues in Mostar; untidy public areas, poor hygiene of bins. Several of our respondents expressed an interest for the establishment of pay-back centers. In this, the negative view respondents have of plastic waste and the high level of knowledge about its degradation, found within the questionnaire, could be a basis upon which communication campaigns could be built for an increase in recycling rates of plastics. Also, this study finds that in Mostar respondents did not consider waste separation at home as part of the recycling system.

5.7   Public communication campaigns

The fifth research objective of this study is to identify whether locally available public communication campaigns (PCCs) have an influence on: a) knowledge and b) on attitudes people have towards the recycling in the two cases. The PCCs were studied with question #13 (see: Appendix II) made of two compound variables: *media sources* (i.e. television, newspapers, radio stations, magazines, internet and brochures) and *social influence* (i.e. friends and family members, neighbors, school, university and utility company). Recyclers and non recyclers were asked from which sources they watched/heard/read and obtained information about the recycling system. An additional question, #17 (see: Appendix II), was used in order to inquire about the content of brochures and similar information tools. Although a "don't know", "yes" and "no" response were also available on the questionnaire, the results with "don't know" answer were not considered. No cases of missing data on the above variables were found. The results are reported in the following tables and include percentages.

Table 26 shows the results obtained in Novi Grad about each of the identified media sources which respondents indicated they have gained information about the recycling system. The television (TV) scored the highest percentage of "yes" answers reported by recyclers (80%) and non recyclers (77.34%), this is followed by newspapers for recyclers (71.43%) and internet for non recyclers (61.34%). This suggests that TV currently is the media source that

provides information on recycling system most widely. Chan (1998) found that TV news programs were effective at increasing level of environmental knowledge among those who watched it.

Table 26: Answers for question on media sources in Novi Grad

QUESTION #8 (APPENDIX II) FROM WHICH OF THE FOLLOWING SOURCES HAVE YOU WATCHED/HEARD/READ AND OBTAINED INFORMATION ABOUT THE RECYCLING SYSTEM?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Television	80	14.28	5.71	77.34	21.34	1.34
Newspapers	71.43	14.28	14.28	58.67	36	5.34
Radio stations	42.86	25.71	31.43	24	58.67	17.34
Magazines	31.43	42.86	25.71	34.67	49.34	16
Internet	42.86	28.57	28.57	61.34	24	14.67
Brochures	50.86	49.14	0	52.34	47.66	0

In Mostar a similar situation can be found (Table 27). Here, TV scored the highest percentage of "yes" answers reported by recyclers (93.34%) while for non recyclers this is newspaper (73.63%). TV is a widely used media where people can obtain various information inclusive of recycling practices (Do Valle, 2005).

Table 27: Answers for question on media sources in Mostar

QUESTION #8 (APPENDIX II) FROM WHICH OF THE FOLLOWING SOURCES HAVE YOU WATCHED/HEARD/READ AND OBTAINED INFORMATION ABOUT THE RECYCLING SYSTEM?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	No	Don't know	Yes	No	Don't know
Television	93.34	0	6.67	71.43	6.59	4.39
Newspapers	86.67	0	13.34	73.63	21.98	4.39
Radio stations	53.34	13.34	33.34	48.35	38.46	13.19
Magazines	46.67	20	33.34	41.76	43.96	14.28
Internet	60	20	20	59.34	31.87	8.79
Brochures	40	60	0	23.08	76.92	0

Considering both cases, respondents from Novi Grad reported of having acquired information from brochures (around 50%) more frequently than in Mostar (30%). However, in general, brochures scored low in both cases. This tells us that in Novi Grad, brochures on recycling have not reached out to residents much more in comparison to other media sources.

The next question aimed to consider types of social influence. Table 28 summarizes results for Novi Grad, and there it is indicated that recyclers gained information about recycling most

frequently through friends and family members (45.71%) while non recyclers through the schools (45.34%). Similar results for social influence are found in the Mostar case (Table 29). Hence, we used Pearson's correlation in order to investigate further relationships between a dependent variable (recycling behavior) and the independent variable (PCCs). In Novi Grad, we found a correlation between recycling behavior and the type of tool that is used in PCCs, educational institution i.e. schools (r=0.261, N=110, p=0.006) which suggests the low strength of their relationship. This relationship indicates that a high level of recycling behavior is associated with information they obtained from the school, on recycling. Another correlation was found between recycling behavior and the type of tool that is used in PCCs, educational institution i.e. university (r=0.309, N=110, p=0.001). Both results suggest that educational institutions such as a school or university are positively related to recycling behavior in terms of providing information on recycling to respondents which helped them to accumulate this information and perhaps separate their waste. However, in the Mostar case, we did not find any significant correlation.

Table 28: Answers for question on social influence in Novi Grad

QUESTION #8 (APPENDIX II) FROM WHICH OF THE FOLLOWING SOURCES HAVE YOU WATCHED/HEARD/READ AND OBTAINED INFORMATION ABOUT THE RECYCLING SYSTEM?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	**No**	**Don't know**	**Yes**	**No**	**Don't know**
Friends and family members	45.71	22.86	31.43	42.67	45.34	12
Neighbors	22.86	40	37.14	8	76	16
School	31.43	34.28	34.28	45.34	46.67	8
University	20	42.86	37.14	34.67	57.34	8
Utility company	28.57	42.86	28.57	20	60	20

Table 29: Answers for question on social influence in Mostar

QUESTION #8 (APPENDIX II) FROM WHICH OF THE FOLLOWING SOURCES HAVE YOU WATCHED/HEARD/READ AND OBTAINED INFORMATION ABOUT THE RECYCLING SYSTEM?	RECYCLERS			NON RECYCLERS		
	Answers (%)					
	Yes	**No**	**Don't know**	**Yes**	**No**	**Don't know**
Friends and family members	53.34	20	26.67	43.95	38.46	17.58
Neighbors	26.67	40	33.34	24.17	58.24	17.58
School	53.34	13.34	33.34	49.45	35.16	15.38
University	40	26.67	33.34	40.66	40.66	18.68
Utility company	20	33.34	46.67	13.18	70.33	16.48

A further aspect that comes forward from these results is that respondents reported that the utility company in Novi Grad (around 24%) provides more information as compared to Mostar (around 16%). This, we assume, can be linked to the dynamic role it has as already as discussed in Section 4.1. On the other hand, it is interesting to notice that social influence i.e. friends, family members and neighbors, is perceived more strongly by respondents in Mostar (around 25%) than in Novi Grad (around 15%). The reason for this might be found in the fact that Mostar is a smaller municipality (111.364 residents - Federal Office of Statistics, 2011) than Novi Grad (124.742 residents Federal Office of Statistics, 2011); in Mostar there are closer ties between residents who exchange information more frequently about their neighbors while in Novi Grad, as a part of a capital city, ties between residents are looser and neighbors might not even know each other. Generally, media sources provided more information to respondents than social influence in both cases.

