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**PROSPECTIVE TEACHERS' BELIEFS REGARDING
INFORMATION SEEKING AND RESPONSIBLE BEHAVIOUR
TOWARDS ENVIRONMENT AT POST GRADUATE LEVEL**

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ABSTRACT

The study was carried out to identify the prospective teachers' beliefs regarding information seeking and responsible behaviour towards environment at postgraduate level. The main emphasis was in this study to measure the male and female prospective teachers' beliefs about information seeking and responsible behaviour towards environment among different disciplines. A sample consisting of 128 prospective teachers enrolled in science teacher education programs responded to this study. Data was collected from prospective teachers, through a self-administered questionnaire based on two subscales: beliefs about information seeking and responsible behavior towards environment. Results indicated a significant mean difference in male and female prospective teachers' beliefs regarding information seeking and responsible behaviour towards environment. Male prospective teachers held more significant mean scores on both subscales compared to female prospective

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teachers. Moreover significant mean scores difference was found among prospective teachers of different discipline on information seeking behavior towards environment subscale.

Key words: Information seeking, Responsible behavior, Environment, Postgraduate level.

INTRODUCTION

Education is being imparted in synchronization with a change in human behaviour definitely in the positive direction. This positive change would not only shape the behaviour but would match and coincide with the intents of the time community and the need (Hungerford & Volk, 1990). Behaviour is a stipulated action and the resultant product of knowledge and attitude (Mc Kenzie & Smith, 1999; Fishbein, 1967) turning into the belief system followed by an individual and strives to achieve the competence to effectively promote and achieve the desired goals (Oreg & Gerro, 2006). Over the span of time citizenship education gained impetus with the multiplicity of dimensions; environment responsiveness among these is the optimized one. Among the emerging areas environment education in order of priority occupied a better rank.

It is not possible for an individual to live in a society without having any concern (information seeking behavior towards environment) for it. Individual will have to be well informed, since it is not a matter of rights but the responsibilities of the individual that has to be discharged by him/her. Learning occurs in connection with action and is part of the cognitive process (Von Wright, 1994). Where the individual lives produces some waste which he/she cannot hold with for a longer period of time it needs to have the knowledge that what way that has to be disposed. The utilities provided are to be paid for, but in case of default those are suspended or some time permanently discontinued. Epidemics and calamities are not restricted to an individual but would be the national concerns; each and every person composes a unit of the nation. Population explosion, immigration and migration, scarcity of resources, living with the provision of amenities, judicious use of land and natural resources need one to be abreast with such local, national and global concerns which are associated with the environment. The migratory birds, rare species like blind dolphin are not only the treasures but the elements of the echo chains, these have to be protected, which would only be possible through remaining environmentally updated. There is a need for knowledge and skills for problem-solving and critical and creative thinking (Voutilainen, Mehtäläinen &

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Niiniluoto, 1991). The old static conception of knowledge has to be replaced with a dynamic conception of knowledge. According to the dynamic view knowledge is something continuously changing and growing when individuals are actively using and producing it (Voutilainen et al., 1991).

Environmental education is more than just conveying information, however (Stapp, 1970; Monroe, 2003). It is also important to help learners gain experiences and skills so that they can engage in solving environmental problems. Skills such as communication, decision-making, analysis, and ecosystem action can be part of a school curriculum to improve responsible environmental behavior (Winther, Volk, & Hungerford, 1994).

Pro-environmental behaviour is believed to be a result of knowledge cast into attitudes and operationalized as a specific behaviour. This eagerness is reflected in the driving force within an individual to attend to this one environment action with efficacy which means a person's confidence or belief about his/her ability to successfully perform this particular action (Oreg & Gerro, 2006). Early models of pro-environmental behavior depict the intertwined relationship between the peoples' environmental knowledge, attitude and behavior in a more generic sense (Burgess, Harrison, & Filius, 1998).

Kollmuss and Agyeman (2002) stated that direct experiences would supplant more influence on individuals' behaviour rather than indirect experiences. It is also assumed that knowledge and attitudes towards environment have stronger influence on individuals' indirect actions than on individuals' direct pro-environmental behaviour. Hines, Hungerford and Tomera (1986) conducted a meta-analysis with 128 existing studies for pro-environmental behavior and identified the variables which are linked with environmentally responsible behavior.