We were interested to see what kind of content was provided in the brochures accessible to the residents. In Novi Grad, several PCCs on recycling were delivered while in Mostar none. Respondents were asked which of the following items: recycling system, waste separation and recycling law were contained in the brochures they have read. Results for the Novi Grad sample (Table 30) on this question have low mean values (range of values: 2.00 – 2.40 for recyclers and 1.56 – 1.77 for non recyclers). These data suggest that brochures did not offer sufficient information on recycling system, waste separation and recycling law to the respondents.

Table 30: Values for question on brochures across the recycling behavior in Novi Grad

CONTENT OF BROCHURE	RECYCLERS				NON-RECYCLERS			
	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Recycling system	35	2.26	1.120	0.189	75	1.77	1.021	0.118
Waste separation	35	2.40	1.193	0.202	75	1.76	0.998	0.115
Recycling law and its implementation	35	2.00	1.260	0.213	75	1.56	0.904	0.104

*Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers

Table 31 indicates for a similar circumstance also for Mostar (range of values: 1.73 – 1.87 for recyclers and 1.23 – 1.27 for non recyclers). Even though there were no campaigns on recycling, it might be assumed that respondents obtained information through 100 posters set out and 200 brochures distributed to the local community through the Local Environmental Action Plan (LEAP) project (EcoPlan, Grad Mostar, 2006). The project covered several

different thematic areas (e.g. waste management, urban planning, public health, water management, natural and historical heritage). However, due to time and budget constrains more detailed information about the LEAP project and its implementation cannot be provided.

Table 31: Values for question on brochures across the recycling behavior in Mostar

CONTENT OF BROCHURE	RECYCLERS				NON-RECYCLERS			
	N	Mean*	Std. Deviation	Std. Error Mean	N	Mean*	Std. Deviation	Std. Error Mean
Recycling system	15	1.73	1.163	0.300	91	1.27	0.668	0.070
Waste separation	15	1.87	1.302	0.336	91	1.26	0.629	0.066
Recycling law and its implementation	15	1.87	1.407	0.363	91	1.23	0.579	0.601

*Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers

Even though respondents perceived that brochures have not given enough information on recycling, data suggest that nevertheless these made a contribution since in Novi Grad scores on several items are higher in comparison to Mostar.

In the following subsections, we report on an independent t-test used to investigate whether PCCs (media sources and social influence) have an influence on knowledge levels and attitude toward recycling behavior and recycling system. Only results that can help us to address our research questions are reported.

Influence of PCCs on knowledge level

The influence of PCC on knowledge levels was investigated with an independent T-test. In Novi Grad (Table 32 and Table 33), two groups of respondents were identified: respondents who gained information via TV (n=86) and respondents who did not gained information via TV (n=24). For this sample, a statistically significance difference was found in the mean scores on the dependent variable (knowledge level regarding question on benefits of recycling system) for respondents who gained information via TV (M=0.93; SD=0.193) and respondents who did not gain information via TV (M=0.73; SD=0.361; t (26.794)=2.667, p=0.00). The magnitude of the differences in the mean scores is moderate (eta squared = 0.062). In this, it might be assumed that respondents who frequently watch TV accumulated more information about the benefits of recycling system in comparison to those respondents who did not watch TV. This suggests that TV has a role in passing messages to the residents and the results support findings of earlier research that comes to similar conclusions.

Table 32: Mean value on knowledge through media source (TV) in Novi Grad

Knowledge about benefits of recycling system	Information gained via TV	N	Mean*	Std. Deviation	Std. Error Mean
	Those who gained info	86	0.93	0.193	0.021
	Those who did not gain info	24	0.73	0.361	0.074

Table 33: T-test for knowledge on benefits of recycling system through TV in Novi Grad

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F.	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	23.63 2	0.00 0	3.697	108	0.000	0.204	0.055	0.095	0.313
Equal variance not assumed			2.667	26.794	0.013	0.204	0.076	0.047	0.361

However, in the Mostar sample, *no* statistically difference was found in the mean scores of the dependent variable (knowledge level) and independent variable (PCCs in terms of media sources and social influence).

In relation to attitudes

An independent t-test is used to verify the influence that independent variable (PCCs including media sources and social influence) had on the dependent variable (attitudes towards recycling) in both cases. In Novi Grad, *no* statistically difference was found in the mean scores of these two variables.

In Mostar (Table 34 and Table 35), a statistically significance difference *is* found in the mean scores on the dependent variable (attitude toward statement *"waste separation keeps the environment clean"*) for respondents who gained this information via internet (M=4.48; SD=0.840) and respondents who did not gain this information via internet (M=4.04; SD=1.122; t(81.864)=2.225, p=0.00). The magnitude of the differences in the means was small (eta squared = 0.045). The finding from qualitative data suggest that respondents expressed their personal interest in environmental protection and it might be assumed that they developed attitudes by reading materials on waste separation and contribution to environmental protection through web sites on the internet.

Table 34: Mean value on attitude through media source (internet) in Mostar

Attitude toward waste separation which keeps the environment clean	Information gained via internet	N	Mean*	Std. Deviation	Std. Error Mean
	Those who gained info	63	4.48	0.840	0.106
	Those who did not gain info	43	4.04	1.122	0.164

*Scale: from a min of 1(don't agree at all) to a max of 5 (very much agree) answers

Table 35: T-test for attitude on waste separation via internet in Mostar

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F.	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	8.200	0.00	2.319	104	0.022	0.434	0.187	0.063	0.804
Equal variance not assumed		5	2.225	81.864	0.029	0.434	0.195	0.046	0.821

To conclude, we found that TV and newspapers followed by Internet are the media sources from which respondents gain information most frequently. On the other hand it seems that the content of brochures has not been picked up very much by the Novi Grad respondents.

When we talk about social influence, this study finds that friends and family members as well as school had an influence. For instance, in Novi Grad, a relationship was found between the following compound variables: *recycling behavior* and *social influence* while in Mostar respondents report of having obtained information from neighbors. Similarly, also Vining and Ebreo (1990) reported that respondents turn to friends for obtaining information on environmental protection. Generally speaking we can conclude that in both cases media sources contributed more to disseminate information about the recycling system in comparison to social influence.

In terms of knowledge levels we found that some media sources i.e. TV has an influence in Novi Grad, while in Mostar no significant results were found. These results suggest that television programs should continue and effectively inform the public about recycling. Along with this, education is also needed for ordinary people in developing countries such as BiH in order to engage in environmental actions and to develop environmental ethics. De Feo and De Gisi (2010) found that knowledge levels are improved by TV, by reading newspapers and using the Internet.

In terms of attitudes, results suggest that PCCs' had an influence on respondents' attitudes toward recycling behavior. In Mostar this is in regard to the Internet while in Novi Grad no significant results were found.

Sudarmadi et al. (2001) suggest that environmental education and qualitative promotion and publicity, i.e. public communication campaigns, are important aspects to be considered with regard to environmental protection and the promotion of recycling. Environmental education is an effective strategy that could help to increase the environmental knowledge the public has and can contribute to the formation of specific attitudes towards recycling. Education and PCCs are essential for the success of any recycling scheme (Evison and Read, 2001).

6   CONCLUSION

6.1   Introduction

The research reported in this thesis centered on recycling behavior. This thesis has aimed to investigate positive and negative factors that influence recycling behavior at the household level and has focused on two cases (municipalities) located in FBiH, Novi Grad and Mostar. In the following a summary of the research outcomes for each of the initially stated objectives is provided as well as general conclusions and remarks of recycling behavior's significance.

Research objective #1: *To identify what motivational factors support recycling behavior.* Based on qualitative data, two groups of motivational factors were identified in both cases: intrinsic (general and personal satisfaction toward waste separation in contribution to environmental protection) and extrinsic (presence of PCCs, rewards, sanctions, recycling infrastructure – containers and pay-back centers and social influence). In this, this study finds a stronger presence of intrinsic motivational factors in the Novi Grad sample when compared to the Mostar sample. Extrinsic motivational factors are present in both cases. Motivational factors were further investigated with a questionnaire and results suggest that recyclers and non recyclers were/would be motivated the most by having better recycling infrastructure (e.g. containers and pay-back centers).

Research objective #2: *To identify concerns that the local community has in terms of adopting recycling behavior.* Interview data helped to identify that in Novi Grad there is a poor understanding of economic opportunities for recycling among local authorities; that respondents are concerned about plastic waste and about the insufficient number of containers. In Mostar respondents expressed concerns regarding poor collaboration and communication between the two utility companies, and regarding improper behavior i.e. actions among residents which littered public green areas.

Research objective #3: *To assess current attitudes toward recycling behavior.* Quantitative data helped to map out the positive and negative attitudes toward recycling system. In Novi Grad respondents reported a positive attitude toward KJKP Rad and its dynamic role, its very good performance in introducing the recycling practice and good collaboration with the canton and municipality. In Mostar, respondents pointed to the ethnically based division between the two utility companies which, according to the collected evidence, seems to hinder proper waste management and the introduction of recycling practice. Quantitative data allowed a further investigation of attitudes and a significant correlation between recycling behavior and attitudes was found in both samples. Quantitative data helped to identify that

respondents in both cases have a personal satisfaction for waste separation which is aligned to environmental protection.

Research objective #4: *To assess the influence of knowledge levels, respondents have, on the recycling behavior.* Quantitative data indicates that respondents have good knowledge levels about the recyclability of paper, glass and wood (recyclable materials), but also they are less knowledgeable about the recyclability of batteries, medical waste and chemical liquids (not recyclable). Aspects about disposal and degradation of recycling materials are also less known among respondents. Knowledge about other aspects e.g. benefits of the recycling system and composting is present in both cases. However, quantitative data collected for this thesis does not support the assumption that knowledge influences recycling behavior and this applies to both empirical cases.

Research objective #5: *To identify whether locally available public communication campaigns have an influence on knowledge, and on attitudes people have towards recycling.* First we looked at PCCs, specifically at media sources and social influence. Regarding media sources, TV and newspapers, along with Internet, scored the highest and are reported to be the main source of information about recycling. Regarding social influence, respondents indicate that friends and family members as well as schools are the main sources of information. Quantitative data collected for this thesis suggest that PCCs have an influence on knowledge. A significant correlation between PCCs (TV) and knowledge (regarding benefits of recycling system) was found for the Novi Grad sample. In other words, it seems that the TV had an influence on the level of knowledge respondents have about the benefits of the recycling system. In Mostar no significant correlation was found. In terms of attitudes, no significant correlation was found between PCCs and attitude in Novi Grad; however in Mostar we found a significant correlation between PCCs (Internet) and attitude *(i.e. "waste separation keeps the environment clean").*

To conclude, two cases are differentiated from each other in several segments. For instance, there was a consequence from civil war (Mostar, left as an ethnically divided municipality while Novi Grad as not divided). This also reflected the performance of utility companies in both cases which have different approaches toward waste management including recycling. The ethnical division hindered proper waste management and introduction of recycling practice in Mostar while Novi Grad did not have this connotation but rather a poor understanding towards the economic opportunities of recycling. It is clear that TV is among the most influential media source which can be useful when designing public campaigns and delivering important messages to the residents. Also, the engagement of friends and family

members in recycling can provide a significant support to others. The common aspect for both cases is respondents' care for environmental protection and a good will to start/continue recycling in their communities. Also, continuous educational programs can be beneficial in order to enhance respondents' recycling behavior.