Hines et al. (1986) presented their model of responsible behaviour that was fundamentally based on Ajzen and Fishbein's (1980) theory of planned behavior. There is a close association between the following variables on responsible behaviour towards environment.

Information of issues: A person has to be well acquainted with the environmental problems and their causes of persistence.

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Information about action strategies: A person has to be recognizable about the role he/she can play in minimizing the contributive effect on the environmental problem from his/her end.

Locus of control: It relates to individual's belief and confidence about his/her ability to bring about change through his/her behavior or actions. Individuals with internal locus of control would have the confidence to bring about a change through their actions as compared to those individuals who have external locus of control or less confidence to bring about change through their actions.

Attitudes: Attitudes at the first level are the thinking pattern and at the second the courage to act upon. People with strong environmental attitudes are more likely to involve in environmental activities.

Verbal commitment: The communicated willingness to take action shows some indication about the individual's willingness to engage in environment protecting activities.

Responsible behavior: A person with stronger sense of personal responsibility may have likely to have environmental responsible behavior.

There is no consensus about the single framework of pro-environment behavior which can explain it completely; environmental behavior is too complicated trait that cannot be visualized through single diagram (Kollmuss & Agyeman, 2002).

There is empirical evidence that there are some factors which play an important role in the development of responsible behaviour towards environment, including

- a) Gender and education: Research evidence about the gender and level and quality of education translated into education variables that influence pro-environmental attitude and environmentally responsible behavior. Females are usually assumed to have less general knowledge about environment as compared to males. The persons having more extensive and longer years of education are also assumed to have extensive knowledge about the environment. But more education might be not a significant factor which increases pro-environmental behavior (Fliegenschnee & Schelakovsky, 1998, Lehmann, 1999).

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- b) Culture: Cultural and societal norms have substantial influence in the shaping of human behavior. Cultural values can motivate people to manifest environmentally responsible behaviour for the sustainability of the healthy society (Oreg & Gerro, 2006).
- c) Motivation: Motivation is a momentous factor of behaviour which steers the behaviour to be more enactive. "Motivation is the reason for behaviour or strong internal stimulus around which behavior is organized" (Kollmuss & Agyeman, 2002). Motives for behavior may be overt or covert, geared by the conscious or unconscious drives that reinforce behaviour to do specific action. The fact that motivation plays an important role in developing responsible behaviour towards environment in human beings is well substantiated with the research orientation (Moisander, 1998).
- d) Empowerment variables: Empowerment variables play a significantly tangible role in the training of environmentally responsible behavior in citizens. These variables guide human beings to be conscious considerate and concerned in bringing about resolute change in environment which can resolve the environmental issues. Empowerment has significant place in environmental education to train the people about the environmental problems (Hungerford & Volk, 1990).
- e) Knowledge about environment: There is a strong relationship between environmental knowledge and awareness with pro-environmental behavior. Individuals who have basic knowledge of environment and its issues can put in more conscious efforts in protecting the environment acting in an environmentally responsible direction (Fliegenschnee & Schelakovsky, 1998).
- f) Values: Values are found more contributive in shaping behavior. A person's values are determined through society, family, neighbors and peer group (Fuhrer, Kaiser, Seiler, & Maggi, 1995). What factors contribute in shaping the environmental values? Chawla (1998) conducted interviews from professional environmentalists and asked who influenced their decisions to become environmentalists. She identified the following factors which contributing significantly in developing the environmentally responsible behavior in people. Childhood experiences about nature, experiences about the pro-environmental destruction, education it level quality and extent of exposure, mastery experiences from friends and teachers, pro-environmental values held by family.

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The current research will be the pioneer study in the context of Pakistan which will contribute a significant role to identify the prospective teachers' beliefs about information seeking and responsible behaviour towards environment enrolled in science teacher education programs. This study will provide the baseline information about the consistency in beliefs about information seeking and responsible behaviour towards environment between male and female prospective teachers. It is a general perception that prospective teachers enrolled in science teacher education programs tend to demonstrate more information seeking and responsible behaviour towards environment that's why three science teacher education programs such as Mathematics, Physics and Chemistry were selected as a sample for this study. The results of the study will be helpful to investigate the effectiveness of science teacher education programs and will also provide information about which science teacher education is more effective for the development of information seeking and responsible behaviour towards environment.