This research provides several significant outcomes. First, recycling behavior has one of the major roles in recycling and should be considered in contextualized policy measures. Second, factors assessed in this thesis that influence recycling behavior should incorporated when developing recycling programs. Third, results got from qualitative and quantitative analysis of data are encouraging. The last, there is a potential, in both cases, to start with recycling and reduce the amount of waste sent to the landfill. Along with recycling, public communication campaigns can have a role in educating residents and giving them an opportunity to be engaged in recycling. This can have a positive outcome for the community but also for their environment.

6.2 Limitations of the thesis

Limitations of this thesis can be found in the empirical sections of this research. The research relied on respondents' self-reported answers to a questionnaire (e.g. knowledge, PCCs, concerns, attitudes and motivations). Self-reported questionnaires might not provide a precise representation of the variable, which on the other hand could be achieved by integrating other research methods (i.e. observation, taking pictures, and other statistical tests). Due to resource limitations (budget and time) both samples are of a small size and hence generalization to the whole population is not possible. Also, resource limitation did not allow the integration of other data collection methods e.g. focus groups. The empirical part of this research took place in a complex geographical context and the choice was to focus on some aspects. It is recognized that for instance, attitude is a multifaceted phenomena influenced by a number of factors, yet this thesis could not consider the social, economic, psychological and cultural elements in greater detail. Waste managment at the houshold level in FBiH turned out to be a complex issue about which little research has been conducted. This thesis could focus on some aspects of interest. However, the research conducted for this thesis could secure all answers, because of time and resource constrains. Yet this thesis point to a number of issues and areas of interest that future research may explore.

REFERENCES

Aberg, H., Dahlmann, S., Shanahan, H., Säljö, R . 1996. Towards Sound Environmental Behavior: Exploring Household Participation in Waste Management. Journal of Consumer Policy 19 (1). 45-67.

Arul, M.J. 2001. Teaching notes. Attitude: Its Nature, Development and Change. Teaching notes. Web site: http://www.geocities.com/Athens/5503/intro.html , accessed Jan 27th, 2009.

Baldassare, M., Katz, C. 1992. The Personal Threat of Environmental Problems as Predictor of Environmental Practices. Environment and Behavior 24 (5). 602-616.

Banerjee, S.B. 2002. Corporate environmentalism the construct and its measurement. Journal of Business Reserach 55. 177-191.

Barr, S. 2007. Factors Influencing Environmental Attitudes and Behaviors: A U.K. Case Study of Household Waste Management. Environment and Behavior 39 (4). 435-473.

Barr, S., Gilg A.W., Ford, N.J. 2001. Differences Between Household Waste Reduction, Reuse and Recycling Behaviour: a Study of Reported Behaviours, Intentions and Explanatory Variables. Environmental & Waste Management 4 (2). 69-82.

Barr, S., Gilg, A. 2006. Sustainable lifestyles: Framing environmental action in and around the home. Geoforum 37 (6). 906-920.

Becic, A. 2010. Grad osigurao dvije plaće za djelatnike. Dnevni list, 2010. Website: http://www.dnevni-list.ba/index.php?option=com_content&view=article&id=14182:grad-osigurao-dvije-plae-za-djelatnike&catid=2:mostar&Itemid=3, accessed Dec 18th, 2010.

Berenguer, J., Corraliza, J.A., Martín, R. 2005. Rural-Urban Differences in Environmental Concern, Attitudes, and Actions. European Journal of Psychological Assessment 21 (2). 128–138.

Burn, S.M., Oskamp, S. 1986. Increasing Community Recycling with Persuasive Communication and Public Commitment. Journal of Applied Social Psychology 16 (1). 29-41.

Calò, F, Parise, M. 2009. Waste management and problems of groundwater pollution in karst environments in the context of a post-conflict scenario: The case of Mostar (Bosnia Herzegovina). Habitat International 33 (1). 63-72.

Carrus, G., Passafaro, P., Bonnes, M. 2008. Emotions, habits and rational choices in ecological behaviors: The case of recycling and use of public transportation. Journal of Environmental Psychology 28. 51–62.

Chan, K. 1998. Mass communication and pro-environmental behavior: waste recycling in Hong Kong. Journal of Environmental Management 52 (4). 317-325.

Commission for Reforming the City of Mostar. 2003. Recommendations of the Commission Report of the Chairman. Official Gazette of the City of Mostar.

Commission of the European Communities. Bosnia and Herzegovina 2009 Progress Report. Brussels 2009.

De Feo G, De Gisi D. 2010. Public opinion and awareness towards MSW and separate collection programs: A sociological procedure for selecting areas and citizens with a low level of knowledge. Waste Management 30(6). 958 – 976.

De Young, R. 1986. Some Psychological Aspects of Recycling: The Structure of Conservation – Satisfactions. Environment and Behavior 18 (4). 435-449.

De Young, R. 2000. Expanding and Evaluating Motives for Environmentally Responsible Behavior. Journal of Social Issues 56 (3). 509–526.

DEFRA. 2001. Survey of Public Attitudes to Quality of Life and to the Environment. London, UK.

Derksen, L., Gartrell, J. 1993. The Social Context of Recycling. American Sociological Review 58 (3). 434-442.

Diamond, W.D., Loewy, B.Z. 1991. Effects of Probabilistic Rewards on Recycling Attitudes and Behavior. Journal of Applied Social Psychology 21 (19). 1590-1607.

Đipa, A. 2005a. Dokazali na djelu da se bez njih ne može. Bilten Informativni glasnik KJKP Rad 1. 8.

Đipa, A. 2005b. Realizovan projekt ekološke edukacije »Smanjimo i reciklirajmo«. Bilten Informativni glasnik KJKP Rad 2. 8-9.

Đipa, A. 2006a. Međunarodna obuka o upravljanju krutim otpadom za zemlje Jugoistočne Evrope. Bilten Informativni glasnik KJKP Rad 4. 5-7.