This study tested the following hypotheses:

There is a significant mean score difference between male and female prospective teachers' beliefs on a) information seeking behaviour towards environment subscale; and on b) responsible behaviour towards environment subscale.

There is a significant mean score difference in beliefs of prospective teachers related to different disciplines on a) information seeking behaviour towards environment subscale; and on b) responsible behaviour towards environment subscale.

METHOD

Participants

The study was conducted through a survey. Three randomly selected intact classes of prospective teachers were selected in this study. Approximately 128 questionnaires were collected from prospective teachers enrolled in science teacher education programs, 38 to M. Sc Mathematics and B. Ed, 44 to M. Sc Chemistry and B. Ed and 46 to M. Sc Physics and B. Ed. There were total of 71 male and 57 female prospective teachers in this study. The majority of the prospective teachers were having the age group of 20 to 24 years old with a few prospective teachers were slightly older (25 to 30 years). Data were collected from prospective teachers at the end of their degree program as the purpose of this study was to determine how well these prospective teachers have beliefs

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about information seeking and responsible behaviour towards environment before leaving the university.

Measures

Researchers developed fourteen close-ended and three open-ended items to explore beliefs regarding information seeking and responsible behaviour towards environment. Two indicators, beliefs about information seeking behaviour and responsible behaviour towards environment were drawn from an international literature (Hines et al., 1986; Oreg & Gerro, 2006; Burgess et al. 1998; Farmer, Knapp, & Benton, 2007). Open ended items were used to collect information about the environmental problems, dominant feature of environment and involvement in community activities.

Close Ended Questionnaire

The close-ended responses were collected on a 5-point Likert scale and converted into a numerical scale (Strongly agree=5, Agree=4, Uncertain=3, Disagree=2, Strongly disagree=1).

The frequency distribution, mean scores, and standard deviation of each variable were calculated to be well aware of data structure and its statistical applications and implications.

Principal component factor analysis was initially performed in turn on the full number of 14 items making up the two hypothesised scales of information seeking and responsible behaviour towards environment. The factor analysis was followed by an oblique rotation of the factor axes as it is commonly known that if more than one factor is present, these factors are likely to be correlated in psychological research (Youngman, 1979; Norusis, 1990). In principal components factor analyses, the factor axes are at right angles, in other words the factors are set to be uncorrelated, which might be quite wrong in practice.

The factor analysis showed the very strong first indicator of information seeking behaviour towards environment accounting for 42.7% of the total item variance. A second much weaker indicator of responsible behaviour towards environment took 8.6% of variance. Having confirmed the item allocation to the two indicators, each set of items was subject to further validity and reliability checks.

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First Subscale: Students' belief about information seeking behavior towards environment

A factor analysis of the identified six items making up this scale was confirmed as a single factor accounting for 57.8% of the total item variance. The items and their factor loadings appear in table 1. A scale made by totalling the scores on each of the six items has a high Cronbach Alpha reliability of 0.85 (N=128).

This factor expresses the acquisition of information about environmental issues from personal life, books, media, newspaper and teachers and getting information for the conservation of natural resources from environmental conservation documentaries.

The factor validates the choice of items purported to measure students' beliefs regarding *information seeking towards environment* derived from the international literature. All items have high loadings above 0.7 which indicates the good validity of the scale, especially items (2) and (6).

Table 1
Students' beliefs about environmentally information seeking behaviour

Items	Factor loading	Item-Total Correlation	Mean	SD
1. I can seek out information about environmental issues for my personal life.	0.76	0.63	2.30	1.03
2. I can obtain information about environmental issues from books.	0.83	0.72	2.17	1.03
3. I can receive information about environmental issues from news papers.	0.75	0.62	2.35	1.22
4. I can obtain information about environmental issues from electronic media TV.	0.65	0.52	1.98	1.03
5. I can obtain information about environmental issues from teachers.	0.77	0.66	2.28	1.09
6. I can seek out information about the conservation of natural resources [water, energy and gas] from environmental conservation documentaries.	0.79	0.68	2.16	1.29

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Second Subscale: Students' beliefs about responsible behaviour towards environment

A factor analysis of the identified eight items making up this scale was confirmed as a single factor accounting for 43.9% of the total item variance. The items and their factor loadings appear in table 2. A scale made by totalling the scores on each of the eight items has a high Cronbach Alpha reliability of 0.82 (N=128).