Đipa, A. 2006b. Počela edukacija za ISO 14000. Bilten Informativni glasnik KJKP Rad 5. 11.

Đipa, A. 2006c. Program obuke prodavača javnih nabavki u Bosni i Hercegovini. Bilten Informativni glasnik KJKP Rad 5. 10.

Do Valle, O.P., Reis, E., Menezes, J., Rebelo, E. 2004. Behavioral determinants of household recycling participation: The Portuguese Case. Environment and Behavior 36 (4). 505-540.

Dunlap, R., Van Liere, K. 1978. The New Environmental Paradigm. Journal of Environmental Education 9. 10–19.

Dwyer, W.O., Leeming, F.C., Cobern, M.K., Porter, B.E., Jackson, J.M. 1993. Critical Review of Behavioral Interventions to Preserve the Environment: Research Since 1980. Environment and Behavior 25 (3). 275 – 321.

Ebreo, A., Vining, J. 2000. Motives as predictors of the public's attitudes toward solid waste issues. Environmental Management 25 (2). 153-168.

Ecoplan, Grad Mostar. 2006. Izrada lokalno ekološkog akcionog plana (LEAP) grada Mostara. 1-87.

European Bank. 2007. Strategy for Bosnia and Herzegovina. Document of the European Bank for reconstruction and development.

European Commission. 2004. Waste Recycling Pilot Project in Bosnia and Herzegovina Waste Recycling Handbook. 1-80.

European Environmental Agency. Municipal waste generation per capita. Website: http://www.eea.europa.eu/data-and-maps/figures/municipal-waste-generation-per-capita-in-western-europe-eu-15-new-member-states-eu-12-eu-countries-eu-27-and-total-in-europe-eu-27-turkey-croatia-norway-iceland-switzerland-3, accessed 10th August, 2011.

Evison, T., Read, A.D. 2001. Local Authority recycling and waste – awareness publicity/promotion. Resources, Conservation and Recycling 32. 275-291.

Fahy, F. (2005). The right to refuse: Public attitudes and behavior towards waste in the west of Ireland. Local Environment 10 (6). 551–569.

Federal ministry of environment and tourism. 2010. State of Environment in the Federation of Bosnia and Herzegovina. ISBN 978-9958-9089-9-6.

Federal ministry of environment and tourism. 2011. Fedral Plan for Waste Management 2011 - 2016.

Federalno ministarstvo okoliša i turizma. 2010. Strategija Zaštite Okoliša Federacije Bosne i Hercegovine 2008-2018.

Federal Office of Statistics. 2011. Kanton Sarajevo u brojakama. Website: http://www.fzs.ba/Podaci/09.pdf , accessed 19th November, 2011.

Federal Office of Statistics, 2011. Hercegovačko-neretvanski kanton u brojkama. Website: http://www.fzs.ba/Podaci/07.pdf , accessed 19th November, 2011.

Field, A. 2005. Discovering Statistics Using SPSS. Sage Publications: London.

Fishbein, M., Ajzen, I. 1975. Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research (Reading: Addison-Wesley).

Fransson, N., Gärling, T. 1999. Environmental concern: Conceptual definitions, measurement methods, and research findings. Journal of Environmental Psychology 19. 369-382.

Friends of the Earth. 2008. Recycling: why it's important and how to do it. 1-14.

Gakovic, S. Ništa od zajedničkog komunalnog preduzeća u Mostaru. Irib World Service, 2010.Website:http://bosnian.irib.ir/analize/izvietaji/item/90885-sanela-gakovi%C4%87-ni%C5%A1ta-od-zajedni%C4%8Dkog-komunalnog-preduze%C4%87a-u-mostaru, accessed Dec 20th, 2010.

Gamba, R.J., Oskamp, S. 1994. Factors Influencing Community Residents' Participation in Commingled Curbside Recycling Programs. Environment and Behavior 26 (5). 587-612.

Gonzalez-Torre, P.L., Adenso-Dıaz, B. 2005. Influence of distance on the motivation and frequency of household recycling. Waste Management 25. 15–23.

Gray, D.E. 2004. Doing research in the real world. 1st edition. Sage Publication: London.

Grob, A. 1995. A Structural model of environmental attitudes and behaviors. Journal of Environmental Psychology 15. 209-220.

Grodzinska-Jurczak, M., Tarabula, M., Read, A.D. 2003. Increasing participation in rational municipal waste management: a case study analysis in Jaslo City (Poland). Resources, Conservation and Recycling 38. 67- 88.

Guagnano, G.A., Stern, P.C., Dietz, T. 1995. Influences on Attitude-Behavior Relationships: A Natural Experiment with Curbside Recycling. Environment and Behavior 27 (5). 699-718.

Hadden, S.G. 1991. Public perception of hazardous waste. Risk Analysis 11 (1). 47-57.

Hopper, J.R., Nielsen, J.M. 1991. Recycling as Altruistic Behavior: Normative and Behavioral Strategies to Expand Participation in a Community Recycling Program. Environment and Behavior 23 (2). 195-220.

Hornik, J., Cherian, J. 1995. Determinants of Recycling Behavior: A Synthesis of Research Results. Journal of Socio-Economics 24 (1). 1-24.

Howenstine, E. 1993. Market Segmentation for Recycling. Environment and Behavior 25 (1). 86-102.

Hungerford, H.R., Volk, T.L. 1990. Changing Learner Behavior Through Environmental Education. Journal of Environmental Education. 8 – 21.

International Crisis Group. 2009. Bosnia: A Test of Political Maturity in Mostar. Crisis Group Europe Briefing 54. 1-14.

Jeffrey, A. 2006. Building state capacity in post-conflict Bosnia and Herzegovina: The case of Brcko District. Political Geography 25 (2). 203-227.

Kantonalno ministarstvo prostornog uređenja i zaštite okoliša. Informacija o upravljanju otpadom u Kantonu Sarajevo. 2009. 1-25.

Katzev, R., Blake, G., Messer, B. 1993. Determinants of Participation in Multi-Family Recycling Programs. Journal of Applied Social Psychology 23 (5). 374-385.