This factor expresses students' beliefs regarding *responsible behaviour towards environment*, for example; "I can participate in community activities to improve the environment", "I can help people to clean environment," and "I can reduce waste material and dispose of garbage properly."

The factor validates the choice of items purported to measure *environmentally responsible behaviour* derived from the international literature. All items have high loadings above 0.5 which indicates the good validity of the scale, especially items (5) and (8).

Table 2
Students' beliefs about environmentally responsible behavior

Items	Factor loading	Item-Total Correlation	Mean	SD
1. I can participate in community activities to improve the environment.	0.67	0.54	2.78	1.16
2. I can help the people to keep their environment clean.	0.67	0.54	2.14	1.14
3. I can often dispose of garbage properly.	0.59	0.47	2.18	1.19
4. I can reuse waste material like jars, containers etc.	0.70	0.58	2.40	1.22
5. I can sell or donate goods such as clothing instead of throwing them out.	0.74	0.65	2.19	1.29
6. I can buy recyclable products and recycle them again	0.64	0.51	2.78	1.15
7. I can help students in my campus to dump garbage or waste material on a proper place	0.53	0.41	2.21	1.15
8. I can make an effort to reduce waste in my campus.	0.72	0.60	2.72	1.28

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The researchers distributed the questionnaires to prospective teachers during the last semester of their degree program. They were given a full class period, approximately 60 min, to complete the task. Close and open ended questions were supplemented with demographic information such as, gender, age and discipline.

Open-ended items

Three questions in the survey allowed participants to describe the worst environmental problems, the most significant feature of the environment, and the type of community activities they are currently involved in.

The worst environmental problems, according to these participants, were: air pollution, water pollution, land pollution, population, endangered species, poverty, climate change, water quality and desertification. Likewise students highlighted the following significant features of environment i.e., plants, water, air, land. Prospective teachers also explained their involvement in community activities that included eradicating water pollution, growing plants and supporting proper waste management.

RESULTS

T-test and one-way ANOVA were used to interpret the results of the study. t-test was used to see the significant mean score difference between male and female prospective teachers' beliefs regarding information seeking behaviour and responsible behaviour towards environment subscales. One-way ANOVA was used to see the significant mean score difference among different disciplines of prospective teachers.

Table 3

Prospective teachers' beliefs on information seeking behaviour and responsible behaviour towards environment subscales by gender (128)

Beliefs	Male		Female		t-value
	Mean	SD	Mean	SD	
Information Seeking Behavior	14.50	5.51	11.73	4.10	3.26**
Responsible Behavior	20.76	6.73	17.79	5.49	2.68**

(**p < 0 .001)

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There is a significant mean score difference in prospective teachers' beliefs on two subscales scales: information seeking behaviour and responsible behaviour towards environment during their science teacher education programs. Male prospective teachers held significantly high mean scores on both subscales compared to female prospective teachers. It reflects male prospective teachers had more awareness and responsiveness toward environment.

Table 4
Prospective teachers' beliefs information seeking and responsible behaviour towards environment sub subscales by disciplines (N=128)

Beliefs about..	Math		Chemistry		Physics		F(2,125)	sig
	M	SD	Mean	SD	Mean	SD		
Information Seeking Behavior	12.45ab	4.40	12.08ac	4.47	15.08a	5.77	4.881**	.001
Responsible Behavior	19.25	5.45	19.21	5.30	19.80	7.91	.118	.88

Note: means carrying same subscript are statistically significant

There is a significant mean score difference in prospective teachers' beliefs on information seeking behaviour towards environment subscale among different disciplines. Prospective teachers enrolled in Physics discipline had significantly high mean scores on information seeking behaviour towards environment subscale as compare to prospective teachers enrolled in Mathematics and Chemistry disciplines. On the other side, there is no significant mean scores difference in prospective teachers' beliefs on responsible behaviour towards environment subscale among different disciplines.