Cantonal Environmental Action Plan - KEAP (Kantonalni Okolišni Akcioni Plan). 2010. Kanton Sarajevo. 1-132.

Klemencic M., Schofield C. 1996. Mostar: make or break for the federation? Boundary and Security Bulletin 4 (2). 72-76.

Knussen, C., Yule, F., MacKenzie, J., Well, M. 2004. An analysis of intentions to recycle household waste: The roles of past behavior, perceived habit, and perceived lack of facilities. Journal of Environmental Psychology 24. 237–246.

Lee, Y-J., De Young, R., Marans, R.W. 1995. Factors influencing individual recycling behavior in office settings: A Study of Office Workers in Taiwan. Environment and Behavior 27 (3). 380-403.

Li, S. (2003). Recycling Behavior Under China's Social and Economic Transition: The Case of Metropolitan Wuhan. Environment and Behavior 35 (6). 784-801.

Lindén, A. L., Carlsson-Kanyama, A. 2003. Environmentally Friendly Disposal Behavior and Local Support Systems: lessons from a metropolitan area. Local Environment 8 (3). 291-301.

Luyben, P.D., Bailey, J.S. 1979. Newspaper Recycling: The Effects of Rewards and Proximity of Containers. Environment and Behavior 11 (4). 539 – 557.

Martin, M., Williams, I.D., Clark, M. 2006. Social, cultural and structural influences on household waste recycling: A case study. Resources, Conservation and Recycling 48. 357–395.

Martinez, M.D., Scicchitano, M.J. 1998. Who Listens to Trash Talk? Education and Public Media Effect on Recycling Behavior. Social Science Quaterly 79 (2). 288-300.

McDonald, S., Ball, R. 1998. Public participation in plastics recycling schemes. Resources, Conservation and Recycling 22. 123–141.

McDonald, S., Oates, C. 2003. Reasons for non-participation in a kerbside recycling scheme. Resources, Conservation and Recycling 39. 369-385.

Medic, M. Mostar se ponovo gusi u smecu, Parkovi i dalje u strajku. Vecernji, 2010. Website: http://www.vecernji.ba/vijesti/mostar-se-ponovo-gusi-smecu-parkovi-dalje-strajku-clanak-233792, accessed Dec 19th, 2010.

Meneses, G.D., Palacio, A.B. 2005. Recycling Behavior: A Multidimensional Approach. Environment and Behavior 37 (6). 837-860.

Ministarstvo trgovine, turizma i zaštite okoliša. 2010. Plan upravljanja otpadom Hercegovačko-neretvanskog kantona/županije 2011-2021.

Minton, A.P., Rose, R.L. 1997. The Effect of Environmental Concern on Environmentally Friendly Consumer Behavior: An Exploratory Study. Journal of Business Research 40. 37-48.

MORI. 2002. Public Attitudes Towards Recycling and Waste Management Quantitative and Qualitative Review. The Strategy Unit, Cabinet Office, London, UK.

National Environmental Action Plan – NEAP. Bosnia and Herzegovina. 2003. 1-131.

Nixon, H., Saphores, J-D.M. 2009. Information and the decision to recycle: results from a survey of US households. Journal of Environmental Planning and Management 52 (2). 257–277.

Ojala, M. 2008. Recycling and Ambivalence: Quantitative and Qualitative Analyses of Household Recycling Among Young Adults. Environment and Behavior 40. 777-797.

Oom Do Valle, P., Rebelo, E., Reis, E., Menezes, J. 2005. Combining Behavioral Theories to Predict Recycling Involvement. Environment and Behavior 37 (3). 364-396.

Oskamp, S., Harrington, M.J., Edwards, T.C., Sherwood, D.L., Okuda, S.M., Swanson, D.C. 1991. Factors influencing household recycling behavior. Environment and Behavior 23 (4). 494-519.

Pallant, J. 2005. SPSS Survival Manual. Open University Press, Berkshire.

Palmer, J.A., Suggate, J. 1996. Infleunces and Experiances Affecting the Pro-environmental Behavior of Educators. Environmental Education Research 2 (1). 109-121.

Panjeta, A. 2006. Od napasti do koristi. Fondeko 20. 54-55.

Parliamentary Office of Science and Technology. 2005. Recycling household waste. Postnote 252. 1-4.

Perrin, D., Barton, J. 2001. Issues associated with transforming household attitudes and opinions into materials recovery: a review of two kerbside recycling schemes. Resources, Conservation and Recycling 33. 61–74.

Pieters, R.G.M. 1991. Changing Garbage Disposal Patterns of Consumers: Motivation, Ability, and Performance. Journal of Public Policy & Marketing 10 (2). 59-76.

Read, A.D. 1997b. Knocking on doors to boost recycling, Recycling World, 21. Website: http://www.wastewatch.org.uk, accessed June 10th, 2010.

Refsgaard, K., Magnussen, K. 2009. Household behavior and attitudes with respect to recycling food waste - experiences from focus groups. Journal of Environmental Management 90. 760-771.

Reid, D.H., Luyben, P.D., Rawers, R.J., Bailey, J.S. 1976. Newspaper Recycling Behavior: The Effects of Prompting and Proximity of Containers. Environment and Behavior 8 (3). 471-482.

Rujnić-Sokele, M., Šercer, M., Pilipović, A. 2008. PET bottles recycling waste – utilization and properties. Archives of Materials Science 29 (1-2). 68-72.

Seacat, J.D., Northrup, D. 2010. An information-motivation-behavioral skills assessment of curbside recycling behavior. Journal of Environmental Psychology. 1-9.

Shekdar, A.V. 1999. Municipal solid waste management – the Indian perspective. Journal of Indian association for environmental management 26(2). 100-108.

Sidique, S.F., Lupi, F., Joshi, S.V. 2010. The effects of behavior and attitudes on drop-off recycling activities. Resources, Conservation and Recycling 54. 163-170.

Smajkic M. 2010. U Mostaru nadlezno pet preduzeca, a haos u odvozu smeca. Dnevni avaz. European Banksite:

http://www.dnevni-avaz.ba/feed/dogadjaji/panorame/18652-mostar_nadlezni_smece_haos.txt, accessed Dec 19th, 2010.

Smith, B.J., Ferguson, C., McKenzie, J., Bauman, A., Vita, P. 2002. Impacts from repeated mass media campaigns to promote sun protection in Australia. Health Promotion International. 51 – 60.

Stern, P.C. 1992. Psychological Dimensions of Global Environmental Change. Annual Review Psychology 43. 269-302.

Stern, P.C., Dietz, T., Kalof, L. 1993. Value Orientations, Gender and Environmental Concern. Environment and Behavior 25 (23). 322-348.

Stoykova, I. 2006. Zero waste as a Best Environmental Practice to address the POPs issues created by waste incineration and/or landfilling of waste - Case Study from Sofia, Bulgaria. International POPs Elimination Project, Romani Baht Foundation. 1-20.

Sudarmadi, S., Suzuki, S., Kawada, T., Netti, H., Soemantri, S., Tugaswati, A.T. 2001. A Survey of Perception, Knowledge. Awareness, and Attitude in Regard to Environmental Problems in a Sample of Two Different Social Groups in Jakarta, Indonesia. Environment, development and sustainability 3(2). 169-183.

Thomas, C. 2001. Public understanding and its effect on recycling performance in Hampshire and Milton Keynes. Resources, Conservation and Recycling 32. 259–274.

Thomas, C., Yoxon, M., Slater R., Leaman, J. 2004. Changing Recycling Behavior: An Evaluation of Attitudes and Behavior to Recycling in the Western Riverside Area of London. Waste 2004 Integrated Waste Management and Pollution Control Conference, London, UK.

Tietenberg, T. H. 1994. Environmental economics and policy. New York: Harper Collins.

Timlett, R.E., Williams, I.D. 2008. Public participation and recycling performance in England: A comparison of tools for behavior change. Resources, Conservation and Recycling 52 (4). 622-634.

Tucker, P. 2003. Understanding Recycling Behavior Volume 2: A Technical Monograph. ISBN 1-903978-16-5.

United Nations Economic Commission for Europe. 2011. Environmental performance reviews, Second review. ECE/CEP/162, ISSN: 1020-4563.

Vining, J., Ebreo, A. 1990. What Makes a Recycler? A Comparison of Recyclers and Nonrecyclers. Environment and Behavior 22 (1). 55-73.

Vining, J., Ebreo, A. 1992. Predicting Recycling Behavior from Global and Specific Environmental Attitudes and Changes in Recycling Opportunities. Journal of Applied Social Psychology 22 (20). 1580-1607.

Vining, J., Linn, N., Burdge, R.J. 1992. Why Recycle? A Comparison of Recycling Motivations in Four Communities. Environmental Management 16 (6). 785-797.

Williams, I.D., Kelly, J. 2003. Green waste collection and the public's recycling behavior in the Borough of Wyre, England. Resources, Conservation and Recycling 38. 139-159.

Wilson DC, Araba AO, Chinwah K, Cheeseman CR. 2009. Building recycling rates through the informal sector. Waste Manage 29. 629 – 635.

Wilson, C.D.H., Williams, I.D. 2007. Kerbside collection: A case study from the north-west of England. Resources, Conservation and Recycling 52. 381–394.

World Bank. 2008. Bosnia and Herzegovina Solid Waste Management Project II Environmental Framework and Management Plan. E1839.

Yin, R. K. 2003. Case Study Research: design and methods. Sage Publications, London.

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APPENDIX Ia

List of questions for all respondent groups except for respondent group, *residents*

1. What is the major environmental issue that municipality has?
2. How much is necessary for the municipality to adopt recycling and try to minimize the waste?
3. Do you think that schools, universities and institutions pay sufficient attention to this issue?
4. In your opinion which are the structural barriers for recycling to succeed in this municipality?
5. Do you think that rural emigrants have a different approach to waste as compared to the urban residents?
6. Do you think that before the civil war, people were recycling more and were more concerned about the environment?
7. Which institutional factors are needed in order to influence people's behavior to recycle?
8. What are the institutional barriers for recycling?
9. Do you think that many activities and campaigns have been done and exposed to people that it is now expected from them to start recycling? Can you name some, or direct me to the organizers or promoters?
10. Do you think that the quota of recycled waste is high in this municipality? If yes, do you have some data on this? If not, why?
11. Do you think there is a miscommunication between people who separate waste and collectors who put the garbage to the truck, and between collectors and workers at the landfill?
12. Which incentives should be set up for people to improve recycling?
13. What is the current waste management policy of FBiH?
14. How are responsibilities in waste management distributed in FBiH? And in this canton?
15. What methods are used for processing waste?
16. Is there a sufficient storage place on current landfill for the following years?
17. Do the waste management authorities have the necessary infrastructure and specialized personnel for carrying out this activity?
18. In order to have a successful recycling, do you think it necessary to have a separate and unique law on recycling? Would it make any difference? Why yes, why not?
19. Do you think recycling should be optional or required by the institutions?

APPENDIX Ib

List of questions for the respondent group, *residents*

1. What are your major concerns about waste in your community?
2. Does it bother you when you see litter on the street or in the park? Why?
3. Are you concerned when you see mix of recyclable materials in containers that are supposed to be separated such as paper, glass or plastic?
4. Do you recycle? If not, what is your reason for not recycling? If yes, what materials do you recycle and what do you do with them?
5. Would you feel bad if your neighbor recycles and you don't? Or maybe if you would read or hear by campaigns?
6. Do you think if you start recycling it would influence others to start recycling?
7. Do you think people should recycle? Why?
8. Do you think that people should be punished (by monetary penalty) for not recycling or throwing the litter on the street or in the park?
9. Do you think recycling should be optional, or required by the law?
10. Do you ever think about these things, for instance: that 1 plastic bag can be reused few times when you go for a shopping or that 1 glass jar can be reused for filling it with other ingredients in the kitchen?
11. Do you ever think about where does all waste we produce and throw in the containers go and how long will landfill accept our waste? Are there going to be any other options for landfilling or minimizing the waste?
12. What would be the first initiator or motivation for you to start recycling?
13. Do you think you have all necessary things to start recycling (e.g. place/storage, separated containers, practice...)?
14. Did you notice any new containers in your community for recycling?
15. In most countries, people are getting money back for some plastic and glass bottles, do you think FBiH should introduce a similar approach/practice?
16. Do you have enough knowledge about recycling that you can start doing it now? If yes, where did you gain this knowledge?
17. Are you aware which materials are recyclable and which are not?
18. Who should be responsible for people's behavior in terms of recycling?
19. Have you ever heard, seen or read about waste management and recycling? If so, where have you heard, seen or read about?