Open ended responses

Prospective teachers described the following environmental problems they considered most important: air pollution 22.70%, water pollution 18.80%, land pollution 16.40%, endangered species 14.80, desertification 7.80%, and population 7%, water quality 5.50% climate change 4.70% and poverty existence 2.30% in their environment. The largest portion of prospective teachers (nearly 23%) thought air pollution is a global environmental problem and declared it as the main environmental problem for human beings.

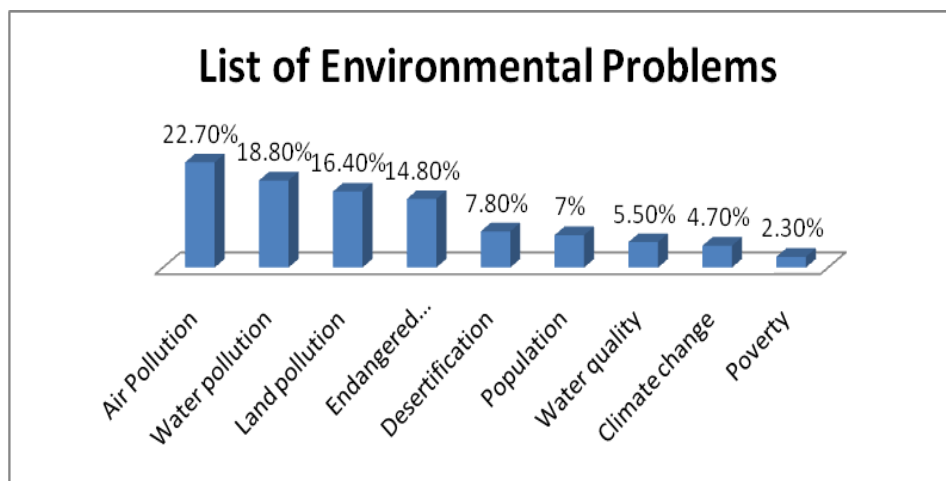


Figure 1: List of environmental problems reported by prospective teachers as important

According to prospective teachers' responses, plants, water and air are the dominant features of environment. They supposed that their environment is composed of plants 30.46%, water 13.28% and air 11.71%. The largest portion (45%) of prospective teachers believed that all these elements are dominant in their environment.

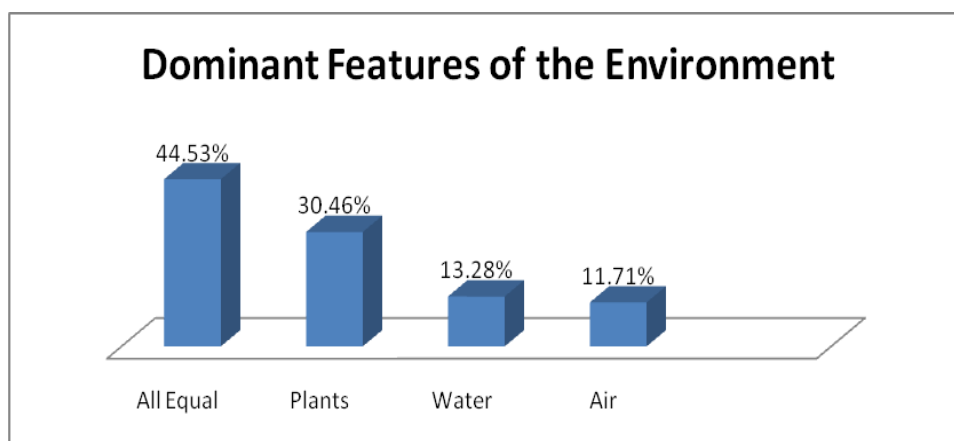


Figure 2: Dominant features of the environment as reported by prospective teachers

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Prospective teachers give information about their involvement in community activities like, growing plants 64.84%, supporting proper waste management 21.09% and eradicating water pollution 14.06%.