APPENDIX II

Questionnaire

University of Nova Gorica, Slovenia
www.ung.si

Please **read carefully** the following questions, **circle your best response** (1 to 5) or **write down as indicated**. The information will be confidential and **only** used for the thesis research.

1. Do you separate your waste at home? (circle one option)
Yes   No   Don't know

2. If not, can you please tell us why you don't separate?
_____

3. In my household, I dispose my waste:
Every day   Once a week   More than 2 times per week

4. How much the following motivates/would motivate you to separate your waste at home? (1 – not at all…5 – very much):

Establishment of pay-back centers	1	2	3	4	5
Presence of public campaigns (e.g. brochure) informing the population how to separate waste	1	2	3	4	5
Presence of sufficient containers and information labels for waste separation	1	2	3	4	5
Presence of eco inspection	1	2	3	4	5
Providence of financial economic rewards	1	2	3	4	5
Providence of non - financial economic rewards (e.g. discount in food shopping)	1	2	3	4	5
Presence of monetary penalty	1	2	3	4	5

5. .How much do the following issues concern you?
(1 – not at all…5 – very much):

Full (or overloaded) waste separated containers	1	2	3	4	5
Presence of odor, birds and insects in containers for waste separation	1	2	3	4	5
No containers for waste separation	1	2	3	4	5
No labels and info for waste separation	1	2	3	4	5
No place in my kitchen for waste separation	1	2	3	4	5
No eco inspection	1	2	3	4	5
No monetary penalty	1	2	3	4	5

6. How much do you agree with the following:
(1 – strongly disagree…5 – strongly agree)

I separate waste because it makes me feel good to do the right thing	1	2	3	4	5
I separate waste because it keeps the environment where I live clean	1	2	3	4	5
I separate waste because everybody else does it as well	1	2	3	4	5
I separate waste because it allows a reduction of the amount of mixed waste in my kitchen	1	2	3	4	5

7. How much do you agree with the following: (1 – strongly disagree…5 – strongly agree):

Waste separation takes a lot of time, effort and space	1	2	3	4	5
Waste separation causes messiness in my kitchen	1	2	3	4	5
For waste separation, one must know which waste goes to which container	1	2	3	4	5

8. Which are the following materials recyclable?

Paper	Yes	No	Don't know
Glass	Yes	No	Don't know
Batteries	Yes	No	Don't know
Medical waste (tablets, drugs)	Yes	No	Don't know
Wood	Yes	No	Don't know
Chemical liquids	Yes	No	Don't know

9. Separation of organic waste (e.g. leaves, peelings from fruits and vegetables) from my mixed waste can be used as compost (e.g. a fertilizer) at the farmland for gardens.

Yes   No   Don't know

10. Which of the following needs to be done before disposing waste into separated containers:

Labels on plastic or glass containers should be removed	Yes	No	Don't know
Plastic or glass containers should be washed	Yes	No	Don't know
Lids from plastic or glass containers should be removed	Yes	No	Don't know
Cartons should be pressed/made flat	Yes	No	Don't know
Only clean paper should be disposed	Yes	No	Don't know

11. The recycling system includes:
(circle one option):

Waste separation at home	Yes	No	Don't know
Waste separation at landfill	Yes	No	Don't know
Manufacturing and producing new materials	Yes	No	Don't know
Reusing and producing new materials	Yes	No	Don't know

12. The recycling system helps to (circle one option):

Conserve natural resources	Yes	No	Don't know
Reduce waste	Yes	No	Don't know
Save energy	Yes	No	Don't know
Reduce use of landfill	Yes	No	Don't know

13. From which of the following sources have you watched/heard/read and obtained information about the recycling system?

Television	Yes	No	Don't know
Newspapers	Yes	No	Don't know
Radio stations	Yes	No	Don't know
Magazines	Yes	No	Don't know
Internet	Yes	No	Don't know
Brochures	Yes	No	Don't know
Friends and family members	Yes	No	Don't know

Neighbors	Yes	No	Don't know
School	Yes	No	Don't know
University	Yes	No	Don't know
Waste company	Yes	No	Don't know

Other (which?) _____

*Please answer also question 17

14. Recycling paper helps to:

Pollute less water and air	Yes No Don't know
Save natural timber resources	Yes No Don't know
Save gasoline, electricity and water	Yes No Don't know

15. Which of the following is true?

It takes about 100 years for aluminum cans to degrade	Yes No Don't know
It takes about 1000 years for plastic bag to degrade	Yes No Don't know
Glass bottles are not degradable	Yes No Don't know

16. How much do you agree that the following actors have a key role in making the recycling system work?

Communal company for waste management	1 2 3 4 5
Retailers	1 2 3 4 5
Recycling facility	1 2 3 4 5
Households	1 2 3 4 5
Manufactures	1 2 3 4 5

17. How much do you agree with the following statements about brochures provided by the public campaigns?
(1 – strongly disagree…5 – strongly agree):

These have given enough information about the recycling system	1 2 3 4 5
These have given enough information about instructions how to separate waste	1 2 3 4 5
They have given enough information about the recycling system law and its implementation	1 2 3 4 5

Demographic data

Status of residency:
1. Always lived here
2. Moved from rural area _____
3. Moved from urban area _____
4. Other_____
Gender: 1. Male   2. Female
Year of birth:
Number of members in household:
Current work:
1. Small enterprise
2. Big enterprise
3. Government
4. NGO
2. Self-employed (private)
3. Other
Highest education level:
1. Secondary school
2. High school
3. Universi
ty degree
4. Higher level (M.Sc. or D.Ph.)