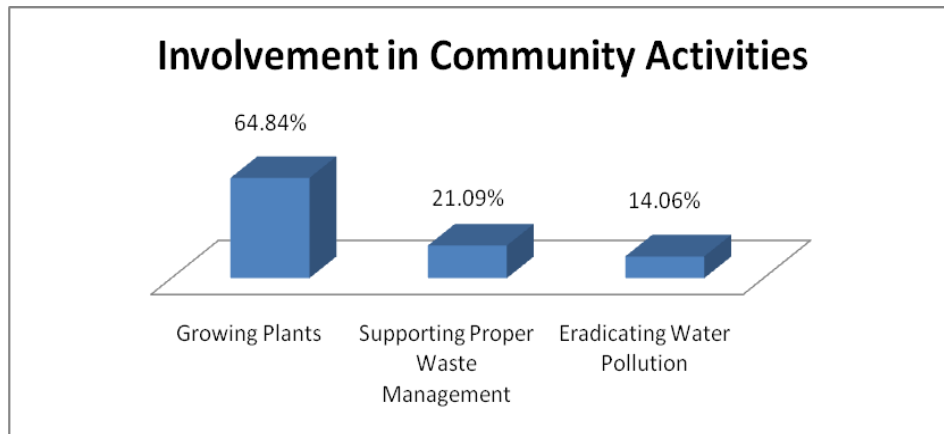


Figure 3: Prospective teacher's involvement in community activities

DISCUSSION

This study assessed the prospective teachers' beliefs regarding information seeking responsible behaviour towards environment. Results showed that male prospective teachers had stronger beliefs about their ability to seek information about environment than female prospective teachers. They get information about the conservation of natural resources (water, energy, gas) from environmental documentaries. Similarly male prospective teachers are more responsive towards environment than female prospective teachers.

Male prospective teachers may participate more in keeping their campus environment clean. They had stronger beliefs about recycling products and knowledge about the methods of dumping trash. As Fliegenschnee and Schelakovsky (1998) and Lehmann (1999) stated, females tend to have less extensive knowledge about environmental issues than males. Females may have a stronger emotional connection and fewer beliefs about technological solutions and showed more willingness for change. These results could also be due to male prospective teachers showing more confidence in their abilities and more likely to agree that their actions are meaningful. Survey documents are not likely to be

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able to discern which explanation is at work, suggesting follow-up interviews might be needed.

This study also investigated the prospective teachers' beliefs among different disciplines. Prospective teachers from physics discipline had stronger beliefs toward environmentally information seeking behavior than those prospective teachers who are enrolled in mathematics and chemistry. It may be assumed that prospective teachers from physics have more opportunities to participate in environmental activities like seminars or poster competitions in their discipline. Perhaps their interest in environmental issues led them to study physics and physical phenomenon. The authors observed that physics prospective teachers tend to take more interest in activities through environment of the campus and community in protecting and keeping it clean. Such an interest and awareness may contribute to greater knowledge and beliefs about their abilities (Kollmuss & Agyeman, 2002).

Environmental education is an aspect of quality education (Hua, 2004). Citizens with responsible behaviour towards environment actively participate in community activities to solve the environmental problems. When prospective teachers were asked about the worst environmental problems they described air pollution, water pollution, land pollution, endangered species, desertification, population, water quality, climate change and poverty. They believed air pollution is the biggest problem faced by them. They described plants, water, and air as the significant, equally important and dominant elements of our earth. Some students gave special importance to plants and explained the reasons of their subsequent value. They said plants are the natural resources which provide oxygen, keep the environment clean and reduce air pollution. Some students believed that "plants are the heart of environment".

Prospective teachers may assume that plants are the natural resources which provide oxygen, keep the environment clean and reduce air pollution. Some students believed that plants are the heart of environment. Some of the prospective teachers believe that they involve in community activities like growing plants, supporting waste management and eradicating water pollution. Prospective teachers illustrate their role in improving their local environment and explained the following ways through which environment can be improved:

- Environmental awareness raising campaigns for disseminating knowledge about the protection of environment

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- Developing environmentally responsible behaviour among students at all levels and takes up the responsibility to protect the environment
- Devising proper sanitary system for maintaining the good living standard of community
- Developing the habit of placing the waste material properly in bins, managing trash bins according to the nature of liter (food scraper, aluminum, plastic, and paper)
- Growing more plants and participating in plantation campaigns for keeping the environment green

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